MANUAL
OF
QUALITY CONTROL

FOOD CORPORATION OF INDIA
NEW DELHI
# CONTENTS

## INTRODUCTION

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INTRODUCTION

1-(1) Foodgrains are biological material. Some of them are live while being handled. These, therefore, have an inherent quality which is subject to changes on account of the environment and the handling practices. Any quality change may mean either loss in food-value, money-value or weight, together or separately. The organisation handling foodgrains, therefore, has to aim at maintaining quality at the same level at which the foodgrain is received. This, though difficult, is possible through a strict Quality Control on the foodgrain right at the point of receipt and during movement, storage and distribution.

1-(2) **Role of FCI:** The Food Corporation of India (FCI), largest single agency handling Foodgrains in the country was setup in 1965 primarily to implement the Food Policy Objectives of:

(a) Price assurance to farmers,

(b) Supply of foodgrains at reasonable prices to consumers, particularly low-income-group; and

(c) Build optimum buffer and operational stocks.

Over the last 25 years, the FCI has been successful in implementing the Food Policy Objectives—starting with modest efforts, the Corporation has grown to handle about 20 Million Tonnes of procurement, over 22 Million tonnes of issues annually and had built record stock level of about 29 Million Tonnes by mid-1985— with over 8000 purchase centres in the Country, effective market and price assurance has been provided to farmers and helped in achieving higher production growth rates in Wheat and Rice—Wide coverage of PQS through 3,50,000 FPS and regular and adequate supplies of foodgrains throughout the Country makes available foodgrains at reasonable prices and helps in containing market prices. Adequate buffer stocks have provided food security from year to year fluctuations in production and availability.

1-(3) **Quality Control in FCI:** Main functions of FCI include procurement, transportation, storage, preservation and distribution—Quality Control function is important in all these disciplines—objectives of the quality control function are:

(a) Development and adoption of standards and techniques to facilitate loss free transactions at various stages;

(b) ensure storage and preservation; to result in least loss.
(c) Provide quality assurance to consumers

(d) Upgradation of technology through research and liaison with National as well as International Agencies.

1-(4) Recent Developments: A number of important developments have taken place in the last decade which have influenced the magnitude of operations and the complexity of functions in the Corporation.

Important developments are:

(i) Procurement of indigenous foodgrains has now assumed a dominant proportion compared to imported foodgrains.

(ii) It was possible to build total stocks of about 29 million tonnes by mid 1985. The challenges of maintaining such record level stocks for long duration was met and the experience gained will be helpful in future.

(iii) With self-sufficiency in production and easy availability of foodgrains in the open market at reasonable prices, consumer expectations of quality has risen.

(iv) In view of the magnitude of storage and transit shortages, the Corporation has taken up an action plan of various measures for containing losses and the quality control function has an important role to play in these efforts.


(vi) In bumper year grain is exported.

In the light of these important and basic developments combined with new legislation and revisions in organisation handling food grains on a National basis has assumed an added significance.

-(5) Quality is a relative term and can have different meaning in varying situations. Where food grains are handled, three agencies get involved from quality angle. These are the producer, the processor and the consumer. All these have different criteria for quality assessment. The producer takes a simple view in this respect and wants whatever is produced to be accepted as of best quality and paid the highest price. The processor is capable of manipulating quality. He seeks to receive maximum price through these manipulations. The consumer has different notions of quality keeping in mind purity and end use of the grain. Added to these different views on quality are the changes taking place in agricultural practices with stress on yield, processing mechanism with emphasis on economy and out turn and end use from the angle of nutrition and cooking patterns. Complete satisfaction of agencies holding divergent views as these, is a difficult task. Age-old practice of judging quality is to examine appearance and feel of the grain. When trade is carried out on small scale and for limited area this subjective criteria for judgement of quality satisfies the seller and the buyer. On a large national scale, as is the case with the F.C.I., however, objective standards that are capable of yielding identical results, in any situation, become necessary.
1-(6) Through efforts such standards have been developed and are in use in the country for the last few years. The manual describes these standards and operations relating to these. A question asked in this connection is, how these standards compare with standards of other countries and particularly developed countries. In this connection it need to be explained that quality standard is related to methods of production handling and end use. As these vary from country to country, standard of quality also has to vary: Efforts to develop an International standard for each grain has not succeeded on this account and is not likely to succeed in the near future. Efforts to have uniform definitions and methods of analysis of quality have also met partial success on this account. Basic concept namely, purity and health of the grain is, however, common in all standards. Main objective in quality control for food grains, therefore, is to maintain purity and health of the grain.

1-(7) Looking to the history of quality control in India in this field, it is seen that standards and standard techniques developed and adopted in the country over last few decades are largely acceptable to producers and the consumers. Standards for grains, otherwise known as specification, is revised each year keeping in mind the conditions prevailing and this satisfies the requirement of the producers. In countries exporting grain, export specification is not generally changed but for internal requirements changes could be allowed. As a result of stability achieved in the field of quality assessment and resultant developments in grain handling, many countries do not allow mentioning of crop year in the statement of quality. In India too technical development in this direction may become possible in the near future. Other developments will have to await changes in the pattern of consumption.

1-(8) In view of many sided importance of quality of the grain to be handled the corporation has set-up a Wing of technically qualified personnel, within itself, to look after quality aspects of foodgrains handled by it. What constitutes quality and procedure for assessment of quality from the time grain is received to the time it is distributed has been finalised in the light of technological developments and experience gained during last few decades in the field. Steps to be taken by the Management under various circumstances are developed in consultation with technical experts. Facilities required in this connection are provided. The revised manual describes in detail the procedure to be followed and contains prevailing instructions to be adopted, at various stages of food grain handling, by the quality control personnel in the Food Corporation of India. Facilities needed and made available are listed. Some general information on latest developments is given. It needs to be added that in the handling of this biological material success or failure of the attempt will largely depend upon tact and skill with which attempt is made by using information and procedures given in the Manual.

1-(9) Outline of the Manual: The sequential flow of various functions form the basis in organising chapters on the Manual. Broad arrangement of the Manual is to cover the Basic/common aspect like Organisation, sampling procedure etc., Procurement/purchase function; storage and preservation function; Sales/Despatches and other functional areas like damaged foodgrains, etc. These parts are followed by coarse grains, technological developments, sugar and fertilisers. Definitions for reference is the final part.
CHAPTER 1

QUALITY CONTROL ORGANISATION

1.1 In the operations of the corporation, Quality Control is one of the functions. Procurement, Import, Transportation, Storage and Distribution of foodgrains with ease, economy and least loss being the main objective, necessary quality control for each operation assumes importance. The Corporation has a separate Wing manned by technically qualified hands, at all levels of operations, for implementing necessary tasks in this connection. Tasks in this connection are:

a) Development of standards and procedures needed for different transactions at various stages.

b) Ensure damage free handling and storage.

c) Meet quality requirements of producers and consumers.

d) Upgrade Technology in tune with developments in and out of the country.

1.2 The Organisation of the Wing Comprises:

Head Quarters

Manpower.— Manager (Q.C.), Jt. Manager (Q.C.), Dy. Manager (Q.C), supporting staff and a Laboratory for chemical & physical analysis.

Functions:— General policy decisions, Directions, Guidance, Supervision, Purchase of material, R & D., Liaison with Govt. and technical institutes and bodies.

Zonal Offices (5)

Manpower.— Jt. Manager (Q.C.), Dy. Manager (Q.C.), supporting hands and a Laboratory.

Functions:— Supervision, Co-ordination, Guidance, Purchase of equipment and Pesticides, etc.

Regional Offices (24)

Manpower:— Jt. Manager (Q.C), Dy. Manager (Q.C.) Assistant Manager (Q.C), Supporting hands and a Laboratory.

Functions:— Co-ordination, Analysis, Reanalysis, purchase and Completion of Technical Returns For H.Q. at required frequency.
District Offices (153)

**Manpower:** Dy. Manager (Q.C), Asstt. Manager (Q.C), Technical Assistants, supporting staff and a laboratory.

**Functions:** Control, Supervision, Coordination, Analysis, Reanalysis etc.

  Field units (Over 1400 and variable depending on needs)

**Manpower:** Assistant Manager (Q.C), and/or Technical Assistant/s.

**Functions:** All the basic operations as procurement, inspection, analysis, preservation, categorisation, quality complaints, issues, etc.

1.3 At the Head Quarters, Manager (Q.C), handles all policy matters relating to Quality Control and maintains a technical control on field and laboratory operations. Instructions on procedures to be followed and periodical information to be furnished are issued from here. Information received from various operational points is compiled at regular intervals for keeping watch on operations and for keeping Management informed about technical problems arising and the condition of grain in storage. An over-all watch is maintained on damages in storage and arrangement for disposal of damaged grain. Revision of technical instructions in operation is undertaken as necessary. Supply position of pesticides and required equipment is watched and special steps taken as necessary for securing them or moving them from one zone to other. A liaison is maintained with various related Institutes, Research organisations, and Ministries of the Govt. As and when required advice and suggestions are made in connection with Quality specifications to be adopted in the country, for grain to be procured locally, and from abroad as well as for export.

1.4 Zonal, Regional and District levels keep a watch on Q.C. operations, coordinate activities in their respective areas and ensure timely submission of necessary information to the Head Quarters. These offices draw out plans of requirements for pesticides and equipment and ensure that supplies reach operational points in time. District and Regional offices draw out plans for procurement/purchase and storage of grain and connected requirements, at the beginning of each season. At Zonal level these are coordinated and supervised. Analysis reports from the laboratories are acted upon and a watch is kept on proper functioning of the laboratories. Quality Appeals are dealt with at District/Regional Laboratories. Disposal of damaged grain is arranged and expedited as and when necessary. Q.C. Officers of these offices advise Zonal, Regional and District Managers on Quality aspects on the basis of existing instructions from the Head Quarters and seek advice from the Head Quarters if necessary.

1.5 **Technical Review:** Information is furnished every month relating to Q.C. by the Regions to the Head Quarters in various proformae. These proformae are given at Appendix IA-I. This information enables keeping a watch on the quality of grains at each stage of handling. In addition, senior Technical Officers carry out checks known as squad Inspections. Each depot is checked once in 3 months and stocks under CAP once in 15 days during monsoon months and for such squad inspections, Proforma for S.I. is at
1.6 Training: Training is arranged for staff of various levels from time to time at the Central Training Institute in Delhi or in the Zones. Some of the training is in the form of refresher courses. In addition, officers of the Wing attend and participate in technical seminars and meetings at national and international levels. Where necessary, the Corporation is represented by the Q.C. Officers in bodies like the Bureau of Indian Standards.
Proformae in which information is to be sent by each of the Region to the Head Quarters, addressed to
the Manager (Q.C.) are given below. This information is to be sent in respective proforma at intervals
and with such additional information and a certificate as given below:—

(i) **Proforma-I** :- Quarterly Statement showing storage capacity position agencywise to be sent every
3 months with technical review for the months of March, June, September and December.
Statement in the proforma to be sent so as to reach H.Q. by 10th of the following month.

(ii) **Proforma-II** :- Monthly statement showing category-wise/variety-wise/commodity-wise/group/
designation and class-wise stock position of all foodgrains to be sent at the end of each month. A
certificate to the effect that all the stocks in all the storage units in the region, at the beginning of
the month have been covered by the fortnightly prophylactic treatment and that all the infested
stock earmarked for fumigation at the beginning of the month have been fumigated, will
accompany the statement. In case of shortfall/excess either, in prophylactic or curative treatment,
reasons will be clearly indicated. Certificate and reasons, where given will be added at the bottom
of the Proforma-II. Position of stocks in silo/bins will be shown in proforma II (A).

(iii) **Proforma-II(B)** :- Monthly statement showing stock position with CWC/SWCs at the end of each
month. Additional information to be furnished in the proforma is treatments given, sliding down
position, up-grading, if any, issues to RFMs, despatch of rice, wheat and paddy out of the region
from the CWC and SWC depots.

(iv) **Proforma-III** :- Statement (monthly) showing variety-wise opening balance, receipts, issues and
closing balance for the month. In the proforma category and class-wise position will be indicated
for opening/closing balance and issues. In the portion giving abstract, in case of issues of wheat,
it should be shown with reference to RFMs and PDSs when issues are made to RFMs. Despatches
indicated should include only those quantities that are sent outside the region, whenever, such
despatch outside the region is for export purpose same should be clearly indicated. In case of rice
also, apart from issues to PDS despatches outside the region for export are to be indicated
separately. In case of wheat, in addition to giving the category-wise position of wheat issued full
details of category-wise position of rain-affected wheat if issued, should be clearly indicated
along-with grade of rain affected wheat. A certificate will be also recorded that stocks despatched
from one point to other within and outside the region were pest-free and conformed to laid down
specifications.

(v) **Proforma-IV** :- Monthly statement showing age-wise position of stock. In this, in addition, stocks
of above 4 to 5 years and above 5 years will be indicated separately. An abstract of category and
commoditywise issues of more than 2 years old stocks will be shown as a footnote to the statement.

(vi) **Proforma-V** :- Monthly statement showing centrewise, commodity-wise, variety/group/designa-
tionwise 'C' and 'D' category stock position.
(vii) **Proforma-VI** :- Monthly statement showing districtwise/commoditywise stock position of damaged grain. A footnote to be added showing total commoditywise damaged grains lying with CWC/SWCs in the district indicating categorised and not categorised stocks separately.

(viii) **Proforma-VII** :- Monthly statement showing centre/commodity/categorywise stock of food grains stored in CAP.

(ix) **Proforma-VII(A)** :- Monthly statement showing centrewise salvaging of affected stock.

(x) **Proforma-VIII** :- Monthly statement showing position of chemicals in the region. In the certificate about use at prescribed rate, mention be made about excess dosage used if any, with relevant details. Inter-regional movement of the chemicals, if any, should not constitute issue and therefore, in the closing balance of the region will continue to be included as stock-in-hand in the region.

(xi) **Proforma-VIII-A** :- Monthly statement showing stock position of technical equipment (serviceable/repairable and unserviceable).

(xii) **Proforma-VIII-B** :- Monthly statement for polythene covers.

(xiii) **Proforma-IX** :- Monthly statement showing Q.C. staff in the region.

(xiv) **Proforma-X** :- Monthly statement showing Districtwise/Depotwise/categorywise position of imported grain indicating country of origin.

(xv) **Proforma-XI** :- Monthly statement giving issue position of imported wheat, originwise and categorywise.

(xvi) The RTR (Regional Technical Review) comprising above I to XI proformae complete in all respects and thoroughly checked shall be sent alongwith a covering letter signed by the Regional Heads so as to reach the H.Q. by 10th of the following month. Covering letter will contain alongwith relevant salient points following information :—

   (a) Action taken at regional level to remedy drawbacks in the maintenance of health in storage.

   (b) Specific steps taken to liquidate lower category grain, rain affected wheat and damaged food-grains.

   (c) Performance of CWC/SWC in respect of FCI stock.

   (d) Action taken to purchase chemicals, equipment, polythene covers to ensure a minimum of 3 months requirement at every depot level.

(xvii) A copy of the RTR will also be sent to the Zonal office. Zonal Office will ensure timely preparation and despatch of RTR. to H.Q. from the regions under their control.
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<th>Name of the District</th>
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<th>Pvt. Parties/ Others</th>
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**Grand Total:**

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Dy. Manager (QC)
For Regional Manager
CONSOLIDATED STATEMENT SHOWING CATEGORYWISE/COMMODITYWISE/VARIETY/GROUP/DESIGNATION/CLASSWISE STOCK POSITION OF ALL FOODGRAINS (INCLUDING STOCKS STORED WITH CWC/SWC/PVT. PARTIES ETC.) FOR THE MONTH ENDING..........................................................IN RESPECT OF......................................................REGION

<table>
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<th>Commodity</th>
<th>Variety/Group/ Designation</th>
<th>Category A B C D B/D Total</th>
<th>Classification Clear few heavy</th>
<th>Stocks Treated sprayed Malathion</th>
<th>DDVP</th>
<th>Pyrethrum</th>
<th>Total Al</th>
<th>EDB, M Br. Total Fumigated</th>
<th>Phosphide</th>
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<td>D in Case of wheat only.</td>
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<td>* B/D-Below 'D' Category</td>
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<tr>
<th>Paddy</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>Total</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>Total</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>Total</th>
<th>G. Total Clear, few, heavy)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**Sprayed/Fumigated</td>
</tr>
<tr>
<td>Fine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S. Fine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In case of stock of Paddy declared substandard/Unmillable, it may also be shown separately.

Dy. Manager (Q.C)
For R.M./S.R.M./J.M. (P.O.) O.S.D.
Information to be incorporated with proforma II and II-A

<table>
<thead>
<tr>
<th>Infested stock</th>
<th>Qty. fumigated w.r. ref (1)</th>
<th>Infested stocks received during the month</th>
<th>Qty. fumigated with ref. to (3)</th>
<th>Stocks found infested as a result of inspection during the month</th>
<th>Qty. fumigated wrt. (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
</tr>
</tbody>
</table>
PROFORMA-1

STATEMENT SHOWING CENTREWISE, CATEGORYWISE, COMMODITY/VARIETY/GROUP/DESIGNATION/CLASSWISE STOCKS POSITION OF ALL FOODGRAINS STORED IN SILO/BINS FOR THE MONTH OF ———- IN RESPECT OF ———- REGION.

Figures in M

<table>
<thead>
<tr>
<th>Name of the Centre/Distt.</th>
<th>Commodity/Variety/Group</th>
<th>Category</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A B C D B/D</td>
<td>Total</td>
</tr>
</tbody>
</table>

N.B. : For Paddy Designations details be given.
B/D-Below 'D' Category

Dy. Manager (Q.C)
for R.M./S.R.M./J.M.(P.O.)/O.S. D
PROFORMA-II (B)

STATEMENT SHOWING CENTRE, CATEGORY WISE, COMMODITY/VARIETY/GROUP/DESIGNATION/CLASSWISE STOCKS POSITION OF ALL FOODGRAINS STORED WITH CWC/SWC FOR THE MONTH OF ___________________ IN RESPECT OF ___________________ REGION.

(Figures in M.T.)

<table>
<thead>
<tr>
<th>Name of depot/Centre/Distt.</th>
<th>CWC/SWC</th>
<th>Commodity/Variety/Group</th>
<th>Category</th>
<th>Classification</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
</tbody>
</table>

N.B. Information for CWC and SWC be given in separate proforma numbered II (B) (i) and II (B) (ii)

N.B.: For paddy designations details be given.

* B/D-Below ‘D’ Category

Dy. Manager (QC)
For SRM/RM/JM(PO)/OSD
### PROFORMA III

**STATEMENT SHOWING DISTRICTWISE, COMMODITY/VARIETY/GROUP/DESIGNATIONWISE OPENING BALANCE. RECEIPT, ISSUES AND CLOSING BALANCE OF ALL FOODGRAINS FOR THE MONTH IN RESPECT OF REGION.**

Figures in M.T.

<table>
<thead>
<tr>
<th>Commodity/District</th>
<th>Opening Balance</th>
<th>Classification</th>
<th>Receipt</th>
<th>Classification</th>
<th>Issue</th>
<th>Classification</th>
<th>Sliding down</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Clear few Heavy</td>
<td>A B C D</td>
<td>B/D Total</td>
<td>Clear Few heavy</td>
<td>A B C D</td>
<td>B/D Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Upgradation</th>
<th>Closing balance</th>
<th>Classification</th>
<th>Reasons for downgradation</th>
<th>Commodity/Variety</th>
<th>Closing balance</th>
<th>Classification</th>
<th>Downgradation</th>
<th>Upgradation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower to Higher</td>
<td>A B C D B/D Total</td>
<td>Clear Few heavy</td>
<td>Gradation</td>
<td>Variety</td>
<td>A B C D B/D Total</td>
<td>Clear few Heavy</td>
<td>A-B-B-C-C-D Total</td>
<td>D-C C-B B-A Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Issue Agency</th>
<th>A B C D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>PDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RFMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EXPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Despatches</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td>PDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Export</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>despatches</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other Foodgrains</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Grand Total:**

N.B.: 1) For paddy designationwise details be given.
2) Certified that foodgrains despatched from one point to another within the Region as well as outer side region were pest free and confirmed to laid down specification.

Dy. Manager (QC)

For SRM/RM/JM (PO/OSD)

* B/D-Below 'D' Category
STATEMENT SHOWING DISTRICTWISE, AGewise/CATEGORY/COMMODITY/VARIETY/GROUP/DESIGNATIONWISE STOCKS POSITION OF ALL FOODGRAINS FOR THE MONTH ENDING IN RESPECT OF REGION

<table>
<thead>
<tr>
<th>Commodity Group-Variety/</th>
<th>District</th>
<th>Consumers Preference</th>
<th>Upto1 year Old</th>
<th>1 to2 Year Old</th>
<th>2-3 years Old</th>
<th>3-4 years Old</th>
<th>4-5 Years Old</th>
<th>Above 5 Years Old</th>
<th>G. Total</th>
</tr>
</thead>
</table>

Total (Commodity/Variety/Groupwise)

Grand total of all food grains

* In case of Paddy, categorywise and designationwise position be given
* B/D-Below 'D' Category in case where categorisation is based on percentage of weevilled grains.

Issue of category wise/commodity wise stock of more than 2 year old.

Commodity Category

Wheat
Rice
Others

Dy. Manager
For SRM/RM/JM(PO)/OSD
**PROFORMA**

STATEMENT SHOWING CENTREWISE, COMMODITY/VARIETY/GROUP/DESIGNATIONWISE POSITION OF ALL C AND D CATEGORY FOODGRAINS FOR THE MONTH OF ——— IN RESPECT OF ——— REGION (TO BE SENT TO HQRS. IN QUADRUPlicate)

<table>
<thead>
<tr>
<th>Name of the District/centre</th>
<th>Commodity/Variety/Group</th>
<th>Category</th>
<th>Total</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

Dy. Manager (QC)
For SRM/RM/JM(PO)
<table>
<thead>
<tr>
<th>Commodity</th>
<th>Name of Districts</th>
<th>Opening balance</th>
<th>Closing Balance</th>
<th>Foot Note: Total stock of commoditywise damaged foodgrains in CWCSWC in the Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td></td>
<td>Use</td>
<td>Feed</td>
<td></td>
</tr>
<tr>
<td>P.F.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ind.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dump.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

- Qty. covered by tender order.
- Qty. covered by release order.
- Qty. for which highest offers accepted but financial arrangement awaited.
- Total stock of damaged grains.

**Grand Total:**

For SRM/RM/JM (PO)

Dy. Manager (QC)
PROFORMA-VI(A)

STATEMENT SHOWING DISTRICTWISE/COMMODITYWISE STOCKS POSITION OF DAMAGED FOODGRAINS FOR THE MONTH OF ———— IN RESPECT OF ———— REGION

Where stocks exceed 200 Tonnes

(Figures in M.T.)

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Name of District</th>
<th>OPENING BALANCE</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>CLOSING BALANCE</th>
<th>C. F.</th>
<th>P. F.</th>
<th>Ind. Use.</th>
<th>Manure</th>
<th>Dump.</th>
<th>Un-Cat.</th>
<th>Total</th>
<th>Free stock of damaged grains.</th>
<th>**Qty. covered by tender</th>
<th>Qty. covered by release order</th>
<th>Qty. for which highest offers accepted but financial arrangements awaited.</th>
</tr>
</thead>
</table>

Dy. Manager (QC)
For SRM/RM/JM(PO)/OSD
**PROFORMA-VII**

STATEMENT SHOWING CENTREWISE/COMMODITY WISE STOCK POSITION OF FOODRTAINS STORED IN CAP FOR THE MONTH OF—

IN RESPECT OF—

REGION.

<table>
<thead>
<tr>
<th>Name of the Centre</th>
<th>Commodity</th>
<th>Upto 1 year</th>
<th>1 to 2 year old</th>
<th>2-3 year old</th>
<th>3-4 year old</th>
<th>above 4 years old</th>
<th>G. Total</th>
</tr>
</thead>
</table>

Certified that all the stacks totalling—Nos. representing the above quantities, have been effectively covered/lashed and also aerated from time to time.

* B/D-Below ‘D’ Category

Dy. Manager (QC),
For SRM/RM/JM(PO)/OSD
PROFORMA VII(A)

STATEMENT SHOWING THE CENTREWISE SALVAGING OF AFFECTED STOCKS FOR THE MONTH OF ______________________ (FOR THE SEASON ____________) STARTING FROM JUNE ONWARDS.

(Figures in M. T.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Condition of stocks</th>
<th>CAP</th>
<th>Covered</th>
<th>Total</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wheat</td>
<td>Rice</td>
<td>Paddy</td>
<td>Others</td>
</tr>
<tr>
<td>1.</td>
<td>Stocks affected</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Stocks salvaged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Stocks awaiting salvaging</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Stocks recovered as damaged (unfit for human consumption)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Reason for damages</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Target date for completion of salvaging.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dy. Manager (QC)
For SRM/RM/JM/(PO)/OSD
# PROFORM

**STATEMENT SHOWING THE STOCKS POSITION OF CHEMICALS/INSECTICIDES AND THEIR REQUIREMENT FOR THE MONTH IN RESPECT OF REGION.**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the chemicals</th>
<th>Opening balance</th>
<th>Receipt</th>
<th>Source of receipt</th>
<th>Consumption</th>
<th>Issue</th>
<th>To whom issued</th>
<th>Closing balance</th>
<th>Requir if any</th>
</tr>
</thead>
</table>

Certificate about the dosage adopted:

**Foot Note:** Indicate any short supply against Hqrs./Z.O./R.O. supply order, any urgent requirement and action taken at Regional level etc.

Dy. Manager
For SRM/RM/J/
## ANNEXURE - VIII-A

**STATEMENT SHOWING THE STOCK POSITION OF TECHNICAL EQUIPMENT (SERVICEABLE, REPAIRABLE AND UNSERVICEABLE) AND THEIR REQUIREMENTS FOR THE MONTH ENDING ——— IN RESPECT OF ——— REGION.**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the equipment</th>
<th>Opening balance</th>
<th>Receipt</th>
<th>Issue</th>
<th>Closing balance</th>
<th>Requirement</th>
</tr>
</thead>
</table>

---

**Footnote:** Indicate any short supply against Hqrs. /ZO/RO supply order, any urgent requirement and action taken at Regional level etc.

Dy. Manager (QC)
For SRM/RM/JM (PO)

Certified that all above mentioned equipments (including fumigation covers) are properly maintained and regularly being used.
<table>
<thead>
<tr>
<th>CAP storage capacity as on the last day of the month.</th>
<th>Actual stock under CAP storage with no. of stacks.</th>
<th>Opening balance of serviceable covers available as on 1st of the month</th>
<th>No. of new covers received during the month</th>
<th>Closing balance as on last day of the month</th>
</tr>
</thead>
<tbody>
<tr>
<td>For REGION.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For further stocks to be stored in open.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Breakup of covers shown under Col. 5**

(a) Less than 6 months old.
(b) More than 6 months old.
(c) More than one yr. old.

<table>
<thead>
<tr>
<th>Requirement of new covers during the next month with full justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of repairable covers available in the region on the last day of the month</td>
</tr>
<tr>
<td>No. of unserviceable covers available on the last day of the month</td>
</tr>
<tr>
<td>No. of unpacked/new-unused polythene covers available on the last day of the month</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Paddy</td>
<td>(a) Used</td>
<td>(a) Used</td>
<td>(b) Wheat</td>
<td>(b) new Unused</td>
<td>(n) New (unused)</td>
<td></td>
</tr>
</tbody>
</table>

**Action taken to repair the repairable covers and disposal of unserviceable covers**

Dy. Manager (QC)
for SRM/RM/JM(PO)
<table>
<thead>
<tr>
<th>Designation</th>
<th>As per Hqrs. sanction</th>
<th>Staff in position</th>
<th>Vacant/Surplus</th>
<th>Remarks indicating action taken to fill-up vacancies</th>
</tr>
</thead>
</table>

Dy. Manager (QC) for SRM/RM/JM(PO)
PROFORMA - X

STATEMENT SHOWING DISTRICTWISE/DEPOTWISE/CATEGORYWISE POSITION OF IMPORTED GRAIN FOR THE MONTH OF——-
IN RESPECT OF——-(REGION)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>District</th>
<th>Depot</th>
<th>Commodity and variety/class</th>
<th>Source of Origin</th>
<th>Quantity Held</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A   B   C   D</td>
<td>Total</td>
</tr>
</tbody>
</table>

Note: Districtwise sub-totals and grand total of each region be furnished, commodity-wise.

Dy. Manager (QC)
for SRM/RM/JM (PO)
## STATEMENT SHOWING ISSUES OF IMPORTED WHEAT ORIGINWISE AND CATEGORY WISE DURING THE MONTH OF ———— IN ———— (REGION.)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Variety of Imported wheat (Origin of Country.)</th>
<th>Issues made to</th>
<th>Category</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) PDS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Roller Flour Mills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Any others (specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dy. Manager (QC)
for SRM/RM/JM (PO)
APPENDIX - 1.A.2

SQUAD INSPECTION REPORT

1. Name and Designation of Inspection Officer:

2. Date of Inspection:

3. Depot Inspected: (Figures in MTs)

4. a) Storage capacity of the Depot; Covered
   Owned   Hired

   b) Commodity-wise/category-wise/classification-wise stocks held
      in the depot as per latest inspection by local QC Staff.

5. Strength of Q.C. Staff and adequacy thereof as per norms;
   Sanctioned
   In position
   AM(QC)
   Tech. Asstt. Gr. I
   Tech. Asstt. GR. II
   Tech. Asstt. GR. III
   Dusting Operators
   Total

6. Condition of godowns with specific reference to repairs, if any, to be carried out;

7. Type of dunnage in use—adequacy or otherwise;

8. Overall Hygienic condition in and around the depot. Improvement, if any required, suggestions of the Visiting Officers;

9. Condition of stocks held:
   (a) Whether stacks have been built neatly on proper dunnage and sufficient space provided for treatment/inspection etc. of stacks.
(b) Whether stocks are inspected/treated and up to date entries recorded on stack-cards periodically by QC staff attached to the Depot, if not why?

(c) Whether proper and timely fumigation & prophylactic treatments are given, if not why and action taken by the Inspection Officer to ensure this;

10. Condition of stocks held in CAPs at the time of Inspection:

(a) General condition of stacking with special reference to dome formation. Hygienic condition around the complex/drainage system;

(b) Whether periodical inspection and regular treatments of stocks ensured and whether stack-card entries on QC aspects are complete and correct?

(c) Whether all stacks properly covered with polythene covers and nets. Whether properly lashed as per instructions in vogue, if not, steps taken by the inspecting Officer in this regard to ensure proper protection of stacks?

(d) Availability of polythene covers, adequacy or otherwise, total covers available—serviceable/unserviceable, steps taken to repair the covers etc.

(e) Whether proper aeration on clear weather days is given to ensure health of stocks and maintenance of record thereof?

11. Condition of stocks freshly received from procurement centres/mills after custom milling/levy or for export purposes:

(a) Commodity/variety/quantity of stocks
received in the depot and source/date of receipt.

(b) Whether the quality of stocks is in conformity with the uniform specifications of Govt. of India, if not, in what respect?

(c) Whether complaints on quality of such stocks received have been lodged as per procedure and the progress thereon?

12. Test check statement on classification/categorisation/uniform specification in respect of stocks under item 9, 10 and 11 above to be attached. 10% stocks to be checked at smaller depots and at least 5% in the big depots, say more than 25,000 tonnes.

13. Whether receipt points are supervised by QC staff and quality of stocks at the time of receipt assessed and recorded properly? whether receipt register is maintained?

14. Whether priority list for issues from the depot is being drawn up periodically and handed over to the Depot Officer for enforcement, and a watch is kept to see that the issues are in conformity with the same priority list?

15. Whether issue points are attended to by depot QC staff to see that only good quality stocks conforming to PFA and acceptable to the purchaser are issued?

16. Total quantity of damaged foodgrains commoditywise, declared unfit for human consumption available in the depot as on date of inspection. Their categorisation and progress of disposal. Action taken for categorising uncategorised damaged stocks. (CAP damages to be shown separately with progress of salvaging etc.)
17. Stock position of Insecticides and technical equipments. Their adequacy or otherwise. Action taken to replenish stocks, whenever required.

18. Special comments on the day-to-day utilisation of technical equipments such as Moisture meters, fumigation covers, polythene covers, sprayers, cleaners and driers etc. whether any of them is surplus to the actual requirements, and is/are sparaime ?

19. Comments on the maintenance of QC registers and records. Any improvement suggested for the benefit of local QC staff.

20. Special problems, if any, noticed or brought to the notice of the inspecting Officer by local QC Staff. If so, action taken to overcome such difficulties in consultation with the Depot Officer.

21. Overall general impression of the inspecting Officer on the QC activities of the depot. Points on which improvements required and Regional Office/Zonal Office/Headquarters intervention required to tackle these problems.

22. Date of last Inspection of this depot and the general improvements noticed on Q.C. aspects.

23. Miscellaneous

The visiting officer is required to mention here the gist of instructions given/recorded by him in the depot's Inspection Register for compliance.

Signature of Inspecting Officer
With Designation

28
CHAPTER - 2

SAMPLING PROCEDURES

2.1 Drawing of representative sample is an important and essential part of quality assessment of grain at various stages. If the sample obtained is not representative, no amount of care in further analysis will establish true quality of grain. An approved standard procedure, therefore needs to be strictly followed. The Bureau of Indian Standards has developed a Standard for sampling of food grains. These National Standards are accepted as a base for sampling procedure to be followed in the operations of the Corporation. These Standards BIS 2814-1978 and BIS 3714-1978 are given at Appendix 2-A-1. Sample slip to be used is at Appendix 2-A-2.

2.2 Sampling of grain during open market / price support purchases. In view of large magnitude involved in the purchases to be made in the produce Markets, it is of paramount importance that the pricing is correctly done in relation to the specifications in force. The aim, in this direction, should be to sample and check maximum number of lots for purchase in the Market. If due to volume of work, each lot cannot be sampled, the sampling shall be done on the scale shown below (2.3) and samples sent to the District Laboratory for analysis and check. In such cases price paid for the lot sampled shall be indicated on the sample slip.

2.3 Scale of sampling in Produce markets when each lot purchased cannot be sampled on account of magnitude of purchase to be made —

<table>
<thead>
<tr>
<th>Number of lots Purchased</th>
<th>Number of samples to be drawn and sent to District Laboratory</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upto 100</td>
<td>Four samples with a minimum of one sample from each grade or variety purchased.</td>
<td>It may be ensured that samples for different lots drawn on the basis of heaps purchased in a Mandi are not less than the number indicated.</td>
</tr>
<tr>
<td>100 to 199</td>
<td>Seven samples with a minimum of one sample from each grade or variety purchased.</td>
<td></td>
</tr>
<tr>
<td>200 to 399</td>
<td>Ten samples with a minimum of 2 samples from each grade or variety purchased.</td>
<td></td>
</tr>
<tr>
<td>400 and above</td>
<td>Twelve samples with a minimum of 3 samples from each grade or variety purchased.</td>
<td></td>
</tr>
</tbody>
</table>
For purchases made in the produce Markets the Inspector will maintain a complete record of lot wise bidding and gradation and send samples of lots purchased in accordance with above sampling scheme. Proper gradation, pricing and sampling in the Markets will be ensured by the Senior Officers through frequent surprise checks.

2.4 District and Regional Laboratories will certify pricing and gradation/classification done in the markets through analysis of samples received and corrective steps, if any needed, will be intimated to concerned Inspector within 3 days of the receipt of the sample in the District/Regional Laboratory. In case of purchases in Produce Markets, moisture determination, for pricing, will be done in the market. In case of purchases from rice mills, agents and State Govts. sampling will be done according to standard procedure at the point of receipt of grain namely, Railway Station or godown, and sample sent to the Laboratory with all required particulars. Price in these cases will be determined on the basis of analysis in the Laboratory. A preliminary examination will, however be done at the sampling point to see if the lot is of acceptable quality. In case it is generally found to be of not acceptable quality, it should be allowed to be improved so as to conform to requirements. If this decision is disputed, sample drawn as per standard procedure will be referred to the Laboratory for a decision. Moisture content is determined at the sampling point. A separate sample for moisture is not to be, therefore included in the composite sample. In such cases moisture content determined will be mentioned on the sample slip.

A preliminary inspection may be carried out by the inspector, of the stock offered by the State Govt., Rice miller and Agent to know general condition and wholesomeness of the grain offered in their storage. Final sampling and acceptance of such stock will, however, be only at the point of receipt of the grain namely at the Railway Station or at the godown of the corporation. The Inspector will ask for improvement of the stock at the railway station or godown at the time of final sampling, when same is not found to be conforming to specification. It is mandatory on the agency to offer stocks conforming to quality specifications. Sample shall be drawn by the inspector from 10% of the bags selected by him at random. Such of these bags from which sample is drawn will be stencilled with the word ‘S’.

The bags selected at random for 10% weightage should be marked ‘W’. Samples sent to the Laboratory for analysis and determination of price shall carry seal of the Inspector (such seals will be provided to the Quality Inspectors - ref. equipment to be provided to the Technical Inspector—Appendix 3-A-4 (page 49). Laboratories will check the seal at the time of receipt of sample and undertake analysis after ascertaining that the seal is intact. In case of custom milled rice 4 samples will be prepared. One will be given to the miller, 2 sent to the laboratory and one retained at the receipt point.

2.5 Sampling at storage depots —

For drawing samples at storage depots standard method given at Appendix 2.A/1 will be followed. At the time of receipt, a representative sample of not less than 500 gms. shall be drawn from each wagon/lorry load. The sample shall be examined for general condition of grain received and the grain classified categorised on that basis according to existing instructions and required treatments arranged to be given. In drawing samples of stored grain, care shall be taken to select the bags in different positions and different layers in the stock. Invariably sample should be drawn from all four sides of the stack, from bottom to the top diagonally and also in the form of ‘X’ from the top layer. It is necessary to ensure that at least 10% of the bags from the periphery of the stack are included in the collective sample weighing
approximately 500 gms. Sample shall also be drawn, once a quarter, from the third or fourth layer on
the top by lifting the upper bags.

2.6 **The Laboratory** — When examination in a Laboratory is considered necessary, sample will be sent to
the laboratory and all particulars will be mentioned on a sample slip and enclosed with the sample. A
standard sample slip is shown at Appendix 2. A-2.

2.7 **Coding and decoding of samples** —

Following procedure is followed where coding/decoding is done :

i) The District/Regional Manager will nominate a Coding Officer not below the rank of an Assistant
Manager. The coding Officer shall be other than the Officer I/c of the Laboratory.

ii) All the samples received by the Coding officer shall be entered in to a register and each sample
given a code number.

iii) After giving the code number and checking the seal, the coding Officer shall open one of the two
samples received for analysis. The sample slip from the opened sample shall be removed and
retained by the Coding Officer. The sample opened for analysis shall be passed on to the laboratory
with no other marking except the code number and the classification of the stock in which it was
purchased.

iv) The laboratory shall prepare the analysis report giving only the code number.

2.8 **Sampling for export** — Procedure given in the Bureau of Indian standard as at App. 2-A-1, will be
followed unless otherwise laid down in the contract.

2.9 **Preservation and disposal of samples** :

i) The samples received in the district/regional laboratory for analysis shall be retained and
preserved in glass jars or polythene bags for future reference and for checking the quality of each
consignment in the event of complaint from recipients. The glass jar/bags be suitably numbered,
labelled and registers relating to these be maintained segment wise for reference. The samples shall
be suitably fumigated to preserve the condition of the grain, as and when required.

ii) Samples received in the District and Regional laboratories shall be disposed of when no longer
required. Regarding samples pertaining to purchase operations from rice mills and custom mills,
out of the two samples received in the laboratory, the sample which is opened and analysed for
the purpose of payment, has to be preserved for a period of six weeks from the date of analysis and
then disposed of. The second sealed sample shall be preserved for a period of three months and
disposed of provided no complaint is received from the recipients in respect of this lot. The
samples for which any complaints are received shall be kept till finalisation of the complaint.
iii) The grain in the sample when no longer required in the laboratory shall be bagged according to variety and condition and transported to the nearest corporation Depots, with a forwarding letter indicating categorisation of the grain for disposal. This grain shall be weighed on receipt at the depot and taken on the ledger and issued/disposed in accordance with disposal instructions.

iv) Shipment samples, received with consignments from abroad shall be disposed of on receipt, in the normal manner as grain is disposed of. Samples of Mandi purchase operations will also be disposed of after analysis, in the normal manner.

2.10 Reference type samples —

Each Laboratory will maintain type samples for reference purposes in glass jars/polythene bags. These samples shall be as genuine as possible and will be properly maintained. As far as possible, these will be renewed each year from the fresh crop.

2.11 Though sampled grain may be disposed of, sample slips will be retained and destroyed only with orders from competent authority.
STANDARD METHOD FOR SAMPLING OF CEREALS AND PULSES
(Ref. IS. 2814-1964)

1 METHOD OF SAMPLING:

1.1 Foodgrains in Bags.

1.1.1 Sampling in Warehouse - Sampling of a lot in the warehouse shall be generally at the time the lot is being moved out. The scale of sampling shall be as given in Table - I

Table- I: Scale of Sampling

<table>
<thead>
<tr>
<th>Number of bags in the lot</th>
<th>Number of bags in the sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 30</td>
<td>All bags to be sampled</td>
</tr>
<tr>
<td>31 to 300</td>
<td>30</td>
</tr>
<tr>
<td>301 to 1000</td>
<td>50</td>
</tr>
<tr>
<td>1001 to 2000</td>
<td>100</td>
</tr>
<tr>
<td>2001 and above</td>
<td>5 per cent</td>
</tr>
</tbody>
</table>

Selection of bags for sampling according to the above scale shall be done at random and shall cover bags from various positions of the stack. For this purpose some random number table or any other method of random sampling shall be used. In the absence of any agreement the following procedure shall be adopted.

Starting from any container, count all the containers in one order as 1, 2, 3, —upto r and so on. Every rth container so counted shall be withdrawn to give a sample for the rest.

Where: \[ r = \frac{N}{n} \]

N being the number of containers in the lot, and n the number of containers to be chosen. If comes out to be a fraction number its value shall be taken as equal to the integral part of it.

1.1.1.2 Procedure of primary samples—The slotted tube sample (See IS : 2815-1964) shall be inserted diagonally in about one third of the bags to be sampled, lengthwise in another one-third, and widthwise in the remaining one-third. Each bag shall be sampled only once.

The sampler shall be inserted in the bag in the ‘closed position’ with slotted part facing downwards. This is absolutely necessary to draw a sample representative of the bag. When the sampler has been inserted
to the desired position it shall be turned to bring the slotted part to face upwards and brought to 'open position'. Gentle turning fills the opened slots with grain. It shall be taken to be brought to the 'closed position', turned to bring the slotted part face downwards and then taken out of the bags keeping it horizontal so as not to allow the sample taken to get mixed up.

When a PARKHI (See IS : 2816-1964) is used for sampling, it shall be inserted in the bag in a diagonal position and the sample collected at the other end by gentle turning. In case of sampling by PARKHI, if the buyer desires, he shall have the option to open at the seams and sample 10 percent of the bags to make the composite sample. The samplers need to be handled carefully till the samples are taken out. Samples shall be spread on a clean piece of paper or wooden plank or suitable receptacle ensuring that samples from different bags do not get mixed till a visual examination on these samples is complete. In the visual examination, if samples drawn from different positions are found to be homogeneous in quality, they may be allowed to go in the composite sample. In case different qualities of grain are found filled in any one bag, sampling shall be done on the bags (100 per cent) and the bags having different qualities shall be rejected.

1.1.2 Sampling Bagged Grain in Transit - A consignment in transit may be suitably divided into convenient lots. Each lot shall be then sampled according to the scale (as in Table-1). When sampling is done at the unloading end, precautions shall be taken to select bags for sampling from each vehicle load. The procedure of sampling to be followed from the bags selected for the purpose shall be the same as given in 1.1.1.2.

1.1.2.1 The scale of sampling for foodgrains in bulk shall be as given in Table - II.

Spots shall be selected for sampling at various depths and in case the pre arranged depth cannot be reached, samples shall be drawn while the grain is being moved out. As far as possible selection of spots for sampling may be done at random.

**Table-2 : Scale of sampling for Foodgrains in Bulk.**

<table>
<thead>
<tr>
<th>Quantity of consignment</th>
<th>Number of Spots from which samples to be drawn.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 300 tonnes</td>
<td>30 spots</td>
</tr>
<tr>
<td>301 to 1000 tonnes</td>
<td>50 spots</td>
</tr>
<tr>
<td>1001 tonnes and above</td>
<td>100 spots</td>
</tr>
</tbody>
</table>

1.1.2.2 Procedure for sampling—Sampling of a bulk shall be done either with a thermo-sampler or a deep bin probe. When a thermo-sampler is used the instrument shall be pushed to the desired depth, given an upward jerk, allowed about a minute to fill-up, the temperature recorded and then the sampler pulled out. Wherever the record of temperature of the bulk is considered necessary temperature shall be observed as soon as the sampler is taken out and then the grain poured out on a clean piece of paper or wooden plank or other suitable receptacle. The deep bin probes can be used only to a depth of 1.5 meters.
They could be, therefore, employed only when the grain is being moved out. These shall be inserted at an angle in a closed position and opened when the desired depth is reached. The tube shall then be opened for about half a minute allowed to collect the sample and pulled out after being closed. The sample shall be emptied completely on a clean piece of paper, wooden plank etc. as described above.

when sampling takes place while the product is in motion sample shall be drawn with either a scoop or a pelican type sampler at timely intervals depending on the rate of flow.

1.2 Preparation of Composite Samples.

1.2.1 All the primary samples drawn from the same lot shall be thoroughly mixed and blended to constitute a homogeneous composite sample to represent the lot in respect of quality. If the composite sample is less than 2 kgs. 500 g, suitable number of primary samples shall be added so that the composite sample is at least 2 kgs. 500 gms.

1.2.2 Preparation of Final Sample and Samples for Moisture Determination.

The composite sample shall be divided into three final samples and three samples for moisture determination. Each final sample shall comprise about 500 g and each sample for determination of moisture about 150 g. The final sample shall be enclosed in a cloth bag conforming to the details given in Appendix-‘A’. The moisture sample which shall be first placed in a polyethylene bag conforming to the details given in Appendix ‘E’ and the polyethylene bag shall then be heat-sealed and placed in a close-fitting cloth bag.

A sample slip as at App. III. A.2 shall then be inserted in the cloth bag and the bag closed and sealed to prevent loosening or tampering. These sample bags so prepared from the composite sample shall be distributed as one each to the buyer and the seller and one for reference purpose.
APPENDIX- 2.A.2

SAMPLE SLIP

(a) Date and place of drawing sample
(b) Commodity
(c) Variety / Type / Grade
(d) Name of consignor
(e) Name of Consignee
(f) Station of despatch
(g) Date of despatch
(h) Wagon No./Name of ship Hatch NO.
(i) No. of bags.
(j) Weight (in MT)
(k) Sample drawn by tube sampler/parkhi
(l) Other particulars (This should indicate general condition of grain with any special information that needs to be taken note of at the time of analysis).
(m) Moisture content at the time of receipt (%)

Signature of Supplier/Agent

Date :
Name and address of person drawing sample
Designation :
Signature
**APPENDIX 2-A-3**

**THE FOOD CORPORATION OF INDIA SAMPLE SLIP FOR IMPORTED GRAIN**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Sample No. :</td>
</tr>
<tr>
<td>b)</td>
<td>Food grain (with class/ grade and crop year) :</td>
</tr>
<tr>
<td>c)</td>
<td>Origin :</td>
</tr>
<tr>
<td>d)</td>
<td>Name of the ship :</td>
</tr>
<tr>
<td>e)</td>
<td>Port of landing :</td>
</tr>
<tr>
<td>f)</td>
<td>Date of landing :</td>
</tr>
<tr>
<td>g)</td>
<td>Date of drawing sample :</td>
</tr>
<tr>
<td>h)</td>
<td>Hatch Number :</td>
</tr>
<tr>
<td>i)</td>
<td>Marking on the Bag :</td>
</tr>
<tr>
<td>j)</td>
<td>Whether from bagged or bulk cargo. Incase if portion found damaged/contaminated— :</td>
</tr>
<tr>
<td>k)</td>
<td>Remarks on nature of damage/contamination</td>
</tr>
<tr>
<td>l)</td>
<td>Approximate quantity involved</td>
</tr>
<tr>
<td>m)</td>
<td>Location in hatch/es</td>
</tr>
<tr>
<td>n)</td>
<td>Action taken on segregation and separate despatch/storage.</td>
</tr>
</tbody>
</table>

Place : 

Date : 

Inspector supervising operations—Name

Signature
CHAPTER 3

LABORATORIES

3.1 Laboratories—For purchases made in the Agricultural produce Markets, quality assessment is generally made by the Technical Assistant on spot. Reference samples, samples relating to Disputes, samples for opinion, samples of food grains purchased from rice mills and secondary sources, samples of imported grain and samples of grain to be exported are analysed in the laboratories set-up by the Corporation. Distribution of laboratories set-up in the country is shown at Appendix 3-A-1. Equipment required at Zonal/Regional laboratories is given at Appendix 3-A-2. Equipment required at the District laboratory is given at Appendix 3-A-3. Equipment needed by Technical Assistants for field analysis is shown at Appendix 3-A-4. Equipment needed at each storage depot for analysis and preservation is given at Appendix 15 A-7.

3.2 Laboratory at the Head Quarters is equipped for detailed analysis of all foodgrains. Samples of various foodgrains produced in the country are analysed here every year, to have an up-to-date information on variations in quality of the grains produced in different parts of the country. Limited research activity is also undertaken at the laboratory. Any disputes not settled at the Zonal/Regional Laboratory are referred to the Central Laboratory. Result of the Central Laboratory in such cases is final.

3.3 Laboratories at Zonal/Regional and District head quarters and suitable for undertaking routine analysis of grains handled by the corporation. At Regional and Zonal laboratories cases of complaints and appeals for reanalysis are handled when required.
### Appendix - 3.A.1

**FOODGRAIN-LABORATORIES - DISTRIBUTION IN THE COUNTRY**

<table>
<thead>
<tr>
<th>Zonal laboratory</th>
<th>Regional laboratory</th>
<th>District laboratory</th>
<th>Mini laboratory</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. North-East-Zone</td>
<td>Kokrajhar</td>
<td>Silchar</td>
<td>North-Lakhimpur</td>
<td>Total existing laboratory=9</td>
</tr>
<tr>
<td></td>
<td>Dibrugarh</td>
<td></td>
<td>Jorhat</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bongaigaon</td>
<td></td>
<td>Nowgong</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Assam)</td>
<td></td>
<td>Guwahati</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gauhati</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Meghalaya)</td>
<td>Shillong</td>
<td>Total laboratory=6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(N.E.F.A.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Silchar</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Imphal</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dimapur</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Aizwal</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Agartala</td>
<td></td>
</tr>
<tr>
<td>II East Zone</td>
<td>(a) W. Bengal</td>
<td>Cooch Behar</td>
<td></td>
<td>Total Laboratory</td>
</tr>
<tr>
<td>Calcutta</td>
<td>Calcutta</td>
<td>Calcutta (West)</td>
<td></td>
<td>= 20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Burdwan</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Calcutta (East)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24-Paragana</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Birbhum</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Midnapur</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Purulia</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jalpaiguri</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Howrah</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dinajpur</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Malda</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Murshidabad</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bankura</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Calcutta (North)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Calcutta (South)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nadia.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hooghly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zonal laboratory</td>
<td>Regional laboratory</td>
<td>District laboratory</td>
<td>Mini laboratory</td>
<td>Remarks</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------</td>
<td>---------------------</td>
<td>----------------</td>
<td>------------------</td>
</tr>
<tr>
<td>W. Bengal (Port Operations)</td>
<td>Calcutta</td>
<td>Siliguri</td>
<td>PXD Calcutta</td>
<td>NPD Calcutta</td>
</tr>
<tr>
<td>(b) Orissa Bhubaneshwa</td>
<td>Sambalapur</td>
<td>Cuttack</td>
<td>Titlagarh</td>
<td>Berhampur</td>
</tr>
<tr>
<td>(c) Bihar PATNA</td>
<td>Patna</td>
<td>Purnea</td>
<td>Darbhanga</td>
<td>Bhagalpur</td>
</tr>
<tr>
<td>III North Zone</td>
<td>(a) Delhi</td>
<td>Mayapuri</td>
<td>Shaktinagar</td>
<td>= 3</td>
</tr>
<tr>
<td></td>
<td>(b) (Haryana) Chandigarh</td>
<td>Kurukshetra</td>
<td>Kamal</td>
<td>Rohtak</td>
</tr>
<tr>
<td></td>
<td>(c) (Himachal Pradesh) Simla</td>
<td>—</td>
<td>= 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(d) (J &amp;K) Jammu</td>
<td>Srinagar</td>
<td>Jammu</td>
<td>= 3</td>
</tr>
<tr>
<td>Zonal laboratory</td>
<td>Regional laboratory</td>
<td>District laboratory</td>
<td>Mini laboratory</td>
<td>Remarks</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------</td>
<td>---------------------</td>
<td>-----------------</td>
<td>---------</td>
</tr>
<tr>
<td>(e) (Punjab)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chandigarh</td>
<td>Bhatinda</td>
<td>Nabha</td>
<td></td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>Gurdaspur</td>
<td>Moga</td>
<td></td>
<td>Laboratory</td>
</tr>
<tr>
<td></td>
<td>Jallandhar</td>
<td>Zeera</td>
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<td>Jhansi</td>
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**IV South Zone**

<p>| Madras          |                     |                     |                 |         |
| (a) (Andhra Pradesh and P.O. Vizag) | Nizamabad |                     |                 |         |
|                 | Nellore             |                     |                 |         |
|                 | Sanatnagar          |                     |                 |         |</p>
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<th>Zonal laboratory</th>
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<th>District laboratory</th>
<th>Mini laboratory</th>
<th>Remarks</th>
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<td>Vijayawada</td>
<td>Karimnager</td>
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<td>Mahabubnagar</td>
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<td>Srikakulam</td>
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<td>Guntur</td>
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<td>Kakinada</td>
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<td>Tadepalligudem</td>
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<td>Gangavathi</td>
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<td>Baroda</td>
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<td>Jabalpur</td>
<td>Ujjain</td>
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<td>Bilaspur</td>
<td>Indore</td>
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<td>Goa</td>
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<td>Total laboratory = 3</td>
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G. Total: 182
LIST OF THE EQUIPMENT FOR ZONAL/REGIONAL LABORATORY

(1) Air oven
(2) Sample Divider IS. No. 4940-1968
(3) Dockage sieves (Set for wheat and rice)
(4) Enamelled plates (round) 30 cms.
(5) Sample scoops
(6) Counter scale-cap 1 kg. with weight box
(7) Portable balance with weight box
(8) Physical balance 5 mg. sensitivity
(9) Analytical balance 0.1 mg. sensitivity
(10) Moisture meter with accessories
(11) Hectolitre weight apparatus No. IS-4333-1967 part -III
(12) Glass slabs
(13) Parkhi IS.No. 2816-1964
(14) Tube sampler IS No. 2875-1964
(15) Magnifying glass
(16) Hot plates
(17) Degchi with cover
(18) Dry and wet thermometer
(19) Air tight tins
(20) Polythene sample bags
   size - i) 4 1/4" x 7" x 300 gauge
   ii) 6" x 8 1/4", x 300 gauge.
(21) Sample slips
(22) Cloth sample bags IS. No. 2814-1964
(23) Thermometers 0° C to 200° C
(24) Vernier calipers sliding type
(25) Pressure cooker
(26) Tongs
(27) Scalpel
(28) Forceps
(29) Measuring cylinder
(30) Measuring flasks 250 CC., 500 CC.
(31) Dessicator
(32) Aluminum moisture dishes
(33) Sample pan
(34) Heat sealer
(35) Glass jars
(36) Petri dishes
(37) Specimen tubes
(38) Grinding mills
(39) Test sieves size — i) 4.00 mm
    for foodgrains — ii) 3.35 mm
    IS. No. 4333 Part-1 — iii) 1.70 mm
    — iv) 1.00 mm

Wheat products
(40) IS, No. 1009-1968 - 180 microns.
(41) IS No. 1010-1968 - 1.18 mm, 0.73 mm 0.24 mm
(42) IS No. 1155 - 1968 - 600 microns.
Equipment for uric acid estimation:

(43) Waring blender
(44) Centrifuge
(45) Photo electric calorimeter
(46) Beakers - 250 cc, 500 cc
(47) Conical flasks - 250 cc, 500 cc
(48) Burette
(49) Pipette
(50) Reagent bottles
(51) Funnel-4"
(52) Pipette stand wooden and Burette stand
(53) Nessleir colour coparator
(54) Thin layer chromatography kit including Micro pipettes (5 µl, 10 µl, 50 µl)
(55) Column Chromatogram
(56) Hot air blower.
(57) Water bath with temperature regulator.
(58) Soxh-let apparatus
(59) Electric Shaker
(60) Blender
(61) Bunsen burner/Heater/Gas oven.
(62) Nickel crucibles - 100 ml, capacity
(63) Tongs
(64) Rotary vacuum evaporator
(65) Burettes, Pipettes, funnels,
Laboratory funnel stand.
APPENDIX - 3.A.3

LIST OF THE EQUIPMENT FOR DISTRICT LABORATORY

(1) Air oven

(2) Sample divider IS. No. 4940-1968

(3) Enamelled plates round 30 cms

(4) Sample scoops

(5) Counter scale - Cap. 1 kg with weight box

(6) Portable balance with weight box

(7) Physical balance 5 mg. sensitivity

(8) Analytical balance 0.1 mg. sensitivity

(9) Moisture meter with accessories

(10) Hectolitre weight apparatus IS. No. 4333-1967 part -II

(11) Glass slabs

(12) Parkhi IS No. 2816-1964

(13) Tube sampler IS No. 2875-1964

(14) Magnifying glass

(15) Hot plates or electric stove

(16) Degchi with cover

(17) Polythene sample bags size -
   i) $4\frac{1}{4}'' \times 7'' \times 300$ gauge
   ii) $6'' \times 8\frac{1}{2}'' \times 300$ gauge

(18) Sample slips

(19) Cloth sample bags - IS No, 2814-1964
(20) Thermometers 0°C to 200°C
(21) Vernier calipers sliding type
(22) Tongs
(23) forceps
(24) Measuring cylinder
(25) Measuring flasks 250 cc, 500 cc
(26) Dessicator
(27) Aluminium moisture dishes
(28) Sample pan
(29) Heat sealer
(30) Glass jars
(31) Petri dishes
(32) Specimen tubes
(33) Grinding mill
(34) Test sieves size:
   - i) 4.00 mm
   - ii) 3.35 mm
   - IS.No. 4333 Part -1
     - iii) 1.70 mm
     - iv) 1.00 mm
LIST OF EQUIPMENT FOR FIELD INSPECTION

(1) Tube sampler

(2) Parkhi

(3) Portable balance with weight box.

(4) Enamel plate.

(5) Sampling spoons.

(6) Type samples of important varieties

(7) Polythene and cloth bags

(8) Sample slips

(9) Brass seal

(10) Kit for dehusked grain testing (by double staining method)

(11) Magnifying lens

(12) A pair of scissors (small size)

(13) Measuring-Cylinder
CHAPTER - 4

ANALYTICAL PROCEDURES

4.1 Analysis enable knowing proportion of various impurities and constituents of the grain lot under consideration. Representative sample (also known as test sample) is used for analysis. Before undertaking analysis all equipment needs to be checked and cleaned. Sample to be analysed is to be checked for its condition and seal. After opening the seal it should be ensured that the sample slip contains all relevant information. When two samples are received for a lot, one should be used for analysis and other properly preserved for re-analysis, in case such a need arises. A record will be maintained in the laboratory of all analysis carried out and where necessary, reports and certificates will be prepared in the forms shown in the Appendices - 4-A-1 to 4-A-8.

4.2 Analysis comprises following steps —

(a) Visual inspection,
(b) Determination of moisture content,
(c) Assessment of impurities,
(d) Chemical Analysis,
(e) Recording all particulars of analysis.

4.3 Visual inspection — Test Sample (excluding sample meant for moisture test) is to be examined visually, for general condition such as odour, colour and insect as well as microbial infestation, if any. Objective is to determine whether sample is wholesome, clean, dry and in a sound merchantable condition. Observations on these points are to be recorded.

4.4 Moisture determination — Moisture content is the amount of water in a product designated on the basis of water expressed as percent. There are two methods of expressing moisture content viz. (i) wet basis and (ii) dry basis. Following equation shows how moisture is expressed in the two methods:

\[
\text{Percent moisture wet basis} = \frac{W_w}{W_w + W_d} \times 100
\]

\[
\text{Percent moisture dry basis} = \frac{W_w}{W_d} \times 100
\]
Where Ww is weight of water and Wd weight of dry matter. In these determinations, moisture content expressed on dry basis will always be higher as compared to moisture on wet basis. Thus moisture on dry basis of 5, 10 and 15% will correspond to 4.8, 9.1 and 13% respectively, on wet basis. In practice moisture content expressed is on wet basis. Moisture content on dry basis is used mainly for research investigations.

4.5 Moisture is an important constituent of grain. It varies with environmental conditions of handling and the type and grade of grain. It affects weight, price and storability of the grain. Methods employed for determination are either direct or indirect, standard method No.IS-4333 (Part-II) 1967 is a direct method involving exposure of the sample of grain to a definite temperature for a definite period and expressing in weight as moisture content. This standard method is given at Appendix 4 A-9. The standard method is time consuming and laborious. It is used, therefore, as a method for reference and calibration.

4.6 In practice, indirect methods which are quick and easy to operate are used. One of these based on electric resistance is used in the operations of the corporation. Electric resistance or conductivity depends upon the moisture content of the material. This principle depends upon the moisture content of the material. This principal is used for determination of moisture content in the grain in a number of meters. Investigations have shown that there is a linear relationship between the moisture content and the logarithm of its electric resistance. Temperatures affect resistance and on this account moisture content is to be read on the dial against temperature. Resistance in each grain varies and different tables exist for different grains. In the meters in use with the Corporation, relationship of moisture content, pressure on sample and electric resistance is arrived at moisture content of the sample. For reliable results it is necessary to use same amount of pressure in each determination. It needs to be added that the method determines resistance only of the surface of grain and moisture content is, therefore, only of the surface of the grain. Metres in use have a range of 8.5 to 40 percent of moisture and a standard error of ±0.28%. To ensure results, as close as possible to real moisture content, meters need to be calibrated once in 4 months or at the beginning of each season against the standard method. Difference between the meter reading and the standard method be treated as a correction factor and used for adjusting moisture content in each reading on the meter. A record will be maintained for each moisture meter stating dates of calibration and correction factor.

Calibration of Moisture Meters: For calibration of Moisture Meters only the Hot Air Oven method should be repeat should be followed and all moisture meters individually must be calibrated directly with Hot Air Oven before putting to use at least before start of Rabi and Kharif season without any fail. Necessary average correction factor (±) should invariably be passed on every moisture meter after calibration and use in the field for each range of recordings from Moisture Meters.

Identical samples will be tested on both the Hot-Air-Oven and the Moisture Meters concerned. Not less than six samples will be taken up for comparative study. The samples will be tested with the greatest care and the percentage of Moisture will be tabulated. Wherever the difference between the results obtained on the Hot-Air Oven and the other Moisture Meters ate marginal the average difference will be struck and this will be the correction, positive or negative as the case may be, that will have to be applied to the readings obtained on the other meter. Such corrections will current
for such time as the next calibration is done. If however, the results obtained on the Moisture Meters are wide off the range, further examination of the Moisture Meter itself, will become imminent.

It may be appreciated that these corrections have far-reaching consequences, in so far as the estimation of Moisture in the samples in respect of consignments supplied by parties is concerned. It will, therefore, be of great importance that this calibration work is done with the utmost care and accuracy. Necessary records will also be maintained, duly authenticated by the Assistant Manager (QC) to indicate the trials carried out and the results obtained and the decision taken thereof. It will be better if a separate register is opened and a page is allotted in the register for each Moisture meter separately, so that successive trials could be got noted one below the other in a chronological order for future reference and verification.

HOT-AIR-OVEN METHOD FOR DETERMINATION OF MOISTURE IN FOODGRAIN

Preparation of the sample: Take about 10 gms. of representative composite sample of the foodgrain and grind it to a fine powder which may pass through a 40 mesh sieve. The grinding should be done in a hand grinder or by any other device taking care that not much heat is generated during the process of grinding, which would result in loss of moisture. Immediately take about 2 grams of this flour in a clean, dried and previously weighed petri dish and cover it with its lid. These petri dishes should be weighed correct to 2 decimal places.

Method of determination: Adjust the Air-Oven to a temperature of 130° ± 3°C. The petri dishes containing about 2 gms. of flour be put inside the oven and remove their lids. The lids should also be kept separately inside the Oven. Close the air-oven and keep the samples exact for 2 hours for drying, maintaining the oven temperature at 130° ± 3°C. The oven should not be opened within the two hours (two hours-drying period begins when the oven temperature is actually 130°C). Put on the lid over the petri dishes. While still in the oven, transfer all the petri dishes to dessicator and weigh soon after room temperature is attained.

Calculation: Let the weight of the petri dish with lid be equal to \( W_1 \), the weight of the container, sample and the lid be equal to \( W_2 \) and the weight of the container, sample and the lid after drying be equal to \( W_3 \).

\[
\text{The weight of the sample} = W_2 - W_3
\]

Loss in weight due to loss of moisture = \( W_2 - W_1 \)

Therefore percentage of moisture = \( \frac{W_2 - W_1}{W_2 - W_3} \times 100 \) %

Precautions:

1. The container and the lids should not be touched with hand at any stage of the determination of moisture but should only be handled by a pair of tongs.
(2) The 2 gm. sample should be spread in the container in thin and uniform layer distributed on the whole bottom surface of the container. A round container of approximate 2" diameter will serve the purpose.

(3) The lids and the containers may be numbered to avoid exchange of lids when the containers are removed from the oven after drying. Their approximate weights may also be written on them for ease in weighing them repeatedly.

(4) The Air-Oven should not be opened during the period of Heating and there should be proper ventilation of the oven when it is in use.

(5) The drying-agent for the dessicator, viz., calcium chloride should be changed from time to time so that its power of absorbing moisture is not exhausted.

(6) In case of any doubt the experiment should be repeated.

4.7 Moisture content in grain —In the present context of the use of new high yielding varieties and mechanical gadgets for harvest, moisture content of grain at harvest has to be high. In paddy it has to be in the neighbourhood of 22% and in wheat 18%. For high out turn of rice, paddy with moisture at around 15% is required to be used resulting in moisture of around 14% in rice. In parboiled rice moisture after milling could be 15 to 16%. In the course of storage and handling, grains tend to come to equilibrium with the environmental conditions. Equilibrium moisture content of paddy, rice and wheat are shown in the table below:

<table>
<thead>
<tr>
<th>TABLE</th>
<th>MOISTURE EQUILIBRIUM FOR COMMON GRAINS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp.</td>
<td>Grain</td>
</tr>
<tr>
<td>20</td>
<td>Paddy M.C.</td>
</tr>
<tr>
<td>25</td>
<td>—,—</td>
</tr>
<tr>
<td>38</td>
<td>—,—</td>
</tr>
<tr>
<td>44</td>
<td>—,—</td>
</tr>
<tr>
<td>20</td>
<td>Raw Rice</td>
</tr>
<tr>
<td>25</td>
<td>—,—</td>
</tr>
<tr>
<td>38</td>
<td>—,—</td>
</tr>
<tr>
<td>44</td>
<td>—,—</td>
</tr>
<tr>
<td>10</td>
<td>Wheat</td>
</tr>
</tbody>
</table>

53
<table>
<thead>
<tr>
<th>Temp.</th>
<th>Grain</th>
<th>Relative Hum. 30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Wheat</td>
<td>9.2</td>
<td>9.7</td>
<td>11.0</td>
<td>12.4</td>
<td>14.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>9.0</td>
<td>9.7</td>
<td>10.9</td>
<td>11.9</td>
<td>13.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td>7.6</td>
<td>9.1</td>
<td>10.4</td>
<td>11.2</td>
<td>13.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Moisture content varies with the variety of grain. Equilibrium moisture given above is, therefore, approximation of real moisture in general.

4.8 Grain, whether in bags or in bulk, unless stored in air-tight container, will tend to come to equilibrium with the environment. As environment keeps on changing, moisture in the grain keeps on changing. This may be a loss or gain depending on the change in the environment. A stock of grain bags or the bulk of grain behaves in respect of moisture content exactly like a kernel of grain. Change at the surface is rapid in comparison to change in the interior. Moisture content in a stock or in a bulk will, therefore, always maintain a range. Also, as moisture meters record moisture content of the surface only, in the grain loosing moisture, recorded moisture content will be lower and in the grain gaining moisture higher. A standard grain stack of 150 tonnes or a bulk of about 500 tonnes, when not subject to environmental changes will come to equilibrium, in all layers in a period of three months. In practice this condition is not possible and moisture content either in a stack or in a bulk, will vary from layer to layer. In this situation a technical interpretation is needed to relate moisture changes with changes in grain weight. It also needs to be added that initial changes in moisture of the grain are rapid in relation to changes that may be reversed. Thus gained moisture is not lost as rapidly as gained and lost moisture not gained that rapidly. Grain that has gained moisture, therefore, may retain the gain for years and vice versa. These complexities need to be understood in interpreting relationship between moisture and weight and storability of grain.

4.9 Assessment of impurities—For assessment of the proportion of impurities standard method of grain analysis is to be adopted. This method is given at Appendix 4-A-10. Correct weighment is very necessary in the analysis as slight variation will get magnified manyfold while converting the results into percentage. Proforma for preparation of analysis information are given at App. 4-A-1 to 4-A-8. In addition analysis record will be maintained in the laboratory register.

4.10 Chemical analysis—In Regional and District laboratories three tests viz (i) Uric Acid determination (ii) Iodine test for glutinous rice and (iii) Methylene blue and metanil yellow test for dehusked grain, will need to be carried out. Procedure to be followed for these tests is given at App. 4-A-11 to 4-A-13. Chemical analysis is involved in determination of pesticide residues 4-A-14. For these, samples will be sent to Zonal/Headquarters Laboratory, where necessary. Procedure for determination of protein and gluten in wheat is given at 4-A-15 and 4-A-16. Test for pressure parboiled rice is given at App. 4-A-17. Procedure for Ergot and Bunt is at App. 4-A-18 and 4-A-19 respectively.
4.11 Reanalysis—This is carried out on an appeal from the seller. Procedure to be adopted is given below. It needs to be added that where reanalysis is statutory under levy order, re-analysis will be carried out as provided in the levy order where not statutory following procedure will be applicable-

(a) The seller when not satisfied with the analysis results of the sample, will be entitled to prefer an appeal for re-analysis, in respect of all or an individual refraction other than moisture. (Each appeal will have to be accompanied by the bank draft for Rs. 25/- per sample drawn in favour of District Manager concerned as fee for re-analysis which is not normally refundable. This, however, is at the discretion of the State Government concerned). An appeal should be preferred within one week from the date of receipt of the analysis report by the seller. In case the last date for preferring an appeal happens to be a holiday, it can be preferred the next working day. Information about appeals will be submitted by the District Manager to the Regional Manager, District Manager will ensure that the appeals are attended to at the earliest and in any case within one month from the date of filing of the appeal by the party. The Regional Manager in consultation with the District Manager will fix a suitable date for conducting re-analysis and a clear notice of 15 days will be given to the seller to enable him/his representative to be present for analysis.

(b) The re-analysis will be conducted by a Board duly constituted by the Regional Heads. The Board will comprise of Deputy Manager (Quality Control) and another Quality Control Officer at the Asstt. Manager’s level.

(c) The Second sealed sample preserved in the District Laboratory will be used for appeal analysis. Before commencing of re-analysis the seller or his authorised representative shall be required to give an undertaking that the seals of the second sample have been inspected and found by him to be intact and the sample belongs to him. Further, he will be required to give an undertaking that he will abide by the results of the analysis which will be binding on him as well as the Food Corporation of India. He will also be required to indicate the particular refractions for which he wants the re-analysis.

The prescribed proforma for the declaration form is given at Appendix 4-A-21.

(d) Appeals in respect of moisture content shall not be allowed under any circumstances. After taking an undertaking from the party as detailed above, the second sealed sample shall be opened and analysed in the presence of the seller or his representative. The party will be allowed to witness the weight of the refractions after re-analysis. Re-analysis report will be signed by the supplier or his representative and all members of the Board present at the re-analysis.

(e) At the time of re-analysis if the seller himself or his authorised representative fails to turn up at the appointed time and date, his appeal will stand automatically rejected.

(f) The parties after filing an appeal will not normally be allowed to withdraw the appeal but in case clear notice of seven days is given before the actual date of the re-analysis, the analysis
fee in that case will be refunded in full. The Board will, using its discretion, decide on the request.

(g) In the event of the results of the analysis going in favour of the seller, the amount of Rs. 25/- per sample being the re-analysis fee will be refunded to the seller at the time of settlement of final claims in respect of re-analysis. In case the results are going against the seller re-analysis fee of Rs. 25/- shall be forfeited.

(h) The procedure for reappeals for re-analysis outlined above does not confer any right or otherwise on the seller or anyone else to ask the Corporation to entertain and conduct re-analysis in accordance with the above procedure.
APPENDIX- 4-A.1

ANALYSIS REPORT

Ref. No.__________

PADDY

(Fig. in percentage)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Sample No.</th>
<th>Particulars</th>
<th>Quality</th>
<th>Grade/Type</th>
<th>Foreign matter</th>
<th>Inorganic</th>
<th>Organic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

Admixture of lower Grades

<table>
<thead>
<tr>
<th>Admixture</th>
<th>Damaged Weevilled</th>
<th>Immature grains</th>
<th>Shrunken grains</th>
<th>Sprouted grains</th>
<th>Discoloured grains</th>
<th>Moisture content</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>

Aanlyser

Asstt. Manager (Q.C.)
FOOD CORPORATION OF INDIA
APPENDIX 4.A.2
ANALYSIS REPORT

Ref. No. Received from :

Date of receipt of sample :

Date of analysis :

RICE

(Fig. in percentage)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Sample No.</th>
<th>Particulars</th>
<th>Quality/ Grade/</th>
<th>Broken grains</th>
<th>Foreign matter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>class type</td>
<td>1/4th to 3/4th</td>
<td>1/8th to 1/4th</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Damaged/ Slightly Damaged</th>
<th>Chalky grains</th>
<th>Discoloured grains</th>
<th>Red grains</th>
<th>Admixture of Inf.</th>
<th>Dehusked grains</th>
<th>Moisture content</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
</tr>
</tbody>
</table>

Analysed by: 

Asstt. Manager (Q.C.)
FOOD CORPORATION OF INDIA

APPENDIX-4.A.3

QUALITY CERTIFICATE

Sl. No.

OFFICE OF THE DISTRICT MANAGER

ANALYSIS REPORT

WHEAT

Commodity

Date: ........................................

(Fig. in percentage)

(1) Laboratory No. of sample

(2) Name of despatching station

(3) R.R.No./Truck Chit No. & Date

(4) Wagon No./Truck No.

(5) Quality/Class

(6) Quantity in M.T.

Refractions:

(A) Foreign Matter

(B) Other foodgrains

(C) Damaged grains

(D) Slightly damaged grains

(E) Shrivelled grains

(F) Broken grains

(G) Moisture content

(H) Admixture of inferior grades/varieties

(I) Weevilled grains

59
(J) ...........................

(K) ...........................

The quality is/is not according to uniform specifications of Govt. of India.
In case of second analysis signature of the representative of the supplier.

Analysed                                            Officer - In-Charge of the Laboratory
FOOD CORPORATION OF INDIA
APPENDIX-4 A.4
QUALITY CERTIFICATE

No.

OFFICE OF THE DISTRICT MANAGER ......................

ANALYSIS REPORT

RICE RAW/PARBOILED

Date :

<table>
<thead>
<tr>
<th>COMMODITY, RICE PADDY :</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Laboratory No. of sample</td>
<td></td>
</tr>
<tr>
<td>(2) Name of despatching station</td>
<td></td>
</tr>
<tr>
<td>(3) R.R.No./Truck Chit No. and Date</td>
<td></td>
</tr>
<tr>
<td>(4) Wagon No./Truck No.</td>
<td></td>
</tr>
<tr>
<td>(5) Quality/Class</td>
<td></td>
</tr>
<tr>
<td>(6) Quantity in M.T.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Refractions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Brokens : Big 1/4th to 3/4th</td>
<td></td>
</tr>
<tr>
<td>Small 1/8th to 1/4th</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>(B) Foreign Matter</td>
<td></td>
</tr>
<tr>
<td>i) Organic</td>
<td></td>
</tr>
<tr>
<td>ii) Inorganic</td>
<td></td>
</tr>
<tr>
<td>(C) Damaged grains</td>
<td></td>
</tr>
<tr>
<td>(D) Chalky grains</td>
<td></td>
</tr>
</tbody>
</table>

61
(E) Discoloured grains
(F) Red grains
(G) Admixture of inferior varieties
(H) Dehusked grains
(I) Moisture
(J) .....................
(K) .....................

Remarks: The quality is/is not according to specifications. In case of second analysis, signature of the representative of the supplier.

Analyser

Office-in-Charge of the Laboratory
FOOD CORPORATION OF INDIA
APPENDIX- 4.A.5
ANALYSIS REPORT
(For grains other than wheat and rice)

Ref. No. : Date of receipt of sample :
Received from Date of analysis :

COMMODITY
(Fig. in percentage)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Sample No.</th>
<th>Particulars in M.T.</th>
<th>Quantity</th>
<th>Grade/ Type</th>
<th>Foreign Matter</th>
<th>Other Damaged/ Slightly Shriveled Grains</th>
<th>Slightly Damaged Velvety Grains</th>
<th>Brokens</th>
<th>Moisture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

Analyser

Asstt. Manager (Q.C.)
FOOD CORPORATION OF INDIA
APPENDIX - 4.A.6
ANALYSIS REPORT

Reference No. :
Port of Landing :
Date of receipt of samples :
Date of analysis :

WHEAT CANADA
Grade/Type

<table>
<thead>
<tr>
<th>Sample number</th>
<th>Hatch number</th>
<th>Bushel weight</th>
<th>Matter other than cereal grains</th>
<th>Total including cereal grains other than wheat</th>
<th>Wheat of other classes</th>
<th>Durum</th>
<th>Total including Durum</th>
<th>Hard vitreous Kernels</th>
<th>Broken Kernels after removal of dockage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

Incidence of Sprouted wheat (No. of Green Kernels in 500 gms.)

<table>
<thead>
<tr>
<th>Incidence of Sprouted grains</th>
<th>Buck wheat</th>
<th>Grass</th>
<th>Moisture</th>
<th>Black points</th>
<th>Damaged grains</th>
<th>Shrivelled grains</th>
<th>Weevilled grains</th>
<th>Frosted grains</th>
<th>Dockage</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
</tr>
</tbody>
</table>

Analysed

Assistant Manager (QC)
THE FOOD CORPORATION OF INDIA

APPENDIX - 4.A.7

ANALYSIS REPORT

Reference No. :
Port of landing :
Date of receipt of sample :
Date of analysis :

Name of steamer :
Date of Arrival :

WHEAT U.S.A.
Grade/Type. 

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Hatch No.</th>
<th>Dockage</th>
<th>Defects</th>
<th>(Fig. in percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Shrunken &amp; broken</td>
<td>Foreign matter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Heat damaged</td>
<td>Total defects</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wheat of other classes</td>
<td>Contrasting classes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Weight per bushel in (Lbs.)</th>
<th>Moisture</th>
<th>Touched</th>
<th>Weed seeds</th>
<th>Dark hard and vitreous</th>
<th>Weevilled</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>

Analyser

Assistant Manager (QC)

65
THE FOOD CORPORATION OF INDIA
APPENDIX—A.8

ANALYSIS SLIP

Port of landing :
Date of receipt of samples :
Date of analysis :
Name of Steamer :
Date of arrival :

AUSTRALIAN WHEAT

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Sample No.</th>
<th>Hatch No.</th>
<th>Moisture content</th>
<th>Dirt &amp; F.M. excepting other foodgrains</th>
<th>Other Damaged &amp; Touched foodgrains</th>
<th>Weevilled</th>
<th>Moth Eaten</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

Unripe | Shrivelled | Brokens | Brushel Wt. (Imperial lbs.) | Weed seeds | Remarks |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>

Analyser

Assistant Manager (Laboratory)
APPENDIX - 4.A.9

METHODS OF ANALYSIS FOR FOODGRAINS MOISTURE

REF. IS:4333 (PART-III) -1967

0.1 With the increasing inter-State transactions and centralisation of corporations and co-operative societies for handling foodgrains, intended for human consumption, the assessment of their quality has assumed a higher significance recently. For proper assessment, it is necessary that only uniform methods of test are adopted and only those terms are used in test reports which have been defined properly. This standard, based on national and international practices is, therefore, being issued to ensure the adoption of uniform terminology and method of test for foodgrains throughout the whole country. It is also expected that this standard would help farmers in assessing and thus better processing of their produce. Besides, it would help in fixation of price of foodgrains on a scientific basis and in narrowing down misunderstandings between the purchasers and the vendors.

0.2 Moisture content is one of the most important factors in the maintenance of quality as well as purchase of foodgrains. Moisture may be required to be determined every time a consignment is received or despatched for consumption or storage. If the moisture content goes above certain critical levels for sometime, there is a danger of undesirable developments taking place due to physiological processes within the grain resulting in deterioration of quality, sometimes in total damage. Determination of the moisture content is also necessary to decide whether the grain needs to be dried before storage or transportation and also to determine the proper storage conditions.

(1) SCOPE :

1.1 This standard prescribed the basic reference and routine methods for the determination of moisture in foodgrains.

(2) TEST SAMPLE :

2.1 Samples for moisture determination shall be obtained on the basis of BIS 2814-1978 and BIS : 3714-1978

(3) BASIC REFERENCE METHOD :

3.0 This method is intended to serve as a standard method for checking the moisture meters which are particularly suitable for routine determination of moisture.

3.1 Principle :—Loss in mass of the ground test portion as determined by drying at 130° C in an oven.

3.2 Apparatus.

3.2.1 Grinding Mill :—Made of material which does not absorb moisture. It shall be easy to clean, and have as little dead space as possible. It shall enable grinding to be carried out rapidly and uniformly without appreciable development of heat and shall avoid contact with the outside air. The entire material ground by the mill shall pass through the 1.0 mm sieve.

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3.2.2 Metal Dish: — dish of non-corrodible metal or of glass, with a sufficiently tight fitting lid, the effective surface enabling the test portion to be distributed so as to give not more than 0.3 g/cm².

3.2.3 Oven: — Electrically heated, with arrangements for controlling temperature in such a way that the temperature of the air and of the shelves carrying the test portions is within the range 130°C and 133°C in the neighbourhood of the test portions in normal working. The oven should have a heat capacity such that when initially adjusted to a temperature of 133 °C it should again reach this temperature in less than 45 minutes (preferably in less than 30 minutes) after inserting the maximum number of test portions that can be dried simultaneously. The effectiveness of the ventilation may be determined by means of wheat semolina, with a maximum particle size of 1 mm, as the test substance. The ventilation should be such that when all the test portions that the oven can hold are dried simultaneously at 130°C to 133°C for 2 hours and for 3 hours the results shall not differ by more than 0.15 percent.

3.2.4 Dessicator: — With a thick perforated plate of metal or Porcelain, containing anhydrous calcium sulphate (CaSO₄) or any other effective desiccant.

3.3 Grinding

3.3.1 Grinding without pre-conditioning: —

This is required for the products which are not likely to undergo variations in moisture content in the course of grinding, in general, grains with a moisture content between 7 and 17 percent. As just the grinding mill, grind a small quantity of the product and reject this. Then quickly grind an amount of sample slightly greater than that required for the test which should be at least 5 g. Transfer the grindings to the previously dried and tared dish; quickly close the latter, and weigh it. Then carry out the analysis. The time between taking the sample and weighing before drying should be less than 2 minutes if a small mill of the usual cone or hammer type is used.

3.3.2 Grinding with pre-conditioning.

3.3.2.1 Products which are too dry (water content less than 7 percent) or too moist (water content more than 17 percent) should be suitably humidified or pre-dried before they are ground.

3.3.2.2 For products of moisture content below 7 percent, rehumidify the sample by placing it in a suitable atmosphere so as to bring the moisture content to between 7 and 17 percent (preferably between 9 and 15 percent).

3.3.2.3 Pre-drying of the grains should be carried out, in order to bring moisture within the range 7 to 17 percent (preferably between 9 and 15 percent). Carry out the operation according to the instructions in 3.4 except that the mass of sample conditioned should be slightly greater than that required for the test, that the time of heating in the oven should be 7 to 10 minutes, and that cooling of the product to laboratory temperature should be done with the vessel uncovered and without a desiccator for at least 2 hours.

3.3.2.4 Immediately after weighing, grind the sample in the mill, previously adjusted. Transfer the powder to the dish and reweigh. The time elapse between the two weighings should be less than two minutes.
3.4 Procedure: Place the open dish containing the test portion, in the oven and leave it for 2 hours reckoned from the moment when the oven temperature again reaches 130°C. After this period, and carrying out the operations rapidly, take the dish out of the oven, cover it and put it in the desiccator, never put dishes on top of one ather in the desiccator. When the dish has cooled to laboratory temperature (generally between 30 and 45 minutes after it is put into the desiccator), weigh it. Carry out the tests at least in duplicate, and weighing to the nearest ±1 mg.

3.5 Calculation.

3.5.1 The moisture content, as a percentage by mass of the product as received, is equal to:—

— Without preliminary conditioning

\[
(M_s - M_i) \times \frac{100}{M_0}
\]

— With preliminary conditioning

\[
(M_2 - M_3) \times \frac{M_1}{M_2} + M_0 - M_i \times \frac{100}{M_0} \left(1 - \frac{M_1 M_3}{M_0 M_2}\right)
\]

Where:—

\(M_s\) = initial mass in g. of the test portion;

\(M_i\) = mass in g. of the test portion after conditioning;

\(M_2\) = mass in g. of the test portion after grinding; and

\(M_3\) = mass, in g., of the dry test portion.

Note: The difference between two determinations made on the same sample should not exceed 0.1 g of moisture per 100 g of sample. If it does so, the determination should be repeated in duplicate. The mean of the results of duplicate tests, rounded to the nearest 0.05 g of moisture per 100 g of sample, represents the moisture content of the sample.

4. Routine method:

4.1 For routine purpose, a suitable moisture meter shall be used. In comparison with the basic reference method, this moisture meter shall have a sensitivity of ±0.2 percent.
APPENDIX 4. A 10

METHODS OF ANALYSIS FOR FOODGRAINS
(Ref. BIS: 4333 (PART I)-1977)

0.1 With the increasing inter-State transactions and centralization of corporations and co-operative societies for handling foodgrains intended for human consumption, the assessment of their quality has assumed a higher significance recently. For proper assessment, it is necessary that only uniform methods of test are adopted and only those terms are used in test reports which have been defined properly. This standard based on national and international practices, is, therefore, being used to ensure the adoption of uniform terminology and methods of test for foodgrains throughout the whole country. It is also expected that this standard would help farmers in assessing and thus better processing of their produce. Besides, it would help in fixation of price of foodgrains on a scientific basis and in narrowing down misunderstandings between the purchasers and the vendors.

0.2 In the context of foodgrains the term “refractions” denotes several meanings. This standard prescribes definitions of the various constituents of refractions and the method of their determination.

(1) SCOPE:

1.1 This standard prescribes the method for determination of refractions in foodgrains to assess the marketable quality.

(2) PREPARATION OF TEST SAMPLE:

2.1 Lot shall be a stated proportion into which the consignment has been divided for evaluation of quality. From this lot, a composite sample of about 2500 g shall be drawn. The composite sample shall be reduced to about 500 g by dividing on divider; otherwise, empty the content of the composite sample on a flat smooth surface and mix it thoroughly. Spread the composite sample in a circular layer of about 12 mm to 25 mm thickness. Scoop out 500 g sample from centre sides and different points taking care that no foreign matter is left over from the grain which has been scooped.

(3) PROCEDURE:

3.1 Determination of foreign Matter : Weigh about 500 g of the test sample accurately. Pour the quantity over the appropriate set of sieves previously arranged in a way so that the sieve with the largest perforations comes at the top and those with smaller perforations are placed in order of their sizes. The sample shall then be agitated thoroughly to strain out the foreign matter into the bottom pan. As a result of this straining, other foodgrains and foreign matter like bolder pieces of clay, chaff, etc., would remain on the first three sieves according to their sizes on the different sieves. The top most sieve would contain bold grains, big pieces of clay and other big sized foreign matter, while the lower sieves would contain smaller, shrivelled and badly insect-infested grains and smaller foreign matter. After straining, all the sieves should be separated, and all foreign matter should be picked up by hand. All these and the foreign matter in the bottom pan should then be picked up by hand. All these and the foreign matter in the bottom pan should be then weighed and the percentage calculated. The figure so obtained should be noted as the percentage of foreign matter in foodgrains.
3.2 Refractions other than Foreign Matter:—The contents of the other 4 sieves should then be mixed together and spread out evenly on the metal or glass surface just as in 3.1. From this spread, take exactly the specified quantity required for analysis for the grains under test as indicated below from different sides and the middle by means of small scoops. This quantity should be placed on an enamel plate and various items of refractions other than foreign matter, picked by hand with the help of magnifying glass, if necessary. These refractions should be separated from the sound grains and weighed on physical balance. The percentage of various individual refractions should then be calculated on the quantity taken for actual analysis.

3.2.1 In the analysis of rice, refractions other than foreign matter may be carried in duplicate and their average reported.

**Quantity of sample to be taken for Determining Refractions other than Foreign Matter**

<table>
<thead>
<tr>
<th>Foodgrains</th>
<th>Weight in g (Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>50</td>
</tr>
<tr>
<td>Maize</td>
<td>50</td>
</tr>
<tr>
<td>Rice</td>
<td>20</td>
</tr>
<tr>
<td>Barley</td>
<td>50</td>
</tr>
<tr>
<td>Gram</td>
<td>50</td>
</tr>
<tr>
<td>Other pulses</td>
<td>25</td>
</tr>
<tr>
<td>Millets</td>
<td>20</td>
</tr>
</tbody>
</table>
APPENDIX - 4.A.11

PROCEDURE FOR DETERMINATION OF URIC ACID
IS : 4333 PART - V-1970

(1) DETERMINATION OF URIC ACID:

Direct calorimetric method for determination of URIC acid content in insect damaged food grains.

50 Grams of representative sample of the foodgrains is finally pulverised and a quantity of 20 g. containing about 1-5 mg. of uric acid is suspended in 200 cc of water. The mixture is allowed to stand for two hours, with occasional stirring and then mixed in a Waring Blender for 10 minutes. It is centrifuged at 2000 r.p.m. for 10 minutes. To 100 CC of clear centrifugate 10 c.c. of 10% Sodium Tungstate solution is added. After mixing 10 c.c of 0.667 N Sulphuric Acid is added to precipitate the protein present in the extract. The mixture is allowed to stand for 5 minutes and then filtered. An aliquot of the filtrate containing between 0.15 and 0.3 mg. of uric acid in 10 cc is taken in a 50 cc Volumetric flask, 5 cc of 5% solution of sodium Cyanide is added from a burette, followed by 1 cc, of the Arsenophospho-Tungstic-acid reagent. The contents of the flask are mixed by gentle shaking and at the end of 5 minutes diluted to 50 cc. mark with distilled water and mixed.

For calorimetric measurement, the blue solution is compared with a simultaneously prepared solution obtained by treating 10 cc of standard uric acid solution (0.2 mg. of uric acid) in 50 cc. flask with 5 cc. Sodium Cyanide solution. 1 cc of the reagent and diluting to the mark at the end of 5 minutes. The intensity of the colour can be determined either in a photo electric calorimeter with 420 m/u. filter or by visual comparison in Nessler's tubes.

In case the determination is carried out by visual comparison it may be necessary to have a number of standards containing varying proportions of uric acid for matching with the colour developed in the questioned sample. A quantity of uninfested grain of the same weight as the sample under examination may be taken for control.

(2) REAGENTS REQUIRED FOR DETERMINATION OF URIC ACID:

(1) 10% Solution of sodium Tungstate.
(2) 0.667 N Sulphuric Acid.
(3) Benedicts uric acid reagents.

100 g. of pure sodium tungstate (G.R) is placed in a litre pyrex flask and dissolved in 600 cc of water. Now, 5 gm. of Arsenic acid (As₂O₃) is added followed by 25 cc of 85% phosphoric acid and 20 cc. of conc. Hydrochloric acid. The mixture is boiled for 20 minutes. cooled and diluted to one litre. The reagent appears to keep indefinitely.
(3) **SODIUM CYANIDE:**

A 5% solution of sodium cyanide containing 2 cc of Ammonia per litre, which should be prepared fresh once in about 6 to 7 weeks.

(4) **STANDARD URIC ACID SOLUTION (BENEDICTS):**

A stock solution is prepared as follows. Dissolve 9 g. of Disodium-hydrogen phosphate and 1 g of sodium hydrogen phosphate (pure crystalline salts) in about 200 to 300 cc of hot water. If not perfectly clear, filter. Dilute the clear solution to 500 cc. with hot water and pour exactly 200 mg. of pure uric acid suspended in a few cc. of water in a litre flask mix until solution is complete. Cool, and add exactly 1.4 cc of glacial Acetic Acid, dilute to mark and mix. Add 5 cc of Chloroform to prevent bacterial or mould growth (5 cc.—1 mg of uric acid).

The working standard is prepared fresh weekly as follows:—

Measure 50 cc. of the phosphate standard solution containing 10 mg. of uric acid in a 500 cc volumetric flask and is diluted to 400 cc. with distilled water. 25 cc of dilute Hydrochloric acid is added (1 Vol. Hydrochloric acid and 9 Vol. water) and the solution is diluted to 500 cc and mixed. The dilute standard solution should be prepared from the phosphate standard after 10 days to 2 weeks.
APPENDIX - 4-A-12

DETERMINATION OF GLUTINOUS RICE GRAINS IN RAW RICE

(I) ANALYSIS PROCEDURE:

(a) Out of 20 gms. representative sample of rice (including broken and whole grains) five gram sample be taken in a petri dish. Add 20 cc of iodine solution (N/1000) and shake as to completely soak all the grains, allow to stand for about two minutes when the starch which had turned blue in the beginning becomes white again, showing the bran predominantly, in the case of non-glutinous rice. Kernels and pieces of kernels of glutinous rice which take a brown colour are picked out and counted. The percentage of glutinous rice grains is determined by counting and expressed as a percentage.

(b) Preparation of iodine solution: Dissolve 2.0 gms. of potassium iodide in 30-40 ml of water in a glass stoppered, one litre flask, weigh out 1.27 gms. of iodine and transfer it to concentrated solution of potassium iodide and shake in the cold until all the iodine is dissolved. Allow the solution to acquire room temperature and make-up to one litre by adding water. This solution of iodine is N/100. Since the solution deteriorates faster when exposed to direct sunlight it should be preserved in small glass stoppered dark, brown bottles filled completely and kept in cool dark place or in ordinary glass bottle with black paper pasted over them. To prepare N/1000 iodine solution for the above test, mix one part by volume of the stock N/100 solution with nine parts of water before use.
DETERMINATION OF DEHUSKED GRAINS IN MILLED RICE 
(BY DOUBLE STAINING METHOD)

Dehusked grains shall be the rice kernels whole or broken which have more than 1/4th of the surface area covered with the bran and determined as follows:—

Analysis Procedure: Out of 20 gms representative sample of rice, immerse 5 gms of milled rice (excluding the other fractions but inclusive of brokens) in Metanil Yellow or Tartazine (0.05% by weight in distilled water) in a petridish and add a drop of concentrated Hydrochloric acid to it. Keep it for about a minute and then wash the rice kernels with water after pouring out Metanil Yellow. The kernel acquire a yellow stain. Dip these yellow stained kernels in 5 ml. of Methylene blue (0.05% by weight in distilled water) solution for a minute. Now the kernels are washed thrice with dilute Hydrochloric Acid (5% solution by volume in distilled water) and then twice with only water. The residual bran on the milled rice kernels remain green. These stained grains are kept in water for about 5 minutes in case of raw rice and for about 10 minutes in case of boiled rice and again given a washing when the green & yellow stains become quite distinct making it easy for a proper assessment of the bran covering on the rice kernel, green stain indicating the bran portion. The stain is stable and lasts for a long period.

Grains (including both whole and brokens) having the bran covering (indicated by green stain) more than 1/4th of the surface area are picked out and counted and expressed as percentage as is done in case of Iodine Test. In case of brokens, 3 pieces are counted as one full kernel.

In case, rice kernels are dipped in metanil Yellow or in Methylene Blue for more than the prescribed time of one minute then more washings should be given with dilute Hydrochloric Acid (5%) than the prescribed three washings.

METHOD FOR METHYL BROMIDE ESTIMATION 4.A-14 (A)

AACC Method 60-10

Definition:

Inorganic bromide residue is detd. on sample after extn. of organic bromide with methylene chloride. Organic bromide may be detd. by analyzing total bromide and inorganic bromide and subtracting titters of inorganic from total.

Scope:

Applicable to grain and cereal products.
Apparatus:

1. Nickel crucible, 100-ml. capacity.
2. Muffle furnace. Any type that will maintain 600°C. will do.

Reagents:

1. Potassium hydroxide, 2.5% soln. in ethyl alcohol.
2. Sodium hydroxide pellets.
3. Sodium peroxide.
4. Hydrochloric acid, 6N soln. which should be as free of bromides as possible. Concentrated acid is diluted to 6N and distd., first and last 10% fractions being discarded to eliminate most of any free bromide or hydrobromic acid.
5. Sodium hydroxide, 3N soln.
6. Sodium acid phosphate.
7. Hypochlorite soln., 1N. in 0.1N sodium hydroxide soln.
8. Sodium formate, 50% soln.
9. Sodium molybdate, 1% soln.
11. Sulphuric acid, 6N soln.
12. Sodium thiosulphate, 0.01N soln. Stabilize with 1 g. sodium carbonate per 1,000 ml. Stdze, against 0.01N potassium iodate soln. in presence of 75 ml. water, 10 ml. 6N sulphuric acid soln. and 0.5 gm potassium iodide per aliquot of thiosulphate soln. being titrated.
13. Starch indicator, 1% soln. Mix about 2 g. finely powdered potato starch with cold water to thin paste, add about 200 ml. boiling water, stirring const., and immediately discontinue heating. Add 1 ml. mercury, shake, and let starch soln. stand over mercury.
14. Methylene chloride. Commercial material usually contains trace of hydrolyzable bromide which is removed by shaking 2,000 ml. of this solvent with 15 g. potassium hydroxide dissolved in 300 ml. 95% ethyl alc., let mixt. stand for several days. Alc. potassium hydroxide soln. is then washed out with water and methylene chloride is filtered, dried over anhyd. calcium sulphate, and fractionated.
Procedure:

Total bromide:

1. To sample weighing 5-10 g, in nickel crucible add 40 ml. alc. potassium hydroxide soln. with stirring. Let mixt. stand 1 hr., then evap. to dryness on steam bath. After further drying for short time at 110°, cover with 10 g. sodium hydroxide pellets. Place crucible for 1 to 2 hr. on hot plate until bubbling or smoking diminishes; then place in muffle furnace at 600°C (Note 1).

2. Add sodium peroxide to melt, few mg. at a time; to complete oxidation of remaining organic matter. Peroxide must be added cautiously while crucible is removed from furnace; bromide is lost if charge burns with flare when too much peroxide is added at one time (Note 2). Rotate crucible to let melt solidify on sides, cool, and dissolve contents in 75 ml. water (Note 3).

3. Transfer resulting soln.to 400-ml. beaker and partially neutralize with ca. 50 ml. 6N hydrochloric acid soln., then boil to destroy peroxides and to reduce vol to ca. 100 ml.

4. Remove nickel hydroxide and other insoluble hydroxides by filtering through No. 2 whatman paper, collecting filtrate and washings in 500-ml. wide-mouthed E. flask. Make filtrate slightly acid with 6N hydrochloric acid soln., then neutralize with sodium hydroxide soln., (3V) adjusting to colour change of methyl red. Vol. at this point should be approx. 150 ml.

5. Add ca. 2 g. sodium acid phosphate Mono. basic and 5 ml. hypochlorite soln. and heat mixt. to boiling. After min. or so, introduce 5 ml. sodium formate soln., and continue boiling 2 min. Cool sample and treat with few drops 1% sodium molybdate soln., 0.5 g. potassium iodide, and 25 ml. 6N sulphuric acid soln.

6. Titrate immediately with std. 0.01N sodium thiosulphate soln., adding starch indicator just before end point.

7. Carry blank on all reagents thru entire procedure.

Separation of organic bromide:

1. Triturate replicate sample of 5-10 g, in 100-ml. beaker with 15 ml. methylene chloride; and filter immediately thru fritted-glass crucible, rinsing with three 5-ml. portions solvent (Note 4).

2. Transfer most of filter cake back to beaker and let stand 5 min. with 15 ml. addnl. methylene chloride (Note 5), then filter and rinse as before.

3. Again return solid to beaker and treat with 15 ml. methylene chloride, this time for 15-min. period, followed by third filtration and rinsing in same crucible (Note 6).
Inorganic bromide:

Now det. inorganic bromide on this extd. filter cake by same procedure as descr. for total bromide, practically all organic bromide having been removed (Note 7) by extn. with methylene chloride.

Notes:

1. Fusion should be carried out without excessive burning or foaming; if charge becomes ignited, remove crucible from muffle until flame is extinguished; then return it to muffle and repeat this process until volatile gases have been removed.

2. Complete combustion of organic matter can be effected best by returning any organic matter that has arisen above sodium hydroxide to bottom of crucible, where it mixes with melt and is easily destroyed by addn. of peroxide. This is accomplished by carefully rotating hot crucible to wash down organic matter and adding 0.5 g more of peroxide. If no burning or bubbling takes place, oxidation is complete. Few carbon particles which may remain after final addn. of sodium peroxide do not affect accuracy of results.

3. Sln. of sodium compounds is hastened by placing crucible on hot plate for several min.

4. In filtering by suction, sample should not be allowed to become so cold from evapn. that moisture condenses on it.

5. If filter cake is lumpy it should be ground with solvent in mortar at this stage.

6. Filtrate, which is ordinarily discarded, contains most of methyl bromide or other soluble organic bromide, but not all since extn. may have been incomplete and since volatile compounds may have escaped. Presence of a soluble bromide compound may, if desired, be detected by catching filtrates in alc. potassium hydroxide and detg. inorganic bromide formed after evapn. to dryness and ashing. Whether or not bromide so found is methyl bromide or nonvolatile organic halide may be ascertained by making duplicate set of extns. and evapg. exts to ca. half their original vol. before addn. of alc. alk. Methyl bromide is expelled during this process and nonvolatile bromide may be detd. on remainder after hydrolysis and ashing.

To remove any incompletely extd. volatile bromide compounds, return sample remaining after extn. to original beaker and treat with 15 ml. methylene chloride. Evap. this to dryness while stirring to prevent bumping. but do not overheat. When sample appears dry, lay beaker on its side in warm place, such as on top of oven, until all odor of methylene chloride is gone.

7. Residue after water extn. may be placed in 100-ml. nickel crucible and analysed for bromide in manner descr. under Total bromide. Generally only a very small fraction of total bromide will be found in this residue. and amt. will be less, the more thorough the water washing. Therefore, this bromide is usually considered to be inorganic.

8. Interferences. Absorbs such as activated charcoal will interfere.

Calculations

\[ \frac{\text{Tx} \times 0.1332}{1000 \ W} = \text{p.p.m. inorganic bromide.} \]

Where Tx= 0.01N sodium thiosulphate used for titration of methylene chloride-extd. cake, after organic bromide has been removed; W = g. of sample.
APPENDIX 4A.14. (B)

METHOD FOR DETERMINATION OF MALATHION RESIDUES
IS No.-58563 Part-1-1970.

PROCEDURE

Apparatus:—Spectrophotometer

Reagents

Malathion:—analytical grade.

Carbon Tetrachloride:—analytical grade.

Ethanol:—containing not more than 1 per cent of water (74° O.P. industrial methylated spirit is suitable).

Carbon Disulphide solution:—Dissolve 1 ml of analytical grade carbon disulphide in 200 ml of analytical grade carbon tetrachloride.

Sodium Sulphate Solution:—9 percent (w/v). Prepare from analytical reagent grade anhydrous sodium sulphate.

Concentrated Hydrochloric Acid—Analytical reagent grade.

Standard Hydrochloric Acid solution:—5 N.

Ferric Chloride Solution:—5 percent (W/V). Dissolve 5 g of analytical reagent grade ferric chloride in 100 ml of N hydrochloric acid.

Copper Sulphate Solution:—Dissolve 3.5 g of analytical reagent grade copper sulphate crystals (CuSO₄·5H₂O) in 100 ml of distilled water.

Standard sodium Hydroxide Solution:—6N, aqueous.

Phenolphthalein Indicator Solution:—one percent (W/V).

Extraction:—For cereal products (raw grains) use approximately 50 g of the grain; for oilseeds (such as groundnut and cocoa) use approximately 25 g of delectated nuts or beans, which should be placed in a mortar and reduced to fragments approximately one-eighth or less of the original size of the seed. Transfer the grain or oilseed to a suitable Soxhlet thimble (wash out the mortar into the top of the Soxhlet after fragmenting oilseed). Extract for four hours with a suitable amount of carbon tetrachloride. Take care to see that local overheating of the extract does not occur at the sides of the flask. Adjust the volume of the extract to 100 ml before analysis.

Procedure for Determining Malathion.

Transfer the 100 ml of extract to a 250-ml separating funnel. Add 1.0 ml of the carbon disulphide solution and 25 ml of ethanol, and mix by gentle stirring/swirling/swirling.
Add 75 ml of sodium sulphate solution acidified with 2.5 ml of hydrochloric acid, and shake vigorously for one minute. Filter the carbon tetrachloride layer through a fluted, fast filter-paper into dry 250-ml separating funnel. Do not allow any of the aqueous layer to run on to the filter-paper, and do not wash the paper.

Add 25 ml of ethanol to the filtered carbon tetrachloride solution, then add 1.0 ml of the standard sodium hydroxide solution and shake for exactly one minute. Carry out the procedure from this point onwards without interruption, as aqueous alkaline and acid solution of dimethyl-phosphorodithioic acid are stable for short period only. Add immediately 75 ml of sodium sulphate solution, and shake vigorously for one minute. Allow the layers to separate, and discard the carbon tetrachloride layer. Add 25 ml of carbon tetrachloride, shake vigorously for 30 seconds, and discard the carbon tetrachloride layer. Add to the contents of the separating funnel 25 ml of carbon tetrachloride, two drops of phenolphthalein indicator solution and the standard hydrochloric acid solution, dropwise, with swirling until the pink colour disappears. Add 1.0 ml of the ferric chloride solution.

Shake vigorously for 30 seconds, and discard the carbon tetrachloride layer. Repeat the extraction twice more with 25 ml portions of carbon tetrachloride and discard each portion. Add by pipette 15.0 ml of carbon tetrachloride and 1.0 ml of copper sulphate solution, shake vigorously for one minute, and allow the layers to separate. Run the carbon tetrachloride layer into a small beaker containing about 2 g of anhydrous sodium sulphate. Swirl the beaker for a few seconds, and pour off the carbon tetrachloride solution into a 4 cm absorptiometer cell. Measure the optical density of the solution, within 5 minutes of extraction to avoid fading at 418 m/μ.

**Preparation of Calibration Curve for Malathion:**

Dissolve approx. 62.5 mg (weighed to 0.1 mg) analytical grade Malathion in ethyl alcohol and dilute volumetrically to 250 ml with ethyl alcohol. Mix well, then transfer 10 ml aliquot to another 250-ml volumetric flask and dilute to volume with ethyl alcohol (1 ml =10 microgram of malathion). Using this standard solution, carry aliquot of 0.5, 10, 15, 20 and 25 in order to cover the range of 50 to 250 mg of malathion through the procedure given below.

Transfer aliquot to 250-ml separating funnel containing 100 ml carbon tetrachloride and 1 ml carbon disulphide solution and add 25 ml ethanol. Then mix by gentle swirling.

Prepare calibration curve by plotting absorbance against microgram of malathion taken.

**Reporting of Malathion Residues in Sample:**

From calibration curve, read the amount of malathion corresponding to absorbance and calculate the ppm malathion in sample is given below and report the same :

\[
\text{Malathion in sample, ppm} = \frac{y}{g}
\]

where

\[y = \text{Malathion found, and } g = \text{sample in aliquot analysed.}\]
COLORIMETRIC ESTIMATION OF DICHLORVOS (DDVP)


A rapid and accurate method for the quantitative estimation of 0,0-dimethyl 2, 2-dichlorovinyl phosphate (DDVP) in formulations by hydrolysing with alkali is described. The colour produced by the residual alkali with carbon disulphide and ethyl alcohol is measured quantitatively in a colorimeter.

The insecticide 2, 2-dichlorovinyl dimethyl phosphate has been extensively tested for use in baits, space spray, aerosols and possibly as a fumigant and animal spray. The principal constituents of DDVP after hydrolysis in aqueous solution are dimethyl phosphoric acid and dichloroacetalddehyde.

Estimation of DDVP has been done by a number of workers. The observation that dichloroacetalddehyde forms a derivative with 2,4-dinitrophenyl hydrazine which yields an intense blue colour on the addition of alkali has made possible its determination by a modification of the method used for triose phosphates. There are also methods of estimation by Hodgson and Casida and Hughes. There are also some other methods for its determination. Visweswariah et al., estimated DDVP using monooethanolamine hydrolysis.

The measurement of the colour produced by ethyl alcohol and carbon disulphide with the excess alkali after hydrolysis of DDVP is reported. The chemicals used are (i) Dichlorvos (DDVP) (analytical grade); (ii) Ethyl alcohol (96 per cent); (iii) Caustic soda solution (5 per cent NaOH in distilled water); (iv) Carbon-disulphide, (analytical grade); and (v) Carbon tetrachloride, (analytical grade).

DDVP (0.1 per cent) in acetone is prepared and used as standard solution. Different amounts (10, 20, 30, 40 mg) of this solution are taken in four test tubes. Then to each test tube 1 ml of 5 per cent NaOH is added. A blank is prepared by adding only 1 ml alkali solution in a test tube. All the test tubes are kept immersed in ice bath for 30 minutes. The hydrolysed solution is then taken in four separating funnels (250 ml). To each of them 25 ml carbon tetrachloride and 15 ml alcohol are added. After proper shaking for 3 min. 25 ml distilled water and 5 ml carbon disulphide are added and shaken. The CCL layer is discarded. The intensity of colour of the aqueous layer is estimated in a colorimeter within 15 min. The reading of the blank gives highest reading and as the concentration of DDVP increases, the intensity of the colour decreases. The standard graph is prepared by plotting concentration of DDVP against the colorimetric reading obtained by subtracting sample reading from the blank.

The method is very accurate and simple. The sensitivity is low at 1 μg.

The colour formation is probably due to the formation of complex sodium xanthate (CH$_3$CH$_2$O-CSSNa)$^*$ produced by carbon disulphide, ethyl alcohol and alkali.

Here, DDVP is hydrolysed by alkali and the residual alkali is used for colour formation. As the amount of alkali is fixed in all cases but amount of DDVP is varying, so amount of residual alkali is varying which is responsible for colour formation. As a result, the intensity of colour is different for different amounts of DDVP. Adopting this procedure DDVP can be estimated easily.

The full form of the various abbreviations used is given at page 86.
APPENDIX - 4-A-15

DETERMINATION OF TOTAL PROTEIN CONTENT BY MICRO-KJELDAHL PROCEDURE
(A.O.A.C. 1965)

(a) Principle: In the Kjeldahl nitrogen determination the sample is digested in concentrated sulphuric acid. The sulphuric acid acts as a dehydrating and oxidising agent. Carbon in the sample is oxidised according to \(2\text{H}_2\text{SO}_4 + \text{C} = \text{CO}_2 + 2\text{SO}_2 + 2\text{H}_2\text{O}\). The nitrogen of the sample is transformed into ammonia. Carbon dioxide, water and sulphur dioxide escape and the ammonia is held back as ammonium ion \((\text{NH}_4^+))\) in the form of ammonium sulphate. Sodium hydroxide is then added to solution, which transforms ammonium ion into ammonia \((\text{NH}_3)\) which is distilled off, absorbed in a boric acid solution and titrated with standard hydrochloric acid.

Since the boiling point of the \(\text{H}_2\text{SO}_4\) is not sufficiently high to oxidise organic substance quickly, \(\text{K}_2\text{SO}_4\) is added to raise its boiling point. \(\text{SiO}_2\) or mercury in the solution has been found to empirically promote conversion of organic nitrogen to ammonia. \(\text{CuSO}_4\) acts as a catalyst.

(b) Equipments and glass-ware:

i) Micro-Kjeldahl digestion unit,

ii) Micro-Kjeldahl distillation equipment

iii) Micro-Kjeldahl digestion flask, 30 ml

iv) Pipettes each of, 1 ml, 2 ml, 10 ml

v) burettes, 10 ml

vi) measuring cylinder, 25 ml

vii) volumetric flask, 100 ml

viii) erlenmeyer flask, 100 ml

ix) wash bottle.

(c) Reagents:

i) Sulphuric acid sp. gr. 1.84, N- free

ii) Catalyst mixture: Grind together in a mortar 99.0 g of \(\text{K}_2\text{SO}_4\), 4.1 g of Hg and 0.8 g of \(\text{CuSO}_4\)

iii) Sodium hydroxide - sodium thiosulphate solution:

Dissolve 50 g Na OH and 5 g \(\text{Na}_2\text{S}_2\text{O}_3\).5\(\text{H}_2\text{O}\) in
iv) Boric acid solution: Dissolve 4 g in warm water and dilute to 100 ml
v) Hydrochloric acid solution, 0.02 n
vi) Methyl red-bromocresol green indicator solution:
    Mix one part 0.2% Methyl red in ethanol with 5 parts 0.2% bromocresol green in ethanol

(d) Procedure:

i) Weigh 100 mg sample and transfer it to a digestion flask. Add 1 g of catalyst mixture and 3 ml of concentrated sulphuric acid.

ii) Digest until the solution is colourless (approx. 40 min. at 370°C).

iii) After cooling add minimum quantity of water to dissolve solids & allow to cool.

iv) Pipette 10 ml of boric acid solution into a 100 ml erlenmeyer flask. Add 2-3 drops of indicator solution, & place the flask under condenser with tip extending below surface of the solution.

v) Transfer digest to distillation apparatus and rinse flask 4 times with 2-3 ml portions of distilled water.

vi) Add 15 ml sodium hydroxide-sodium the isosulphate solution to still & stea-distill until about 40-50 ml of distillate collects.

vii) Lower the receiving flask & continue distillation one more minute. Wash the tip of the condenser with a few drops of water. Remove the receiving flask.

viii) Titrte contents of receiving flask to grey and point or first appearance of violet colour.

ix) Make blank determination (without sample) using quantity of reagents and some digestion and distillation period as for sample determination.

x) Include one standard check of tyrosina by taking 10 mg of it.

(d) Calculation:— Calculate % age of nitrogen as follows:—

%N (m HCl in determination - ml blank) normality x 14.007 x 100 / mg sample

% protein = %N x 6.25 (or factor for a given grain)

The full form of the various abbreviations used is given at page 86.
DETERMINATION OF PROTEIN CONTENT BY MICRO-KJELDAHL PROCEDURE

The amount of nitrogen in the flour is determined by the usual Kjeldahl method and this multiplied by the factor 5.7 for the determination of protein (Kene-Jones and Amos, 1957, p.549).

(a) **Principle:** In the Kjeldahl nitrogen determination the sample is digested in concentrated sulphuric acid. The sulphuric acid acts as a dehydrating and oxidising agent. Carbon in the sample is oxidised according to \(2H_2 + SO_4 + C = CO_2 + 2SO_2 + 2H_2O\). The nitrogen of the sample is transformed into ammonia. Carbon dioxide, water and sulphur dioxide escape and the ammonia is held back as ammonium ion \((NH_4^+)\) in the form of ammonium sulphate. Sodium hydroxide is then added to solution, which transforms ammonium ion into ammonia \((NH_3)\) which is distilled off, absorbed in a boric acid solution and titrated with standard hydrochloric acid.

Since the boiling point of the \(H_2SO_4\) is not sufficiently high to oxidise organic substance quickly, \(K_2SO_4\) is added to raise its boiling point. \(SeO_2\) or Mercury in the solution has been found to empirically promote conversion of organic nitrogen to ammonia. \(CuSO_4\) acts as a catalyst.

**Equipments and glass-ware:**

i) Micro-Kjeldahl digestion unit,

ii) Micro-Kjeldahl distillation apparatus

iii) Micro-Kjeldahl digestion flask, 30 ml

iv) pipettes each of, 1 ml, 2 ml, 10 ml

v) burettes, 10 ml

vi) measuring cylinder, 25 ml

vii) volumetric flask, 100 ml

viii) erlenmeyer flask, 100 ml

ix) wash bottle.

(c) **Reagents:**

i) Sulphuric acid sp. gr. 1.84; N-free

ii) Catalyst mixture: Grind together in a mortar 99.0 g of \(K_2SO_4\), 4.1 g of Hg and 0.8 g of \(CuSO_4\)

iii) Sodium hydroxide—sodium thiosulphate solution: Dissolve 50 g NaOH and 5 g \(Na_2SO_3\cdot5H_2O\) in distilled water and dilute to 100 ml

iv) Boric acid solution: dissolve 4 g in warm water and dilute to 100 ml

v) Hydrochloric acid solution, 0.02 N
vi) Methyl red-bromocresol green indicator solution: Mix one part 0.2% Methyl red in ethanol with 5 parts 0.2% bromocresol green in ethanol.

(d) Procedure:

i) Weigh 100 mg sample and transfer it to digestion flask. Add 1 g of catalyst mixture and 3 ml of concentrated sulphuric acid.

ii) Digest until the solution is colourless (approx. 40 min. at 370°C).

iii) After cooling add minimum quantity of water to dissolve solids & allow to cool.

iv) Pipette 10 ml of boric acid solution into a 100 ml erlenmeyer flask. Add 2-3 drops of indicator solution, & place the flask under condenser with tip extending below surface of the solution.

v) Transfer digest to distillation apparatus and rinse flask 4 times with 2-3 ml portions of distilled water.

vi) Add 15 ml sodium hydroxide-sodium thiosulphate solution to still & steam-distill until about 40-50 ml of distillate collects.

vii) Lower the receiving flask & continue distillation with a few drops of water. Remove the receiving flask.

viii) Titrate contents of receiving flask to grey end point or first appearance of violet colour.

ix) Make blank determination (without sample) using quantity of reagents and same digestion and distillation period as for sample determination.

x) Include one standard check of tyrosine by taking 10 mg of it.

(d) Calculation: Calculate %age of nitrogen as follows:

\[
\% N = \frac{(\text{ml HCL in determination} - \text{ml blank}) \times \text{normality} \times 14.007 \times 100}{\text{mg sample}}
\]

\[
\% \text{protein} = \% N \times 6.25 \text{ (or factor for given grain)}
\]

The full form of the various abbreviations used is given at page 86.
DETERMINATION OF GLUTEN IN WHEAT

Gluten: (Kent-Jones and Amos. 1957:601 p.)

Knead 20 gm. of flour into a normal dough with requisite amount of water (10-12 ml.) Kneading can be done either with a spatula or in a small mixer. Then the dough is allowed to stand in a bowl of tap water for one hour at room temperature. Further knead the dough by hand under a gentle steam of tap water, taking care in the early stages of washing to retain all the gluten while the starch washes away. It is desirable to have under the dough a stretched piece of silk which allows the starch to pass, but which will catch any small pieces of gluten which break off in washing. Such pieces should be collected and added to the gluten in the final stages of washing. Wash for 10 minutes. The weight of the wet gluten can be recorded as well as that of the dry gluten i.e. after drying at 100°C for 24 hours.

The full form of the various abbreviations used from page 75 to 87 are given below:

1. gms. — Grams
2. ml. — Millimeter
3. Extn. — Extraction
4. detd. — Detected
5. soln. — Solution
6. concd. — Concentrated
7. dild. — Diluted
8. Alc. — Alcoholic
9. Anhyd. — Anhydrous
10. Mixt. — Mixture
11. hr. — Hour
12. evap. — Evaporate
13. Vol. to Ca — Volume to Capacity
15. E. Flask. — Erlenmeyer flask
16. Std. — Standard
17. Addnl. — Additional
18. Thru. — Through
19. Det. — Determine
20. Descr. — Described
21. addn. — Addition
22. Distd. — Distilled
23. Mg. — Milligram
24. Ext. — Extracted
25. evpm. — Evaporation
26. Detd. — Desintegrating
27. Evapg. — Evaporating
28. Ext. to Ca. — Extracts to Capacity
29. amt. — Amount
30. ppm — Parts per million
31. W/V — Weight by Volume.
APPENDIX - 4.A-17

A METHOD TO DISTINGUISH PRESSURE PARBOILED RICE FROM NORMAL PARBOILED RICE (PADDY PROCESSING RESEARCH CENTRE THANJAVUR, T.N.)

(1) Keep ready a boiling water bath first.

(2) A test tube (dia. 15 mm) is taken. Ten fully translucent whole milled rice is transferred and one ml. of 5% KOH solution (by titration) is added.

(3) The test tube is kept in the boiling water bath for 4 minutes and at the close of this period taken out, immediately kept in cold water bath (at room temperature and then the KOH solution is drained;

(4) With the help of wire scoops, the rice kernels in the test tube are transferred to a glass plate and observed for the opaqueness in each Kernel.

(5) Even the fully translucent parboiled rices of the traditional and CFTRI method (hot soaking method) of parboiling would exhibit white core (white abdomen or white belly) at the end of the reaction; whereas the fully translucent pressure parboiled rice would be a lumpy gel without any white core.

In case, if the pressure parboiled rice kernels taken for the test have white core (white belly) at the beginning of the test, these kernels will be exhibiting white core even at the end of the tests.
APPENDIX - 4-A-18

DETERMINATION OF ERGOT IN WHEAT

The presence of ergot in flour or bread could be detected either microscopically or colorimetrically where the alkaloid is dissolved in water and when treated with a solution of para dimethyl-amine-benzaldehyde in sulphuric acid containing trace of ferric chloride, yields a blue coloration. There are other standard methods used one of which is described below:

Ergot-Ether-Bicarbonate Method (AACC Method 42-56)

Scope : Applicable to rye flour, wheat flour and semolina.

Reagents :

1) Ether.

2) Sulphuric acid (1+3)

3) Sodium bicarbonate, standard solution.

Procedure :

1) Shake 20 g. of wheat flour, 50 ml. ether, and 5 ml. 1+3 sulphuric acid and the final dilution of ether solution should be 60 ml. and let stand 6 hr. in closed flask.

2) Filter and wash residue with ether until 40 ml. filtrate are obtained. Add 1.8 ml. saturated sodium bi-carbonate solution. Reading of stds. should be divided by 2 because of double wt. of sample used. If the lower layer formed is coloured light or dark violet, ergot is present.
ESTIMATION OF SMUT AND BUNT IN WHEAT

Microscopic Method (AACC Method 42-70):

Definition:

The official grain standards of the U.S. define Smutty wheat or rye as grain which has an unmistakable odour of smut, or which contains balls or spores of smut in excess of a quantity equal to 14 balls of average size in 250 g. wheat or rye.

When balls are unbroken, the application of the above rule is not difficult. When however, balls become broken and spores are spread over kernels, the following test will determine whether the equivalent of 14 smut balls is present in 250 g. One average size smut ball will weigh 0.01 g and contain, on an average, 3,750,000 spores which would allow 52,520,000 spores per 250 g. wheat.

Scope: Applicable to Wheat.

Apparatus:

1. Compound microscope
2. Hemacytometer
3. E. Flask, 500 ml. capacity
4. Dropper with end drawn to fine capillary point

Procedure:

1. Weigh out exactly 50 g. representative sample. By hand, pick out all smut balls and pieces of balls from 50 g. sample and weigh them. Next place sample in 500 ml. E. flask add 100 ml. water, stopper and shake vigorously for 2 min. If count is not to be made immediately, pour smutty water into another flask. This is not necessary if count is to be made immediately.

2. Thoroughly clean surface of hemacytometer with soft linen cloth and place cover plate over grating so that it rests on raised guides on each side of grating. Agitate water smut suspension and draw small portion into dropper. Quickly and carefully allow small position of suspension to be drawn under cover glass by capillary attraction. Take care that there is not an excess of water under cover glass. If bubbles form, it is necessary to start a new in order to secure clear field.

3. When a satisfactory field is secured, place slide under microscope and count nine squares in succession and note total number of spores present. Calculate the number of spores in the 100 ml. of water smut suspension. Divide this number by 3.75 x 10 to obtain smut present in suspension.
and add to weight of whole or broken smut balls previously determined. Calculate total weight of smut per 250 g. If this is in excess of 0.14 g (0.05% by weight), wheat or rye will grade smutty.

**Sedimentation method (AACC 42-71):**

**Definition:**

A quaternary ammonium salt solution (Reccal) is added to a smut water suspension in graduated oil centrifuge tube. Spore sedimentation is complete in 10 min. and volume can be read directly from graduated tube.

**Scope:** Wheat

**Apparatus:**

1. Balance and weights.
2. Bottles with screw caps 8-oz capacity
3. Graduated Cylinder, 100 ml. capacity,
4. Graduated oil centrifuge tubes 100 ml. capacity

**Reagents:**

1. Tween - 20
2. Rocal (10% soln. of alkyl dimethyl benzyl ammonium chloride)

**Procedure:**

1. Weigh 100 g of grain into screw cap bottle. Add approx. 120 ml. warm tapwater (120° - 135°F) and 1 drop Tween 20. Let stand 5 min., then shake vigorously for 30 sec. Replace cap. With screw cap filter and decant into all oil centrifuge tube.

2. Add approx. 0.6 ml. Rocal with pipette or graduated medicine dropper, stopper and mix contents by inverting tube twice. Allow to stand 10 min. and read vol. of sediment.

**Calculation:**

<table>
<thead>
<tr>
<th>Vol of spores ml.</th>
<th>smut.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 - 1.4</td>
<td>Light</td>
</tr>
<tr>
<td>1.5 - 3.0</td>
<td>Medium</td>
</tr>
<tr>
<td>3.0</td>
<td>Heavy</td>
</tr>
</tbody>
</table>
APPENDIX - 4-A-20

DETERMINATION OF HECTOLITRE WEIGHT

Ref: IS-4333 (III)-1968

Weight per hектolitre is an important index of the quality in a general way and indicates natural condition of the grain. More plump and well matured grain carries higher test weight and yields more flour. Low test weight due to shrivelled kernels, higher moisture, etc., results in relatively lower flour yields.

GENERAL:

In the case of wheat, rye and barley, test weight shall be determined on the basis of the grain which is free from foreign matter.

Make the test immediately after the sample has been brought for testing.

SAMPLING:

Sampling shall be carried out on the lines specifics in IS : 2814-1964 and IS : 3714-1966.

Size of the test sample shall be 500 g.

APPARATUS:

Kettle: made of mild steel or aluminum sheet of 2-mm thickness. Its capacity shall be 500 ml, inside diameter 8.5 cm & height 8.8 cm. Its sensitivity, when filled with water, shall be within ±5 ml.

Pan: 30 cm in length, made of aluminum or mild steel sheet. The first 15 cm length shall have width of 22 cm with height of sides as 3.5 cm. The rest shall end in core having opening of 3.5 cm diameter.

Balance: weighing capacity up to 1 kg., sensitivity 100 with standard weight box.

Stroker (Wooden Strio):—— made of fine wood, well-polish smooth surface, 30-cm long, 415 cm wide and about 1 cm. in thickness.

Procedure:—— Fill the pan and hold it over the kettle in such a way that the opening of the pan is above the centre of the kettle and pouring occurs from a height of about 15 cm above the kettle. Pour the grain into the kettle in a regular slow stream.

Place the stroker on the edge of the kettle lightly without jarring the kettle. Hold the stroker on the kettle with the side of the stroker in vertical position. Stroke the grain from the kettle with three full length zigzag motions of the stroker. Weigh the grain in the kettle on the balance.

CALCULATION:

Calculate is follows:——

Weight of the grain in g = m

Hectolitre weight

= m x 200 g

= x = 0.2 kg.
APPENDIX - 4.A.21

DECLARATION FORM

I................................. on being present personally/through my representative, namely................., at the Joint Analysis conducted by the committee authorised by the Food Corporation of India whatever amount that may be due to the Food Corporation of India, on account of Joint analysis and if I do not pay the amount, I hereby authorise the Corporation to deduct the said amount from my pending or subsequent bill/bills as the case may be. If as a result of such joint analysis any amount is found payable, the same may be refunded to me on a claim presented by me to the Corporation.

Station

Date:                           Signature
CHAPTER -5

CENTRAL LEGISLATIONS CONCERNING
FOOD GRAIN HANDLING

Three Acts of the Central Government namely, Prevention of Food Adulteration Act, Plants, Fruit and Seeds—
regulation of import into India Act and the Consumer Protection Act concern Food Grain Handling. They are
mentioned below :

5.1 Prevention of Food Adulteration Act (PFA):

Basic quality to which any food grain has to conform is defined under this Act. No powers are conferred
either on the Central Govt. or the State Govt. to exempt any agency from the provisions of the Act. Further
to safeguard the interests of the consumer penalties provided in the Act are stringent. Any
contravention can result in the launching of prosecution proceedings against the defaulter. Utmost vigil
is needed to be exercised, therefore, by the concerned officers of the Corporation in purchases, storage
and distribution of food grains for human consumption.

5.2 Provisions of the Act as far as food grain is concerned are as—

Food grains meant for human consumption shall conform to the following standards :

(i) **General**: Foodgrains shall be free from deleterious material including artificial colouring matter.
The pesticide residue, if any, shall not exceed the prescribed permissible limit. Bajra and wheat
grains shall not contain ergot affected grains more than 0.05% by weight.

(ii) **Foreign matter**: Foreign matter means any extraneous matter other than foodgrains and will
comprise inorganic and organic matter. Inorganic matter which includes sand, gravel, dirt,
pebbles, stone, lumps of earth, clay and mud shall not exceed one per cent whereas in case of
paddy, it shall not exceed three per cent by weight. Organic matter which includes chaff, straw,
weed seeds, edible grain, oil-seed and other non poisonous seeds shall not exceed 3 per cent by
weight.

(iii) **Damaged Grain**: Damaged grain means grain damaged by fungus, moisture, heating and
wherein the damage is not superficial but the grain is affected internally. It shall not exceed 5 per
cent by weight.
(iv) **Insect damage**: The amount of weevilled grains (by count) shall not be more than 10 per cent, or uric acid content arising as a result of insect damage shall not exceed 10 milligrams per 100 grams, whichever is lower.

(v) **Rodent hair and excreta**: Rodent hair and excreta shall not exceed 2 pieces per kg. of the sample.

(vi) **Moisture**: The loss in weight by heating the pulverised foodgrains at 130-133°C for two hours shall not exceed 16 per cent.

5.3 The amended Act differentiates Food as ‘Primary Food’ and ‘Processed Food’. Primary food is defined as any article of food being a produce of agriculture or horticulture in its natural form. Whole foodgrains cereals and pulses therefore come under Primary Food. Paddy is primary food whereas, Rice comes under the item processed food, Section 2 of the Amended Act reads as under, giving the outlines whereby the food will be considered as adulterated.

5.4 **Definitions**:

In this Act unless the context otherwise required, 3(1) ‘adulterant’ means any material which is or could be employed for the purpose of adulteration (i.e.) Adulterated an article of food shall be deemed to be adulterated—

(a) If the article sold by a vendor is not of the nature, substance, or quality demanded by the purchaser and is to his prejudice, or is not of the nature, substance or quality which it purports or is represented to be;

(b) If the article contains any other substance which affects, or if the article is so processed as to affect, injuriously the nature, substance or quality thereof;

(c) If any inferior or cheaper substance has been substituted wholly or in part for the article so as to affect injuriously the nature, substance or quality thereof;

(d) If any constituent of the article has been wholly or in part abstracted so as to affect injuriously the nature, substance or quality thereof;

(e) If the article had been prepared, packed or kept under insanitary conditions, whereby it has become contaminated or injurious to health;

(f) If the article consists wholly or in part of any filthy, putried, rotten, decomposed or diseased animal or vegetable substance or is insect-infested or is otherwise unfit for human consumption;

(g) If the article is obtained from a diseased animal;

(h) If the article contains any poisonous or other ingredient which renders it injurious to health;

(i) If the container of the article is composed, whether wholly or in part, of any poisonous or deleterious substance which renders its contents injurious to health;
(j) If any colouring matter other than that prescribed in respect thereof is present in the article, or if the amounts of the prescribed colouring matter which is present in the article are not within the prescribed limits of variability;

(k) If the article contains any prohibited preservative or permitted preservative in excess of the prescribed limits;

(l) If the quality or purity of article falls below the prescribed standard or its constituents are present in quantities not within the prescribed limits of variability, which renders it injurious to health;

(m) If the quality or purity of article falls below the prescribed standard or its constituents are present in the quantities not within the prescribed limits of variability but which does not render it injurious to health.

Provided that, where the quality or purity of the article, being primary food, has fallen below the prescribed standards or its constituents are present in quantities not within the prescribed limits of variability, in either case, solely due to natural causes and beyond the control of human agency, then, such article, shall not be deemed to be adulterated within the meaning of this sub-clause.

5.5 If due care is taken to check the quality during purchase, storage and issues and the stock in general conforms to the specifications and standards laid down, then there is no scope of violating the provisions of this Act. The Act as amended now lays down tolerance limits for pesticidal residues. There is excess of the limit will be considered as injurious admixtures.

Restrictions on the use of insecticide:

The term insecticide shall have the same connotation and meaning as defined in the Insecticides Act of 1968. The conditions for use of such insecticides shall be regulated by that Act from time to time.

The amount of insecticide mentioned in column 2 or the foods mentioned in column 3 shall not exceed the tolerance limit prescribed in column, 4, of the table given below:—

"CONTAINS ADDED FLAVOUR"

PART XIII A—CARRY OVER FOOD ADDITIVE

64C. Carry over of Food Additives—(1) for the purpose of the standards specified in Appendix B, the “CARRY OVER” principle applies to the presence of additives such as colours, flavouring agents, antioxidants, anti-caking agents, emulsifying and stabilizing agents and preservative in food, as a result of the use of raw material or other ingredients in which these additives were used. The presence of contaminants is not covered by this purpose.
(2) The presence of an additive in food through the application of the carry over principle is admissible in general unless otherwise specifically prohibited in the rules or in Appendix B provided the total additive including the carry over through the raw material or other ingredients does not exceed the maximum amount so permitted.

**PART XIV—INSECTICIDES AND PESTICIDES**

"65. Restriction on the use of insecticides—"[(1) Subject to the Provisions of sub-rule (2), no insecticide shall be used directly on articles of food:

Provided that nothing in this sub-rule shall apply to fumigants which are registered and recommended for use as such on articles of food by the Registration Committee, constituted under section 5 of the Insecticides Act, 1968 (46 of 1968)].

"[(2)] The amount of insecticide mentioned in Column 2, on the foods mentioned in Column 3, shall not exceed the tolerance limit prescribed in Column 4 of the Table given below:

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Name of insecticide</th>
<th>Food</th>
<th>Tolerance limit mg/kg (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>1.</td>
<td>Aldrin, dieldrin (The limits apply to aldrin and dieldrin singly or in any combination and are expressed as dieldrin)</td>
<td>Foodgrains</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk and Milk products</td>
<td>0.15 (on a fat basis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fruits and Vegetables</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meat</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eggs</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(On a shell free basis)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Carbaryl</td>
<td>Foodgrains</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Okra and leafy vegetables</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Potatoes</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other vegetables</td>
<td>5.0</td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cottonseed (whole)    1.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maize cob (kernels)    1.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.</td>
<td>Chlordane (residue to be measured as cis plus trans chlordane)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Foodgrains    0.05</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk and Milk Products    0.05</td>
<td>(on a fat basis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vegetables    0.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fruits    0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sugar beet    0.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk and Milk Products    1.25</td>
<td>(on a fat basis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fruits and Vegetables including potatoes    3.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meat, poultry and fish    7.0</td>
<td>(on whole duct basis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eggs    0.5</td>
<td>(on a shell basis)</td>
</tr>
<tr>
<td></td>
<td>5.</td>
<td>Diazinon</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Foodgrains    0.05</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vegetables    0.05</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.</td>
<td>Dichlorvos [content of dichloroacetaldehyde (D.C.A.) be reported where possible]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Foodgrains    1.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milled foodgrains    0.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vegetables    0.15</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fruits    0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.</td>
<td>Dicofol</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fruits and Vegetables    5.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tea (dry manufactured)    5.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.</td>
<td>Dimethoate (residue to be determined as dimethoate and expressed as dimethoate)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fruits and Vegetables    2.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.</td>
<td>Endosulfan (residues are measured and reported as total of endosulfan A and B and endosulfan-sulphate)</td>
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<td>Fruits and Vegetables    2.0</td>
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<td>Cottonseed    0.5</td>
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<td>Cottonseed oil (crude)    0.2</td>
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<td>Milk and Milk products</td>
<td>0.05 (on a fat basis)</td>
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<td>Milk and Milk products</td>
<td>0.1 (on a fat basis)</td>
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<td>Hydrogen cyanide</td>
<td>Foodgrains</td>
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<td>Eggs</td>
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<td>Milk and Milk products 0.05</td>
<td>(on a fat basis)</td>
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<td>heptachlor (combined residues of heptachlor and epoxide to be determined and expressed as heptachlor)</td>
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<td></td>
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<td></td>
<td>Milk and Milk products 0.1</td>
<td>(on a fat basis)</td>
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<td>Vegetables 0.0</td>
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<td>Inorganic bromide (determined and expressed as total bromide from all sources)</td>
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<td>Milled foodgrains 25.0</td>
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<td>Fruits 30.0</td>
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<td>Milk and Milk products 0.2</td>
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<td>Fruits and Vegetables 3.0</td>
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<td>Eggs 0.1</td>
<td>(on a shellfree basis)</td>
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<td>Meat and poultry 2.0</td>
<td>(on whole basis)</td>
</tr>
<tr>
<td>16.</td>
<td>Malathion (Malathion to be determined and expressed as combined residue of malathion and malaoxon)</td>
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</tr>
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<td></td>
<td>Milled foodgrains 1.0</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Fruits 4.0</td>
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<td></td>
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<td>Vegetables 3.0</td>
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<td>Dried fruits 8.0</td>
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<td>Parathion methyl (Combined residues of parathion methyl and its oxygen analogue to be determined and expressed as parathion methyl).</td>
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<td>Phosphamidon residues (expressed as the sum of Phosphamidon and its desethyl derivative).</td>
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<td>Pyrethrins (Sum of Pyrethrins I and II and other structurally related insecticidal ingredients of pyrethrum)</td>
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<td>Fruits and Vegetables</td>
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<td>Milk and Milk products</td>
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<td>Meat and Poultry</td>
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<td>(fat basis)</td>
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<td>Vegetables</td>
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<td>Groundnuts</td>
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<td></td>
<td>Fruits</td>
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<td>Potatoes and Onions</td>
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<td>Meat and Poultry</td>
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<tr>
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<td>(carcass fat basis)</td>
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Prevention of Food Adulteration Rules 1955

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<td>Milk and Milk products</td>
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<td>(fat basis)</td>
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*Soluble in water and hence not necessary to mention on fat basis.

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<td>ETHION</td>
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<td>(Residues to be determined as ethion and its oxygen analogy and expressed as ethion).</td>
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<td>(carcass fat basis)</td>
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<td>(shellfree basis)</td>
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<tr>
<td></td>
<td></td>
<td>*Meat and Poultry</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Milk (whole)</td>
<td>0.01</td>
</tr>
</tbody>
</table>
Prevention of Food Adulteration Rules 1955

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.</td>
<td>THIOMETON</td>
<td>Foodgrains</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td>(Residues determined as thiometon is sulfoxide and sulphone expressed as thiometon)</td>
<td>Milled foodgrains</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fruits</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Potatoes, Carrots and Sugar beets</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other vegetables</td>
<td>2.5</td>
</tr>
</tbody>
</table>

(*Soluble in water and hence not necessary to mention on fat basis.

Explanation.—For the purposes of this rule:
(a) the expressions “insecticide” shall have the meaning assigned to it in the Insecticide Act, 1968 (46 of 1968);
(b) unless otherwise stated—
   (i) maximum levels are expressed in mg/kg. on a whole product basis.
   (ii) all foods refer to raw agricultural products moving in commerce.)
NOTIFICATION

G.S.R. 445(E).—Whereas certain draft rule further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), in the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health) No. GSR 769(E) dated the 21st August, 1989 in the Gazette of India, Extraordinary, Part-II, Section 3, Sub-section (i), dated the 21st August, 1989 at pages 1—16, inviting objections and suggestions from all persons likely to be affected thereby, before the expiry of sixty days from the date on which copies of the Gazette of India in which the said notification was published, was made available to the public:

And whereas the copies of the said Gazette were made available to the public on 20th September, 1989,

And whereas the objections and suggestions received from the public on the draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 23 of the said Act, the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955 namely:

RULES.

1. (1) These rules may be called the Prevention of Food Adulteration (Third amendment) Rules, 1990

(2) They shall come into force on the date of their publication in the official Gazette.

2. In the prevention of Food Adulteration Rules, 1955 in rules 65 in the table, after serial number 31 and entries relating thereto, the following serial numbers and entries shall respectively be inserted, namely:

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Name of insecticide</th>
<th>Food</th>
<th>Tolerance limit mg/kg (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>Acephate</td>
<td>Safflower seed</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cotton seed</td>
<td>2.0</td>
</tr>
<tr>
<td>33</td>
<td>Methamido-phos (A metabolite of Acephate)</td>
<td>Safflower seed</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cotton seed</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------</td>
<td>------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>34.</td>
<td>Aldicarb (sum of Aldicarb, its sulfoxide and sulphone, expressed as Aldicarb)</td>
<td>Potato</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chewing Tobacco</td>
<td>0.1</td>
</tr>
<tr>
<td>35.</td>
<td>Atrazine</td>
<td>Maize</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sugarcane</td>
<td>0.25</td>
</tr>
<tr>
<td>36.</td>
<td>Carbendazim</td>
<td>Foodgrains</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milled foodgrains</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vegetables</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mango</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Banana (whole)</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other fruits</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cotton seed</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Groundnut</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sugar beet</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dry fruits</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eggs</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(shell free basis)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meat &amp; Poultry</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(carcass fat basis)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk &amp; Milk products</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(fat basis)</td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>Benomul</td>
<td>Foodgrains</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milled foodgrains</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vegetables</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mango</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Banana (whole)</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other fruits</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cottonseed</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Groundnut</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sugar beet</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dry fruits</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eggs</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(shell free basis)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meat &amp; Poultry</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(carcass fat basis)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk &amp; Milk products</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(fat basis)</td>
<td></td>
</tr>
<tr>
<td>(1)</td>
<td>(2)</td>
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</tr>
<tr>
<td>38. Captan</td>
<td>Fruit &amp; Vegetable</td>
<td>15.00</td>
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<tr>
<td>39. Carbofuran (sum of carbofuran and 3-hydroxy carbofuran expressed as carbofuran)</td>
<td>Foodgrains</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Milled foodgrains</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fruit &amp; Vegetables</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oil seeds</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sugarcane</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meat &amp; Poultry</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Milk &amp; Milk Products</td>
<td>0.05 (carcass fat basis)</td>
<td></td>
</tr>
<tr>
<td>40. Copper Oxychloride (determined as Copper)</td>
<td>Fruit</td>
<td>20.00</td>
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</tr>
<tr>
<td></td>
<td>Potato</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other vegetables</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td>41. Cypermethrin (sum of isomers) (fat soluble residue)</td>
<td>Wheat grains</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Milled wheat grains</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brinjal</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cabbage</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bhindi</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oil seeds except groundnut</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meat &amp; Poultry</td>
<td>0.20 (carcass fat basis)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Milk &amp; Milk Products</td>
<td>0.01 (fat basis)</td>
<td></td>
</tr>
<tr>
<td>42. Decamethrin/Deltamethrin</td>
<td>Cotton seed</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>43. Edifenphos</td>
<td>Rice</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rice bran</td>
<td>1.00</td>
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</tr>
<tr>
<td></td>
<td>Eggs</td>
<td>0.01 (shell free basis)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meat &amp; Poultry</td>
<td>0.02 (carcass fat basis)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Milk &amp; Milk Products</td>
<td>0.01 (fat basis)</td>
<td></td>
</tr>
<tr>
<td>44. Fenthion (sum of fenthion, its oxygen analogue and their sulphoxides and)</td>
<td>Foodgrains</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Milled foodgrains</td>
<td>0.03</td>
<td></td>
</tr>
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<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
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<tr>
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</tr>
<tr>
<td>45. Fenvalerate (fat soluble residue)</td>
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<td></td>
</tr>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Sulphones, expressed as fenthion)</td>
<td>Onion</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Potatoes</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Beans</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Peas</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tomatoes</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other vegetables</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Musk melon</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meat &amp; Poultry</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>Milk &amp; Milk products</td>
<td></td>
<td>(carcass fat basis)</td>
<td></td>
</tr>
<tr>
<td>Cauliflower</td>
<td>2.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brinjal</td>
<td>2.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Okra</td>
<td>2.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cotton seed</td>
<td>0.20</td>
<td></td>
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</tr>
<tr>
<td>Cottonseed oil</td>
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<td></td>
</tr>
<tr>
<td>Meat &amp; Poultry</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Milk &amp; Milk products</td>
<td>0.01</td>
<td>(carcass fat basis)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(fat basis)</td>
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<td></td>
</tr>
</tbody>
</table>

46. Dithiocarbamates (the residue tolerance limit are determined and expressed at mg/CS₂/kg and refer separately to the residues arising from any or each groups of dithiocarbamates)

(a) Dimethyl dithiocarbamates residue resulting from the use of ferbam or Ziram and,

(b) Ethylene bis-dithiocarbamates resulting from the use of mancozeb, maneb or Zineb (including zineb derived from nabam plus zinc sulphate)

47. Phenthoate

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foodgrains</td>
<td>0.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milled foodgrains</td>
<td>0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potatoes</td>
<td>0.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tomatoes</td>
<td>3.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cherries</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other fruits</td>
<td>3.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk &amp; Milk products</td>
<td>0.01</td>
<td>(shell free basis)</td>
<td></td>
</tr>
<tr>
<td>Foodgrains</td>
<td>0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milled foodgrains</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oilseeds</td>
<td>0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edible oils</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eggs</td>
<td>0.05</td>
<td></td>
<td></td>
</tr>
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<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Meat &amp; Poultry</td>
<td>0.05 (carcass fat basis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk &amp; Milk products</td>
<td>0.01 (fat basis)</td>
</tr>
<tr>
<td>48.</td>
<td></td>
<td>Phorate (sum of phorate, its oxygen analogue and their sulphotides and sulphones, expressed as phorate)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Foodgrains</td>
<td>0.05</td>
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<td>Milled foodgrains</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tomatoes</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other vegetables</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fruits</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oil seeds</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Edible oils</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sugarcane</td>
<td>0.05 (shell free basis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eggs</td>
<td>0.05 (carcass fat basis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meat &amp; Poultry</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk &amp; Milk Products</td>
<td>0.05 (carcass fat basis)</td>
</tr>
<tr>
<td>49.</td>
<td></td>
<td>Simazine</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maize</td>
<td>0.13</td>
</tr>
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<td></td>
<td>Sugarcane</td>
<td>0.25</td>
</tr>
<tr>
<td>50.</td>
<td></td>
<td>Pirimiphos-methyl</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wheat grains</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milled wheat grains</td>
<td>2.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eggs</td>
<td>0.05 (shell free basis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meat &amp; Poultry</td>
<td>0.05 (fat basis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk &amp; Milk products</td>
<td>0.05 (fat basis)</td>
</tr>
</tbody>
</table>

[No. P.15014/2/88 PH (F&N) PFA]
BALBIR SINGH, Jt. Secy.

Note: The Prevention of Food Adulteration Rules, 1955 were first published in Part II, Section 3 of the Gazette of India vide S.R.O. 2106 dated 12-9-55 and subsequently amended as follows by:
1. S.R.O. 1202 dt. 26-5-56
2. S.R.O. 1687 dt. 28-7-56
3. S.R.O. 2213 dt. 28-9-56 (Extraordinary)
4. S.R.O. 2755 dt. 24-11-56

The further amendments were published in Part II, Section 3, sub-section (i) of Gazette of India as follows:

5. G.S.R. 514 dt. 28-6-58
6. G.S.R. 1211 dt. 20-12-58
7. G.S.R. 425 dt. 4-4-60
8. G.S.R. 169 dt. 11-2-61
9. G.S.R. 1134 dt. 16-9-61
10. G.S.R. 1340 dt. 4-11-61
11. G.S.R. 1564 dt. 24-11-62
12. G.S.R. 1589 dt. 22-10-64
13. G.S.R. 1814 dt. 11-12-65
14. G.S.R. 74 dt. 8-1-66
15. G.S.R. 382 dt. 19-3-66
16. G.S.R. 1256 dt. 26-8-67
17. G.S.R. 1533 dt. 24-8-68
18. G.S.R. 2163 dt. 14-12-68 (Corrigendum)
19. G.S.R. 532 dt. 8-3-69
20. G.S.R. 1764 dt. 26-7-69 (Corrigendum)
21. G.S.R. 2068 dt. 30-8-69
22. G.S.R. 1808 dt. 24-10-70
23. G.S.R. 938 dt. 12-6-71
24. G.S.R. 992 dt. 3-7-71
25. G.S.R. 553 dt. 6-5-72
26. G.S.R. 436(E) dt. 10-10-72
27. G.S.R. 133 dt. 10-2-73
28. G.S.R. 205 dt. 23-2-74
29. G.S.R. 850 dt. 12-7-75
30. G.S.R. 508(E) dt. 27-9-75
31. G.S.R. 63(E) dt. 5-2-76
32. G.S.R. 754 dt. 29-5-76
33. G.S.R. 755 dt. 29-5-76
34. G.S.R. 856 dt. 12-6-76
35. G.S.R. 1417 dt. 2-10-76
36. G.S.R. 4(E) dt. 4-1-77
37. G.S.R. 18(E) dt. 15-1-77
38. GSR 651(E) dt. 20-10-77
39. G.S.R. 732(E) dt. 5-12-77
40. G.S.R. 775(E) dt. 27-12-77
41. G.S.R. 36(E) dt. 21-1-78
42. G.S.R. 70(E) dt. 8-2-78
MINISTRY OF HEALTH AND FAMILY WELFARE

(Department of Health)

NOTIFICATION

New Delhi, the 11th February, 1991

G.S.R. 68(E).—Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules, 1955, which the Central Government proposes to make in exercise of the powers conferred by sub-section (1) of section 23 of the said Act, after consultation with the Central Committee for Food Standards, is hereby published as required by the said sub-section for information of all persons likely to be affected thereby, and notice is hereby given that the said draft rules will be taken into consideration after the expiry of sixty days from the date on which the copies of the Official Gazette in which this notification is published are made available to the public.

Any objection or suggestion which may be received from any person with respect to the said draft rules before the expiry of the period so specified will be considered by the Central government.

Objections or suggestions, if any, may be sent to the Secretary, Ministry of Health & Family Welfare (Department of Health) Nirman Bhawan, New Delhi.

RULES

1. (1) These rules may be called the Prevention of Food Adulteration (Amendment) Rules, 1991.

(2) They shall come into force on the date of their final publication in the official gazette.
2. In the Prevention of Food Adulteration Rules 1955, in Rule 65 (2), in the table,—

(a) The entries in Column 2, 3 and 4 against serial number 1, 3 and 11 shall be omitted.

(b) For serial number 15 and entries relating thereto the following serial number and entries shall be substituted, namely :

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Name of insecticide</th>
<th>Food</th>
<th>Tolerance limit mg/kg (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hexachlorocyclo-hexane and its Isomers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) Alfa (α) Isomer :</td>
<td>Rice grain unpolished</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice grain polished</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk (whole)</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice grain unpolished</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice grain polished</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk (whole)</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(b) Beta (β) Isomer :</td>
<td>Food grains except rice</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice grain unpolished</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice grain polished</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk (whole)</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk products</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(on whole basis)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fruits and Vegetables</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eggs</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(on shell free basis)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meat and Poultry</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(on whole basis)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(c) Gama (γ) Isomer :</td>
<td>Rice grain unpolished</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>known as Lindane</td>
<td>Rice Polished</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk (whole)</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>d) Delta (δ) Isomer :</td>
<td>Rice grain unpolished</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rice Polished</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milk (whole)</td>
<td></td>
</tr>
</tbody>
</table>

[No. P. 15014/8/90-PH (F&N) PFA]
BALBIR SINGH, Jt. Secy.

Note: The Prevention of Food Adulteration Rule 1955 were first published in Part II Section 3 of the Gazette of India vide S.R.O. 2105 dated 12-9-1955 and subsequently amended as follows by—
1. SRO 1202 dated 26-5-56
2. SRO 1687 dated 28-7-56
3. SRO 2213 dated 28-9-56 (Extraordinary)
4. SRO 2755 dated 24-11-56

The further amendments were published in Part II, Section 3 Sub-section (i) of Gazette of India as follows by :-
5. GSR 514 dt. 28-6-58
6. GSR 1211 dt. 20-12-58
7. GSR 425 dated 4-4-60
8. GSR 169 dated 11-2-61
9. GSR 1134 dated 16-9-61
10. GSR 1340 dated 4-11-61
11. GSR 1564 dated 24-11-62
12. GSR 1589 dated 22-10-64
13. GSR 1814 dated 11-12-65
14. GSR 74 dated 8-1-66
15. GSR 382 dated 19-3-66
16. GSR 1256 dated 28-8-67
17. GSR 1533 dated 24-8-68
18. GSR 2163 dt. 14-12-68 (Corrigendum)
19. GSR 532 dated 8-3-69
20. GSR 1764 dt. 26-7-69 (Corrigendum)
21. GSR 2068 dt. 30-8-69
22. GSR 1809 dated 24-10-70

Explanations :
(a) Unless otherwise indicated, maximum levels are expressed in mg/kg (ppm) in a whole product basis.
(b) Unless otherwise stated, all food refers to raw agricultural products moving in commerce.

In view of the above, proper control of infestation and prevention of cross infestation both in primary and processed foodgrains is necessary and the fumigations need to be planned systematically with judicious use of insecticides.

The other provisions in the amended act which are of vital importance to FCI along with guidelines are indicated below :—

(1) Nomination of Unit Officer : Under Section 17(2) of the Amended Act, the FCI is required to nominate an officer to be incharge of the individual units for the implementation of the provisions of this Act. Hence instructions have been issued to all Regional Heads to nominate the AM (QC) or the Depot incharge as Unit Incharge and this should have the written consent of such officers nominated. The nomination should be in the prescribed form (VIII Rule 12-B) to be obtained from the local Health Authorities. The names of the persons nominated with their jurisdiction should be informed to Head Quarters within a month of such nominations. These nominated officers
being fully responsible for implementing the provisions of this Act, should exercise all care in ensuring proper quality standards and maintaining the prescribed hygienic conditions where foodgrains are handled or are labelled for sale. For any contravention of the provisions, the unit in-charge is liable for prosecution. Hence the nominated officers should be given full administrative charge.

(2) Warranty: Under section 14 of the Amended Act, a Bill, cash-memo or invoice in respect of sale of any article of Food given by a manufacturer, distributor or dealer in such articles to vendor thereof shall be deemed to be a warranty given by those persons about the nature and quality of such article to the vendor. The FCI, thus is quite significant as far as issue/release of stocks from the depots. The unit in-charge should ensure that only stocks conforming to PFA are released/issued to avoid prosecution. The vendor shall be given full opportunity to check the quality of stocks under issue to them to satisfy themselves about the quality; representative sample in triplicate of such stocks shall be drawn jointly and sealed jointly at the time of issues. One such sample shall be handed over to the Vendor concerned (FPS/Ration shop owners) in support of the quality of stocks released and the vendor should be advised to display the sample and retain it for any future reference. An endorsement in the invoice stating that the quality is in conformity with the jointly drawn and sealed sample given thereon be made to safeguard the interest of FCI. Of the remaining two samples one shall be deposited with the Distt. Office and other retained in the Unit itself for any future reference. Validity of the period for which sample could be considered representative may be decided depending upon local situations. Once the container in which grain represented in the sample is released or opened it is no more tamper proof. This procedure shall be followed while releasing stocks to the Public distribution system i.e. FPS/Cooperative etc. As for issues of wheat to Roller Flour Mills and other authorised flour millers of Defence services, the question of treating invoice or bill as warranty does not arise in view of the provision at clause 10(2) that ‘Primary Food’ not intended for sale as such food shall not be sampled by the Food Inspectors. Since the wheat is issued for further processing, an endorsement on the invoice wheat released not meant for sales as wheat should be made as a safeguard.

Since all state Governments and their Agencies as also similar Corporations handling foodgrains are not exempted from the purview of the act, the FCI has a logical stand in emphasising that the quality of stocks if and when offered by them to the FCI should conform to PFA.

5.7 The FCI deposits stocks with CWCs and SWC. When these stocks are issued from their godowns it should be ensured that a certificate should be taken from the CWC/SWC to the effect that at the time of release these have been examined and found to be conforming to the PFA standards of quality. This will safeguard the interest of the FCI.

To enable expeditious checking for pesticidal residue in suspected lots, the Regional Office should ensure that every Regional laboratory is provided with the necessary men and material for carrying out this analysis.

A copy of the amended act with Rules should be available at every depot.

5.8 In case of processed food the Act provides a safeguard, namely, that if the processed food has not been tempered with in the course of handling and storages, responsibility for defaults if any will be with the
agency processing the food. For processed foods like sugar, rice, etc., handled by the FCI, therefore unit officers will point out to the persons sampling the food under the Act, the name and address of the processing agency and also that the food has not been tempered with in the course of handling and storage. In this context it will be necessary to ensure that all receptacles of processed food bear a legible stencil giving particulars of the manufacturer and also the food contained. Any lapse in this respect should be corrected in time.

5.9 For various items involved in the provisions of the Act definitions/description given for the items in related portion of the Act, will be applicable. Where such description is not given or analytical procedure is not mentioned, definition/procedure of the related Indian standard is to be adopted. This needs to be noted by all concerned.

5.10 In the depots of the corporation, along with grain and sugar meant for human consumption, damaged grain, sweepings and certain categories of grain to be released conditionally are handled. For operational reasons it is not possible to keep these lots in separate sheds other than those meant for sound grain. When such lots are required to be kept in the same sheds with sound grain, strict precaution to be taken is to keep them at sufficient distance isolated from sound grain, clearly labelled in bold letters "Not to be released for human consumption". A separate register shall be maintained in each shed for such lots giving full details about receipt, type of damage, reconditioning to be done and how to be disposed. Normal sweepings and mixed sweepings which are likely to be considered 'adulterated' under the provisions of the 'Act' shall be also kept separate, clearly labelled as long as these are not reconditioned and rendered fit for human consumption. Mishandling of sweepings received from different sources could invite penalties under the provisions of the Act. Full record of quantities received, source of receipt, quantities reconditioned and type of reconditioning, therefore, needs to be maintained with names of staff concerned to enable fixing of responsibility, if necessity arises.

5.11 The plants, fruits and seeds (regulation of Import into India) order, 1989. This replaces earlier PPS order, 1984

Short title and commencement.—This order may be called the Plants, Fruits and Seeds (Regulation of Import into India) Order, 1989. This comes in force from 27-10-89.

5.12 Definitions.—

In this order, unless the context otherwise requires—

(a) “Form” means form attached to this order;

(b) “Official Phytosanitary Certificate” means a Phytosanitary certificate in the formate prescribed by International Plant Protection Convention sponsored by the Food and Agricultural Organisation of the United Nations Organisation (reproduced as Schedule-I) and issued by the authorised officer of the country of origin of consignments;

(c) “Packing material” means the packing material consisting of saw dust, wood shavings, waste paper and synthetic, material used for packing of plant, fruits or seeds;
(d) "Pest" means any form of plant or animal life or any pathogenic agent, injurious or potentially injurious to plants or plant products and includes any insect, mite, nematode, snail, bacterium fungus, virus, viroid, mycoplasma-like-organism (MLO), Phanerogam or weed;

(e) "Plant" means any plant or part thereof, whether living or dead, trees, shrubs, nursery stocks, and includes all vegetatively propagated materials;

(f) "Plant Protection Advisor" means the plant protection Advisor to the Government of India, Directorate of Plant Protection Quarantine and Storage, N.H. IV, Faridabad-121001;

(g) "Post-entry quarantine" means growing of plants in isolation for any specified period in a glasshouse, and facility, area or nursery, approved by the plant Protection Advisor;

(h) "Seeds" means seeds of agricultural, horticultural and fodder crops, forest trees and includes seedlings and tubers, bulbs, rhizomes, roots, cuttings, all types of grafts and other vegetatively propagated material utilised for sowing, planting, or consumption;

(i) "Schedule" means schedule annexed to this order.

5.13 General conditions for Import.—

All consignments of plants, fruits and seeds (hereinafter referred to as consignments) shall be imported into India subject to the following conditions, namely:—

(1) No consignment shall be imported into India without a valid permit issued under clause (3);

(2) All applications for a permit to import consignments by land air or sea shall be sent (in triplicate), at least one month in advance to the plant protection Adviser along with prescribed fee. The application for the import of seeds and fruits for consumption shall be made in Form ‘A’. The application for the import of seeds, fruits and plants for consumption shall be made in Form ‘A’. The application for the import of seeds and plants for sowing or planting shall be made in form “B”.

(3) (i) The Plant Protection Adviser shall issue permits (in duplicate) in Form ‘C’ for import of seeds and fruits for consumption and in Form ‘D’ for import seeds and plants for sowing or planting, if he is satisfied that the applicant meets all the necessary conditions;

(ii) The issue of permit may be refused or withheld by the plant protection adviser after giving reasonable notice to the applicant and for reasons to be recorded in writing;

(4) The Plant Protection Advisor shall forward to the importer an Orange and Green colour Tags, specified in form ‘E’; in the case of permits issued for import of seeds and plants for sowing or planting so as to facilitate the identification of consignments at the time of their arrival at the land custom station or port of entry;
(5) All the consignments for consumption, sowing and propagation or planting shall be imported through entry points notified by the Central govt. from time to time in his behalf.

(6) The consignments on arrival at the ports/land custom stations shall be inspected and, if necessary fumigated, disinfected or disinfested by the plant Protection Adviser or any other officer authorised by him in this behalf.

Provided that in the case of consignments of seeds and fruits for consumption of more, than 1000 cubic meters in volume, the importer shall, at his own cost, arrange for fumigation, disinestation or disinfection of the consignment under the supervision of an officer authorised by the plant protection adviser in that behalf through an agency approved by the plant protection adviser.

(7) It shall be the responsibility of the importer—

(a) to bring the consignments to the concerned plant Quarantine and fumigation station, or to places of inspection, fumigation or treatment, as directed.

(b) to open, repack and load into or unload from the fumigation chamber and seal the consignments; and

(c) to remove them after inspection and treatment,

according to the directions issued by the Plant Protection Adviser or an Officer authorised by him;

(8) Plants and seeds which require post-entry quarantine inspection shall be grown in a post-entry quarantine facility approved by the Plant Protection Adviser. The period for which the plants of seeds shall be grown in such facility shall be as specified in the permit granted under conditions (3);

(9) The consignments intended for other countries shall be allowed transit or transshipment at air or sea ports or at land custom stations, provided that they are packed in such a manner as will not permit spillage of any soil or escape of any pest and subject to the condition that they are not opened in any place in India;

(10) No consignment shall be imported unless accompanied by an Official Phytosanitary Certificate issued by the authorised Officer of the country of origin of the consignment;

Provided that cut flowers, garlands, bouquets, fruits and vegetables weighing less than two kilograms imported for personal consumption may be allowed to be imported without a Phytosanitary certificate or a permit.

(11) No consignment wherein hay or straw or any material of plant origin is used for packaging or as a part of packaging material shall be imported;

(12) Import of soil, earth, compost, sand, plant debris along with plants, fruits or seeds shall not be permitted except under the following conditions:
(i) The consignments of soil, earth, clay for any microbiological, soil-mechanics or mineralogical investigations and peat for horticultural purposes may be permitted through specified air or sea ports or land custom station on applications made for that purpose;

(ii) The applications for that purpose shall be made at least one month in advance in Form ‘F’;

(iii) The Plant Protection Adviser may, after scrutiny of the application, and if satisfied of the purpose for which such consignment is being imported, issue special permit in Form ‘G’;

(iv) The consignments shall be inspected, fumigated or sterilised on arrival by the Plant Protection Adviser or any other officer authorised by him in this behalf;

(13) The importer of the consignments or his agents shall pay to the plant protection adviser or any officer authorised by him in this behalf, the fees prescribed in schedule-III to meet the cost of fumigation, disinfection or disinfection before release of the consignments.

5.14 Special Conditions:

In addition to the general conditions specified in 5.13, the articles hereinafter mentioned shall be imported subject to special conditions prescribed for them in Schedule-II.

(i) Cotton seeds, and all species of Gossypium;
(ii) Seeds of forest trees;
(iii) Groundnut seeds, and all species of Arachis;
(iv) Potato and all species of Solanum;
(v) Tobacco and all species of Nicotiana;
(vi) Sunflower and all species of Helianthus
(vii) Wheat and all species of Triticum;
(viii) Paddy and all species of Oryzae.

Every consignment of the articles hereinafter mentioned shall be accompanied with the Official Phytosanitary Certificate containing additional declarations that they are free from pests specified against them in column 4 of Schedule-II.

5.15 Actions related to import will be initiated at the Head Quarters. Actions at the ports such as super inspection, fumigation etc. by the office of the Plant Protection Adviser are to be taken by the concerned Regional/District Managers. Copies of the related documents concerning import be obtained from H.Q. well in advance of the actual arrival of grain.
CHAPTER I
PRELIMINARY

1. Short title and commencement.—(1) This order may be called the Plants, Fruits and Seeds (Regulation of Import into India) Order, 1989.

(2) It shall come into force on the date of its publication in the Official Gazette.

2. Definitions.—In this order, unless the context otherwise requires,—

(a) “Competent Authority” means an authority notified by the Central Government from time to time by notification in the Official Gazette;

(b) “Designated Inspection Authority” means the authority notified by the Central Government from time to time through a notification to be published in the Official Gazette for the inspection of the plants grown in post entry quarantine facilities;

(c) “Entry Point” means sea port, airport or land customs station through which import is permitted under this order;

(d) “Form” means form attached to this order;

(e) “nursery” means any orchard, or any other place, facility, glass-house, screen house, utilised for raising plants;

(f) “Official Phytosanitary Certificate” means a phytosanitary certificate in the format (reproduced as Schedule 1) prescribed by the International Plant Protection Convention sponsored by the Food and Agricultural Organisation of the United Nations Organisation and issued by the authorised officer of the country of origin of consignments;

(g) “Packing material” means the packing material consisting of saw dust, wood shavings, waste paper and synthetic material used for packing of plants fruits or seeds;
(h) "pest" means any form of plant or animal life or any pathogenic agent, injurious or potentially injurious to plants or plant products and includes any insect, mite, nematode, snail, bacterium, fungus, virus, viroid, mycoplasma like organism (MLO), phanerogam or weed;

(i) "plant" means any plant or part thereof, whether living or dead, trees, shrubs, nursery stock, and includes all vegetatively propagated materials;

(j) "Plant Protection Adviser" means the plant Protection Adviser to the Government of India, Directorate of Plant Protection, Quarantine and Storage, N.H. IV, Faridabad;

(k) "Post-entry Quarantine" means growing of plants in isolation for any specified period in a glasshouse, and facility, area of nursery, approved by the Plant Protection Adviser;

(l) "seeds" means seeds of agricultural, horticultural, fruit and fodder crops, forest trees and includes seedlings and tubers, bulbs, rhizomes, roots, cuttings, all types of grafts and other vegetatively propagated material utilized for sowing, planting or consumption;

(m) "Schedule" means schedule annexed to this order;

(n) "soil" includes earth, peat, compost, clay, sand or any medium capable of supporting life of plants and includes ballast or any soil for mineralogical or microbiological investigations or soil utilised for any other purpose.

CHAPTER II

3. General Conditions for Import.—All consignments of plants, fruits and seeds (hereinafter referred to as 'consignments') shall be imported into India subject to the following conditions, namely:

(1) No consignment shall be imported into India without a valid permit issued under clause (3);

(2) (i) All applications for a permit to import consignments by land, air or sea shall be sent in triplicate at least one month in advance to the Competent Authority, and the application for the import of seeds, fruits and Plants for consumptions shall be made in form 'A' and that for the import of seeds and plants for sowing or planting shall be made in form 'B';

(ii) A fee of Rs. 50/- shall be payable along with the application for the import of seeds, fruits and plants for consumption and Rs. 100/- for application for the import of seeds and plants for sowing or planting and the fee shall be payable in the form of Demand Draft payable to the Competent Authority having jurisdiction.

(3) (i) The Competent Authority shall issue permit in Form "C" for import of seeds and fruits for consumption and in Form "D" for import of seeds and plants for sowing or planting, if he is satisfied that the applicant meets all the necessary conditions;
(ii) The issue of permit may be refused or withheld by the Competent Authority after giving reasonable notice to the applicant and for reasons to be recorded in writing;

(iii) The import permit issued under this clause shall be valid for a period of six months provided that the Competent Authority may, on request, extend the period of validity for a further period of six months, for reasons to be recorded in writing;

(4) The Competent Authority shall forward to the importer an orange and green colour tag specified in form “E”, in the case of permits issued for import of seeds and plants for sowing or planting so as to facilitate the identification of consignments at the time of their arrival at the land customs station or port of entry.

(5) (i) All the consignments for consumption, sowing and propagation or planting shall be imported into India only through entry points notified by the Central Government from time to time in this behalf, provided that all consignments of dry fruits, fresh fruits and vegetables for consumption, imported from Afghanistan, Pakistan and West Asian countries by land shall be imported only through Attari-Wagha Border.

(ii) All consignments of plants and seeds for sowing and propagation or planting shall be imported into India through land customs station, seaport, airport at Amritsar, Bombay, Calcutta, Delhi and Madras and such other entry points as may be specifically notified by the Central Government from time to time.

(6) (i) The consignment, on arrival, at an entry point, shall be inspected by the Plant Protection Adviser or any other officer duly authorised by him in this behalf, in accordance with the guidelines issued by the Plant Protection Adviser from time to time.

(ii) The Plant Protection Adviser or the officer authorised by him may, after inspection, fumigation, disinfection or disinfestation, as may be considered necessary by him, accordin quarantine clearance for the entry of a consignment into India or require, in public interest, destruction of the consignment or return of the same to the country of origin;

(iii) Where fumigation or disinfestation or disinfection is considered necessary in respect of a consignment of plants, seeds and fruits of more than 1000 cubic metre in volume, the importer shall on his own or at his cost through an agency approved by the Plant Protection Adviser arrange for the fumigation disinfection or disinfestation of the consignment, under the supervision of an officer duly authorised by the Plant Protection Adviser in that behalf;

(7) It shall be responsibility of the importer,—

(a) to bring the consignments to the concerned Plant Quarantine and Fumigation Station, or to places of inspection, fumigation or treatment as directed by the Plant Protection Adviser or the officer duly authorised by him;
(b) to open, repack and load into or unload from the fumigation chamber and seal the consignments; and

(c) to remove them after inspection and treatment, according to the directions issued by the Plant Protection Adviser or an officer duly authorised by him.

(8) The consignments intended for other countries shall be allowed transit through or transhipment at air or sea ports or land customs stations, provided they are packed in such a manner as will not permit spillage of any soil or material or escape of any pest, and subject also to the condition that they are not opened in any place in India.

(9) No consignment shall be imported unless accompanied by an Official Phytosanitary Certificate issued by the authorised officer of the country of origin of the consignment:

Provided that cut flowers, garlands, bouquets, fruits and vegetables weighing less than two kilograms imported for personal consumption may be allowed to be imported without a Phytosanitary Certificate or an import permit.

(10) Consignments for import should be packed in the packaging material envisaged as in clause 2(g) of this order. No consignment wherein hay or straw or any material of plant origin is used for packaging or as a part of packaging material shall be allowed to be imported.

(11) Import of soil, earth, compost, sand, plant debris alongside plants, fruits or seeds shall not be permitted except under the following conditions:

(i) The consignments of soil, earth, clay and similar material for any microbiological, soil-mechanics or mineralogical investigations and peat for horticultural purposes may be permitted through specified air or sea ports or land custom station, on applications made for that purpose;

(ii) The application for the purpose referred to in (i) above shall be made to the Plant Protection Adviser, at least one month in advance, in form “F”;

(iii) The Plant Protection Adviser may, after scrutiny of the application, and if satisfied of the purpose for which such consignment is being imported, issue special permit in Form “G”.

(iv) The consignments shall be inspected, fumigated, disinfected or disinfested, on arrival, by the Plant Protection Adviser or any other officer duly authorised by him in this behalf.

(12) The importer of the consignments or his agent shall pay to the Plant Protection Adviser or any other officer duly authorised by him in this behalf, the fees prescribed in Schedule III to meet the cost of inspection, fumigation disinfection, disinfection before the release of the consignments.
CHAPTER III

4. Special conditions.—(1) In addition to the general conditions specified in Chapter II, the articles hereinafter mentioned shall be imported subject to special conditions prescribed for them in Schedule II, namely:

(i) All species of Allium;
(ii) Cacao and all species of Sterculiaceae and Bombacaceae;
(iii) All species of Citrus;
(iv) Coconut, seeds and all species of Cocoa;
(v) Coffee plants and seeds, and all species of Coffee;
(vi) Cotton seeds, and all species of Gossypium;
(vii) Seeds of forest trees;
(viii) Groundnut seeds, and all species of Araches;
(ix) Bucrene and all species of Medicago;
(x) Potato and all species of Solanum;
(xi) Rubber and all species of Hevea;
(xii) Sugarcane and all species of Saccharum;
(xiii) Tobacco and all species of Nicotiana;
(xiv) Berseem and all species of Trifolium;
(xv) Sunflower and all species of Helianthus;
(xvi) Wheat and all species of Triticum;
(xvii) Paddy and all species of Oryzae;
(xviii) Cuttings, saplings and bud-woods of flowers or ornamental plants;
(xix) Seeds and the plant material of fruits.

(2) Every consignment of the articles hereinafter mentioned shall be accompanied with the official Phytosanitary Certificate issued by the authorised officer of the country of origin of consignment, containing additional declarations that they are free from pests specified against them in column 4 of Schedule II.

CHAPTER IV

POST-ENTRY QUARANTINE

5. Plants and seeds, which require Post-entry Quarantine as laid down in Schedule II of this order, shall be grown in Post-entry Quarantine facilities, approved and certified by the Designated Inspection Authority, to conform to the conditions laid down by the Plant Protection Adviser. The period for which, and the conditions under which, the plants and seeds shall be grown in such facilities shall be specified in the permit granted under clause 3.
6. The Post-entry Quarantine facilities shall be established and provided by the importer or his agent at his own cost and these shall be ready for use at the time of arrival of the consignment in India. The importer shall obtain a certificate from the Designated Inspection Authority who, after inspection of the Post-entry Quarantine facilities, shall certify that such Post-entry quarantine facilities have been duly established and provided in accordance with the guidelines of the Plant Protection Adviser. The importer shall produce this certificate before the Officer-in-Charge of the Quarantine Station at the entry point, at the time of arrival of the consignment.

7. (i) The Officer-in-Charge of the Quarantine Station, if after inspection of the consignment satisfied, shall accord quarantine clearance with Post-entry Quarantine condition on the production, by an importer, of a certificate from the Designated Inspection Authority as envisaged in clause 7, with the stipulation that the plants shall be grown in such Post-entry Quarantine facility for the period specified in the import permit.

(ii) After according quarantine clearance with Post-entry Quarantine conditions to the consignments of plants and seeds requiring Post-entry Quarantine, the Officer-in-Charge of the quarantine station at the entry point shall inform the Designated Inspection Authority, having jurisdiction over the Post-entry Quarantine facility of their arrival at the location where such plants would be grown by the importer.

8. The importer shall inform in advance the Designated Inspection Authority having jurisdiction about the time of planting of such material.

9. The importer shall permit to the Designated Inspection Authority complete access to the Post-entry Quarantine facility for the inspection of plants and shall at all times abide by his instructions concerning the plants in the Post-entry Quarantine.

10. The Designated Inspection Authority shall inspect the plants grown in the Post-entry Quarantine facility of the importer for the detection of the incidence of pests and diseases and observance of general terms and conditions governing the approval of the Post-entry Quarantine. Such inspections shall be at the time of planting and at such intervals as may be considered necessary by the Designated Inspection Authority in accordance with the guidelines issued by the Plant Protection Adviser.

11. (i) The Designated Inspection Authority shall permit the release of plants from Post-entry Quarantine, if they are found to be free from pests and diseases for the period specified in the permit for importation.

(ii) Where the plants in the Post-entry Quarantine are found to be affected by pests and diseases during the specified period:

(a) the Designated Inspection authority shall order the destruction or return to the country of origin of the affected consignment of whole or a part of the plant population in the Post-entry Quarantine if the pest or disease is exotic, and
(b) the Designated Inspection Authority shall advise the importer about the curative measures to be taken to the extent necessary, if the pest or disease is not exotic and permit the release of the affected population from the Post-entry quarantine only after curative measures have been observed to be successful. Otherwise, the plants shall be ordered to be destroyed.

(iii) Where destruction of any plant population is ordered by Designated Inspection Authority, the importer shall destroy the same in the prescribed manner under the supervision of Designated Inspection Authority.

12. The importer shall be liable to pay the prescribed fee for inspection of plants in the Post-entry Quarantine facility as laid down in Schedule III.

CHAPTER V
APPEAL AND REVISION

13. (i) If an importer is aggrieved by the decision of a Designated Inspection Authority regarding the destruction of any plant population, he may appeal to the Plant Protection Adviser within 7 days from the date of communication of the decision giving the grounds of appeal.

(ii) It shall be lawful for the Plant Protection Adviser to rely on the observation of the Designated Inspection Authority and such other expert opinion, as he may deem necessary, for deciding the appeal.

14. The memorandum of appeal shall set out the grounds on which the decision is challenged and shall be accompanied by a Treasury Challan evidencing the payment of a fee of Rs. 10/-.

15. The Plant Protection Adviser may, at any time call for the records relating to any case pending before the Designated Inspecting Authority for the purpose of satisfying itself as to the legality or propriety of any decision passed by that authority and may pass such order in relation thereto, as it thinks fit:

Provided that no such order shall be passed after the expiry of three months from the date of the decision:

Provided further that the Plant Protection Adviser shall not pass any order prejudicial to any person, without giving him a reasonable opportunity of hearing.

CHAPTER VI

16. Powers of Relaxation.—The Central Government may, in public interest, relax any of the contentions of this order relating to the permit and to phytosanitary Certificate in relation to the import of any consignment.

[No. 8-4/87-PP]

B. NARASIMHAN, Jt. Secy.
FORM—A

[Clause 3(2)(i)]

APPLICATION FOR PERMIT TO IMPORT SEEDS/FRUITS/PLANTS FOR CONSUMPTION

To

The Competent Authority,

________________________________________

________________________________________

The undersigned hereby applies for a permit authorising the import of seeds/fruits/plants for consumption as per details given below:—
(Please write/type in Block Letters)

1. Name and exact description of seeds/fruits/plants to be imported:

2. Description of the Consignment and Quantity:

3. Name and address of the consignor:

4. Name and address of the importer:

5. Country and locality in which grown or produced:

6. Foreign port of shipment:

7. Approximate date of arrival of the consignment in India:

8. Name of *Air/Sea Port/Land Customs Station of entry in India:

I undertake to produce an official Phytosanitary Certificate with additional declaration, if any, as specified in the permit. I also undertake to pay to the Plant Protection Adviser or any officer duly authorised by him, the prescribed fees to meet the cost of inspection, fumigation, disinfection and disinfection of the consignment referred to above.

Place: Signature of the importer or his authorised agent.

Date: Name and Postal address of the importer or his authorised agent

*Strike out whichever is not applicable.
FORM—B

[See Clause 3, condition (2)]

APPLICATION FOR PERMIT TO IMPORT SEEDS AND PLANTS FOR SOWING/PLANTING

To

The Competent Authority,


The undersigned hereby applies for a permit authorising the import of Seeds/Plants as per details given below:—

(Please type/write in BLOCK Letters)

1. Name and address of Importers:

2.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Exact description of seeds/plant to be imported (state commercial and botanical name)</th>
<th>Name of Hybrid/variety</th>
<th>Quantity No. of packages</th>
<th>Total weight or total No. of propagating material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. *Catalogue of seeds producer establishing identity of the seed/planting material to be imported:

4. Name and address of the producing company:

5. Name and address of consignor:

6. Country and locality in which seed/planting material grown:

7. Foreign port of shipment:

8. Approximate date of arrival of consignment in India and name of **Air/Seaport/Land Custom Station.

9. Number and date of registration certificate from National Seeds Corporation/State Director of Agricul-
10. Number and date of import licence for commercial import of seeds of coarse cereals, oilseeds and pulses (photo copy to be attached).

11. ONLY FOR IMPORTS FOR WHICH POST ENTRY QUARANTINE/INSPECTION IS PRESCRIBED

(a) Exact locality and its postal address where imported seeds/plants will be grown:

(b) Names, postal address of Designated Inspection Agency (DIA) under whose supervision imported seeds/plant will be grown.

12. DECLARATION

I declare that the information furnished is correct to the best of my knowledge and belief.

I undertake to produce an official phytosanitary certificate with additional declarations, if any specified in the permit.

I also undertake to pay to the Plant Protection Adviser or the officer duly authorised by him, the prescribed fees to meet the cost of inspection, fumigation, disinfection and disinfection of the consignment referred to above:

Place:

Date: Signature of the Importer or his authorised agent

* Photo copy of cover page and the relevant portion, if original catalogue cannot be furnished/photo copies of documents establishing identity of the seeds/planting materials.

@ Only for Food Processing Industries.

** Strike out whichever is not applicable.
FORM—C  
[Clause 3(3)]  
(National Emblem)  
GOVERNMENT OF INDIA  
MINISTRY OF AGRICULTURE  
(Department of Agriculture & cooperation)  
Directorate of Plant Protection, Quarantine & Storage  
N.H. IV, Faridabad-121001.  
PERMIT FOR IMPORT OF FRUITS/SEEDS/PLANTS FOR CONSUMPTION

Permit No. .............................................. Valid upto.................................

Date..................................................

1. Permission is hereby granted.................................................................

.................................................................
(Name and address of the importer or his authorised agent)

to import by air/sea/land the plants/seeds/fruits herein specified grown or produced in
.................................................................

.................................................................
(Name and address of the consignor)

through air/sea port/land custom station,
.................................................................

.................................................................
(Name of Port/Station)

as per following details:—

1. Name and exact description of seeds/fruits/plants to be imported.

2. Description of the Consignment and Quantity

3. Country and locality in which grown or produced,

4. Foreign Port of shipment:

5. Specific purpose of import:

2. The consignment should be,—

(i) accompanied by an official Phytosanitary Certificate issue by the authorised officer of the country of origin (i.e.*

.................................................................

(ii) the official Phytosanitary Certificate shall also contain the following additional declarations:—

(a) .................................................................

(b) .................................................................

127
3. Quantity and description:

4. This permit is not transferable.

Place: 
Date: 

(SEAL)

Signature of the Competent Authority

*Here specify the country of origin.

Copy to:

(1) the Collector of Customs .................................................................

.................................................................

(address of Collector of Customs)

(2) Officer-in-Charge, Plant Quarantine and Fumigation Station..........................

.................................................................

(Name and address of the station)

Note: (1) The importer or his authorised agent shall produce this permit for inspection by the Plant Protection Adviser or an officer authorised by him at the time of arrival of the consignment at the land customs station or port of entry.

(2) THE IMPORTER SHALL INTIMATE IMMEDIATELY TO THE PERMIT ISSUING AUTHORITY OF ANY CHANGE OF ADDRESS.
FORM—D
[Clause 3(3)]

(National Emblem)

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE
(Department of Agriculture & Cooperation)
Directorate of Plant Protection, Quarantine & Storage
N.H. IV, Faridabad-121 001.

PERMIT FOR IMPORT OF PLANTS/SEEDS FOR SOWING/PLANTING

Permit No. ........................................... Valid upto ...........................................

Date ....................................................

1. Permission is hereby granted .................................................................

(Name and address of the importer or his authorised agent)

to import by air/sea/land the plants/seeds herein specified grown or produced in ...........................................

............................................ from ............................................

(Name and address of the consignor)

through air/sea port/land custom station, ............................................

(Name of Port/Station)

as per following details:—

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Exact description of Plants/Seeds to be imported (state commercial and botanical name)</th>
<th>Name of Hybrid/variety</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of packages</td>
<td>Total weight or total No. of propagating material</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. *Catalogue of seeds producer establishing identity of the seed/planting material to be imported:

3. Name and address of the producing company:

4. Name and address of consignor:
5. Country and locality in which seed/planting material grown:

6. Foreign port of shipment:

7. Approximate date of arrival of consignment in India and name of Air/Seaport/Land Custom Station.

8. Number and date of registration certificate from National Seeds Corporation/State Director of Agriculture/Horticulture/ Central/State Govt. Authorities (alongwith a photo copy):

9. Number and date of import licence for commercial import of seeds of coarse cereals, oilseeds and pulses (photo copy to be attached).

10. ONLY FOR IMPORTS FOR WHICH POST ENTRY QUARANTINE/INSPECTION IS PRESCRIBED

(a) Exact locality and its postal address where imported seeds/plants will be grown:

(b) Names, postal address of Designated Inspection Agency (DIA) under whose supervision imported seeds/plants will be grown.

2. The consignment of plants/seeds should be,—

(i) free from soil and seeds;

(ii) accompanied by an Official Phytosanitary Certificate issued by the authorised officer of the country of origin (i.e.*..........................................................

(iii) the Official Phytosanitary Certificate shall also contain following additional declarations:—

(a) ......................................................................................................................

(b) ......................................................................................................................

(c) ...................................................................................................................... etc.

3. The plants/seeds should be grown under post-entry quarantine approved by the Plant Protection Adviser at ..............

(Name and address of location)
for a period not exceeding .................................................... days.

4. Quantity and description:

5. This permit is not transferable.

Place: ................................................................. Signature of the Competent Authority

Date: .................................................................

(SEAL)

Copy to: ---

(1) The Collector of Customs .......................................................... ..........................................................

(Address of the Collector of Customs)

(2) Officer-in-Charge, Plant Quarantine & Fumigation Station ..........................................................

(Name of Station)

Note: 1. The importer or his authorised agent shall produce this permit for inspection by the Plant Protection Adviser, or an officer authorised by him, at the time of arrival of the consignment at the land custom station or port of entry.

Note: 2. THE IMPORTER SHALL INTIMATE IMMEDIATELY TO THE PERMIT ISSUING AUTHORITY OF ANY CHANGE OF ADDRESS.

*Here specify the country of origin.
FORM—E
[Clause 3(4)]
FACE OF TAG

This package contains perishable plants/seeds

Rush and Deliver to: The Officer-in-Charge
Plant Quarantine and Fumigation Station,
..................................................Airport/Seaport/Land Customs Station.

Signature of Competent Authority

______________________________

REVERSE OF TAG

Permit No........................................Valid upto..........................................................

directions for sending plants/seeds
Under this tag only materials covered by
Permit the number of which it bears should be booked.
Any other material may be confiscated.
Place inside the package the importer's name and address, the invoice, and an official Phytosanitary
Certificate issued by authorised officers of your country. In case of import by sea rush all documents to consignee
by air.

Attach Tag securely to consignment.
To

The Plant Protection Adviser to the Government of India,
Directorate of Plant Protection,
Quarantine & Storage,
N.H. IV,
Faridabad-121 001.

The undersigned hereby applies for a Special Permit authorising import of soil/peat as per details given below :

(IN BLOCK LETTERS)

1. Exact details of the quantity of Soil/Peat to be imported :

2. Details of location (village, town, district, country) from where import will be made :

3. Mode of packing of consignment :

4. Specific purpose of import :

5. Name and address of the Consignor :

6. Name and address of the importer :

7. Foreign Port of shipment :

8. Approximate date of arrival of consignment in India and name of the airport or seaport or Land Custom Station :

9. Specific location where consignment will be utilised :

I undertake to pay to the Plant Protection Adviser or any officer duly authorised by him prescribed fees to meet the cost of inspection, fumigation, disinestration or disinfection of the consignment referred above.

Signature of the importer or his authorised agent

Place :

Date :

Name and postal address of the importer or his authorised agent.
FORM—G

[Clause 3(II)(iii)]
(National Emblem)

Government of India

MINISTRY OF AGRICULTURE
(Department of Agriculture & Cooperation)
Directorate of Plant Protection, Quarantine & Storage
N.H. IV, Faridabad-121 001.

SPECIAL PERMIT FOR IMPORT OF SOIL/PEAT

Special Permit No. ........................................... Valid upto .........................

Date ...........................................................

1. Permission is hereby granted to

........................................................................................................
(Name and address of the importer or his authorised agent)

to import by air/sea/land the soil/peat, as per details given below, from

........................................................................................................
(Name and address of the consignor)

through land custom station/air/sea port of ................................................

(Name of the land)

........................................................................................................
(custom station/air/sea port)
as per following details :

1. Exact details of the quantity of soil/peat to be imported :

2. Details of location (village, town, district, country) from where import will be made :

3. Mode of packing of consignment :

4. Specific purpose of import :

5. Foreign Port of shipment :

6. Specific location where consignment will be utilised :

7. This permit is not transferable :

Place : .......................................................... Signature of the Plant Protection Adviser

Date : .......................................................... to the Government of India

(SEAL)
Copy to:
1. The Collector of Customs .................................................................
   (Address of the Collector of Customs)
2. The Officer-in-Charge, Plant Quarantine and Fumigation Station ..........

   (Name and Address of the station)

Note: 1. The importer or his authorised agent shall produce this permit for inspection by the Plant
       Protection Adviser or an officer duly authorised by him at the time of arrival of the consignment
       at the land customs station or port of entry.

       2. THE IMPORTER SHALL INTIMATE IMMEDIATELY TO THE DIRECTORATE OF
          PLANT PROTECTION, QUARANTINE AND STORAGE OF ANY CHANGE OF
          ADDRESS.

SCHEDULE—I
[Clause 2(f)]
OFFICIAL PHYTOSANITARY CERTIFICATE

Plant Protection Organisation of.............................................. No.

To,

The Plant Protection Adviser to the Government of India,
Dte. of Plant Protection, Quarantine and Storage,
N.H. IV, Faridabad-121 001
(India)

DESCRIPTION OF CONSIGNMENT

Name and address of the exporter : ............................................

Declared name and address of the consignee : ................................

Number and description of packages : ........................................

Distinguishing marks : .............................................................

Place of origin : ......................................................................

Declared means of conveyance : ...............................................  

Declared port of entry/land customs station : ............................  

135
Name of the produce and the quantity declared:

Commercial and Botanical names of the plant/seeds/fruit:

This is to certify that the plants or plant products described above have been inspected and found free from quarantine pests and substantially free from other injurious pests; and that they are considered to conform with the current phytosanitary regulations of the importing country.

DISINFESTATION AND/OR DISINFECTION TREATMENT

Date: ...................................... Treatment: ......................................

Chemical (active ingredient) ...................................... Duration and temperature .................

Concentration ...................................... Additional information ......................................

Additional declaration

(Stamp of Organisation)

Place of Issue: ......................................

Name of the authorised officer: ......................................

......................................

Signature

Date: ......................................

No financial liability with respect to this certificate shall attach to ......................................(Name of the Plant protection organisation) ......................................or to any of its officers or representatives.

*Optional clause.
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Plants, Seeds and propagating materials</th>
<th>Countries from where import is prohibited</th>
<th>Pest for which additional declarations in Official Phytosanitary Certificate are required</th>
<th>Special conditions for import</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All species of Allium (Onion, garlic, leek, Chive, shalot etc.)</td>
<td>—</td>
<td>Smut (Urocystis capulæ)   Stem and bulb nematode  Ditylenchus dipsaci</td>
<td>—</td>
</tr>
<tr>
<td>2</td>
<td>Cacao and all species of the family Sterculiaceae and Bombacaceae</td>
<td>West Indies, Africa and Sri Lanka</td>
<td>Pod rot (Monilia rorei)   Growing imported seed Mealy Pod (Trachysphaeria and plants under post-fructigena), Witches Broom entry quarantine. (Crinipella perniciosa) and swollen Shoot virus.</td>
<td>—</td>
</tr>
<tr>
<td>3</td>
<td>All species of Citrus (lemon, lime, orange, grape fruit etc.)</td>
<td>—</td>
<td>“Mal Secco” (Deuterophoma trachipilla)</td>
<td>Growing imported seeds and plants under post-entry quarantine.</td>
</tr>
<tr>
<td>4</td>
<td>Coconut seeds and plants (all species of cocoa)</td>
<td>—</td>
<td>Red Ring (Rhadinaphelenchus cocophilus), Lethal yellowing, cadang, Bronze leaf wilt, Guam coconut disease, Leaf Scorch, Coconut leaf, miner (Promecotheca cuminigi)</td>
<td>(i) consignments can only be imported by Director, Central Plantation Crops Research Institute, Kasaragod (Kerala). (ii) Imported material shall be grown in individual containers under post-entry quarantine.</td>
</tr>
<tr>
<td>5</td>
<td>Coffee (a) Plants, seeds (all species of Coffee)</td>
<td>—</td>
<td>Americal leaf spot (Omphalia flavida), Virus diseases and coffee berry borer (Hypothenenum hampii)</td>
<td>(i) Consignments of coffee seeds plants can only be imported by Director, Coffee Research Station pin-577117, Karnataka.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<td>----------------------------------------</td>
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<td>----------------------------------------</td>
</tr>
<tr>
<td>6</td>
<td>Cotton seeds (all species of Gossypium)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forest seeds of (all species of Pinus, Ulmus and Castanea)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Groundnut seeds (Peanut (all species of Arachis))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Production of seeds in areas free of Puccinia arachidis and Sphaceloma arachidis.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Inspection of parent crops in active growing season and certification for freedom from peanut mottle, peanut stunt &amp; marginal chlorosis viruses.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Consignment can only be used for research work.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Lucerne (all species of Medicago)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>bacterial wilt (Corynebacterium incidium)</td>
<td></td>
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</tr>
<tr>
<td>10.</td>
<td>Potato (all species of Solanum)</td>
<td>Wart (Synchytrium endobioticum Cyst nematodes Golobodera pallida, G. rostochiensis), Leptinotarsa decemlineata) and freedom of parent crops from virus diseases.</td>
<td>(i) Consignments can only be imported for research by Director, Central Potato Research Institute, Shimla (H.P.) (ii) Consignments shall be grown under post-entry quarantine.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Rubber (all species of Hevea)</td>
<td>America or West Indies</td>
<td>South American leaf Blight (Mycrocyclus ulci) Sphaerostilbe repens</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Sugarcane (all species of Saccharum)</td>
<td>Fiji, New Guinea, Australia, Philippines</td>
<td>Leaf Scald (Xanthomonas albicans), Gummosis (Xanthomonas vasculorum), Serch, white leaf, Downy mildew and chlorotic sterk.</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Sunflower (all species of Helianthus)</td>
<td>Argentina, Peru</td>
<td>Downy Mildew (Plasmodopara halstedii), Orobanche Camana</td>
<td></td>
</tr>
<tr>
<td>(i)</td>
<td>Consignments imported for sowing and planting shall be grown under post-entry quarantine. (ii) Consignments imported for consumption shall be utilised under supervision of Plant Protection Adviser or any officer authorised by him.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Tobacco (all species of Nicotiana)</td>
<td>(a) Tobacco seed</td>
<td>Blue Mould (peronospora tabacina)</td>
<td></td>
</tr>
<tr>
<td>(i)</td>
<td>Tobacco seed for sowing and planting shall only be imported by Director Central Tobacco Research Insti-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>(b) Un-manufactured tobacco</td>
<td></td>
<td>Tobacco Moth (Ephestia elutelia)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Berseem (all species of Trifolium)</td>
<td></td>
<td>Bulb and Stem nematode (Ditylenchus dipsaci)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Wheat (all species of Triticum)</td>
<td></td>
<td>Ergot (Claviceps purpurea), Dwarf bunt (Tilletia controversa), Spikelet rot Pseudomonas antracis and granary weevil (Sitophilus granarius)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) for sowing and planting.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) for consumption</td>
<td></td>
<td>Granary weevil (Sitophilus granarius)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Import of wheat preferably be undertaken during summer months.

17. Paddy seeds/rice

Granary weevil (Sitophilus granarius).

18. Cuttings/Saplings/budwood of flowers

Exotic pests and diseases to be specified in the import permit and ornamental plants.

19. Planting material/seeds of fruits.

Exotic pests and diseases to be specified in the import permit

Consignments for sowing and planting shall only be imported by Director, National Bureau of Plant Genetic Resources, New Delhi.

(ii) Consignment shall be grown in post-entry quarantine.

(i) Ergot not to exceed 0.05% limit.

(ii) Dwarf bunt not to exceed 0.005%.
the recommendations of Director of Horticul-
ture/Agriculture of State Government.
(ii) Consignment to be grown under Post-entry Quarantine conditions, to be specified by the Plant Protection Ad-
viser.

SCHEDULE-III

A—INSPECTION FEES

[Clause 3(12) and 12]

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars of Import</th>
<th>Volume/Wt.</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Plants, cuttings, saplings, budwood etc. for planting as under Clause 4, Schedule II, requiring Post Entry Quarantine.</td>
<td>(i) Upto 10 Nos.</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii) Above 10 Nos.; for every 100 Nos. or part thereof.</td>
<td>Rs. 50/-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(iii) Above 100 Nos. upto 1000 Nos. or part thereof.</td>
<td>Rs. 250/-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(iv) Above 1000 Nos. upto 10,000.</td>
<td>Rs. 500/-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(v) Above 10,000 Nos.</td>
<td>Rs. 250/- for every 1000 Nos. or part thereof.</td>
</tr>
<tr>
<td>2</td>
<td>Plants, bulbs, tubers, corns, rhisoms, etc. for Planting, not requiring Post Entry Quarantine.</td>
<td>(i) Upto 10 Nos.</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii) Above 10 Nos. upto 1000 Nos. or part thereof.</td>
<td>Rs. 100/-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(iii) Above 1000 Nos.</td>
<td>Rs. 100/- plus Rs. 0.05 per piece.</td>
</tr>
</tbody>
</table>
   A. for coarse cereals/Pulses/Oil seeds
      (i) Upto 100 gms. Nil
      (ii) Above 100 gms. for every 1 Kg. or part thereof. Rs. 2/-
      (iii) Above 1 Kg. for every 10 Kg or part thereof. Rs. 10/-
   B. For Vegetables/flowers
      (i) Upto 100 Kgs. Re. 1/- per Kg.
      (ii) Above 100 Kgs. upto 1000 Kgs. Rs. 0.50 per Kg.
      (iii) Beyond 1000 Kgs. Rs. 0.20 per Kg.
   C. For Others
      (i) Above 10 Kgs. for every 200 Kgs. or part thereof. Rs. 100/-
      (ii) Above 100 Kgs. for every 1000 Kgs. Rs. 500/- or part thereof

4. Plants, Seeds and fruits for consumption
   (i) Upto 2 Kgs. Nil.
   (ii) Above 2 Kgs. for every 10 Kg or part thereof. Rs. 2/-
   (iii) Above 10 Kg. for every 100 Kgs. or part thereof. Rs. 20/-
   (iv) Above 100 Kg.; for every 1000 Kg. or part thereof. Rs. 40/-

B. FUMIGATION /DISINFECTION/DISINFESTATION/SUPERVISION CHARGES

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars of Import</th>
<th>Volume/Wt.</th>
<th>Fees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Plants, Seeds for consumption</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) Consignments less than 100 cu. m. in volume :—</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(i) 1.5 Cubic M. or less in volume Rs. 6/- of each consignment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(ii) Additional 1.5 Cubic M. or part thereof. Rs. 2/-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) Consignments more than 1000 Cu. M.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Dry fruits, fresh fruits and vegetables.
   (i) Upto 2 Kgs. Rs. Nil.
   (ii) Above 2 Kgs.; for every 50 Kg. or part thereof Rs. 6/-

3. Soil, earth, clay for microbiological, soil mechanics or mineralogical investigations and peat for horticultural purposes.
   (i) 1.5 Cu. M. or less in volume of each consignment Rs. 6/-
   (ii) Additional 1.5 Cu. M. or part thereof Rs. 2/-

4. Seeds and plants for sowing and planting.
   (i) 1.5 Cu. M. or less in volume of each consignment Rs. 6/-
   (ii) Additional 1.5 Cu M. or part thereof Rs. 2/-

 in volume :-
Supervision charges only Rs. 100/-
(The importer shall arrange for fumigation, disinestation of consignment at his cost, under the supervision of Plant Protection Adviser or an officer authorised by him in this behalf).
MINISTRY OF HEALTH & FAMILY WELFARE
(Deptt. of Health)
NOTIFICATION
New Delhi, the 29th May, 1991

G.S.R. 281 (E).—Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of Section 23 of Prevention of Food Adulteration Act, 1954 (37 of 1954), in the Notification of Government of India in the Ministry of Health and Family Welfare (Department of Health) No. G.S.R. 50(E) dated the 5th Feb. 1990 in the Gazette of India, Extraordinary Part-II Section 3, Sub-section (1), dated the 5th Feb. 1990 at pages 1-13, inviting objections and suggestions from all persons likely to be affected thereby, before the expiry of sixty days from the date on which copies of the Gazette of India in which the said notification was published, was made available to the public.

And whereas the copies of the said Gazette were made available to the public on 14th May, 1990.

And whereas the objections and suggestions received from the public on the draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 23 of the said Act, the Central Govt., after consultation with Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955 namely:

RULES

1. (1) These rules may be called the Prevention of Food Adulteration (fourth Amendment) Rules, 1990.

(2) They shall come into force after sixth month from the date of their publication in the Official Gazette.

2. In the Prevention of Food Adulteration Rules, 1955, in Appendix B, for item A.18.06, the following shall be substituted, namely:

A.18.06—Foodgrains meant for human consumption shall be whole or broken kernels of cereals, millets and pulses. In addition to the undermentioned standards to which foodgrains shall conform, they shall be free from argemonemaxicana and kesari in any form. (They shall be free from added colouring matter. The foodgrains shall not contain any insecticide residues other than those specified in column (2) of the table of rule 65 and the amount of insecticide residue in the foodgrains shall not exceed the limits specified in column (4) of the said Table.

A. 18.06-01—Wheat:

Description.—Wheat shall be the dried mature grains of Triticum aestivum Linn. Or Triticum vulgare vill, Triticum durum Desf, Triticum sphaerococcum perc. Triticum dicocum schu., Triticum Compactum Hopst. It shall be sweet, clean and wholesome. It shall also conform to the following standards, namely:
(i) Moisture—Not more than 14 percent by weight (obtained by heating the pulverised grains at 130°C-133°C for two hours).

(ii) Foreign matter—Not more than 3 percent by weight out of which inorganic matter and poisonous seeds, shall not exceed 1.0 and 0.5 per cent by weight, respectively. Out of total limit of poisonous seeds, dhatura and akra (Vicia species) shall not exceed 0.025 and 0.2 per cent by weight respectively.

(iii) Other edible grains—Not more than 6 per cent by weight.

(iv) Damaged grains—Not more than 6.0 per cent by weight including karal bunt affected grains and ergot affected grains. The limit of Karal bunt affected grains, ergot affected grains shall not exceed 3.0 per cent and 0.05 per cent by weight, respectively.

(v) Weevilled grains—Not more than 10 per cent by count.

(vi) Uric acid—Not more than 100 mg. per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram:

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 12 per cent by weight.

A. 18.06.02-Maize:

Maize shall be dried mature grains of Zea mays Linn. shall be sweet, hard, clean and wholesome. It shall also conform to the following standards, namely—

(i) Moisture—Not more than 16.0 per cent by weight (obtained by heating the pulverised grains at 130°C-133°C for two hours).

(ii) Foreign matter—Not more than 4 per cent by weight out of which inorganic matter and poisonous seeds shall not exceed 1.0 and 0.5 per cent by weight respectively. Out of total limit of poisonous seeds, dhatura and akra (vicia species) shall not exceed 0.025 and 0.2 per cent by weight, respectively.

(iii) Other edible grains—Not more than 3 per cent by weight.

(iv) Damaged grains—Not more than 5 per cent by weight.

(v) Weevilled grains—Not more than 10 per cent by count.

(vi) Uric acid—Not more than 100 mg. per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 9 per cent by weight.
A.18.06.03 Jawar and Bajra:

Jawar and Bajra shall be the dried mature grains of Sorghum Vulgare Pers, and Pennisetum-typhoidem Rich, respectively. These shall be sweet, hard-clean and wholesome. These shall also conform to the following standards, namely:

(i) Moisture—Not more than 16.0 per cent by weight (obtained by heating the pulverised grains at 130°C-133°C for two hours).

(ii) Foreign matter—Not more than 4 per cent by weight out of which inorganic matter and poisonous seeds shall not exceed 1.0 and 0.5 per cent by weight, respectively. Out of total limit of poisonous seeds, dhatura and akra (Vicia species) shall not exceed 0.025 and 0.2 per cent by weight, respectively.

(iii) Other edible grains—Not more than 3 per cent by weight.

(iv) Damaged grains—Not more than 6 per cent by weight out of which ergot affected grains shall not exceed 0.05 per cent by weight.

(v) Weevilled grains—Not more than 6 per cent by weight.

(vi) Uric acid—Not more than 100 mg per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 10 per cent by weight.

A.18.06.04 Rice:

Rice shall be the mature kernels or pieces of kernels of Oryza sativa Linn. obtained from paddy as raw or parboiled. It shall be dry, sweet, clean, wholesome and free from unwholesome poisonous substance. It shall also conform to the following standards, namely:

(i) Moisture—Not more than 16 per cent by weight (obtained by heating the pulverised grains at 130°C-133°C for two hours).

(ii) Foreign matter—Not more than 3 per cent by weight out of which inorganic matter shall not exceed 1 per cent by weight.

(iii) Damaged grains—Not more than 5 per cent by weight (excluding discoloured tip).

(iv) Weevilled grains—Not more than 10 per cent by count.

(v) Uric acid—Not more than 100 mg per kg.

(vi) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.
Provided that the total of foreign matter and damaged grains shall not exceed 6 per cent by weight.

A.18.06.05-Masur Whole:

Masur whole shall consist of lentil (Lens culinaris Medik or Ervem lens esculenta Moench). It shall be sound, dry, sweet, clean and wholesome. It shall conform to the following standards namely:

(i) Moisture—Not more than 14 per cent by weight (obtained by heating the pulverised grains at 130°C-133°C for two hours).

(ii) Foreign matter—Not more than 3 per cent by weight out of which inorganic matter shall not exceed 1 per cent by weight.

(iii) Other edible grains—Not more than 3 per cent by weight.

(iv) Damaged grains—Not more than 5 per cent by weight.

(v) Weevilled grains—Not more than 6 per cent by count.

(vi) Uric acid—Not more than 100 mg per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 8 per cent by weight.

A.18.06.06-Urd Whole:

Urd whole shall consist of seeds of pulses (Phaseolus mungo Linn). It shall be sound, dry, sweet and wholesome. It shall also conform to the following standards, namely:

(i) Moisture—Not more than 14 per cent by weight (obtained by heating the pulverised grains at 130°C-133°C for two hours).

(ii) Foreign matter—Not more than 3 per cent by weight out of which inorganic matter shall not exceed 1 per cent by weight.

(iii) Other edible grains—Not more than 4 per cent by weight.

(iv) Weevilled grains—Not more than 6 per cent by count.

(v) Damaged grains—Not more than 5 per cent by weight.

(vi) Uric acid—Not more than 100 mg per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.
Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 9 per cent by weight.

A.18.06.07-Moong whole :

Moong whole shall consist of seeds of green gram (Phaseolus auritus Roxb., Phaseolus rediatus Roxb.). It shall be sound, dry, sweet, wholesome and free from admixture of unwholesome substances. It shall also conform to the following standards, namely:

(i) Moisture—Not more than 14 per cent by weight (obtained by heating the pulvemised pulses at 130°C-133°C for two hours).

(ii) Foreign matter—Not more than 3 per cent by weight out of which inorganic matter shall not exceed 1 per cent by weight.

(iii) Other edible grains—Not more than 4 per cent by weight.

(iv) Damaged grains—Not more than 5 per cent by weight.

(v) Weevilled grains—Not more than 6 per cent by count.

(vi) Uric acid—Not more than 100 mg per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 9 per cent by weight.

A.18.06.08-Chana whole :

Chana whole shall be the seeds of dried grains of gram (Cicer arietinum Linn). It shall be sound, clean, sweet, wholesome and free from unwholesome substances. It shall also conform to the following standards, namely:

(i) Moisture—Not more than 16 per cent by weight (obtained by heating the pulvemised pulses at 130°C-133°C for two hours).

(ii) Foreign matter—Not more than 3 per cent by weight out of which inorganic matter shall not exceed 1 per cent by weight.

(iii) Other edible grains—Not more than 4 per cent by weight.

(iv) Damaged grains—Not more than 5 per cent by weight.

(v) Weevilled grains—Not more than 10 per cent by count.
(vi) Uric acid—Not more than 100 mg per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 9 per cent by weight.

A.18.06.09-Split Pulse (Dal) Arhar:

Dal Arhar shall consist of husk and split seeds of red gram [Cajanus cajan (L) Millsp]. It shall be sound, clean, sweet, dry, wholesome and free from admixture of unwholesome substances. It shall also conform to the following standards, namely:

(i) Moisture—Not more than 14 per cent by weight (obtained by heating the pulverised pulses at 130°C-133°C for two hours).

(ii) Foreign matter—Not more than 2 per cent by weight out of which inorganic matter shall not exceed 1 per cent by weight.

(iii) Other edible grains—Not more than 0.5 per cent by weight.

(iv) Damaged grains—Not more than 5 per cent by weight.

(v) Weevilled grains—Not more than 3 per cent by count.

(vi) Uric acid—Not more than 100 mg per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 6 per cent by weight.

A.18.06.10 Split Pulse (Dal) Moong:

Dal Moong shall consist of split seeds of green grams (Phaseolus aureus Roxb, Phaseolus radiatus Roxb). It shall be sound, clean, sweet, wholesome and free from unwholesome substances. It shall also conform to the following standards, namely:

(i) Moisture—Not more than 14 per cent by weight (obtained by heating the pulverised pulses at 130°C-133°C for two hours).

(ii) Foreign matter—Not more than 2 per cent by weight out of which inorganic matter shall not exceed 1 per cent by weight.

(iii) Other edible grains—Not more than 4 per cent by weight.
(iv) Damaged grains—Not more than 5 per cent by weight.

(v) Weevilled grains—Not more than 3 per cent by count.

(vi) Uric acid—Not more than 100 mg per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 8 per cent by weight.

A.18.06.11-Split Pulse (Dal) Urd:

Dal Urd shall consist of split seeds of pulse (Phaseolus mungo Linn). It shall be sound, clean, sweet, dry, wholesome and free from admixture of unwholesome substances. It shall also conform to the following standards, namely:

(i) Moisture—Not more than 14 per cent by weight (obtained by heating the pulverised pulses at 130°C-133°C for two hours).

(ii) Foreign matter—Not more than 2 per cent by weight out of which inorganic matter shall not exceed 1 per cent by weight.

(iii) Other edible grains—Not more than 4 per cent by weight.

(iv) Damaged grains—Not more than 5 per cent by weight.

(v) Weevilled grains—Not more than 3 per cent by count.

(vi) Uric acid—Not more than 100 mg per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 8 per cent by weight.

A.18.06.12-Dal Chana:

Dal Chana shall consist of split grains of gram (Cicer arietinum Linn). It shall be sound, clean, sweet, dry, wholesome and free from admixture of unwholesome substances. It shall also conform to the following standards, namely:

(i) Moisture—Not more than 16 per cent by weight (obtained by heating the pulverised pulses at 130°C-133°C for two hours)
(ii) Foreign matter—Not more than 2 per cent by weight out of which inorganic matter shall not exceed 1 per cent by weight.

(iii) Other edible grains—Not more than 2.0 per cent by weight.

(iv) Damaged grains—Not more than 5 per cent by weight.

(v) Weevilled grains—Not more than 3 per cent by count.

(vi) Uric acid—Not more than 100 mg per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 7 per cent by weight.

A.18.06.13-Split Pulse (Dal) Masur :

Dal Masur shall consist of dehusked whole and split seed of lentil (*Lens esculenta* Moench or *Lens culinaris* Medik or *Erveum lens* Linn). It shall be sound, clean, dry, sweet, wholesome and free from admixture of unwholesome substances. It shall also conform to the following standards, namely:—

(i) Moisture—Not more than 14 per cent by weight (obtained by heating the pulverised pulses at 130°C-133°C for two hours).

(ii) Foreign matter—Not more than 2 per cent by weight out of which inorganic matter shall not exceed 1 per cent by weight.

(iii) Other edible grains—Not more than 2 per cent by weight.

(iv) Damaged grains—Not more than 5 per cent by weight.

(v) Weevilled grains—Not more than 3 per cent by count.

(vi) Uric acid—Not more than 100 mg per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 7 per cent by weight.

A.18.06.14—Any other foodgrains not specified above shall conform to the following standards, namely:—

(i) Moisture—Not more than 16 per cent by weight (obtained by heating the pulverised grains at 130°C-133°C for two hours).
(ii) Foreign matter—Not more than 6.0 per cent by weight, out of which inorganic matter and poisonous seeds shall not exceed 1.0 and 0.5 per cent by weight, respectively. Out of the total limit of poisonous seeds, dhatura and akra (Vicia species) shall not exceed 0.025 and 0.2 per cent by weight respectively.

(iii) Other edible grains—Not more than 6 per cent by weight.

(iv) Weevilled grains—Not more than10 per cent by count.

(v) Damaged grains—Not more than 5 per cent by weight.

(vi) Uric acid—Not more than 100 mg per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 12.0 per cent by weight.

Explanation:—For the purpose of items 18.06 to 18.06.14:—

(a) “foreign matter” means the extraneous matter other than foodgrains comprising of—

(i) inorganic matter consisting of metallic pieces, sand, gravel, dirt, pebbles, stones, lump of earth, clay and mud, animal filth and in the case of rice, kernels or pieces of kernels, if any, having mud sticking on the surface of the rice, and

(ii) organic matter consisting of husk, straws, weeds seeds and other inedible grains and also paddy in the case of rice.

(b) Poisonous, toxic and/or harmful seeds—means any seeds which if present in quantities above permissible limit may have damaging or dangerous effect on health, organoleptic properties or ‘technological performance’ such as dhatura (D. fastuosa linn and D. stramonium linn), corn cokle (Agrostemma githagol, Machai Lallium remulenum linn), Akra (Vicia species).

(c) “Damaged grains” means kernels or pieces of kernels that are sprouted or internally damaged as a result of heat, microbe, moisture or weather, viz. ergot affected grain and kamal bunt grains;

(d) “Weevilled grains” means kernels that are partially or wholly bored by insects injurious to grains but does not include germ eaten grains and egg spotted grains;

(e) “Other edible grains” means any edible grains (including oil seeds) other than the one which is under consideration.

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BALBIR SINGH, Jt. Secy.
(ii) Foreign matter—Not more than 2 per cent by weight out of which inorganic matter shall not exceed 1 per cent by weight.

(iii) Other edible grains—Not more than 2.0 per cent by weight.

(iv) Damaged grains—Not more than 5 per cent by weight.

(v) Weevilled grains—Not more than 3 per cent by count.

(vi) Uric acid—Not more than 100 mg per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 7 per cent by weight.

A.18.06.13-Split Pulse (Dal) Masur:

Dal Masur shall consist of dehusked whole and split seed of lentil (Lens esculenta Moench or Lens culinaris Medik or Erven lens Linn). It shall be sound, clean, dry, sweet, wholesome and free from admixture of unwholesome substances. It shall also conform to the following standards, namely:

(i) Moisture—Not more than 14 per cent by weight (obtained by heating the pulverised pulses at 130°C-133°C for two hours).

(ii) Foreign matter—Not more than 2 per cent by weight out of which inorganic matter shall not exceed 1 per cent by weight.

(in) Other edible grains—Not more than 2 per cent by weight.

(iv) Damaged grains—Not more than 5 per cent by weight.

(v) Weevilled grains—Not more than 3 per cent by count.

(vi) Uric acid—Not more than 100 mg per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 7 per cent by weight.

A.18.06.14—Any other foodgrains not specified above shall conform to the following standards, namely:

(i) Moisture—Not more than 16 per cent by weight (obtained by heating the pulverised grains at 130°C-133°C for two hours).
(ii) Foreign matter—Not more than 6.0 per cent by weight, out of which inorganic matter and poisonous seeds shall not exceed 1.0 and 0.5 per cent by weight, respectively. Out of the total limit of poisonous seeds, dhatura and akra (Vicia species) shall not exceed 0.025 and 0.2 per cent by weight respectively.

(iii) Other edible grains—Not more than 6 per cent by weight.

(iv) Weevilled grains—Not more than 10 per cent by count.

(v) Damaged grains—Not more than 5 per cent by weight.

(vi) Uric acid—Not more than 100 mg per kg.

(vii) Mycotoxin including aflatoxin—Not more than 30 micrograms per kilogram.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 12.0 per cent by weight.

Explanation:—For the purpose of items 18.06 to 18.06.14 :—

(a) “foreign matter” means the extraneous matter other than foodgrains comprising of—

(i) inorganic matter consisting of metallic pieces, sand, gravel, dirt, pebbles, stones, lump of earth, clay and mud, animal filth and in the case of rice, kernels or pieces of kernels, if any, having mud sticking on the surface of the rice, and

(ii) organic matter consisting of husk, straws, weeds seeds and other inedible grains and also paddy in the case of rice.

(b) Poisonous, toxic and/or harmful seeds—means any seeds which if present in quantities above permissible limit may have damaging or dangerous effect on health, organoleptic properties or ‘technological performance’ such as dhatura (D. fastuosa linn and D. stramonium linn), corn coke (Agrostemma githagol. Machai Lallium remulennium linn), Akra (Vicia species).

(c) “Damaged grains” means kernels or pieces of kernels that are sprouted or internally damaged as a result of heat, microbe, moisture or weather, viz. ergot affected grain and karnal bunt grains;

(d) “Weevilled grains” means kernels that are partially or wholly bored by insects injurious to grains but does not include germ eaten grains and egg spotted grains;

(e) “Other edible grains” means any edible grains (including oil seeds) other than the one which is under consideration.

[No. P. 15014/3/88-PH(F&H)PFA]
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Note: the Prevention of Food Adulteration Rules, 1955 were first published in Part II Section 3 of the Gazette of India vide S.R.O 2105 dated 12-9-1955 and subsequently amended as follows by:

1. SRO 1202 dated 26-5-56
2. SRO 1687 dated 28-7-56
3. SRO 2213 dt. 28-9-56 (Extraordinary)
4. SRO 2755 dated 24-11-56

The further amendments were published in Part II, Section 3 sub-section (i) of Gazette of India as follows by:

5. GSR 514 dated 28-6-58
6. GSR 1211 dated 20—12-58
7. GSR 425 dated 4-4-60
8. GSR 169 dated 11-2-61
9. GSR 1134 dated 16-9-61
10. GSR 1340 dated 4-11-61
11. GSR 1564 dated 24-11-62
12. GSR 1589 dated 22-10-64
13. GSR 1814 dated 11-12-65
14. GSR 74 dated 8-1-66
15. GSR 382 dated 19-3-66
16. GSR 1256 dated 26-8-67
17. GSR 1533 dated 24-8-68
18. GSR 2163 dated 14-12-68 (Corrigendum)
19. GSR 532 dated 8-3-69
20. GSR 1764 dated 26-7-69 (Corrigendum)
21. GSR 2068 dated 30-8-69
22. GSR 1808 dated 24-10-70
23. GSR 938 dated 12-6-71
24. GSR 992 dated 30-7-71
25. GSR 553 dated 6-5-72
26. GSR 436(E) dated 10-10-72
27. GSR 133 dated 10-2-73
28. GSR 205 dated 23-2-74
29. GSR 850 dated 12-7-75
30. GSR 508(E) dated 27-9-75
31. GSR 63(E) dated 5-2-76
32. GSR 754 dated 29-5-76
33. GSR 755 dated 29-5-76
34. GSR 856 dated 12-6-76
35. GSR 1417 dated 2-10-76
36. GSR 4(E) dated 4-1-77
37. GSR 18(E) dated 15-1-77
38. GSR 651(E) dated 20-10-77
39. GSR 732(E) dated 5-12-77
40. GSR 775(E) dated 27-12-77
41. GSR 36(E) dated 21-1-78
42. GSR 70(E) dtc. 8-2-78
43. GSR 238(E) dated 20-4-78
44. GSR 393(E) dated 4-8-78
45. GSR 590(E) dated 23-12-78
46. GSR 55(E) dated 31-1-79
47. GSR 142(E) dated 16-3-79 (Corrigendum)
48. GSR 231(E) dated 6-4-79
49. GSR 1843 dated 11-8-79 (Corrigendum)
50. GSR 1210 dated 29-9-79 (Corrigendum)
51. GSR 19(E) dated 28-1-80
52. GSR 243 dated 1-3-80
53. GSR 244 dated 1-3-80
54. GSR 996 dated 27-9-80 (Corrigendum)
55. GSR 579(E) dated 13-10-80
56. GSR 652(E) dated 14-11-80
57. GSR 710(E) dated 22-12-80
58. GSR 23(E) dated 16-1-81
59. GSR 205(E) dated 25-3-81 (Corrigendum)
60. GSR 290(E) dated 13-4-81
61. GSR 444 dated 2-5-81 (Corrigendum)
62. GSR 503(E) dated 1-9-81
63. GSR 891 dated 3-10-81 (Corrigendum)
64. GSR 1056 dated 5-12-81 (Corrigendum)
67. GSR 57(E) dated 11-2-82
68. GSR 245(E) dated 11-3-82
69. GSR 307(E) dated 3-4-82 (Corrigendum)
70. GSR 386 dated 17-4-82 (Corrigendum)
71. GSR 422(E) dated 24-5-82
72. GSR 476(E) dated 29-6-82
73. GSR 504(E) dated 20-7-82 (Corrigendum)
74. GSR 753(E) dated 11-12-82 (Corrigendum)
75. GSR 109(E) dated 26-2-83
76. GSR 249(E) dated 8-3-83
77. GSR 268(E) dated 16-3-83
78. GSR 283(E) dated 26-3-83
79. GSR 329(E) dated 14-4-83 (Corrigendum)
80. GSR 539(E) dated 1-7-83 (Corrigendum)
81. GSR 634 dated 9-5-83 (Corrigendum)
82. GSR 743 dated 8-10-83 (Corrigendum)
83. GSR 790(E) dated 10-10-83
84. GSR 803(E) dated 27-10-83
85. GSR 816(E) dated 3-11-83
86. GSR 829(E) dated 7-11-83
87. GSR 848(E) dated 19-11-83
88. GSR 893(E) dated 17-12-83 (Corrigendum)
89. GSR 113 dated 20-1-84 (Corrigendum)
90. GSR 500(E) dated 9-7-84
91. GSR 612(E) dated 18-8-84 (Corrigendum)
92. GSR 744(E) dated 27-10-84
93. GSR 764(E) dated 15-11-84
94. GSR 3(E) dated 1-1-85
95. GSR 11(E) dated 4-1-85
96. GSR 142(E) dated 8-3-85 (Corrigendum)
97. GSR 293(E) dated 23-3-85
98. GSR 368(E) dated 18-4-85 (Corrigendum)
99. GSR 385(E) dated 29-4-85 (Corrigendum)
100. GSR 543(E) dated 2-7-85
101. GSR 550(E) dated 4-7-85
102. GSR 587(E) dated 17-7-85 (Corrigendum)
103. GSR 605(E) dated 24-7-85
104. GSR 745(E) dated 20-9-85
105. GSR 746(E) dated 20-9-85
106. GSR 748(E) dated 23-9-85 (Corrigendum)
107. GSR 892(E) dated 6-12-85
108. GSR 903(E) dated 17-12-85 (Corrigendum)
109. GSR 73(E) dated 29-1-86
110. GSR 507(E) dated 19-3-86
111. GSR 724(E) dated 29-4-86 (Corrigendum)
112. GSR 851(E) dated 13-6-86
113. GSR 852(E) dated 13-6-86
114. GSR 910(E) dated 27-6-86
115. GSR 939(E) dated 9-7-86 (Corrigendum)
116. GSR 1008(E) dated 18-8-86 (Corrigendum)
117. GSR 1149(E) dated 15-10-86 (Corrigendum)
118. GSR 1207(E) dated 18-11-86 (Corrigendum)
119. GSR 1228(E) dated 27-11-86
120. GSR 12(E) dated 5-1-87
121. GSR 28(E) dated 13-1-87 (Corrigendum)
122. GSR 270(E) dated 2-3-87
123. GSR 344(E) dated 31-3-87 (Corrigendum)
124. GSR 422(E) dated 29-4-87 (Corrigendum)
125. GSR 500(E) dated 15-5-87 (Corrigendum)
126. GSR 569(E) dated 12-6-87 (Corrigendum)
127. GSR 840(E) dated 6-10-87
128. GSR 900(E) dated 10-11-87
129. GSR 916(E) dated 17-11-87
130. GSR 917(E) dated 17-11-87
131. GSR 918(E) dated 17-11-87 (Corrigendum)
132. GSR 72(E) dated 3-2-88 (Corrigendum)
133. GSR 73(E) dated 3-2-88 (Corrigendum)
134. GSR 366(E) dated 23-3-88 (Corrigendum)
135. GSR 367(E) dated 23-3-88
136. GSR 437(E) dated 8-4-88
137. GSR 436(E) dated 8-4-88
138. GSR 454(E) dated 8-4-88
139. GSR 618(E) dated 16-5-88
140. GSR 855(E) dated 12-8-88
141. GSR 856(E) dated 12-8-88
142. GSR 924(E) dated 13-9-88 (Corrigendum)
143. GSR 1081(E) dated 17-11-88
144. GSR 1157(E) dated 9-12-88
145. GSR 42(E) dated 20-1-89 (Corrigendum)
146. GSR 128(E) dated 8-3-90
147. GSR 411(E) dated 29-3-90
148. GSR 445(E) dated 16-4-90
149. GSR 457(E) dated 23-4-90

BALBIR SINGH, Jr. Secy.
The Consumer Protection Act, 1986 - No. 68 of 1986:

(1) This Act may be called the Consumer Protection Act, 86.

(2) It extends to the whole of India except the State of Jammu and Kashmir.

(3) Save as otherwise expressly provided by the Central Government by notification, this Act shall apply to all goods and services.

(2) (1) In this Act, unless the context otherwise requires —

(a) "appropriate laboratory" means a laboratory or organisation recognised by the Central Government and includes any such laboratory or organisation established by or under any law for the time being in force, which is maintained, financed or aided by the Central Government or a State Government for carrying out analysis or test of any goods with a view to determining whether such goods suffer from any defect;

(b) "Complainant" means —

i) a consumer; or

ii) any voluntary consumer association registered under the companies Act, 1956 or under any other law for the time being in force, or

iii) the Central Government or any State Government, who or which makes a complaint;

(c) "complaint" means any allegation in writing made by a complainant that—

i) as a result of any unfair trade practice adopted by any trader, the complainant has suffered loss or damage;

ii) the goods mentioned in the complaint suffer from one or more defects;

iii) the services mentioned in the complaint suffer from deficiency in any respect;

iv) a trader has charged for the goods mentioned in the complaint a price in excess of the price fixed by or under any law for the time being in force or displayed on the goods or any package containing such goods,

With a view to obtaining any relief provided by or under this Act;

(d) "consumer" means any person who—

i) buys and goods for a consideration which has been paid or promised or partly paid and partly promised, or under any system of deferred payment and includes any user of such goods other than the person who buys such goods for consideration paid or promised or partly paid
or partly promised or under any system of deferred payment when such use is made with the approval of such person but does not include a person who obtains such goods for resale or for any commercial purpose; or

ii) hires any services for a consideration which has been paid or promised or partly paid and partly promised or under any system of deferred payment and includes any beneficiary of such services other than the person who hires the services for consideration paid or promised or partly paid and partly promised or under any system of deferred payment when such services are availed of with the approval of the first mentioned person;

(e) "consumer dispute" means a dispute where the person against whom a complaint has been made, denies or disputes the allegations contained in the complaint.

(f) "defect" means any fault, imperfection or shortcoming in the quality, quantity, potency, purity or standard which is required to be maintained by or under any law for the time being in force or as is claimed by the trader in any manner whatsoever in relation to any goods;

(g) "deficiency" means any fault, imperfection, shortcoming or inadequacy in the quality, nature and manner of performance which is required to be maintained by or under any law for the time being in force or has been undertaken to be performed by a person in pursuance of a contract or otherwise in relation to any service;

(h) "District Forum" means a Consumer Disputes Redressal Forum established under clause (a) of section 9;

(i) "goods" means goods as defined in the Sale of Goods Act, 1930;

(j) "manufacturer" means a person who——

i) make or manufactures any goods or parts thereof, or,

ii) does not make or manufacture any goods but assembles parts thereof made or manufactured by others and claims the end-product to be goods manufactured by himself; or

iii) puts or causes to be put his own mark on any goods made or manufactured by any other manufacturer and claims such goods to be goods made or manufactured by himself.

Explanation:

Where a manufacturer despatches any goods or part thereof to any branch office maintained by him, such branch office shall not be deemed to be the manufacturer even though the parts so despatched to it are assembled at such branch office and are sold or distributed from such branch office;

(k) "National Commission" means the National Consumer Disputes Redressal Commission established under clause (c) or section 9;
(1) "notification" means notification published in the Official Gazette;

(m) "person" includes —
   i) a firm whether registered or not;
   ii) a Hindu undivided family’
   iii) a co-operative society;
   iv) every other association of persons whether registered under the Societies Registration Act. 1860 or not;

(n) “prescribed: means prescribed by rules made by the State Government or as the case may be by the Central Government under this Act;

(o) "service" means service of any description which is made available to potential users and includes the provision of facilities in connection with banking, financing, insurance, transport, processing, supply of electrical or other energy, board or lodging or both, entertainment, amusement or the purveying a news or other information, but does not include the rendering of any service free of charge or under a contract of personal service;

(p) “State Commission” means a Consumer Disputes Redressal Commission established in a State under clause (b) of Section 9;

(q) "trader" in relation to any goods means a person who sells or distributes any goods for sale and includes the manufacturer thereof, and where such goods are sold or distributed in package form includes the packer thereof;

(r) the expression “unfair trade practice” shall have the same meaning as in section 36-A of the Monopolies and Restrictive Trade Practices Act, 1969, but shall not include an unfair trade practice adopted by the owner of an undertaking to which Part-A of Chapter-III of that Act applies or by any person acting on behalf of, or for the benefit of, such owner.

(2) Any reference in this Act to any other Act or provision thereof which is not in force in any area to which this Act applies shall be construed to have a reference to the corresponding Act or provision thereof in force in such area.

(3) The provisions of this Act shall be in addition to and not in derogation of the provisions of any other law for the time being in force.

5.17 Consumer Protection Councils:

(1) The Central Government may, by notification, establish with effect from such date as it may specify in such notification, a Council to be known as the Central Consumer Protection Council (hereinafter referred to as the Central Council).
(2) The Central Council shall consist of the following members, namely:

(a) the Minister in charge of the Department of Food and Civil Supplies in the Central Government, who shall be its Chairman, and,

(b) such number of other official or non-official members representing such interests as may be prescribed.

(3) (1) The Central Council shall meet as and when necessary, but not less than three meetings of the Council shall be held every year.

(2) The Central Council shall meet at such time and place as the chairman may think fit and shall observe such procedure in regard to the transaction of its business as may be prescribed.

(4) The objects of the Central Council shall be to promote and protect the rights of the consumers such as:

(a) the right to be protected against marketing of goods which are hazardous to life and property;

(b) the right to be informed about the quality, quantity, potency, purity, standard and price of goods so as to protect the consumer against unfair trade practices;

(c) the right to be assured, wherever possible access to a variety of goods at competitive prices;

(d) the right to be heard and to be assured that consumers' interests will receive due consideration at appropriate forums;

(e) the right to seek redressal against unfair trade practices or unscrupulous exploitation of consumers; and

(f) the right to consumer education.

(5) (1) The State Government may, by notification, establish with effect from such date as it may specify in such notification, a Council (hereinafter referred to as the State Council).

(2) The State Council shall consist of such number of members as may be specified by the State Government by notification from time to time.

(6) The objects of every State Council shall be to promote and protect within the State the rights of the consumers laid down in clauses (a) to (f) of section 4.

5.18 Consumer Disputes Redressal Agencies:

(1) These shall be established for the purposes of this Act, the following agencies, namely:

(a) a Consumer Disputes Resolution Forum to be known as the “District Forum” established by the State Government with the prior approval of the Central Government in each district of the State by notification.
(b) a Consumer Disputes Redressal Commission to be known as the “State Commission” established by the State Government with the prior approval of the Central Government in the State by notification; and

(c) a National Consumer Disputes Redressal Commission established by the Central Government by notification.

(2) (1) Each District Forum shall consist of —

(a) a person who is or has been or is qualified to be a District Judge to be nominated by the State Government to be its President;

(b) a person of eminence in the field of education, trade or commerce;

(c) a lady social worker

(2) Every member of the District Forum shall hold office for a term of five years or up to age of 65 years, whichever is earlier, and shall not be eligible for re-appointment;

Provided that a member may resign his office in writing under his hand addressed to the State Government and on such resignation being accepted, his office shall become vacant and may be filled by the appointment of a person possessing any of the qualifications mentioned in sub-section (1) in relation to the category of the member who has resigned.

(3) The salary or honorarium and other allowance payable to and the other terms and conditions of service of the member of the District Forum shall be such as may be prescribed by the State Government.

(3) (1) Subject to the other provisions of this Act, the District Forum shall have jurisdictions to entertain complaints where the value of the goods or services and the compensation if any, claimed is less than rupees one lakh.

(2) A complaint shall be instituted in a District Forum within the local limits of whose jurisdiction—

(a) the opposite party or each of the opposite parties, where there are more than one, at the time of the institution of the complaint, actually and voluntarily resides or carries on business, or personally works for gain, or

(b) any of the opposite parties, where there are more than one, at the time of the institution of the complaint, actually and voluntarily resides, or carries on business, or personally works for gain, provided that in such case either the permission of the District Forum is given, or the opposite parties who do not reside or carry on business, or personally work for gain, as the case may be acquiesce in such institution; or

(c) the cause of action, wholly or in part, arises
A complaint, in relation to any goods sold or delivered or any service provided, may be filed with a District Forum by—

(a) the consumer to whom such goods are sold or delivered or such service provided;

(b) any recognised consumer association, whether the consumer to whom the goods sold or delivered or service provided is a member of such association or not; or

(c) the Central or the State Government.

Explanation:

For the purpose of this section “recognised consumer association” means any voluntary consumer association registered under the Companies Act, 1956 or any other law for the time being in force.

The District Forum shall, on receipt of a complaint, if it relates to any goods—

(a) refer a copy of the complaint to the opposite party mentioned in the complaint directing him to give his version of the case within a period of thirty days or such extended period not exceeding fifteen days as may be granted by the District Forum;

(b) where the opposite party on receipt of a complaint referred to him under clause (a) denies or disputes the allegations contained in the complaint, or omits or fails to take any action to represent his case within the time given by the District Forum the District Forum shall proceed to settle the consumer dispute in the manner specified in clauses (c) to (g);

(c) where the complaint alleged a defect in the goods which can not be determined without proper analysis or test of the goods, the District Forum shall obtain a sample of the goods from the complainant, seal it and authenticate it in the manner prescribed and refer the sample so sealed to the appropriate laboratory along with direction that such laboratory make an analysis or test, whichever may be necessary, with a view to finding out whether such goods form any defect alleged in the complaint or suffer from any other defect and to report its findings thereon to the District Forum within a period of forty five days of the receipt of the reference of within such extended period as may be granted by the District Forum;

(d) before any sample of the goods is referred to any appropriate laboratory under clause (c), the District Forum may require the complainant to deposit to the credit of the Forum such fees as may be specified for payment to the appropriate laboratory for carrying out the necessary analysis or test in relation to the goods in question;

(e) the District Forum shall remit the amount deposited to its credit under clause (d) to the appropriate laboratory to enable it to carry out the analysis or test mentioned in clause (c) and on receipt of the report from the appropriate laboratory, the District Forum shall forward a copy of the report along with such remarks as the District Forum may feel appropriate to the opposite party;
(f) if any of the parties disputes the correctness of the findings of the appropriate laboratory, or disputes the correctness of the methods of analysis or test adopted by the appropriate laboratory, the District Forum shall require the opposite party or the complainant to submit in writing his objections in regard to the report made by the appropriate laboratory;

(g) the District Forum shall thereafter give a reasonable opportunity to the complainant as well as the opposite party of being heard as to the correctness or otherwise of the report made by the appropriate laboratory and also as to the objection made in relation thereto under clause (f) and issue an appropriate order under section 14.

(2) The District Forum shall, if the complaint received by it under section 12 relates to goods in respect of which the procedure specified in sub-section (1) cannot be followed or if the complaint relates to any services—

(a) refer a copy of such complaint to the opposite party directing him to give his version of the case within a period of thirty days or such extended period not exceeding fifteen days as may be granted by the District Forum;

(b) where the opposite party, on receipt of a copy of the complaint, referred to him under clause (a) denies or disputes the allegations contained in the complaint or omits or fails to take any action to represent his case within the time given by the District Forum, the District Forum shall proceed to settle the consumer dispute—

i) on the basis of evidence brought to its notice by the complainant and the opposite party, where the opposite party denies or disputes the allegations contained in the complaint, or

ii) on the basis of evidence brought to its notice by the complainant where the opposite party omits or fails to take any action to represent his case within the time given by the District Forum.

(3) No proceedings complying with the procedure laid down in sub-sections (1) and (2) shall be called in question in any court on the ground that the principles of natural justice have not been complied with.

(4) For the purposes of this section, the District Forum shall have the same powers as are vested in a civil court under the Code of Civil Procedure, 1908 while trying a suit in respect of the following matters namely:

(i) the summoning and enforcing the attendance of any defendant or witness and examining the witness on oath;

(ii) the discovery and production of any document or other material object producible as evidence;
(iii) the reception of evidence on affidavits

(iv) the requisitioning of the report of the concerned analysis or test from the appropriate laboratory or from any other relevant source;

(v) issuing of any commission for the examination of any witness; and

(vi) any other matter which may be prescribed.

(5) Every proceeding before the District Forum shall be deemed to be a judicial proceeding within the meaning of sections 193 and 228 of the Indian Penal Code and the District Forum shall be deemed to be a civil court for the purposes of section 195 and Chapter-XXVI of the Code of Criminal Procedure, 1973.

(6) (1) If, after the proceeding conducted under section 13, the District Forum is satisfied that the goods complained against suffer from any of the defects specified in the complaint or that any of the allegations contained in the complaint about the services are proved, it shall issue an order to the opposite party directing him to take one or more of the following things, namely:—

(a) to remove the defect pointed out by the appropriate laboratory from the goods in question;

(b) to replace the goods with new goods of similar description which shall be free from any defect;

(c) to return to the complainant the price or as the case may be the charges paid by the complainant;

(d) to pay such amount as may be awarded by it as compensation to the consumer for any loss or injury suffered by the consumer due to the negligence of the opposite party.

(2) Every order made the District Forum under sub-section (1) shall be signed by all the members constituting it and if there is any difference of opinion, the order of the majority of the members constituting it shall be the order of the District Forum;

(3) Subject to the foregoing provisions, the procedure relating to the conduct of the meetings of the District Forum, its sitting and other matters shall be such as may be prescribed by the State Government.

(7) Any person aggrieved by an order made by the District Forum may prefer an appeal against such order to the State Commission within a period of thirty days from the date of the order in such form and manner as may be prescribed;
Provided that the State Commission may entertain an appeal after the expiry of the said period of thirty days if it is satisfied that there was sufficient cause for not filing it within that period.

(8) (1) Each State Commission shall consist of—

(a) a person, who is or has been a judge of a High Court, appointed by the State Government, who shall be its President.

(b) two other members, who shall be persons of ability, integrity, and standing and have adequate knowledge or experience of or have shown capacity in dealing with, problems relating to economies, law commerce, accountancy, industry, public affairs or administration, one of whom shall be a women;

Provided that no sitting Judge of a High Court shall be appointed under this sub-section except after consultation with the Chief Justice of that High Court.

(2) The salary or honourarium and other allowances payable to and the other terms and conditions of service (including tenure of office) of the member of the State Commission shall be such as may be prescribed by the State Government.

(9) Subject to the other provisions of this Act, the State Commission shall have jurisdiction—

(a) to entertain—

(i) complaint: Where the value of the goods or services and compensation, if any claimed exceeds rupees one lakh but does not exceed rupees ten lakhs and

(ii) appeals, against the orders of any District Forum within the State; and

(b) to call for the record and pass appropriate orders in any consumer dispute, which is pending before or has been decided by any District Forum within the State, where it appears to the State Commission that such District Forum has exercised a jurisdiction not vested in it by law, or has failed to exercise a jurisdiction not vested in it by law or has failed to exercise a jurisdiction so vested or has acted in exercise of its jurisdiction illegally or with material irregularity.

(10) The procedure specified in sections 12, 13 and 14 and under the rules made thereunder for the disposal of complaints by the District Forum shall, with such modifications as may be necessary, be applicable to the disposal of disputes by the State Commission.

(11) Any person aggrieved by an order made by the State Commission in exercise of its powers conferred by sub-clause (i) of clause (a) of section 17 may prefer an appeal against such order to the National Commission within a period of thirty days from the date of the order in such form and manner as may be prescribed.
Provided that the National Commission may entertain an appeal after the expiry of the said period of thirty days if it is satisfied that there was sufficient cause for not filing it within that period.

(12) (1) The National Commission shall consist of—

(a) a person who is or has been a judge of the Supreme Court, to be appointed by the Central Government, who shall be its President; 

(b) four other members who shall be persons of ability, integrity and standing and have adequate knowledge or experience of or have shown capacity in dealing with, problems relating to economies, law, commerce, accountancy, industry, public affairs or administration one of whom shall be a woman.

Provided that no sitting Judge of the Supreme Court shall be appointed under this sub-section except after consultation with the Chief Justice of that Court.

(2) The salary or honorarium and other allowances payable to and the other terms and conditions of service (including tenure of office) of the members of the National Commission shall be such as may be prescribed by the Central Government.

(13) Subject to the other provisions of this Act, the National Commission shall have jurisdiction—

(a) to entertain—

(i) complaints where the value of the goods or services and compensation, if any, claimed exceeds rupees ten lakhs, and

(ii) appeals against the orders of any state, commission, and

(b) to call for the records and pass appropriate orders in any consumer dispute which is pending before or has been decided by State Commission where it appears to the National Commission that such State Commission has exercised a jurisdiction not vested in it by law, or has failed to exercise a jurisdiction so vested, or has acted in the exercise of its jurisdiction illegally or with material irregularity.

(14) The National Commission shall in the disposal of any complaints or of any proceedings before it, have the powers of a civil court as specified in sub-sections (4) and (5) of section 13 and follow such procedure as may be prescribed by the Central Government.

(15) Any person, aggrieved by an order made by the National Commission in exercise of its powers conferred by sub-clause (i) of clause (a) of section 21 may prefer an appeal against such order to the Supreme Court within a period of thirty days from the date of the order.

Provided that the Supreme Court may entertain an appeal after the expiry of the said period of thirty days if it is satisfied that there was sufficient cause for not filling it within that period.
(16) Every order of a District Forum, State Commission or the National Commission shall, if no appeal has been preferred against such order under the provisions of this Act, be final.

(17) Every order made by the District Forum, the State Commission or the National Commission may be enforced by the District Forum, the State Commission or the National Commission, as the case may be, in the same manner as if it were a decree or order made by a court, in a suit pending therein and it shall be lawful for the District Forum, the State Commission or the National Commission to send, in the event of its inability to execute it, such order to the court within the local limits of whose jurisdiction—

(a) in the case of an order against a company, the registered office of the company is situated or

(b) in the case of an order against any other person, the place where the person concerned voluntarily resides or carries on business or personally works for gain, is situated,

and thereupon, the court to which the order is so sent, shall execute the order as if it were a decree or order sent to it for execution.

(18) Where a complaint instituted is found to be frivolous or vexatious, the District Forum, the State Commission or, as the case may be the National Commission, may dismiss the complaint.

(19) Where a trader or a person against whom a complaint made fails or omits to comply with any order made by the District Forum, the State Commission or the National Commission, as the case may be such trader or person shall be punishable with imprisonment for a term which shall not be less than one month but which may extend to three years, or with fine which shall not be less than two thousand rupees but which may extend to ten thousand rupees, or with both:

Provided that the District forum, the State Commission or the National Commission, as the case may be, may, if it is satisfied that the circumstances of any case so require, impose a sentence of imprisonment or fine, or both for a term lesser than the minimum term and the amount lesser than the minimum amount, specified in this section.

5.18 Miscellaneous:

(1) No suit, prosecution or other legal proceedings shall lie against the members of the District Forum, the State Commission or the National Commission or any Officer or person acting under the direction of the District Forum, the State Commission or the National Commission for executing any order made by it or in respect of anything which is in good faith done or intended to be done by such member, officer or person under this Act or under any rule or order made thereunder.

(2) If any difficulty arises in giving effect to the provisions of this Act, the Central Government may, by order in the Official Gazette, make such provisions not inconsistent with the provisions of this Act as appear to it to be necessary of expendient for removing the difficulty:
Provided that no such under shall be made after the expiry of a period of two years from the commencement of this Act.

(2) Every order made under this section shall, as soon as may be after it is made, be laid before each House of Parliament.

(3) (1) The Central Government may, by notification, make rules for carrying out the provisions contained in clause (b) of Sub-section (2) of section 4 sub-section (2) of section 5, clause (vi) of sub-section (4) of section 13, section 19, sub-section (2) of section 20 and section 22 of this Act.

(2) The State Government may, by notification, make rules for carrying out the provisions contained in sub-section (3) of section 10, clause (c) of sub-section (1) of section 13, sub-section (3) of section 14, section 15 and sub-section (2) of section 16.

(4) (1) Every rule made by the Central Government under this Act shall be laid, as soon as may be after it is made, before each House of Parliament, while it is in session, for a total period of thirty days which may be comprised in one session or in two or more successive sessions, and if, before the expiry of the session immediately following the session or the successive sessions aforesaid, both Houses agree in making any modification in the rule or both Houses agree that the rule should not be made, the rule shall thereafter have effect only in such, modified form or be of no effect, as the case may be, so however, that any such modification or annulment shall be without prejudice to the validity of any thing previously done under that rule.

(2) Every rule made by a State Government under this Act shall be laid as soon as may be after it is made before the State Legislature.
PART — I

PROCUREMENT,
PURCHASE, IMPORTS
CHAPTER 6

SPECIFICATIONS FOR FOODGRAINS AND
CLASSIFICATION OF RICE

6.1 Specifications is a yard stick with which quality of grain can be assessed. Traditional method for
assessment of quality in India and many other countries has been, and continues to be, to judge it by
appearance and feel. Such judgement is subjective and varies from person to person. Aim in such
judgement, however, is to check purity and health of the grain. In view of possible large variations in
a subjective method of assessment, efforts were made to develop an objective technique, using the same
criteria as used in a subjective technique namely, purity and health of the grain. This involved preparing
definitions for the criteria and later developing scientific technique for laboratory analysis. From these
efforts, emerged a quality specification that names criteria, which are to be assessed for judging quality
of grain and mentions limits up to which a particular criteria can be allowed for a specific quality. Present
day specification for quality thus is an objective way of indicating quality and examination of grain in
relation to specification is possible through scientific analytical procedures. Knowledge of definitions
for the criteria used in the specifications and analytical procedures adopted is necessary in operations
of purchase and sale of grain in relation to specifications. These are given in the Manual in relevant
Chapters.

6.2 Price is related to quality. The specification giving limits for various criteria assume significance in
deciding the price. Where support price operates in the purchases the agency deciding support price,
namely the Government, relates it to specification. For purchases under support price, the Government
thus announce price to be paid during the year along with the quality specification to be followed. This
specification finalised by the Govt. takes into account various factors that affect production for the year
and the specification, therefore, is effective only for that year, unless its operation is extended by special
orders. Field officers should make sure, before operations, that the specification they have to follow is
effective for the period of purchase.

6.3 For meeting consumer needs and encourage marketing of better quality, a specification provides for
either grading or for discounting of price for refractions in excess of certain limits. Where grading is
provided, prices are prescribed gradewise, where price is to be discounted it is done refraction wise and
all grain purchased either with or without discount is treated as of one quality. Every effort has been
made to eliminate ground for disputes regarding judgement of quality, in relation to specification and
grade, by standardising definitions and analytical procedures. Since, quality judgement involves price
to be paid, disputes could arise and need to be settled by following laid down standard procedure.
6.4 In international marketing of grain, basic concepts for judgement of quality are the same namely, purity and health of grain. Condition of production and marketing, however, not being identical in each country, criteria for assessment of quality vary from country to country. As in India, these could also vary from year to year. A uniform International specification for a grain, therefore, is not possible. Efforts made to develop uniform definitions and analytical procedures also have only partially succeeded in view of national considerations. Some countries have standard grade specifications for export, which do not change from year to year. Some items are still negotiable in these specifications depending on practicability and price to be paid. In view of requirements under ‘Prevention of Food Adulteration Act’ and Plant Quarantine requirements specification of the grain to be purchased in international market along with definitions adopted for various refractions and methods of analysis need to be studied and where needed these be negotiated to suit Indian requirements. Many of the wheat exporting countries do not allow mentioning of the crop year. This needs to be borne in mind. These countries, however, allow purchase on protein content basis. This should be availed of. In any case there is no short cut to acquiring complete knowledge about quality specification, definitions of refractions and techniques followed for analysis in the country from which grain is to be purchased. A uniform International Specification for any grain is still a dream and will remain so for years.

6.5 Classification — When number of varieties produced in case of a grain, is too many it becomes necessary, in an objective method of quality assessment, to classify the grain in a few groups of comparable quality. In open market purchases and sales marketing the grain by varietal name amounts to as good as classification. When distinction between varieties is not easily possible, through available scientific techniques, physical and such other detectable characters are employed for classification. In many countries grains are classified for internal as well as export sales. In India, formerly wheat was classified as red and white wheat. In coarse grains jowar is classified as Kharif and rabi jowar. There are many such examples of classification. Presently, in the purchases and sales only rice is classified by the Government and this classification is adopted by the Corporation in its purchases of rice in the country. Short history and basis for this classification is given at Appendix 6-A-1. Procedure to be followed for the classification of new varieties is at Appendix 6-A-2.

6.6 The specification and classification serves a useful purpose of purchase based on objective quality assessment and payment of price in relation to quality. This technique of quality assessment takes into account conditions of production and ultimate requirement of the consumer. Requirements under the ‘Prevention of Food Adulteration Act’ also has to be borne in mind. With the consumer awareness in regard to quality getting better each year, the Government has to keep consumer view in mind in preparing the specification, each year. Over last few years, adoption of better post harvest handling techniques by the producers, have enabled improvements and such improvements have been carried out by tightening the specification. Consumer, however, judges the quality by feel and appearance. Presence of excess moisture in any grain at the time of purchase so also excess foreign matter results in poor appearance. In case of rice low degree of polish and high proportion of brokens can cause similar effect. These criteria need to be carefully watched during purchase and storage to avoid complaints at the time of release of the grain. In case any lapse is observed it needs to be corrected in time.

6.7 Quality specifications to be adopted, at the time of purchase, for various grains, are given at Appendix 6-A3 to 6-A-15. These are effective for the crop year 1991-92 and may continue to be effective in
subsequent years or may be changed. Specification is related to price to be paid by the Government and therefore, is a policy decision of the Government. Specification given in the Appendix for the year 1991-92 will give an idea about the type the quality standard is adopted in the purchases. Concerned officers will ascertain changes, if any, made in these specifications in subsequent years, before starting purchases. Classification of rice to be followed is appended at the beginning of specifications.

6.8 In all specifications, for purchases in Indian markets, definitions and analytical procedure to be adopted is the one given in related Indian Standard unless otherwise stated. These are shown in related chapters of the Manual. In case of Imported grain, purchases are made in International markets according to different specifications. Procedure for analysis and definitions of various terms could be also different from the one followed in India. These need to be ascertained from the Head Quarters before handling such grain.
APPENDIX—6-A-1

RICE CLASSIFICATION
BASIS AND PROCEDURE FOR CLASSIFICATION OF VARIETIES

In India more than 1600 varieties of rice used to be produced. As it was not possible to distinguish these varieties one from another with an objective scientific method, the Govt. appointed a Committee under the Chairmanship of Dr. Ramaiah in 1965 to suggest an objective method of rice classification. The committee recommended classification based on length and length/breadth ratio of the kernel of rice of different varieties. This classification accepted with slight modification by the Govt. was as follows:—

(i) Long slender : Length 6 mm and more with length/breadth ratio 3 and greater than three.
(ii) Medium slender : Length less than 6 mm with length/breadth ratio 2.5 to less than 3 or length less than 4.5 mm and length/breadth ratio between 2 and 2.5
(ii) Short slender : Length less than 6 mm with length/breadth ratio 3 and greater than three.
(iv) Long Bold : Length 6 mm and more with length/breadth ratio less than 3.
(v) Short bold : Length less than 6 mm with length/breadth ratio lower than 2.5.

Scented varieties were to be placed in the appropriate class on the basis of its dimensions and then allowed a premium in price for the scent.

On account of certain practical difficulties of a local nature and in an effort to simplify the classification of rice the Government of India appointed another Committee for reconsideration of classification of the existing paddy/rice varieties in December, 1973 under the Chairmanship of Sh. A.K. Majumdar. This committee was reconstituted in February, 1975 and then again in June, 1975 with Sh. Balasubramanian, the then Additional Secretary in the Department of Food as Chairman of the Committee. After careful consideration of the recommendations of Balasubramanian Committee the Deptt. of Food finally decided upon the following basis for classification of Rice varieties:

<table>
<thead>
<tr>
<th>Class</th>
<th>Criteria of Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common</td>
<td>Length breadth ratio below 2.5</td>
</tr>
<tr>
<td>Fine</td>
<td>Length breadth ratio 2.5 and above but below 3.0</td>
</tr>
<tr>
<td>Superfine</td>
<td>Length breadth ratio 3.0 and above</td>
</tr>
<tr>
<td>Scented</td>
<td>Varieties having natural aroma.</td>
</tr>
</tbody>
</table>

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Further in order to get over the difficulties due to changes in the length breadth ratio because of climatic or due to genetic factors over a period of a few years, in the specifications a tolerance limit may be allowed for fine group permitting the acceptance under this category of upto 40% of grain having length-breadth ratio upto 2.40 and for super fine group upto 2.90, Till 1991, Govt. of India has classified 1492 varieties of paddy/rice. Apart from classification, the price of rice also depends upon the percentage of moisture content, brokens, foreign matter, damaged grains, slightly damaged grains, red grains, chalky grains, dehusked grains, and mixture of inferior varieties. Quality standards laying down the free tolerance levels and the rejection levels for these refractions/impurities are prescribed every year by the Dept. of Food for Central Pool purchases.
CLASSIFICATION OF NEW PADDY/RICE VARIETIES

The paddy/rice varieties not already examined and classified are required to be examined, classified and classification notified by the Deptt. of Food, Govt. of India.

For the purpose of getting the new varieties classified as per the existing norms of classification the following procedure is to be adopted.

(a) Authenticated samples of new commercially grown varieties of paddy should be obtained by Regional Office and sent to Head quarters along with analysis results and recommendations as per norms given in Appendix 6-A-I for its classification by Govt. of India.

(b) Regional Office should also submit bio-data of newly grown varieties as under:

(i) Total area of the State where the said variety is grown indicating names of Districts.

(ii) Total production of the said variety.

(iii) Year of introduction/release of the said variety for its commercial production.

(c) State Govt. should also be requested to take similar steps by sending authenticated samples alongwith above details to the Department of Food, Govt. of India.

**Procedure for classification of the variety:**

(i) An authenticated representative sample of paddy/brown rice, which should contain at least 90 per cent kernels of the principal variety being considered for classification is obtained.

(ii) Sample of brown rice is mixed thoroughly and is spread in a circular layer of about 12 mm thickness.

(iii) From this spread sample a quantity of 20 gms. is scooped out from centre, sides and different points for the purpose of analysis/classification.

(iv) Out of 20 gms sample, kernels of superfine, fine, and common groups are picked out as per the classification norms on length and breadth ratio basis.

(v) Kernels so separated are counted and the percentage of each group (i.e. Superfine, fine and common) is worked out ignoring other physical components i.e. Foreign matter, Brokens, Damaged and discoloured grains etc. on count basis.

(vi) Kernels which are in majority are considered for classification/notification.
(vii) Out of these kernels which are in majority i.e. dominating variety, 100 kernels are picked out for determination of length, breadth and length breadth ratio.

(viii) The overall average length, breadth is worked out and length breadth ratio is ascertained (i.e. average length divided by average breadth).

(ix) On the basis of the length breadth ratio so obtained the variety is classified/notified.
APPENDIX—6-A-3

UNIFORM SPECIFICATIONS OF ALL VARIETIES OF PADDY
(MARKETING SEASON 1991-92)

The paddy shall be in sound merchantable condition sweet, dry, clean, wholesome of good food value, uniform in colour and size of the grains and free from moulds, weevils, obnoxious smell, discolouration, admixtures of deleterious substances or colouring agents and also conforming to PFA standards.

Paddy will be classified into superfine, fine and common groups.

Schedule of different refractions

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Constituents of admixture or impurities etc.</th>
<th>Maximum limits (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Foreign matter:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Inorganic</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>b) Organic</td>
<td>1.0</td>
</tr>
<tr>
<td>2.</td>
<td>Damaged, discoloured, sprouted and weevilled grain</td>
<td>3.0</td>
</tr>
<tr>
<td>3.</td>
<td>Immature, shrunken and shrivelled grain</td>
<td>3.0</td>
</tr>
<tr>
<td>4.</td>
<td>Admixture of lower varieties.</td>
<td>10.0</td>
</tr>
<tr>
<td>5.</td>
<td>Moisture</td>
<td>18.0</td>
</tr>
</tbody>
</table>

NOTE:

1. The definitions of the above refractions and methods of analysis are to be followed as per BIS Methods of Analysis in Food Grains IS : 4333 (Part-I), IS : 4333 (Part-II), 1967 and Terminology for Food grains IS : 2813-1970 as amended from time to time.

2. The method for sampling is to be followed as per Bureau of Indian Standards Method for sampling of Cereals and Pulses IS : 2814-1964 as amended from time to time.
FOLLOWING REQUIREMENTS SHALL BE COMMON FOR ALL CLASSES AND VARIETIES OF RICE

(1) Brokens less than 1/8th of the size of full kernels will be treated as organic foreign matter. The brokens of the size of 1/8th to 1/4th shall not exceed 5.0%. For determination of the size of the brokens average length of the principal class of rice should be taken into account.

(2) Inorganic foreign matter shall not exceed 0.5% in any lot, if it is more, the stocks should be cleaned and brought within the limit.

(3) In case of parboiled rice, prepared by pressure parboiling technique, it will be ensured that correct process of par-boiling is adopted i.e. pressure applied, the time for which pressure is applied, proper gelatinisation, aeration and drying before milling are adequate so that the colour and cooking time of parboiled rice are good and free from encrustation of the grains.
APPENDIX—6-A-4(i)

NOTES APPLICABLE TO THE SPECIFICATIONS OF COMMON, FINE AND SUPERFINE VARIETIES OF RICE

Note:

1. The definitions of the above refractions and method of analysis are to be followed as given in Bureau of Indian Standard 'Method of Analysis of Foodgrains' Nos. IS: 4333 (Part-I) 1967 and IS: 4333 (Part-II) 1967 'Terminology for Foodgrains' 'IS: 2813-1970 as amended from time to time. Dehusked grains shall be the rice kernels whole or broken which have more than 1/4th of the surface of the area covered with the bran and determined as follows:

**ANALYSIS PROCEDURE:** Out of 20 gms. representative sample of rice, immerse 5 gms. of milled rice (excluding the other refractions but inclusive of brokens) in Metanil Yellow or Tartazine (0.05% by weight in distilled water) in a petridish and add a drop of concentrated Hydrochloric acid to it. Keep it for about a minute and then wash the rice kernels with water after pouring out Metanil Yellow. The kernels acquire a yellow stain. Dip these yellow stained kernels in 5 ml. of Methylene Blue (0.05% by weight-in distilled water) solution for a minute. Now the kernels are washed thrice with dilute Hydrochloric Acid (5% solution by volume in distilled water) and then twice with only water. The residual bran on the milled rice kernels will be stained green while the rest of the kernels remain yellow. These stained grains are kept in water for about 5 minutes in case of raw rice and for 10 minutes in case of boiled rice and given a washing when the green & yellow stains become quite distinct making it easy for a proper assessment of the bran covering on the rice kernels, green stain indicating the bran portion. The stain is stable and lasts for a long-period.

Grains (including both whole and brokens) having the bran covering (indicated by green stain) more than 1/4th of the surface area are picked out and counted and expressed as percentage as is done in case of Iodine Test. In case of brokens, 3 pieces are counted as one full kernel.

In case, rice kernels are dipped in Metanil yellow or in Methylene Blue for more than the prescribed time of one minute then more washings should be given with dilute Hydrochloric Acid (5%) than the prescribed three washings.

2. The method of sampling is to be followed as given in B.I.S. 'method of sampling of cereals and pulses' No. IS: 2814-1964 as amended from time to time.

3. Brokens less than 1/8th of the size of full kernels will be treated as organic foreign matter. The brokens of the size of 1/8th to 1/4th shall not exceed 5.0%. For determination of the size of the brokens average length of the principal class of rice should be taken into account.

4. Inorganic foreign matter shall not exceed 0.5% in any lot, if it is more, the stocks should be cleaned and brought within the limit.

5. In case of parboiled rice, prepared by pressure parboiling technique, it will be ensured that correct process of parboiling is adopted i.e. pressure applied, the time for which pressure is applied, proper gelatinisation, aeration and drying before milling are adequate so that the colour and cooking time of parboiled rice are good and free from enfrustration of the grains.

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APPENDIX—6-A-5

UNIFORM SPECIFICATIONS OF FINE AND COMMON VARIETIES OF RICE
(MARKETING SEASON 1991-92)

The rice shall be in sound merchantable condition, sweet, dry, clean, wholesome, of good food value, uniform in colour and size of grains and free from moulds, weevils, obnoxious smell, discolouration, admixture of deleterious substances or colouring agents and all impurities except to the extent in the schedule below. It shall also conform to PFA standards.

SCHEDULE OF REFRACTIONS

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Constituents of admixture or impurities etc.</th>
<th>Tolerance Limit (T.L.)</th>
<th>Rejection Limit (R.L.)</th>
<th>Rate of quality cuts to be imposed for refractions exceeding Tolerance Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Brokens Raw</td>
<td>20.0</td>
<td>25.0</td>
<td>T.L. to R.L. @ 1/4th value</td>
</tr>
<tr>
<td></td>
<td>Parboiled</td>
<td>17.0</td>
<td>22.0</td>
<td>-do-</td>
</tr>
<tr>
<td>2.</td>
<td>Foreign matter</td>
<td>0.5</td>
<td>1.0</td>
<td>T.L. to R.L. @ full value</td>
</tr>
<tr>
<td></td>
<td>Raw/parboiled</td>
<td></td>
<td></td>
<td>-do-</td>
</tr>
<tr>
<td>3.</td>
<td>Damaged/Slightly damaged grains</td>
<td>2.0</td>
<td>5.0</td>
<td>T.L. to R.L. @ 1/2 value</td>
</tr>
<tr>
<td></td>
<td>Raw</td>
<td>3.0</td>
<td>5.0</td>
<td>-do-</td>
</tr>
<tr>
<td></td>
<td>Parboiled</td>
<td></td>
<td></td>
<td>-do-</td>
</tr>
<tr>
<td>4.</td>
<td>Discoloured grains</td>
<td>2.0</td>
<td>4.0</td>
<td>T.L. to R.L. @ 1/4th value</td>
</tr>
<tr>
<td></td>
<td>Raw</td>
<td>4.0</td>
<td>8.0</td>
<td>-do-</td>
</tr>
<tr>
<td></td>
<td>Parboiled</td>
<td></td>
<td></td>
<td>-do-</td>
</tr>
<tr>
<td>5.</td>
<td>Chalky grains</td>
<td>8.0</td>
<td>12.0</td>
<td>T.L. to R.L. @ 1/8 value</td>
</tr>
<tr>
<td>6.</td>
<td>Red grains</td>
<td>6.0</td>
<td>10.0</td>
<td>T.L. to R.L. @ 1/4th value</td>
</tr>
<tr>
<td>7.</td>
<td>Admixture of lower classes i.e., common in Fine</td>
<td>10.0</td>
<td>20.0</td>
<td>Over 10% up to 20%</td>
</tr>
<tr>
<td>No.</td>
<td>Constituents of admixture or impurities etc.</td>
<td>Tolerance Limit (T.L.) %</td>
<td>Rejection Limit (R.L.) %</td>
<td>Rate of quality cuts to be imposed for refractions exceeding Tolerance Limits</td>
</tr>
<tr>
<td>-----</td>
<td>------------------------------------------</td>
<td>-------------------------</td>
<td>--------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>8.</td>
<td>Dehusked grains Raw/Parboiled</td>
<td>10.0</td>
<td>15.0</td>
<td>@ 1/4th value. Down grade fine to common beyond R.L.</td>
</tr>
<tr>
<td>9.</td>
<td>Moisture content Raw/Parboiled</td>
<td>14.0</td>
<td>15.0</td>
<td>T.L. to R.L. @ 1/8th value</td>
</tr>
</tbody>
</table>

T.L. to R.L. @ full value.
APPENDIX—6-A-6

UNIFORM SPECIFICATIONS FOR SUPERFINE RICE
(MARKETING SEASON 1991-92)

The rice shall be in sound merchantable condition, sweet, dry, clean, wholesome of good food value, uniform in colour and size of grains and free from moulds, weevils, obnoxious smell, discoloration, admixture of deleterious substances or colouring agents and all impurities except to the extent in the schedule below. It shall also conform to PFA standards.

SCHEDULE OF REFRACTIONS:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Constituents of admixture or impurities etc.</th>
<th>Tolerance Limit (T.L.) %</th>
<th>Rejection Limit (R.L.) %</th>
<th>Rate of quality cuts to be imposed for refractions exceeding the Tolerance Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Brokens</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raw</td>
<td>18.0</td>
<td>23.0</td>
<td>T.L. to R.L. @ 1/4th value</td>
</tr>
<tr>
<td></td>
<td>Parboiled</td>
<td>13.0</td>
<td>18.0</td>
<td>do-</td>
</tr>
<tr>
<td>2.</td>
<td>Foreign matter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raw/parboiled</td>
<td>0.5</td>
<td>1.0</td>
<td>T.L. to R.L. @ full value</td>
</tr>
<tr>
<td>3.</td>
<td>Damaged/Slightly damaged grains</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raw/Parboiled</td>
<td>2.0</td>
<td>4.0</td>
<td>T.L. to R.L. @ 1/2 value</td>
</tr>
<tr>
<td>4.</td>
<td>Discoloured grains</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raw</td>
<td>2.0</td>
<td>3.0</td>
<td>T.L. to R.L. @ 1/4th value</td>
</tr>
<tr>
<td></td>
<td>Parboiled</td>
<td>3.0</td>
<td>5.0</td>
<td>do-</td>
</tr>
<tr>
<td>5.</td>
<td>Chalky grains</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raw</td>
<td>4.0</td>
<td>8.0</td>
<td>T.L. to R.L. @ 1/8th value</td>
</tr>
<tr>
<td>6.</td>
<td>Red grains</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raw/parboiled</td>
<td>3.0</td>
<td>6.0</td>
<td>T.L. to R.L. @ 1/4th value</td>
</tr>
<tr>
<td>7.</td>
<td>Admixture of lower classes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raw/Parboiled</td>
<td>10.0</td>
<td>20.0</td>
<td>Over 10% upto 15% @ 1/4th value. Over 15% to 20% @ 1/2 value. Down grade beyond R.L.</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>No.</th>
<th>Constituents of admixture or impurities etc.</th>
<th>Tolerance Limit (T.L.) %</th>
<th>Rejection Limit (R.L.) %</th>
<th>Rate of quality cuts to be imposed for fractions exceeding Tolerance Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td>Dehusked grains Raw/Parboiled</td>
<td>10.0</td>
<td>15.0</td>
<td>T.L. to R.L. @ 1/8th value</td>
</tr>
<tr>
<td>9.</td>
<td>Moisture content Raw/Parboiled</td>
<td>14.0</td>
<td>15.0</td>
<td>T.L. to R.L. @ full value</td>
</tr>
</tbody>
</table>
APPENDIX—6-A-7

UNIFORM SPECIFICATIONS FOR RICE OF BASMATI AND OTHER SCENTED VARIETIES
(MARKETING SEASON 1988-89)

The rice shall be scented in sound merchantable condition, sweet, dry, clean, wholesome of good food value, uniform in colour and size of grains and free from moulds weevils, obnoxious smell, discolouration, admixture of deleterious substances or colouring agents and all impurities except to the extent in the schedule below. It shall also conform to PFA standards.

**SCHEDULE OF REFRACTIONS**:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Constituents of admixture or impurities etc.</th>
<th>Tolerance Limit (T.L.) %</th>
<th>Rejection Limit (R.L.) %</th>
<th>Rate of quality cuts to be imposed for refractions exceeding the Tolerance Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Brokens</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raw</td>
<td>18.0</td>
<td>23.0</td>
<td>T.L. to R.L. @ 1/4th value</td>
</tr>
<tr>
<td></td>
<td>Parboiled</td>
<td>13.0</td>
<td>18.0</td>
<td>do-</td>
</tr>
<tr>
<td>2.</td>
<td>Foreign matter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raw/parboiled</td>
<td>0.5</td>
<td>1.0</td>
<td>T.L. to R.L. @ full value</td>
</tr>
<tr>
<td>3.</td>
<td>Damaged/Slightly damaged grains</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raw/Parboiled</td>
<td>2.0</td>
<td>4.0</td>
<td>T.L. to R.L. @ 1/2 value</td>
</tr>
<tr>
<td>4.</td>
<td>Discoloured grains</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raw</td>
<td>2.0</td>
<td>3.0</td>
<td>T.L. to R.L. @ 1/4th value</td>
</tr>
<tr>
<td></td>
<td>Parboiled</td>
<td>3.0</td>
<td>5.0</td>
<td>do-</td>
</tr>
<tr>
<td>5.</td>
<td>Chalky grains</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raw</td>
<td>4.0</td>
<td>8.0</td>
<td>T.L. to R.L. @ 1/8th value</td>
</tr>
<tr>
<td>6.</td>
<td>Red grains</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raw/parboiled</td>
<td>3.0</td>
<td>6.0</td>
<td>T.L. to R.L. @ 1/4th value</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>No.</th>
<th>Constituents of admixture or impurities etc.</th>
<th>Tolerance Limit (T.L.) %</th>
<th>Rejection Limit (R.L.) %</th>
<th>Rate of quality cuts to be imposed for refractions exceeding Tolerance Limits</th>
</tr>
</thead>
</table>
| 7.  | Admixture of scented varieties of lower classes and non scented varieties—Raw/Parboiled | 10.0                    | 20.0                    | a) Over 10% to 15% @ 1/4th value, over 15% to 20% @ 1/2 value  
     |                                           |                         |                         | b) Beyond RL it will not be purchased as Basmati rice/scented rice. |
| 8.  | Dehusked grains Raw/Parboiled            | 10.0                    | 15.0                    | T.L. to R.L. @ 1/8th value |
| 9.  | Moisture content Raw/Parboiled           | 14.0                    | 15.0                    | T.L. to R.L. @ full value. |
APPENDIX—6-A-8

UNIFORM SPECIFICATIONS FOR RAGI
(MARKETING SEASON 1991-92)

The Ragi shall be dried and matured grains of Eleusine coracana. It shall have uniform size, shape and colour. It shall be in sound merchantable condition and also conforming to PFA standards.

Ragi shall be sweet, hard, clean, wholesome and free from moulds, weevils, obnoxious smell, discoloration, admixture of deleterious substances and all other impurities except to the extent indicated in the schedule below:

**SCHEDULE OF DIFFERENT REFRACTIONS:**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Constituents of Admixture or impurities</th>
<th>Maximum limit (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Foreign matter</td>
<td>2.0</td>
</tr>
<tr>
<td>2.</td>
<td>Other foodgrains</td>
<td>1.0</td>
</tr>
<tr>
<td>3.</td>
<td>Damaged grains</td>
<td>1.0</td>
</tr>
<tr>
<td>4.</td>
<td>Slightly damaged grains</td>
<td>2.0</td>
</tr>
<tr>
<td>5.</td>
<td>Moisture</td>
<td>12.0</td>
</tr>
</tbody>
</table>

N.B.


2. The method of sampling is to be followed as given in Indian Standard “Method of sampling of cereals and pulses” No. IS 2814-1964 as amended from time to time.

3. Within the overall limit of 2.0% for foreign matter, the inorganic matter shall not exceed 0.5%.

4. Kernels with husk will not be treated as unsound grains.
APPENDIX—6-A-9

UNIFORM SPECIFICATIONS FOR MAIZE
(MARKETING SEASON 1991-92)

The Maize shall be dried and matured grains of *Zea mays*. It shall have uniform size, shape and colour. It shall be in sound merchantable condition and also conforming to PFA standards.

Maize shall be sweet, hard, clean, wholesome and free from moulds, weevils, obnoxious smell, discoloration, admixture of deleterious substances and all other impurities except to the extent indicated in the schedule below:

**SCHEDULE OF DIFFERENT REFRACTIONS :**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Constituents of Admixture or impurities</th>
<th>Maximum limit (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Foreign matter</td>
<td>1.5</td>
</tr>
<tr>
<td>2.</td>
<td>Other foodgrains</td>
<td>2.0</td>
</tr>
<tr>
<td>3.</td>
<td>Admixture of different varieties</td>
<td>10.0</td>
</tr>
<tr>
<td>4.</td>
<td>Shrivelled &amp; Immature grains</td>
<td>3.0</td>
</tr>
<tr>
<td>5.</td>
<td>Damaged and discoloured grains</td>
<td>2.0</td>
</tr>
<tr>
<td>6.</td>
<td>Slightly damaged and touched grains</td>
<td>4.0</td>
</tr>
<tr>
<td>7.</td>
<td>Weevilled grains</td>
<td>1.0</td>
</tr>
<tr>
<td>8.</td>
<td>Moisture</td>
<td>14.0</td>
</tr>
</tbody>
</table>

N.B.


2. The method of sampling is to be followed as given in Indian Standard "Method of sampling of bigger-sized foodgrains" No. IS 3714-1978 as amended from time to time.

3. Within the overall limit of 1.5% for foreign matter, the inorganic matter shall not exceed 0.5%.
UNIFORM SPECIFICATIONS FOR JOWAR
(MARKETING SEASON 1991-92)

The Jowar shall be dried and matured grains of *Sorghum Vulgare*. It shall have uniform size, shape and colour. It shall be in sound merchantable condition and also conforming to PFA standards.

Jowar shall be sweet, hard, clean, wholesome and free from moulds, weevils, obnoxious smell, discoloration, admixture of deleterious substances and all other impurities except to the extent indicated in the schedule below:

**SCHEDULE OF DIFFERENT REFRACTIONS:**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Constituents of Admixture or impurities</th>
<th>Maximum limit (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Foreign matter</td>
<td>1.5</td>
</tr>
<tr>
<td>2.</td>
<td>Other foodgrains</td>
<td>3.0</td>
</tr>
<tr>
<td>3.</td>
<td>Shrivelled &amp; Immature grains</td>
<td>4.0</td>
</tr>
<tr>
<td>4.</td>
<td>Damaged and discoloured grains</td>
<td>2.0</td>
</tr>
<tr>
<td>5.</td>
<td>Admixture of other varieties (Yellow &amp; or red varieties in white Jowar, white Jowar in yellow &amp; red varieties)</td>
<td>10.0</td>
</tr>
<tr>
<td>6.</td>
<td>Weevilled grains</td>
<td>1.0</td>
</tr>
<tr>
<td>7.</td>
<td>Moisture</td>
<td>14.0</td>
</tr>
</tbody>
</table>

**N.B.**


2. The method of sampling is to be followed as given in Indian Standard “Method of sampling of cereals and pulses” No. IS 2814-1964 as amended from time to time.

3. Within the overall limit of 1.5% for foreign matter, the inorganic matter shall not exceed 0.5%.

4. Kernels with glumes will not be treated as unsound grains. During physical analysis the glumes will be removed and treated as organic foreign matter.
APPENDIX—6-A-11

UNIFORM SPECIFICATIONS OF BAJRA
(MARKETING SEASON 1991-92)

The Bajra shall be dried and matured grains of *Pennisetum typhoides*. It shall have uniform size, shape and colour. It shall be in sound merchantable condition and also conforming to PFA standards.

Bajra shall be sweet, hard, clean, wholesome and free from moulds, weevils, obnoxious smell, discoloration, admixture of deleterious substances and all other impurities except to the extent indicated in the schedule below:

### SCHEDULE OF DIFFERENT REFRACTIONS:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Constituents of Admixture or impurities</th>
<th>Maximum limit (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Foreign matter</td>
<td>1.5</td>
</tr>
<tr>
<td>2.</td>
<td>Other foodgrains</td>
<td>4.0</td>
</tr>
<tr>
<td>3.</td>
<td>Damaged and discoloured grains</td>
<td>2.0</td>
</tr>
<tr>
<td>4.</td>
<td>Shrivelled and Immature grains</td>
<td>4.0</td>
</tr>
<tr>
<td>5.</td>
<td>Slightly damaged grains</td>
<td>2.0</td>
</tr>
<tr>
<td>6.</td>
<td>Weevilled grains</td>
<td>1.0</td>
</tr>
<tr>
<td>7.</td>
<td>Moisture</td>
<td>14.0</td>
</tr>
</tbody>
</table>

N.B.

2. The method of sampling is to be followed as given in Indian Standard "Method of sampling of cereals and pulses" No. IS 2814-1964 as amended from time to time.
3. Within the overall limit of 1.5% for foreign matter, the inorganic matter shall not exceed 0.5%.
4. Kerms with glumes will not be treated as unsound grains. During physical analysis the glumes will be removed and treated as organic foreign matter.
5. Within the overall limit of 2.0% for damaged grains, the ergoty kerms shall not exceed 0.05%.
APPENDIX—6-A-12

UNIFORM SPECIFICATIONS FOR KODON AND KUTKI
(MARKETING SEASON 1988-89)

The Kodon and Kutki shall be dried and matured grains of *Paspalum scrobiculatum* and *panicum-milare* respectively. It shall have uniform size, shape and colour. It shall be in sound merchantable condition and also conforming to PFA standards.

Kodon and Kutki shall be sweet, hard, clean, wholesome and free from moulds, weevils, obnoxious smell, discolouration, admixture of deleterious substances and all other impurities except to the extent indicated in the schedule below:

**SCHEDULE OF MAXIMUM REFRACTIONS:**

<table>
<thead>
<tr>
<th>Grade Designation</th>
<th>Foreign matter %</th>
<th>Other food-grains %</th>
<th>Damaged grains %</th>
<th>Slightly damaged grains %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade—1</td>
<td>1.0</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Grade—2</td>
<td>1.5</td>
<td>0.75</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Grade—3</td>
<td>2.0</td>
<td>1.0</td>
<td>1.5</td>
<td>1.5</td>
</tr>
</tbody>
</table>

N.B.

1. Moisture over 12% to be discounted at full value for every one per cent increase. Stocks having moisture in excess of 16% are to be rejected.

2. Grade 2 will have a lower price by Rs. 1 and Grade 3 by Rs. 2/- per quintal in relation to Grade-1 price.

3. The cut for moisture will be in addition to the cut for respective grade.

4. In case where stocks fall below the lowest grade the stocks will not be purchased.

5. Kernels with glumes will not be treated as unsound grains. During physical analysis the covering will be removed and treated as organic foreign matter.
APPENDIX—6-A-13

UNIFORM SPECIFICATIONS FOR INDIAN WHEAT OF ALL VARIETIES
(MARKETING SEASON 1991-92)

Wheat shall

a) be the dried mature grains of indigenous red, dara, other mexican and 'Superior indigenous farm varieties viz. Triticum vulgare, T. Compactum, T. Sphaerococcum, T. durum, T. aestival and T. dicoccum.

b) have natural size, shape and colour.

c) be sweet, clean, wholesome and free from moulds, living insects, obnoxious smell, discolouration, admixture of deleterious substances including toxic weedseeds and all other impurities except to the extent indicated in schedule below

d) be in sound merchantable condition.

e) not have any admixture of pesticides, fungicides and any obnoxious, deleterious and toxic material.

f) conform to P.F.A. Rules.

SCHEDULE SHOWING THE MAXIMUM PERMISSIBLE LIMITS OF DIFFERENT REFRACTIONS IN FAIR AVERAGE QUALITY OF WHEAT

<table>
<thead>
<tr>
<th>Foreign matter %</th>
<th>Other food-grains %</th>
<th>Damaged grains %</th>
<th>Slightly damaged grains %</th>
<th>Shrivelled &amp; broken grains %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.75.</td>
<td>8.0</td>
<td>3.0</td>
<td>10.0</td>
<td>12.0</td>
</tr>
</tbody>
</table>

NOTE:

1. Moisture in excess of 12% up to 14% will be discounted at full value.

2. In case of stocks having living infestation a cut at the rate of fifty paise per quintal may be charged as fumigation charges.

3. For weevilled grains determined by count, following price cuts in addition to other cuts will be imposed:

   i) From the beginning of the season till end of August the rate of cut will be Rs. 1/- per qtl., for every 1% or part thereof.

   ii) From 1st September till end of October, no cut will be imposed up to 1% while for any excess, the cut will be @ Rs. 1/- per qtl. for every 1% or part thereof.

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(iii) from 1st November, till end of the season, no cut will be imposed, upto 2% while for any excess the cut will be @ Rs. 1/- per quintal for every 1% or part thereof.

(iv) Stocks containing weevilled grains in excess of 3% will be rejected.

**Method of analysis :**

As given in Bureau of Indian Standard No. IS : 4333 (Part I & II) 1967 and as amended from time to time except for weevilled grains which are to be determined by count method.

**Definitions :**

*Foreign Matter* : Includes organic and inorganic matter. The inorganic matter shall include sand, gravel, dirt pebbles, stones, lumps of earth, clay and mud, glass and metallic pieces etc. The organic matter shall include chaff, straw, weed seeds and other inedible grains.

*Shrivelled Grains* : Kernels or pieces of kernels that are not fully developed.

*Brokens* : Pieces of kernels that are less than three fourth of the size of full kernel.

*Slightly damaged grains* : Kernels or pieces of kernels that are damaged or discoloured superficially so as not to affect the quality of the material.

*Damaged Grains* : Kernels or pieces of kernels that are sprouted or internally damaged as a result of heat, microbes, moisture or weather.

*Weevilled grains* : Kernels that are partially or wholly bored.

*Other food grains* : Any foodgrains other than wheat.
GENERAL CHARACTERISTICS:

Gram shall

a) be the dried mature grains of *Cicer arietinum*

b) have uniform size, shape and colour.

c) be sweet, hard, clean, wholesome and free from moulds, living insects, obnoxious smell, discolouration, admixture of deleterious substances and all other impurities except to the extent indicated in schedule below

d) be in sound merchantable condition.

e) not have moisture exceeding 12.0 percent.

f) conform to P.F.A. Rules.

SCHEDULE SHOWING THE MAXIMUM PERMISSIBLE LIMITS OF DIFFERENT REFRACTIONS

<table>
<thead>
<tr>
<th>Grade</th>
<th>Foreign Matter</th>
<th>Other food-grains</th>
<th>Damaged grains</th>
<th>Slightly damaged &amp; touched grains</th>
<th>Immature shrivelled &amp; broken grains</th>
<th>Admixture of other varieties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Grade 1</td>
<td>0.5</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>4.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Grade 2</td>
<td>1.0</td>
<td>3.0</td>
<td>3.0</td>
<td>4.0</td>
<td>6.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Grade 3</td>
<td>2.0</td>
<td>5.0</td>
<td>4.0</td>
<td>8.0</td>
<td>8.0</td>
<td>10.00</td>
</tr>
</tbody>
</table>

N.B.

1. Moisture in excess of 12.0% upto 14.0% to be discounted at full value. Stocks having more than 14.0% moisture content are not to be accepted.
2. Grade 2 will have a lower price by Rs. 1.50 and Grade 3 by Rs. 3.00 per quintal in relation to Grade 1 price.

3. The price cut for moisture will be in addition to grade cut.

4. In cases where stocks fall below the lowest grade the buyer may, at his discretion, purchase the stocks after affecting necessary cuts for expenditure on reconditioning.

5. In case the stocks are infested with living insects, a cut @ 50 paise (Fifty paise) per quintal will be affected as fumigation charges.

6. For weevilled grains following price cuts will be imposed:
   
   (a) from the beginning of the season till end of August, the rate of cut will be Rs. 2.00 per quintal for every 1% or part thereof.

   (b) from the 1st September, till end of October no rebate is to be charged up to 1% while for any excess the cut will be @ Rs. 1/- per quintal for every 1% or part thereof.

   (c) from 1st November, till end of season, no rebate is to be charged up to 2% while for any excess the cut will be @ Rs. 1/- per quintal for every 1% or part thereof.

   (d) Stocks containing weevilled grains in excess of 5% will be rejected.

Definitions:

*Foreign Matter*: Includes organic and inorganic matter. The inorganic matter shall include sand, gravel, dirt pebbles, stones, lumps of earth, clay and mud. The organic matter shall include chaff, straw, weed seeds and indible grains.

*Other foodgrains*: Any food grain other than gram.

*Damaged Grains*: Kernels or pieces of kernels that are sprouted or internally damaged as a result of heat, microbes, moisture or weather.

*Slightly damaged and touched grains*: Kernels or pieces of kernels that are damaged or discoloured superficially so as not to affect the quality of the material.

*Immature and shrivelled grains*: Kernels or pieces of kernels that are not fully developed.

*Weevilled grains*: Kernels that are partially or wholly bored.

*Brokens*: Pieces of kernels that are less than three fourth of the size of full kernel.
APPENDIX—6-A-15

UNIFORM SPECIFICATIONS FOR BARLEY
(MARKETING SEASON 1991-92)

Barley shall

a) be the dried mature grains of *Hordeum vulgare*.

b) have uniform size, shape and colour.

c) be sweet, clean, wholesome and free from moulds, living insects, obnoxious smell, discoulouration, admixture of deleterious substances and all other impurities except to the extent indicated in schedule below.

d) be in sound merchantable condition.

e) not have any admixture of pesticides, fungicides and any obnoxious and toxic material

f) conform to P.F.A. Rules.

### SCHEDULE SHOWING THE MAXIMUM PERMISSIBLE LIMITS OF DIFFERENT REFRACTIONS

<table>
<thead>
<tr>
<th>Grade</th>
<th>Foreign Matter</th>
<th>Other food-grains</th>
<th>Damaged grains</th>
<th>Slightly damaged &amp; touched grains</th>
<th>Immature and shrivelled grains</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>0.75</td>
<td>6.0</td>
<td>2.0</td>
<td>5.0</td>
<td>6.0</td>
</tr>
<tr>
<td>2.</td>
<td>1.50</td>
<td>10.0</td>
<td>3.0</td>
<td>10.0</td>
<td>12.0</td>
</tr>
</tbody>
</table>

N.B.

1. Grade 2 will have a lower price by Rs. 2/- per qtl. in relation to the price of Grade 1.

2. Moisture in excess of 12% up to 14% is to be discounted at full value.

3. The price cut for moisture will be in addition to the grade cut.
4. For weevilled grains following price cuts in addition to the other cuts will be imposed:
   (a) from the beginning of the season till end of August, the rate of cut will be Rs. 1/- per quintal for every 1% or part thereof.
   (b) from the 1st September till end of October no cut will be imposed upto 1% while for any excess the cut will be @ Rs. 1/- per quintal for every 1% or part thereof.
   (c) from 1st November till end of season, no cut will be imposed upto 2% while for any excess the cut will be @ Rs. 1/- per quintal for every 1% or part thereof.
   (d) Stocks containing weevilled grains in excess of 3% will be rejected.

5. In case of stocks having living infestation a cut at the rate of fifty paise per quintal may be charged as fumigation charges.

Definitions:

Foreign Matter: Includes organic and inorganic matter. The inorganic matter shall include sand, gravel, dirt, pebbles, stones, lumps of earth, clay and mud, glass and metallic pieces. The organic matter shall include chaff, straw, weed seeds and other inedible grains.

Other Foodgrains: Any food grain other than Barley.

Damaged Grains: Kernels or pieces of kernels that are sprouted or internally damaged as a result of heat, microbes, moisture or weather.

Slightly damaged and touched grains: Kernels or pieces of kernels that are damaged or discoloured superficially so as not to affect the quality of the material.

Immature and shrivelled grains: Kernels or pieces of kernels that are not fully developed.

Weevilled grains: Kernels that are partially or wholly bored.
CHAPTER-7

QUALITY CONTROL PROCEDURE AT MANDI—PURCHASE LOADING AND DESPATCHES

7.1 Grain Inspection:—With a view to maintain quality of grains to be handled and satisfy the consumer, to whom ultimately the grain is to be sold, inspections are required to be carried out at various stages of handling. Trained qualified personnel are involved in these inspections. Full knowledge of procedures, quality requirements, duties and responsibilities is inevitable for the persons carrying out this work. Persons carrying out this work will always carry with them equipment listed at Appendix 3 A-1. In addition quality specifications of the grain to be purchased will be available with them. They shall also study provisions of the prevention of Food Adulteration Act in relation to food grains (Ref. Chapter-5). Duties and responsibilities of the persons involved in grain inspection are as—

i) He will acquaint himself with the area, trade practices, type and variety of grain produced and ensure proper inspection to safeguard against malpractices. Scientific sampling technique, given in Chapter-2 of the manual shall be adopted and samples sent according to instructions with relevant details on the slip.

ii) It will be ensured that weights used are standard weights and duly stamped by Controller of weights and Measures.

iii) The gunny used for packing the grain and the stitchings on the bags are proper so as to avoid spillage in transit.

iv) Before loading grain in the wagon, it needs to be ensured that the wagon is fit for grain loading and adequately cleaned to avoid any contamination to grain.

v) Despatch advise, and other documents to be despatched without delay.

vi) Should arrange for disinfection of wagon with DDVP where necessary, according to standing instructions (Vide Chapter-12).

vii) Should know instructions on stencilling to be done, the colours to be used for procurement by different Agencies the colour of slips for different varieties of wheat, the colour of slips to be used for stocks which can be of acceptance and those which are not acceptable.

viii) In certain cases it is inevitable to despatch more than one variety/grade of food grains in one wagon. In such cases following steps shall be taken:—

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(a) Separate sample shall be drawn variety/grade wise and relevant details indicated on separate sample slips. Loading shall be done so as to stack variety/grade wise bags together in the wagon.

ix) Telegraphic intimation giving the name of each variety shall be sent to the consignees to facilitate inspection and segregation variety/grade wise at the destination.

7.2 Modes of purchase followed by the F.C.I. are:

i) **Open purchase** :—These are made in the Agricultural produce markets, in open auctions, by bidding for the price. In these purchases, quality specifications of the Govt. are adhered to and quality purchased is graded Fair Average Quality (FAQ).

ii) **Purchase under price support** :—Govt. fix a minimum price for grains at the beginning of the season. When required the Corporation enters the market as an Agent of the Govt. to make purchases under price support to avoid distress sales and consequent hardship to producers. These purchases are made conforming to Govt. specifications and support price.

iii) **Commercial purchase** :—These are made as required laying down limits of quality for purchase. Price for the purchase is intimated from time to time.

iv) **Purchase of superior quality rice** :—This may be superior quality or export quality rice. These purchases are strictly according to specifications and at the price decided by the Govt. In these purchases rice need to be compared to type samples to avoid mistakes. Bags of such rice are to be marked clearly and handled separately. Variety purchased will be clearly mentioned in the sample slip to enable comparison in the laboratory.

7.3 Inspection during open market purchase:

In view of huge purchases made in the open market, where price is fixed directly by the Inspector in the market, it is of paramount importance that pricing of lots is correctly done in relation to the specifications. The aim should be to check and sample the maximum number of lots purchased in the open market. If due to practical difficulties each lot cannot be sampled, the sampling shall be done on the scale given in Chapter-II and samples sent to the District Laboratory for analysis and check. Price paid for the lot shall be indicated on the sample slip. In case of paddy and rain affected grain moisture will be determined before deciding the price.

7.4 Commercial purchases :—In these purchases, every lot purchased shall be sampled separately and samples sent to the district laboratory along with information on price paid. These purchases are to be made within specifications prescribed and at prices intimated by Head Quarters. In case of pulses only bold grains will be purchased.

7.5 Purchases from Agents, State Governments and Rice mills:

Following procedure will be followed:

i) The Inspector shall make a preliminary inspection of foodgrains in mandis/godowns, mills but
the final inspection and sampling shall be done by him at the railway station before loading of foodgrains into wagons. In case of local godown delivery final sampling shall be done at the godowns. If on inspection finds that the grain is not as per the specifications, he shall allow improvement of quality so that the stock conforms to requirement and is acceptable. On the Inspector’s accepting the grain, the seller shall be allowed to load it into the wagons.

ii) sample shall be drawn by the Inspector from 10 per cent of the bags selected by him at random. Such of these bags from which sample is drawn will be stencilled with the letter ‘S’. Out of the sample grain so drawn three representative samples of 500 gms. each should be made and jointly sealed by the Inspector and the seller, and slips with necessary particulars placed inside the bag and pasted outside. The bags selected at random for 10% weightment should be marked ‘W’.

iii) One sample shall be given to the seller and a set of two samples sent to the District Laboratory/Regional laboratory. On receipt of two samples from the inspector, this will be given a code number and one sample will be analysed in the District laboratory within 48 hours from the time of receipt. After the sample is analysed the analysis report will be sent to the Accounts Branch after decoding to settle the final payment of the party. The District Manager shall ensure that a copy of the analysis report is given to the seller’s within one week from the date of acceptance of consignment along with the cheque and the seller’s signature obtained in token of having received the copy of the analysis report.

Determination of Moisture Content at the time of acceptance of rice from Millers under levy/ custom milled:

In order to bring the uniformity for determination of moisture content for the purpose of applying cuts if any, throughout the country, the procedure as given below is to be followed:

1. The Moisture content will be recorded at the time of acceptance of rice stocks under levy or custom milled at the depot level in the presence of millers/traders and a Mini sample not less than 150 gms. of rice properly packed in a polythene bag of thickness not less than 300 gauge along with sample slip containing details including moisture content shall be kept at the core of the cloth bag covered with rice grains for determination and counter-checking of moisture content recorded at the depot level by the Distt./DFSC Labs., which normally should be on the lower side.

2. The moisture content as recorded in the presence of miller/trader at the depot level and recorded in the sample slip will be recorded in the analysis results carried out in the Distt./DFSC Laboratories for calculating Quality cuts and release of payments by the Distt./DFSC Laboratories.

3. Wherever any abnormal difference of moisture content between the depot and that observed in the Distt./DFSC Laboratory is observed, the matter shall be investigated and action taken against the personnel, if they are found guilty and/or to rectify the moisture meter(s) if the same is not working properly.
CHAPTER 8

IMPORTS OF FOOD GRAINS

8.1 **Quality Specification:**—Specification and classification of grain discussed at length in Chapter 6 of the Manual. Basic concepts adopted in India in quality specification of food grains, hold good for similar specifications of other countries. Details such as definition of criteria used, limits for various items and methods of analysis, however, may vary from country to country. These specifications may classify the grain in grades or may provide discount in price for excess of refractions. In some countries specification is effective for a particular season, whereas, in some this may be effective for years as far as exports are concerned. It is also possible, that internal and export specification is different. Some countries are mentioning year of production in respect of exports. Most of the countries also insist that grain inspection for export is carried by their national agency or an agency licensed for the purpose in that country. In case grain is handled mechanically, sampling technique followed is different. It needs to be pointed out that depending on market situation, negotiation on some of the conditions is possible. All these aspects need to be studied in respect of the country from where grain is proposed to be imported. Where Inspection teams are proposed to be sent to watch quality at the time of loading, these teams be fully briefed on these various aspects.

8.2 In case of wheat many countries classify the grain on the basis of varieties, colour and season of production. Protein content is used, in some countries, as criteria for quality. Wheat with protein content in excess of 11% is called hard wheat and with lower than 9% soft wheat. In between it is semi hard wheat. In these wheats, term ‘hard’ and ‘soft’ does not relate to hardness’ and softness of the grain but to protein content of the grain. In foreign markets sale of wheat based on protein content is largely favoured. While making purchases in foreign markets, therefore, it is necessary to have clear idea about the type of wheat required and limits of protein content. Indian consumers, generally, prefer semi hard wheat with protein content in the range of 9% to 11%. Roller Flour Mills need high protein wheat, generally, in the range of 11 to 13%. In international markets wheat with higher protein cost relatively more. Wheat with protein lower than 7% is generally used as cattle feed. In comparison Indian wheats are soft to semi hard with protein in the range of 8 to 11%.

8.3 Weight volume ratio known as bushel or hecto-litre weight is used in many countries as one of the criteria for quality. In America, gradation is based on bushel weight. Good quality wheat has a bushel weight in the range of 60 to 64 Lbs. Lower grades have lower bushel weight. Moisture affects bushel weight. Higher moisture content lowers bushel weight. High foreign matter content will also lower bushel weight. Higher proportion of these in the grain, therefore, lowers the grade of the grain. In India foreign matter comprises inorganic and organic matter. In many grain exporting countries such
distinction does not exist. In some countries foreign matter is grouped into dockage and foreign matter. It is necessary to study definitions of these refractas carefully.

8.4 Some countries ban mentioning crop year in the specification or otherwise in sale agreements. Implications of this regulation needs to be properly studied in relation to needs in India while making purchase from such countries.

8.5 In case of rice, quality revolves round the criteria, broken and degree of polish. In case of parboiled rice moisture content and discoloured grain assume importance. It is on record that in some Asian countries discoloured grain present in rice is associated with toxins. Raw rice of some countries could be glutinous. This is generally short bold variety. Glutinous rice is not liked by consumers in India. This distinction disappears when rice is parboiled.

8.6 Where grain is loaded in bulk, handling systems are mechanised. Sampling and analytical procedures also are mechanised in these countries. Results obtained through Indian procedure where, sampling and analysis is done by hand will be at variance. Possible differences should be borne in mind in making comparisons. It is also possible that in some countries grain containing unwanted weed seeds and grain affected by diseases such as 'ergot', could be offered for export as these may not be considered harmful in their local use.

Purchase of such grain needs to be made keeping in mind Indian legal requirements. Presence of such items are not covered by the normal specification. Special steps needed, if any, in this connection should be decided after examination of grain available for export. It needs to be pointed out that, many countries allow negotiation in regard to quality subject to price adjustments. Indian needs and limitations in these regard should be well known while making purchases from other countries.

8.7 Precautions at load points:—Exporting countries, invariably, have their own organisations or their licensed agencies for sampling, analysis and issue of quality certificate. Certificate issued by these is considered as final. Association of the buyer with these procedures may be or may not be allowed. When association is allowed, only partial check may become possible. For effective check to the extent possible, steps will have to be decided taking into account facilities available in the exporting country. Negotiations may be needed, while making purchases, in this connection.

8.8 In case of the ship to be loaded, with grain for India, it needs to be seen that the ship did not carry hazardous material in the holds to be loaded with grain, in the earlier shipment. From the records it also needs to be ensured that no hazardous material is on board or is proposed to be carried in the current shipment. Holds should be clean prior to loading and should be checked for possible leakages. Where doubts arise shipping company should be asked to rectify defects. Staff deputed for the purpose should have clear instructions in this regard.

In case of problems, local embassy will need to be contacted. Any defects that may have persisted inspite of efforts, should be brought to the notice of unloading port well in advance. Information in this regard also needs to be sent to concerned authorities in India without loss of time.
INSPECTION OF IMPORTED FOODGRAINS AT THE INDIAN PORTS:

8.9 First Inspection Report:

As soon as the vessel arrives and is ready to commence discharge, its cargo shall be inspected by an officer not below the rank of Assistant Manager (QC), to be nominated by the Senior Regional Manager/Regional Manager/JM (PO). The nominated Officer will submit an inspection report regarding the condition of foodgrains, on landing, as per appendix-8-A-1. The copies of the first inspection report are required to be sent to the concerned District Manager/Regional Manager/Sr. Regional Manager/JM (PO)/Zonal Manager, and also to Manager (QC) HQs. and Joint Commissioner (S&R) Govt. of India, Deptt. of Food, Krishi Bhawan, New Delhi. The first inspection report is required to be sent to all concerned within 2 days of the commencement of discharge.

8.10 Drawal of Samples on commencement of discharge:

At the time of first inspection, the nominated officer will also draw samples from the operating hatches and a sample of 500 gms. will be forwarded by him to the District Manager, Regional/Sr. Regional Manager/JM (PO), Zonal Manager and also to Manager (QC), and Joint Commissioner (S&R), Deptt. of Food, at New Delhi, along with the first inspection report. Along with this sample one separate sample packed in polythene bag containing not less than 120 gms shall be placed in the main sample for determination of moisture of the cargo. The samples for Manager (QC) and Joint Commissioner (S&R) should be sent in duplicate, by air-mail.

8.11 Drawal of samples during the discharge of the vessel and analysis thereof:

The inspection of the stocks discharged will be made during each working shift by the QC Staff and the samples shall be drawn from every 5 ft. depth, as the discharge from each hatch progresses. 5 Ft., 10 Ft., 15 Ft. depth means stocks stacked from top to 5 Ft., 5 Ft. to 10 Ft., 10 Ft. to 15 Ft. respectively. In case of bagged cargo on arrival of the Vessel, samples should be drawn at random by selecting minimum 10% of bags both by sample tube as well as by cut of opening some of seam of the bags to final intrinsic nature of quality. Since a number of samples will be drawn from different parts of a hatch at each specified level of depth, such samples should be mixed together to make one sample of one particular depth of each hatch for the purpose of analysis. The samples so drawn from each hatch at different depth levels shall be sent to the District/Regional Laboratories for complete analysis, keeping in view the contractual specifications and also the PFA requirements. In reference to the Indian PFA Standards, the analysis should record the various items that are covered under the PFA standards, like moisture, foreign matter, damaged grains, insect damaged grains, pesticide residues, poisonous weed seed/deleterious material and infestation. The test for protein content should also be undertaken as per the requirements in the contractual specifications. Moisture determination should also be done for the various depth levels along with the analysis for other refractions, for which arrangements for the despatch of samples for moisture determination in sealed containers or polythene bags should be made. The nominated officer should arrange to make composite hatch wise samples and also one composite sample for the entire vessel, after the complete discharge of the vessel and arrange to send the hatch wise composite samples and the general composite sample to the Manager (QC), HQs. and Joint Commissioner (S&R)
Dept. of Food apart from sending the samples to the District/Regional/Sr. Regional Manager/JM (PO) concerned. The hatch wise composite sample should not be less than 500 gms, and the general composite sample should not be less than 2 kg, in each case. While sending the samples to the District/Regional Laboratory it should be ensured that complete details are incorporated in the sample slip and the depth level whether 5 ft., 10 ft., 15 ft., (1.52 metres 3.04 metres, 4.57 metres) should also be indicated. The analysis of the depth wise hatch wise samples as forwarded by the nominated officer to the District/Regional Labs should be analysed promptly and after the detailed analysis results should be sent to the Manager (QC) HQs. and Joint Commissioner (S&R), New Delhi. In addition to the preliminary first inspection report, the nominated officer will also record his general observations regarding the quality and condition of the consignment while the cargo is being unloaded, and send the report to the Manager (QC), covering the following points, on the completion of unloading:—

(i) Quality and quantity of each variety/class/grade and the crop season of the grain;

(ii) Manner of distribution of the cargo in the hatches;

(iii) Quality and condition of containers, if any, and mode of stitching etc.

(iv) Quantity of damaged grain, if any, and causes of damage.

(v) What means were adopted during voyage to discover heating and whether temperature records were maintained,

(vi) Whether any grain has arrived in heated condition,

(vii) Precautions taken at the time of loading and during voyage against heating and sweating of the grain by coming into contact with MS sides and pipes of the ship.

(viii) Action taken or being taken for survey and to recondition the grain,

(ix) Whether the vessel has brought any chemicals along with the grain. If so, name of the chemical and stowage plan should be indicated.

(x) Such other information as may be useful or material in determining the quality and condition of the cargo.

8.12 Actions to be taken on First Inspection Report:

The first inspection report is the most important report to get the information regarding the condition of the stocks, and in case any points of a serious nature, pertaining to the quality of the stocks, are observed by the inspecting officer, he should not only send the report promptly to the concerned DM/JM (PO)/RM/SRM, but also contact them over phone, requesting them to be available on the spot to examine the position first hand. For the purpose of taking prompt action on the first inspection report by the DM/RM/SRM/JM(PO), the following points may be kept in view:—

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(i) General:

In case the grain is found to be damaged due to heating, wetting etc., a survey shall be arranged immediately, as provided in the Charter Party. Survey should be by an independent agency of international repute.

(ii) Heating:

If the cargo has arrived in heated condition or is likely to develop heating in transit it should be aerated before being despatched to the recipients or put into storage. If the grain is likely to develop heating soon after reaching destination, depot officer and the concerned District Manager or the recipients concerned shall be promptly informed about the condition without delay, so that such stocks could be aerated/fumigated by the recipients before putting it into storage.

(iii) Insect infestation:

In case the grain is found to be infested, steps should be taken for fumigation of the stocks at the port depot itself before despatch. In case there are difficulties due to operational reasons or objections by port authorities, the same should be brought on record and simultaneously action should be taken to inform the recipients about the extent of infestation, with an advise to fumigate the stocks immediately on receipt.

(iv) Wet or mouldy grain:

The District Manager shall ensure that the grain which is received in moist, mouldy and wet condition is segregated and reconditioned before despatch. If any stock is found to be unfit for human consumption, it shall not be delivered or despatched to the recipients.

(v) Cargo containing weed seeds:

In case a consignment is found to contain weed seeds etc., steps shall be taken to have the same identified from a recognised institution. If there is any doubt regarding identification, the expert opinion obtained should be forwarded along with sample of weed seeds to the Regional Manager. Samples of such weed seeds along with all relevant details should also be sent to Head quarters. The assistance of the booklet on weed seeds should be taken for attempting identification of the weed seeds. At all ports a copy of this booklet should be kept for any reference. The assistance of local PPQ officers should also be taken. If any toxic or poisonous weed seeds are noticed on first inspection or at a later stage in any part of the consignment, care shall be taken to inspect the consignment thoroughly while it is being unloaded, to find out whether the poisonous seeds are localised or spread over the whole consignment. 40 to 60 random samples of 500 gms. each may be taken at various points and levels for careful analysis to determine the incidence of poisonous seeds by weight as well as by count. When their presence is localised, immediate and effective steps shall be taken to segregate the portions containing such seeds. Representative samples should also be taken therefrom.
The permissible limits of certain important poisonous weed seeds deleterious materials are given below:—

(i) Dhatura 0.025% (Ten seeds per Kg.)
(ii) Agrostemma githago 54 seeds per Kg.
(iii) Ergoty Kamels 0.05% (15-16 grain per Kg.)
(iv) Dwarf Bunt. 0.005%.

The cargo containing poisonous weed seeds in excess of the limits prescribed shall not be despatched to allottees, without clear instructions from the Regional Manager.

(vi) Grain Contaminated by Chemicals:

Grain found contaminated by chemicals shall be carefully segregated, chemically analysed and a report sent as quickly as possible to the Regional Heads. Such grain shall be disposed of only in accordance with the instructions of the Hqrs.

8.13 Advance intimation of damaged cargo to Second Port:

If any damage is noticed in the grain discharged by a ship at any port by way of lightening of part cargo, the nature of the damage shall be communicated to the officer in charge of the second port together with the following details:—

(i) The quantity discharged at the first port and the balance carried forward to the second port;
(ii) The particulars of the hatches containing damaged grain and the parts of the hatches where damaged grain was noticed;

N.B.: In case it is felt that the balance cargo would further deteriorate during the voyage of the ship to the second port, the District Manager at the first port will, after obtaining the approval of Regional Head by telegram or over the telephone, make immediate arrangements to discharge the entire cargo at the first port of discharge and take steps to recondition it with the least possible delay.

8.14 Inspection for Quarantine requirement:

Directorate of plant Protection, Quarantine and Storage, through their local representatives will be inspecting and drawing samples to examine the same for quarantine requirements. Full facilities may be provided to them to draw the samples. The observations of the PPQ Officers should be telegraphically intimated to Manager (QC), HQs, in case there is difficulty in getting the stocks cleared for PPQ requirements.
8.15 Since the arrangement for determination of pesticide residues and protein analysis is available only in the Zonal/Regional laboratories, it should be ensured that the samples for the same are sent promptly to the Zonal/Regional Laboratory. The Zonal Laboratory should analyse the samples immediately and intimate the results to the nominated officer as well as to the Manager (QC), Headquarters telegraphically. A special report should also be sent to the Manager (QC), HQs. in case the stocks are not conforming to the contractual specifications or to the PFA Standards for any of the refractons.

8.16. Gift Consignment—Gift consignments received from overseas on behalf of Agencies include various items besides foodgrains, the foodgrains stocks are usually kept at FCI depots along with FCI stocks till the same are released to the donees nominated by the Agencies or from FCI stocks in lieu of stocks received from abroad on behalf of Agencies. In India mostly the stocks are imported by the World Food Programme Authority and the same are cleared by the Agency nominated by them. The stocks are delivered by the so nominated agency on behalf of WFP Authorities at the FCI depots such stocks before merger with FCI stocks thereafter should be examined thoroughly with regard to quality specifications issued from time to time at the District/Regional level. However an overall composite sample in duplicate with full details of the consignment i.e. Name of the Vessel, date of arrival/booking, Qty. in MTs, Commodity, Port of booking, Port of berthing etc. etc. for ascertaining the quality confirming the varieties/classification of the Gift consignments should be forwarded to Manager (QC), Hqrs. and Jt. Commissioner (S&R), Dept. of Food, Krishi Bhavan, New Delhi. It should also be ensured that the stocks so received from abroad on WFP account and are meant for merger with FCI stocks should conform to the following requirements:

1. It meets the Indian PFA requirement not only in respect of pesticidal residues but also in respect of other parameters such as F.M., Damaged grains, Insectastic damaged grains etc.

2. The M.C. should not exceed 14% which is the Rejection limit in the uniform specification.

3. It does not violate the quarantine restrictions prescribed by the Deptt. of Agriculture i.e. wheat imported does not contain ergot, affected grains and dwarf bunt more than 0.05% and 0.005% respectively. The stocks should also be free from Sitophilus Granarius as stipulated under Plants Fruits and Seeds (Regulation of import into India) Order 1989.

4. The stocks of wheat should not contain more than permissible limit of the pesticidal residues prescribed by the G.O.I. which are as under:

   1. Malathion 4 PPM
   2. Fenitrothion 0.02 PPM
   3. Inorganic Bromide (determined and expressed as total Bromide from all sources) 25 PPM
   4. Hydrogen Phosphide 0.05 PPM
   5. Any Other pesticidal residue Nil
For these requirements the stocks should be got checked up at Indian Ports and the Agency should submit a certificate from a renowned test Laboratory.

6. In addition a sample of wheat should be referred to BARC, Bombay from the discharge port in India and clearance certificate obtained from them by the Agency about the safe levels of radiation that may not be harmful.
APPENDIX 8-A-1

FIRST INSPECTION REPORT OF FOODGRAINS ON LANDING

(A) 1. Name of the vessel
    2. Date of berthing
    3. Port of loading
    4. Port of landing
    5. Name of the commodity.
       Class
       Sub-class
       Grade (As per the shipping documents)

    6. Manifested quantity
       (In M. tonnes and/or bags).

(B) 1. Whether the grain arrived in bulk or in bags and general condition of bags.
    2. Moisture content (%) 
    3. Whether mouldy or whether there is heating in any part of the grain mass.
    4. Whether insect infested (If so type and number of insects per kg.).
    5. Remedial measures, if any, taken during voyage for insects control etc.
    6. Whether it contains extraneous matter, if so, what material
    7. Whether any weed seeds are present
    8. Whether grain is discoloured.
    9. Whether the steamer has brought any chemicals along with the grain (if so, indicate names of the chemicals and stowage plan).
10. Any other visible contamination

11. Any other damage observed (Approx. quantity and its location).

Date ........................................
No. ........................................
Station ...................................

Copy to: ....................................

...........................................

District Manager
PART -II

STORAGE AND PRESERVATION
CHAPTER 9

QUALITY CONTROL AT RECEIPT IN 
STORAGE DEPOTS

9.1 For ensuring quality control at a food grain storage depot it is necessary to know factors that contribute to storage worthiness of the godown (building used for food grain storage), storability of grain and loss in storage. In connection with loss, it is necessary to know role played by moisture, insects and microbes. Required technical information on these factors is given in Chapter 23. Here, only steps to be taken in regard to Q.C. operation are described.

9.2 Steps comprise, pre-storage, at the time of storage, during storage and at the time of release of grain. It needs to be added that, in the godowns of the Corporation in addition to food grain, sugar and fertilizer also are required to be handled. Steps needed in the handling of these are discussed separately later, in the Manual. Bulk storage, silo storage and CAP storage being specialised type of storage is discussed in the following chapters, separately.

9.3 Pre-Storage steps :

Before grain is received in the godown, the Depot-in-charge should attend to the following points:—

i) Check the godown to ensure that there is no likelihood of leakage of rain water and that drainage is in perfect condition.

ii) Clean the godown and its environments,

iii) Assess capacity,

iv) Give pre-storage insecticidal treatment,

v) Draw the stack plan,

vi) Arrange for required dunnage and get cleaned and disinfested,

vii) Stack card to be kept ready,

viii) Ensure adequate security and fire fighting arrangements.
(i) **Check-up of godowns:**

In order to avoid the possibility of damage to the grain to be stored, the depot-in-charge should check that there will be no leakage of water from the roof or valley gutter or walls during rains since leakage can cause considerable damage and loss. Inspection for detection of leakages shall be made frequently, much before commencement of rains, to ensure damage free storage of grain all the time of the year.

In respect of constructions belonging to Food Corporation of India or Government of India, Engineering Wing of the Corporation shall be approached well in advance for effecting repairs whenever these become necessary. It shall be further ensured that these are carried out in time. Private godowns are taken by food Corporation of India, as an ad-hoc measure, on hire, The owners of such godowns shall be informed of repairs, if any which should be got done at their cost before storing foodgrains.

(ii) **Cleanliness and disinfection:**

The godown shall be thoroughly swept and cleaned. It is also essential that the surroundings of the godown are cleared of shrubs/bushes and drainages are maintained clean.

(iii) **Estimation of capacity:**

Storage capacity of the godown shall be carefully estimated on the following basis:

A standard size bag (43\(\frac{3}{4}\) x 26\(\frac{1}{4}\) or 40" x 28" or 110.49 x 67.31 and 101.6 x 71.12 cms) will occupy about 6 sq.ft. of space and will contain 95 to 100 kgs, i.e. 10 to 11 bags to a tonne. Assuming a normal stack to be 16 layers high, a tonne will require 5 to 5\(\frac{1}{2}\) sq.ft. space. Providing 30 per cent of space for alleyways for inspection and disinfection of stacks, the area required for a tonne of grain will be 6.5 to 7.20 sq.ft. (0.6 to 0.66 sq.m). This will however, vary according to weight per bag and the height of a stack. The following table gives the maximum permissible height of stack for different commodities.

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Normal Heights of bags</th>
<th>Maximum possible limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheats, barley, oats, maize gram, pulses, jowar and other millets.</td>
<td>20 layers</td>
<td>20 layers</td>
</tr>
<tr>
<td>Rice and milled pulses</td>
<td>16 years</td>
<td>18 years</td>
</tr>
<tr>
<td>Wheat, barley, oats, maize gram, pulses, jowar and other millets.</td>
<td>20 layers</td>
<td>20 layers</td>
</tr>
<tr>
<td>Rice and milled pulses</td>
<td>16 layers</td>
<td>18 layers</td>
</tr>
<tr>
<td>Wheat products viz. suji maida and gram flour</td>
<td>12 layers</td>
<td>-</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Commodity</th>
<th>Normal Heights of bags</th>
<th>Maximum possible limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atta</td>
<td>10 layers</td>
<td></td>
</tr>
<tr>
<td>Wheat bran</td>
<td>16 layers</td>
<td></td>
</tr>
<tr>
<td>Paddy</td>
<td>18 layers</td>
<td>20 layers</td>
</tr>
</tbody>
</table>

(iv) **Disinfection of godown:**

Irrespective of whether infestation is apparent or not, the godown shall be thoroughly cleaned, floor, walls, pillars etc. swept/brushed and disinfested with any of the chemicals mentioned hereunder:—

(a) Malathion 50 per cent E.C. (Premium grade) by preparing a solution with water in ratio of 1:150 and spraying @ 3 litres per 100 sq. metres.

(b) DDVP-100 E.C. diluted with water in the ratio 1:300 and sprayed only on the floor @ 3 litres per 100 square metres.

(c) EDB - 0.75 kg. per 28 c. metres (1000 sq.ft.)

(d) Aluminium phosphide - 20 tablets of 3 gms. each per 28 c. meters (1000 Cu. ft.)

(v) **Stack plan:**

The floor space should be divided, as far as possible, into uniform size rectangles to build up a stack on each. The standard size for a stack is 30' x 20' (9.15 x 6.1 meters). In no case this size should be changed without approval of the Head Office. Between stacks and between stacks and walls there should be a 2'/ft. (0.76 meters) wide space to serve as an alleyway for moving about for inspection and disinfection and also for facilitating movement of bags. While constructing stacks, the gangways be left in such a way that maximum draft and consequent ventilation is ensured.

**Type of stacks:**

1. Simple or "Thappi" type stacking: Bags are stacked one on top of the other. This type is not suitable for high and stable stacking and is not commonly employed in large scale storage.

2. Block stacking: In block stacking each layer has lengthwise and breadthwise bags alternating to form the block.

3. Cross stacking: In cross stacking, bags are laid systematically in alternate lengthwise and breadthwise tiers.
In case of bigger stacks built-up where curative treatments under cover are not possible, such stacks be liquidated on priority basis to avoid any deterioration during storage and suitable action be taken against the officials responsible for building such large sized stacks because fumigation as well as polythene covers have been purchased so as to cover all standards sized stacks of 9.15 x 6.1 meter size.

Both (2) and (3) types of stacking are useful for long term storage because of stability and countability of bags.

(vi) **Spreading of dunnage duly treated**:

The dunnage for stacking of bags should be either wooden crates, or polythene sheet-black 300 gauge on 2 layers of mats in case of conventional bag storage.

(a) Wooden crates: The wooden crates specifications of which are given in Appendix 9-A-1 are ideal when used with a layer of bamboo mats over them to facilitate collection of spillings. In the wake of heavy CAP storage, wooden crates to be reserved for open storage and for use in substandard hired godown, as far as possible.

(b) Polythene sheet with mats: In the event of crates being in short supply, black polythene sheet of 300 gauge sandwiched between two layers of mats (bamboo or patera) shall be used as effective dunnage.

(c) In the event of either wooden crates or polythene sheets not being available, bamboo or patera mats in two layers will be used.

(d) Ballis and casuarina poles can also be used, when wooden crates/polythene sheets are not available.

Foodgrains shall not be stored in the godowns without proper dunnage. The dunnage material shall be cleaned and disinfested with Malathion/DDVP and if necessary, fumigated after every use to ensure that it is free from infestation. Dunnage and godowns once used for storing fertilizer should as far as possible be not used for storage of foodgrains. In exceptional circumstances if grain has to be stored, the godown and dunnage shall be thoroughly washed before use.

(viii) **Stack cards**:

Each stack shall have a separate stack card. It shall indicate complete record of the receipts and issues. Account of receipts and issues is given on one side of the card and on the other side are recorded the condition of the grain and the treatments given from time to time. The convenient size of a stack card is 14" x 18" (35.5 x 45.75 cms.). The number of dunnage pieces utilised (in case of wooden crates) for each stack may also be mentioned on the card. The card shall be tagged on the front side of the stack at a height convenient for inspection of the stack and recording remarks. (Stack Card form as in Appendix 10-A-2). The cards are preferably placed in a transparent polythene covering. The stack card should give all relevant information such as the condition of the stocks at the time of receipt, the details of findings of fortnightly inspections, etc. For other details see Chapter 10).
SPECIFICATIONS FOR WOODEN CRATES TO BE USED AS DUNNAGE

(1) Each dunnage piece or a pallet will be 5' x 3' and will be made either from Deodar, Kail, Chil, Sal, Kikhat, Shisam, Mango, Jungle, Kanja, Kikar, or any other fibrous wood. In case of woods like Eucaliptus only hard wood/dark coloured interior portion should be allowed to be used. The acceptance of tender should be only for Eucaliptus wood and in case same is not available in adequate quantities, then costlier wood in the order of prices shall be considered.

(2) The lower member (4" x 2") will be 5 in number and each will be 3' long, spaced 14 1/2" centre to centre. The top members will also be 5 and each will be 5' long and 2 1/2" x 2" in section, spaced 8 1/2" centre to centre. The higher dimension of the section of each member will be vertical.

(3) There shall be no joints in any of the members.

(4) The dunnage shall be properly nailed with, sufficient number of nails to make the frame reasonably rigid with proper fit. There shall be atleast two nails at each corner joint and one at every other joint. No nail shall project down the wooden rafter and/or be exposed, so as to be source of danger to the gunnies. The nail head shall beat the top and the nail shall be bent over at the bottom for 1".

(5) No member shall have cracks, as it will endanger its structural strength.

(6) The section of each member will be generally uniform without being heavily bevelled at corners, so as not to reduce its strength.

(7) The wood shall be free from loose knots which would reduce its structural strength.

(8) Wood damaged by white ants shall not be used.

(9) The top of each dunnage piece will be in one level.

(10) Each dunnage piece will be properly painted with two coats of 'Soligum'.

(11) A type sample will be prepared on the basis of above specifications and all the material to be supplied shall conform to the type sample.
CHAPTER 10

DOCUMENTATION

10.1 Stack cards:

Each stack shall have a separate stack card. It shall indicate complete record of the receipts and issues. Account of receipts and issues is given on one side of the card and on the other side are recorded the condition of the grain and the treatments given from time to time. The convenient size of a stack card is 14"X18" (35.5x45.75 cms.). The number of dunnage pieces utilised (in case of wooden crates) for each stack may also be mentioned on the card. The card shall be tagged on the front side of the stack at a height convenient for inspection of the stack and recording remarks. (Stack Card Form as in Appendix 10-A-1). The cards are preferably placed in a transparent polythene covering. The stack card should give all relevant information such as the condition of the stocks at the time of receipt, the details of findings of fortnightly inspections indicating infestation, classification, disinfestation treatment given, treatment recommended, etc. During the fortnightly inspections, the moisture content of the stacks also should be recorded. In addition to the stack cards, all the above information should be reflected up-to-date in the stack-wise register till every stack is killed so that a complete history of the stocks, in every stack, from the time of its receipt to its issue is available. This shall be the responsibility of the Technical Assistants attached to every storage point and a record of this type shall clearly establish whether all care has been taken or not and whether there has been any negligence on the part of either the godown or Technical Staff. Further, in the light of Amended PFA Act, the maintenance of such clear history of stocks for each stack, will come to the help of the nominated unit officer in case of any prosecution proceedings, for establishing that all necessary precautions have been taken.
APPENDIX—10-A-1

STACK CARD

Name of Depot .................................. Dunnage used .................................

Name/No. of the Godown/shed ......................... (i) Type ..................................

Commodity & Variety ................................ Stack plan ..............................

<table>
<thead>
<tr>
<th>Opening Balance</th>
<th>Receipts</th>
<th>Issue</th>
<th>Closing Balance</th>
<th>Sign of shed</th>
<th>Moisture content</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Bags</td>
<td>Weight (Nett) M.T.Q.Kg.</td>
<td>Source Ship etc.</td>
<td>Bags</td>
<td>Weight (Nett) M.T.Q.Kg.</td>
<td>Bags</td>
</tr>
</tbody>
</table>

Stack No. : stack average (Nett) Weight : Tare weight :
# APPENDIX 10-A-(REVERSE)

## DISINFESTATION RECORD

<table>
<thead>
<tr>
<th>Date of Inspection</th>
<th>Extent of Infestation (whether clear few or heavy)</th>
<th>Nature of infestation with pest per kg or grains</th>
<th>Percentage of weevilled/ discoloured &amp; damaged</th>
<th>Recommendations</th>
<th>Extent &amp; nature of infestation before treatment</th>
<th>Date of treatment</th>
<th>Nature of (treatment) fumigation or spraying</th>
<th>Result of treatment etc.</th>
<th>Signature of FA/TA</th>
<th>Signature of inspection officer</th>
</tr>
</thead>
</table>


CHAPTER 11

CARE OF GRAIN IN STORAGE—INSPECTION, CATEGORISATION, AND CLASSIFICATION

11.1 Food grains occupy an important position in the food of many living organisms, including man, because of their storability over long periods. Till recently, deterioration in stored grain was considered natural and, therefore, holding it free of damage in storage, an impossible task. In last about fifty years, considerable knowledge has been gained, about factors that are responsible for damage to grain in storage and how these could be controlled. It has been established, by now, that with proper care storability can be extended to well over 50 years. Though this may be possible under ideal conditions, for commercial purposes satisfactory storability of 3 to 5 years is a worthwhile gain. Objective of the "Care in storage" has to be to achieve this gain.

11.2 Steps developed, after scientific studies, for care in Storage comprise, periodical inspection, recording observations relating to health of the grain, and taking remedial measures based on observations.

At the time of receipt in the godown, the grain bags shall be carefully inspected. If some bags are found slack, torn, wet, damp or containing heavily infested grain or deleterious matter, they shall be segregated for taking suitable action, immediately. Slack bags shall be filled to standard weight, torn bags stitched or replaced, and damp or wet bags opened out and the grain dried and ear-marked for early disposal. In no case any damp or wet grain shall be allowed to go into a stack. Heavily infested grain shall be cleaned and fumigated. In case the grain is dried in the sun, it shall be allowed to cool down before it is re-bagged. Rice will crack if dried in the sun, and hence this shall be avoided. If any deleterious matter is noticed in the grain, it shall immediately be reported to the Regional Manager with samples.

Representative sample of not less than 500 grams shall be drawn from each wagon/lorry load at the time of receipt into the godown. It shall be examined for general condition of the stocks, infestation etc. classified and categorised on the basis of existing instructions. These observations require to be recorded on the reverse of the stack card. In case live infestation is noticed the lot shall be fumigated immediately. As a routine measure, grains on receipt shall be given prophylactic treatment on the same day or within 24 hours of receipt at the latest. Moisture content of the grain shall be determined and recorded, this is applicable to both indigenous and imported grains.

As far as possible only one kind of grain shall be stored in a godown. Milled products of wheat and millets shall not be stored in godown there rice is stored.
11.3 Care of Grain in Storage:

(i) Deteriorated and damaged grain, found in any consignment received, shall be treated or reconditioned as per instructions (vide (iii) below).

(ii) Under no circumstances shall fertilisers and pesticides be stored along with foodgrains in the same godown.

(iii) The reconditioning and salvaging operations consist of cutting the bags open, separating out the sound grains from the damaged kernels, spreading the damaged grain in a thin layer for aeration where necessary, and cleaning where grain has excess foreign matter. The sound grains after sufficient aeration shall be rebagged for issue in the normal channel on priority. The damaged grain shall be moved to the isolation shed after necessary weighment etc., for disposal as per standing instructions laid down in this regard (vide Chapter-20). In case the foodgrain bags, particularly of wheat are affected by rain or flood water in a godown, they shall be segregated, salvaged or re-conditioned and issued expeditiously so as to avoid decomposition of grain in wet bags. Damaged grain shall be clearly labelled as “Damaged” grain. Otherwise it will amount to contravention of PFA Act.

(iv) Fortnightly examination and maintenance of progressive record of condition of grain, —

Stocks shall be examined at least once in a fortnight. A record shall be maintained to show the progressive condition of the grain, degree of deterioration and infestation, if any, with names of insects present and the treatment given. This record shall also be indicated on the stack card. A list of grain pests with their scientific, and common names and distinguishing characteristics and nature of damage caused by them is given in Chapter 23. The photo prints of some of the important pests are also given at the end. For methods of drawing sample, refer to Chapter-2 Based on the examination, grain lot shall be classified as per details below and categorised as per details at App. 11-A-1., each fortnight.

Classification of Foodgrains.

Foodgrains in storage shall be classified as ‘Clear’, ‘Few’ and ‘Heavy’ based on the presence of insect population as indicated below.

a. Clear - Lot completely free from any living infestation.

b. Few - Lot having up to two living insects per 500 gms. of representative sample.

c. Heavy - Lot having more than two living insects per 500 gms. of representative sample.

(v) Heating:

On suspicion of heating in any stack proper aeration shall be arranged and the stack be broken if normal aeration does not bring down the temperature. If the heating is due to excessive moisture
in the grain, the grain shall be released for consumption immediately. If it is due to infestation, the grain shall be fumigated. Such heated lots shall be under close watch till issued out.

(vi) Whenever grains in a stack are damaged by rain water through leakage or seepage such bags shall at once be removed from the stack without awaiting instructions, and the sound grains reconditioned/salvaged. Precautions to avoid rain water damage are given at App. 11-A-2

(vii) During wet months there will arise the infestation of Mites, Psocids and Moths, Mites are minute creatures of creamy colour and escape notice if in small numbers. They multiply very rapidly. Careful examination of bags will show that they move about actively. A simple test is to place one’s hand on the bags for two to three minutes when a scratching sensation will be felt which will indicate the presence of mites. Psocids present are whitish in colour and give rise to musty odour in the godowns. During rainy season infestation by Ephesia sp. is more common. Their presence can be easily identified with the silken web formed by the larvae on the surface of the bags, floor, walls, pillars etc.

11.3 Storage of Pulses, Milled products, spices etc. in godowns:

(i) The general principles for storage of Cereals, and Pulses, etc. are the same except for certain minor differences. Rice kernels having been dehusked, have no protective covering like wheat and hence it is difficult to recondition and reclaim the same if once damaged. Similarly, Milo, Jowar, Maize and such other grains being very soft in nature are more susceptible to insect infestation and microbial damage and these therefore, call for greater attention in storage. Milled products similarly, being more susceptible to insect damage need greater care.
BASIS OF CATEGORISATION OF FOODGRAINS

(i) Wheat/Milo/Jowar

The basis of categorisation is by volume. From out of the sieved sample 20 c.c. of the representative sample may be measured out with help of a Measuring Cylinder. This quantity shall then be analysed on a sample plate for categorisation of the stock. The weevilled grains as well as the touched/germ eaten grains shall be picked out and measured separately. While the percentage of weevilled grains could be calculated directly by the volume obtained as against 20 c.c. measured out originally, the percentage of germ eaten/touched grains shall be arrived at by dividing the volume by three and then added to the percentage of weevilled grain.

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage of weevilled/germ eaten grains</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Upto 1%</td>
</tr>
<tr>
<td>B</td>
<td>Above 1% and Upto 4%</td>
</tr>
<tr>
<td>C</td>
<td>Above 4% and Upto 7%</td>
</tr>
<tr>
<td>D</td>
<td>Above 7% and upto 15%</td>
</tr>
<tr>
<td>B/D below D</td>
<td>above 15%</td>
</tr>
</tbody>
</table>

Illustration:

(a) Total volume taken for analysis 20 c.c.
   Volume of weevilled grains obtained 0.2 c.c.
   Percentage 1

(b) Volume of germ eaten/touched grains obtained 0.6 c.c
   Divided by 3 : \( \frac{(0.6)}{3} \)
   Percentage 0.2 c.c.

Total percentage of weevilled and germ eaten grains/touched grains 1+0.2=2

Category B
(ii) Paddy/Barley/Bajra/Maize:

The basis of categorisation is the same as the case of wheat except for incorporating the "Designation" to indicate the intensity of slightly damaged/discholoured Kernels. Designation will be represented by adding 1.2.3.4 to the category as below. The categorisation is to be done by the volumetric method in respect of above commodities except for Maize where it is by count method.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Percentage of slightly damaged/discholoured/desides touched/damaged and discharged grains.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Upto 5</td>
</tr>
<tr>
<td>2</td>
<td>Above 5 upto 10</td>
</tr>
<tr>
<td>3</td>
<td>Above 10 upto 15</td>
</tr>
<tr>
<td>4</td>
<td>Above 15 upto 20</td>
</tr>
</tbody>
</table>

The following illustration will elucidate how grains are to be categorised and designated:

(a) Grains with 1% of weevilled and 3% of slightly damaged/discholoured and damaged/discholoured grains A1

(b) Grains with 4% of weevilled and 12% of slightly damaged/discholoured and damaged/discholoured grains B3

(c) Grains with 7% of weevilled and 7% of slightly damaged/discholoured and damaged/discholoured grains C2

(d) Grains with 15% of weevilled and 17% of slightly damaged/discholoured and damaged/discholoured grains D4

The designation should be done at the time of receipt and the process repeated at least once in three months.

(iii) Categorisation of Rice:

The rice will hereafter be categorised as A, B, C and D instead of "Good", "Very Fair", "Fair", "Average" and the categorisation will be same for raw and boiled rice. The basis of categorisation will be as under:

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage of damage/discholoured and Chalky grains</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Lot falls within tolerance limits of uniform specifications in respect of items discholoured, damaged and chalky grains.</td>
</tr>
<tr>
<td>Category</td>
<td>Percentage of damage/discoloured and Chalky grains</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>B</td>
<td>When the incidence of one or all the items viz. discoloured, damaged and chalky grains falls beyond tolerance limit but <strong>within</strong> the rejection limits of the specification in force.</td>
</tr>
<tr>
<td>C.</td>
<td>Lot exceeds the rejection limits in force in respect of the items discoloured damaged and chalky grains.</td>
</tr>
<tr>
<td>D.</td>
<td>Lot showing appreciable quantity of loose (&gt;0.3%) bran or giving an unpleasant smell.</td>
</tr>
</tbody>
</table>

‘D’ Category rice should be issued after cleaning where necessary.

**(iv) Pulse whole :**

Categorisation is done in respect of whole pulses by ‘Count method’.

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage of weevilled and damaged/discoloured grains</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Upto 1 by count</td>
</tr>
<tr>
<td>B</td>
<td>Above 1 and upto 2</td>
</tr>
<tr>
<td>C</td>
<td>Above 2 and upto 5</td>
</tr>
<tr>
<td>D</td>
<td>Above 5 and upto 10</td>
</tr>
</tbody>
</table>

**(v) Pulses split :**

Categorisation is done by **Volumetric method**, measuring out 20 cc out of the sieved sample. It may be noted that Tribolium Sp. which is considered to be a minor insect in the Cereals and whole pulses is a major insect in dals.

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage of weevilled Discoloured/damaged grains</th>
</tr>
</thead>
<tbody>
<tr>
<td>'A'</td>
<td>Upto 2 by volume</td>
</tr>
<tr>
<td>'B'</td>
<td>Above 2 and upto 4</td>
</tr>
<tr>
<td>'C'</td>
<td>above 4 and upto 6</td>
</tr>
<tr>
<td>'D'</td>
<td>above 6 and upto 10</td>
</tr>
</tbody>
</table>

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PRECAUTIONS REQUIRED TO BE TAKEN TO AVOID DAMAGE TO FOODGRAINS BY RAIN WATER

Damage to foodgrains is caused by rain water during handling, transporting or while in storage in leaky godowns. Excessive water or moisture induces biological activities which render the grain unfit for human consumption. Reconditioning of water damaged grains is difficult and in case of rice it is almost impossible. It is, therefore, imperative that damage to foodgrains from rainwater should be avoided at every stage. To achieve this the following precautions need be observed.

1. Precautions while handling and transporting:

   (i) During the process of discharging grains from ship-holds tarpaulins shall be kept ready and so adjusted that immediately before rain-fall and suspension of discharge holds could be covered and leakage from the sides prevented.

   (ii) The discharged grain placed in the shed shall be provided protection with tarpaulins against rain water being carried by the gust of winds.

   (iii) It should be ensured, especially during rainy season that trucks transporting foodgrains have adequate number of tarpaulins for any emergency.

   (iv) When transporting grains it must be ensured that the floor of the truck carrying the bags is dry. Bags kept in the truck shall be covered with tarpaulins on all sides and carefully examined on receipt at the destination to ensure that no wet bag is placed in stack.

   (v) Transport contractors are responsible for safety of the grain in their custody, but the enforcement of this, is part of duty of the godown staff. Any damage to grain due to the negligence of the contractor's staff should immediately be reported to the Regional Manager for action to recover the value of the loss from the contractors.

   (vi) For movement of grain by rail only leakproof (water-tight) wagons should be selected for loading. While loading bags should be kept at least 18" (45.72 cms) away from the doors of the wagon to avoid damage from rainwater through door flaps. Adequate dunnage material be provided to the flap doors to get clear RRS from Railways. If any bag is found damaged by water when unloading the wagon, it should be segregated. Complaint about such damage should be lodged with the Railway authorities and if assessment of damage has to be carried out it should be done by appropriate Railway authority before delivery is taken. Appropriate remarks should also be passed in the Railway Delivery book, which is a condition precedent to lodging claim with the Chief Commercial Superintendent of the Railway concerned later on.
2. Precautions during Storage:

(i) Before rainy season godowns should be carefully examined and any suspected leakage points got repaired. On rainy day, if any leaking point is observed, tarpaulins should immediately be spread on stacks likely to be affected.

(ii) Underground drains fed by rain water pipes, shall be examined periodically against choking, if any. In case any stack gets affected due to flooding of floor the same should immediately be broken and good bags stacked in a dry place and affected bags opened out for drying the grain.

(iii) On a rainy day the doors and ventilators of godowns shall be kept closed as far as possible to minimise the chance of rain water entering the godowns. These will, however, be kept open on clear days as usual.

(iv) Tarpaulins must be examined before the rainy season and repairs needed, if any, shall be carried out. Any tarpaulin which gets wet shall be dried in the sun before storing the same. It should never be folded or stored in wet condition.

3. Care of Water damaged grains:

While unloading from a ship, railway wagon or a truck some spillage is likely to occur. If the spilled grain gets wet, it shall be collected and dried by spreading immediately on dry and pucca floor in thin layer. Wet grain shall not be mixed with dry grain.

Bags that get wet either in handling or in godowns need to be segregated, opened and wet grain separated from the dry grain. Wet grain shall be dried as early as possible and stored separately. The quality of grain especially of wheat and other whole grain that have gone slightly wet can be saved by immediate drying but the same is not possible with rice. Greatest care in the handling of rice is, therefore, emphasised. Rice once damaged cannot be reconditioned and results in total loss.

The possibility of any damage can be reduced to minimum provided the staff is alert to take precautions in time.

4. Spraying of wet grains to accelerate drying and prevent microbial damage.

Spray 0.2% solution in water of glacial acetic acid. In the absence of glacial acetic acid 0.5% solution of vinegar may be used. Spraying be done on the wetted grain as soon as possible after wetting with either a plastic or a glass spray bottle and in case of large quantities with garden sprayer. About 20 c.c. of spray material is needed to treat 1 kg. of grain. Grain and similar other commodities sprayed with glacial acetic acid/vinegar are to be left open exposed to free aeration. The commodity be dried as soon as possible. There will not be any deterioration and it could be consumed in the normal manner as during the course of drying., acetic acid volatilises.
CHAPTER 12

PRESERVATION, CHEMICAL TREATMENT, PRECAUTIONARY MEASURES, AND ANTIDOTES FOR CHEMICAL TREATMENTS

12.1 Inspection of grain at laid down intervals as described in Chapter 11, is to be followed with steps, when health of the grain is observed to be deteriorating. Causes for deterioration, in most of the cases could be either moisture or insects or both. In addition rats may be also invading the store and eating the grain after causing considerable damage to grain, bags and the store. In case of moisture cleanliness and aeration become necessary whereas, in case of insects, cleanliness and chemical treatments are needed. Chemical treatments comprise, prophylactic and curative measures. For rats comprehensive programme is required. Steps, covering these aspects, to be taken in a conventional store, are described below.

12.2 Aeration :— In a conventional store aeration is possible through the doors and ventilators provided. Aeration on wet humid days will raise humidity in the store and may result in change of the moisture content of the grain. Likely change in the moisture content may be ascertained from the equilibrium table given in Chapter 4 of the Manual. Moisture content changes will result in increase or decrease in weight of the grain in bags. Moisture content in excess of 12% in the grain will create conditions favourable for insect development and that below 10% will be discouraging to insect growth. Aeration should be planned, therefore, taking these effects into consideration. As far as possible it is advisable not to aerate the grain on humid and wet days. On the days store is to be aerated both doors and ventilators need to be kept open.

12.3 Cleanliness :— From the point of the health of grain in store, cleanliness in the store assumes importance, cleanliness comprises, sweeping the store to remove grain spillages and dust, removal of webbings and accumulated dust from various parts of the store and brushing of the grain bags. In these, sweeping will be a regular feature whereas, removal of webbings and brushing periodic tasks. Accumulated dust on the grain bags and in the store will favour insect growth and will also harbour insects. Insect control treatments and aeration will be less effective when the store and grain bags are covered with dust and webbings. It is likely that chemical treatment may be completely ineffective, when grain bags are covered with dust and webbings. spillages when not collected will shelter insects and favour rat attacks. Proper cleanliness, therefore, is a first essential step in the maintenance of the health of the grain in store.
12.4 Next in importance to aeration and cleanliness in maintaining the health of the grain is chemical treatments. These treatments comprise prophylactic and curative measures. Chemicals involved in these treatments are poisonous chemicals. It is necessary, therefore, that these treatments are carried out only by trained and technically qualified staff. Nature and properties of these chemicals is mentioned along with the relevant chemical to be used. Precautions to be taken in their handling, first-aid and antidotes to be given as well as necessary medical aid to be arranged are given at App. 12-A-3.

12.5 prophylactic measures:

These are necessary for maintaining the health of the grain during storage. They serve to prevent cross infestation and also to control any sudden rise in infestation. If pest free foodgrains stocks are stored under cool and dry conditions in a clean well aerated godown, the stocks can be kept without fumigation by resorting to prophylactic or surface treatments only.

The chemicals normally used for prophylactic treatments are Malathion, Pyrethrum and DDVP. The last mentioned chemical has fumigant action also in addition to its being a contact poison for insects. This requirements of insecticides can be purchased at the Zonal and Regional levels within the delegated financial powers.

Normally, the prophylactic treatments are to be given once a fortnight. However, once a week or even biweekly treatments in the form of air-charging can also be resorted to under the specific directions of AMI(QC) if the condition warrants. The Lepidopterous infestation which includes *sittitra*ga, *corcyra*. *Ephestia* and *Plodia* species commonly known as moths can be brought under control by this treatment of air-charging of the empty space.

(a) Malathion—Malathion 50 per cent E.C. (Premium grade) is diluted with water in the ratio of 1:100 and for surface treatment three litres of this prepared solution is applied in the form of spray for every 100 sq. metres area on the food grain stocks. For aerial spray 1 litre of prepared solution at 1:100 ratio to be used for 270 cum. Malathion is an organophosphorous insecticide being derivative of phosphoric acid plus sodium salt of dimethyl fumarate.

(b) D.D.V.P.—DDVP is a chemical belonging to organophosphate group. It is 0.0 dimethyl- 0.2.2 - dichlorovinyl phosphate. This is a transparent liquid either colourless or yellowish. Industrial DDVP is also an only liquid with either light or dark yellow colour. The active ingredient is a volatile phosphoric ester 0.0 dimethyl 0-2-2 dichlorovinyl phosphate. It is an enzymatic poison, possessing fumigant, contact and stomach poison effect on the Arthropoda. It has high initial toxicity. Its toxicity to warm blooded animals and human beings is comparatively insignificant. It has no adverse effect on germinating qualities of grain.

DDVP is prepared at a dilution of 1:150 and sprayed as a fine spray on floor/wall space. At a time 20 per cent of the total floor area of the godowns only need be sprayed. In no case, naked grain shall be treated with DDVP.

(c) Pyrethrum: Pyrethrum is an organic derivative from some species of Chrysanthemum. The active ingredient in Pyrethrum is Pyrithrin which is extracted from the flowers. It is marketed as a fine dust and as an emulsifiable concentrate. This is a rapid acting contact insecticide with very
little residual effect but somewhat lasting repellent action. The dilution is 1:100 or 1:80 accordingly whether Pyrethrin concentration is 2.5 per cent or 2 per cent respectively for surface treatment once a fortnight. Three litres of prepared solution are adequate for treating 100 sq. metres.

(d) **Brushing of bags before spraying:**

Before spraying with Malathion Emulsion/Pyrethrum Products, bags shall be cleaned as this helps in the removal of collected dust, webs, cocoons, eggs, etc. that might be sticking to the bags. Insecticides used on cleaned bags are relatively effective and long lasting.

(e) **Aeration:**

Aeration of godowns on all clear days during July-March is essential for controlling the activities of Moths, Mites and Psocids. All the ventilators provided in modern godowns shall be kept open for facilitating aeration during this period. During April-June godowns will be kept open as required for operations, inspections and pesticidal treatments.

17.6 **CURATIVE MEASURES**

**Fumigation:**

Fumigation is a process of exposing the grain infested with insects to the fumes of a chemical in an enclosed space at a lethal dose. This is a curative method to control infestation in the grain and is resorted to as soon as the infestation of pest is noticed.

If grain infestation is conspicuous, mere spraying will not be effective. It must be fumigated. Whenever fumigation is carried out, the extent of infestation and the species of pests present prior to and after fumigation must be noted, by taking out representative samples for examination, to know whether the fumigation has been successful or not. The need for planned fumigation and its evaluation are essential. It may be stack fumigation under cover or airtight shed fumigation. The different types of fumigants along with their dosages are given in Appendix 12-A-2.

The fumigants normally in use are:

(a) Aluminium phosphide in the form of tablets,
(b) Methyl Bromide-Liquid under pressure,
(c) Ethylene dibromide-Liquid


(a) **Aluminium Phosphide:**

Aluminium phosphide is most widely used fumigant. It is in the form of tablets each weighing about three grams and emanating 1 gram of phosphine during its disintegration. This disintegration into phospide, carbon dioxide and ammonia takes place when the tablet comes in contact with moisture of intragranular air. Phosphine generated is a potent toxic gas for stored
grain pests. The carbon-dioxide and ammonia help to check the inflammability of phosphine. Its
low molecular weight and low boiling point increase its effectiveness in that it is able to rapidly
diffuse and penetrate in the grain mass to give the necessary lethal concentration. Phosphine has
garlic like odour.

Aluminium phosphide is used for both stack and air-tight shed fumigation. For stack fumigation
the dosage is 3 tablets (9.0 gms) per tonne of the food grain with an exposure period of 5 days. The
requirement of tablets for the stack is calculated and then 50 per cent of the tablets are distributed
on the top surface and the other 50 per cent on the sides. The proper air-tightening of the gas proof
cover or polythene cover, the proper distribution of the tablets and ensuring the required exposure
period are very essential for getting cent-per-cent kill. On no account under dosage should be used
and the concentration and time factor dislocated. Similarly, for air-tight shed fumigation the
dosage is based on the volume of the shed/godown and it is 21 tablets (63 grams) per 28 cu. Mts.
First the volume of the shed/godown shall be calculated, the godown shall be got made air-tight
by pasting the doors, ventilators and any other opening with thick sheets of paper and then
fumigation undertaken. The total number of tablets required is distributed quickly on the stacks
taking care to distribute 50 per cent on the top surface and balance on sides of all stacks and
alleys. Before actually starting the introduction of the tablets, the distribution points should be
marked with a chalk piece so that it could be done quickly and effectively. In case the shed has
a number of doors, all should be closed and made air-tight excepting one for exit of operators,
before introducing the tablets. This door should be utilised for deposition of tablets and after it is
over, it should be ensured that all the persons have come out and this last door closed and made
air-tight. Danger sign should be indicated so that no one goes near the sheds fumigated.

During peak winter and summer months when the humidity may be low, before carrying out shed
fumigation, the godown should be given a DDVP spray to facilitate timely disintegration of
tables. Likewise, in stack fumigation, after the introduction of the tablets and before making the
cover and stack at the bottom should be treated with DDVP, before placement of Sand snakes.

The empty tubes of Aluminium phosphide after consumption should be treated with hot water,
given a scrapping and then disposed off to licensed dealers in scrap metals.

(b) **Methyl Bromide**

Methyl Bromide being highly toxic, is the most potent fumigant capable of good kill of insects in
a short time. At ordinary temperature it is a gas 3.3 times heavier than air. It is preferred as a
fumigant because of its low absorption and exceptional penetrating power; because of its low
boiling point (5°C) it attains through gassification at the temperature at which normally
fumigation is carried out. It has also a low water solubility which permits safe fumigation of
materials having high moisture content. It is non inflammable and non-explosive and with due
precautions, it is easy to apply. It is marketed in liquid state under pressure in steel cylinders. Only
cover fumigation of stacks in covered godown is to be carried out. As per standing instructions,
Methyl Bromide fumigation should be under taken under the strict supervision of AM(QC) and
only trained persons should handle this fumigant. Stack fumigation is carried out by covering the
stack with gas proof rubberised fumigation cover which be perfectly leak-proof and air tight. Methyl Bromide fumigation is not to be undertaken with polythene covers. After covering, the edges should be covered with Sand Snakes to ensure that there is no leakage. The dosage at present followed is 22 grams per cu. m. with an exposure period of 24 to 48 hours. The required quantity of the chemical is introduced from the cylinder directly through a plastic tube, one end of which is connected to the cylinder and the free end taken on the top of the stack under cover. This end should go nearly two feet inside through the air duct of the fumigation cover and should be tied with the tube inside and the other air duct of the fumigation cover should be closed and made airtight. The cylinder is first counterpoised on a beam scale and the required quantity is allowed to flow by keeping the appropriate check weight. Once the introduction of the chemical is over, the cylinder is tightly closed, the free end of the plastic tube at the top is quickly dislodged from the stack and the air duct of the cover tied up tightly.

Before commencing the fumigation, the cylinder should be checked for its air-tightness and leakproofness. Secondly, all persons operating should wear gas-mask and prescribed canisters. Halide leak detector lamp should be used to detect leakage. A green flame indicates leakage of gas. After 24 to 48 hours, while removing the cover again similar check has to be done with all care. No one except the operators should be allowed to work within 50' (15.24 m) of the stack under degassing. All persons engaged in degassing should wear masks and canisters. A first aid kit should be readily available both at the time of fumigation and degassing take place should be well ventilated. The degassing should be done in stages and in the final stage the halide leak detector should be used to ensure that there are no traces of the gas.

In view of the high toxicity all precautions should be taken while carrying out this fumigation. N reliance should be placed on smell since it is quite faint. No doubt, 2 per cent addition of chloropropin is made which, in case of leakage, has a penetrating effect and causes irritation of the eyes but this should not be relied on. Contact of Methyl Bromide with skin leads to severe blister any clothing getting contaminated should be removed immediately. Due to frequent exposure symptoms like vomiting, dizziness, convulsions and even collapse may appear. Sometimes the symptoms are delayed for several hours. Each operator or any official in-charge of the fumigation should wear, without fail respirators and canisters specially designed and of proved protection against the chemical under concentration and for short periods as per the limits laid down by manufacturers. As a matter of fact, after the prescribed period of use, the canisters should be re-activated. Exhausted canisters should not be used. Further, no other type of canister such as used for war gases or HCN be used because they provide no protection against methyl Bromide.

c) **Ethylene dibromide**:

Ethylene dibromide is a liquid fumigant available in different concentrations and its vaporisation is slow. As such it requires prolonged period of exposure. But it is also quite toxic to pests. Both stack and godown/shed fumigation could be carried out. The dosage is 22 grams per cu. Mt. The application is by pouring the required quantity on old unservicable gunny wrappers at different points on the top of the stack and covering it with fumigation cover and making it airtight. The period of exposure is 7 days. It is advisable to complete one round of fumigation with EDB.
covered godowns before onset of monsoon season. It has good ovicidal action and fumigation with this chemical will keep grain free of insects longer.

For air-tight shed fumigation, as in the case of Al. Phosphide, the shed should be got air-tightened and EDB applied on stack top, at different points, sides and alleyways using gunny wrappers.

12.7 The dosage for fumigation of stock stored in ‘CAP’ storage and in substandard godowns has been slightly revised as follows for ensuring complete mortality of insect pests. An allowance of 20 per cent additional dosage of fumigants may be given in case of open storage and in godowns with katcha floor or with brick floor. Further wherever Trogoderma larvae are present the dosage may be raised by 50 per cent.

12.8 Pulses, Milled Products Millets, Milo and Maize and other coarse grains are relatively more, susceptible to deterioration in storage and therefore, need greater attention. A close watch on the condition of these gains shall be maintained and technical measures such as spraying and fumigation carried out promptly.

12.9 To control the spider trouble at the depots it would be necessary to keep the godowns neat and clean and to maintain perfect hygienic conditions at all times. Wherever persistent trouble is noticed, the walls, doors etc., of the godowns shall be sprayed with a solution of lime sulphur to be prepared by dissolving stone lime sulphur in water in the ratio of 1:2:10. Th solution will be further diluted in the ratio of 1:8 and sprayed on the affected area. Under no circumstances, the foodgrains should be allowed to come in direct contact of the formulation. Spraying with the solution should be repeated at an interval of 3 weeks. Observations will be made regularly and a monthly report sent to H.O.

12.10 Rat Control:

For obvious reasons, food grains godowns are the attractive sheltering places for rats. Apart from the fact that each rat consumes upto 50 grams of grain per day, large quantities get contaminated. Moreover, their habit of nibbling the bags results in considerable wastage of grain and collapsing of stacks. Maintenance of hygienic conditions and rat proofing of godowns are the two most effective steps to avoid rat menace. But, if in spite of these steps rat trouble continues, various control measures such as rat proofing of the godowns, baiting, trapping and fumigation of rat burrows shall be resorted to. Proper care shall be taken in the use as given in Appendix 12-A-2 and 12-A-3.

Bags damaged by rats shall be properly repaired or replaced by new bags otherwise such may bleed during transit.

12.11 Storage of Chemicals

All chemicals used for control of insects and rats are highly poisonous and hazardous. They should be, therefore, stored in isolation sheds, away from foodgrains and from the reach of untrained hands, under lock and key.

12.12 Premonsoon Fumigation

One round of premonsoon fumigation of all stocks in the covered stores be ensured for better maintenance of the stock in insect free condition.

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<table>
<thead>
<tr>
<th>Name of Chemical</th>
<th>Preparation (Dilution)</th>
<th>Dosage</th>
<th>Mode of application</th>
<th>Area</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Malathion 50% EC (Premium Grade)</td>
<td>(a) One Litre of emulsion with 100 litres of water (1:100)</td>
<td>(a) Surface treatment 3 litres of prepared solution for every 100 Sq. metres.</td>
<td>Applied in the form of Spray with the aid of Food Operated/ Rocking. power Sprayers or Fog Generators.</td>
<td>A. J&amp;K, Punjab, Haryana, Chandigarh, Delhi, U.P., Bihar, Rajasthan, M.P.</td>
<td>(1) Once in 3 weeks in November to February (2) Every fortnight during March October Every fortnight throughout the year</td>
</tr>
<tr>
<td>2. Pyrethrum with 1:100 2.5% Pyrethrin</td>
<td>-do-</td>
<td>-do-</td>
<td>-do-</td>
<td>-do-</td>
<td>Once in 6 weeks in respect of milled process.</td>
</tr>
<tr>
<td>3. D.D.V.P. 100 Ec.</td>
<td>1:150 (one part of chemical with 150 parts of water)</td>
<td>Empty space treatment 3 litres of prepared solution for every 100 sq.m. and only 20% floor area to be treated.</td>
<td>Applied with the aid of foot operated/ rocking/ power sprayers</td>
<td>Once in 15 days.</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 12-A-2

CURATIVE MEASURES WITH DIFFERENT FUMIGANTS

Details of dosages, period of exposure etc., involved in fumigation of stocks are indicated below. Properties methods of application, precaution first-aid and anti doses are furnished in Appendix 3:13.

<table>
<thead>
<tr>
<th>Name of fumigant</th>
<th>Cover</th>
<th>DOSAGE</th>
<th>Drainage</th>
<th>Period of exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Ethylene Dibromide (E.D.B.) (Ref.: IS :1311-1966)</td>
<td>—</td>
<td>22 gms/c.Mt.</td>
<td>—</td>
<td>7 days</td>
</tr>
<tr>
<td>-do-</td>
<td>—</td>
<td>—</td>
<td>150 gms.C.Mt.</td>
<td>—</td>
</tr>
<tr>
<td>3. Alluminium Phosphide (ALP)</td>
<td>(9 gms/tonnes</td>
<td>63 gms/28 c.Mt.</td>
<td>—</td>
<td>5 days</td>
</tr>
</tbody>
</table>
PRECAUTIONS TO BE TAKEN WHILE HANDLING CERTAIN INSECTICIDES/ FUMIGANTS/RATICIDES, AND THE FIRST AID IN CASE OF POISONING

Insecticides, fumigants and rodenticides are poisonous and could cause hazards if not stored carefully. They have to be kept in store under lock and key and away from foodstuffs.

While handling the chemicals also, it is equally essential to observe necessary precautions, such as wearing protective gloves over-all and masks should be taken before commencing the application of insecticides/ fumigants/Raticides in the field. The use of gas masks, respirators and safety goggles is imperative before commencing any fumigation operations indoors. During the application of pesticides strict care should be taken not to come in contact with pesticides in any manner. Washing of hands and the exposed parts of the body with soap and plenty of water is very important after completing any kind of pesticidal operation. The containers of pesticides should be tightly closed and stored in a safe place beyond the reach of children, pets, and live-stock after using the same.

Antidotes of the insecticides, fumigants and Raticides now in vogue in storages and the first aid in case of poisoning are given below. Details of antidotes and first aid measures could also be referred to in Indian standard Guide Nos. IS:4015 (Part-1) 1967 and IS:4015 (Part-II)-1967.

CYANIDES:

(Cyanogas (Calcium Cyanide, Potassium cyanide, sodium cyanide, Acrylonitrile).

First-Aid: In cases of HCN poisoning, if the person is unconscious, promptness on the spot is essential. Carry patient to fresh air. Have him lie down. Remove contaminated clothing but keep patient warm. Start the following first-aid treatment immediately and call a physician.

(a) If patient is conscious and breathing, break an amyl nitrite pearl in a cloth and hold lightly over the nose for not more than fifteen to twenty seconds. Repeat every two to three minutes for 25 minutes if recovery is not forthcoming.

(b) If cyanide has been swallowed—Give patient one pint of 1 per cent Sodium thiosulphate solution or (soapy water or mustard water) by mouth every 15 minutes until vomiting occurs.

(c) If patient has stopped breathing—Try artificial respiration until breathing starts. In addition break an amyl nitrite pearl in a cloth and hold lightly over the nose for not more than 20 seconds - repeating every 2-3 minutes for 25 minutes or till breathing starts.

(d) If patient is unconscious but breathing—Break an amyl nitrite pearl in a cloth and hold lightly often over the nose for not more than 20 seconds repeating every 2-3 minutes. If recovery is observed to be difficult give oxygen from an inhalator.
Never give anything by mouth to an unconscious person. In all cases keep patient quiet and warm until a physician arrives.

**Treatment by the physician:**

A trained assistant must be asked to break one at a time, pearls of amyl nitrate in a handkerchief and latter held over the patient’s nose often for 15 to 20 seconds. At the same time doctor should quickly load his-syringe with 3 per cent solution of sodium nitrite (Na NO₂). The administration of amyl nitrite should be stopped and 10 c.c. of 3 per cent solution of sodium nitrite should be injected intravenously at a rate not faster than 2 c. c. per minute. The patient will subsequently have to be watched for 24-48 hours. If there is reappearance of sign of poisoning, injection of sodium nitrite should be repeated.

The injections may be repeated for prophylactic purposes two hours after the first injection even if the patient is apparently well. 1/4 - 1/2 c.c. of 1.1000 adrenaline should be kept ready to combat the frequent fall of B.P. with Na NO₂. The handkerchief containing amyl nitrite should be laid over the patient’s nose as it sometimes helps the respiratory movements to resume. As soon as the signs of breathing appear, injections of the above mentioned solution should be promptly made. Empinephrine or Ephedrine may be used to counteract any profound fall of blood pressure. If the patient is breathing poorly, oxygen inhalation and other supportive measures such as blood transfusions should be instituted.

Bolger, Nieson’s artificial respiration gives greater pulmonary ventilation and may be recommended as a better substitute than SCHAFER’s.

**Methyl Bromide:**

As with all fumigant materials, Methyl Bromide should be handled only by individuals who are thoroughly familiar with its proper use. While this material has been and can be safely used, concentration commonly used in space fumigation can produce injury on relative short exposure if proper precautions are not taken.

Following are possible symptoms of Methyl Bromide exposure:

Early symptoms of serious Methyl Bromide poisoning are malaise, headache, disturbance of vision, nausea, and vomiting. As the exposure is usually through the respiratory tract, pulmonary oedema may commonly occur. It is also possible that the onset of symptoms may be delayed and the total period may be 24-48 hours after exposure.

Most of the symptoms of chronic or low-grade Methyl Bromide poisoning in man are related to the central nervous system with the exception of frequent skin irritation. Disturbance in raising speech, gait and mentation are common and very complicated neurological abnormalities have also been observed. At the first sign of any of the above symptoms, the following first aid treatment should be given:

(i) Remove patient to fresh air, keep warm,

(ii) Remove contaminated clothings,

(iii) Do not administer alcohol,
(iv) Call physician or take the person to a physician.

It is advisable for the entire crew of men on fumigation job working under the same conditions to stop work immediately when somebody explains illness due to exposure. The affected operator should be treated as mentioned above. Further he shall not carry out fumigation work until he has received the approval of the physician.

Suggested Treatment by physician:

The following measures are to be administered by a physician only, or under his direct supervision —

(i) Nausea, if accompanied by vomiting will require intravenous glucose-bearing vehicles to relieve the vomiting and avoid dehydration. This should be pushed to the point of a satisfactory urinary output.

(ii) If vomiting is not satisfactorily controlled by this measure, it may be necessary to administer a narcotic in which case delauded 1/64/11/32 or pantopen gram 1/3 would be the narcotic of choice.

(iii) If evidence of cardiac and/or circulatory failure arises, coromine or caffeine and sodium banzoate should be administered hypodermically to maintain cardiac function.

(iv) If evidence of pulmonary embarrassment arises, the patient should have a 100 per cent $O_2$ and $CO_2$ atmosphere administered by an appropriate method. In such cases the physician should be alerted to the possibility of oedema and pneumonities.

(v) If respiration should fail artificial respiration should be administered in $O_2$ rich atmosphere, if available or in atmosphere.

(vi) Skin burns are common treatment as usual. But a weak sodabicarbonate solution may be recommended as a prophylactic skin application. In several case continuous $C_2H_3OH$ administration for even 24 hours has been reported as successful in literature.

Experience to date seems to indicate that if the more serious effects of acute exposures lung-oedema and convulsions are survived, recovery in all probability will be complete, but may require a considerable time, depending upon the severity of the exposure. In cases of chronic intoxication (prolonged repeated exposure where lung involvement is not a factor, the primary effects of Methyl Bromide is on the nervous system. Recovery from such effects may be expected to be slow but in all probability will be complete. Therefore, the importance of early diagnosis and cessation of exposure is necessary.

Zinc phosphate:

If poison has been swallowed not much earlier:

(a) Let the patient drink a tea-spoon full of mustard in warm water.

(b) When the vomiting due to treatment has stopped, give $KMNO_4$ solution (5 gram in a glass of water) to the patient.
(c) After about half an hour of treatment dissolve \( \frac{1}{2} \) tea-spoon full of CuSO4 in water and let the patient drink it.

(d) After about 15 minutes of treatment give one tablespoon full of Epsom salt in water to the patient.

If the poison has been ingested more than 24 hours earlier then only (b), (c) and (d) treatments are to be given.

MALATHION TECHNICAL

Precautions:

Minimum cautionary notice on label:

HAZARDOUS, USE RUBBER GLOVES, OVERALLS AND GAS MASK TO PREVENT SKIN CONTAMINATION AND INHALATION WHILE HANDLING ALWAYS STORE UNDER LOCK AND KEY. DO NOT EMPTY CONTAINERS FOR STORAGE OF FOODSTUFFS AND ANIMAL FEED. IMMEDIATELY AFTER HANDLING WASH HANDS THOROUGHLY WITH SOAP AND WATER.

SOAP AND WATER

Information to be given on instruction sheet to be provided with each package of the material.

First and Measures: If swallowed: Induce vomiting by gently touching or stocking the throat with a finger or spoon or by administering two spoonfuls of common salt in half a glass of warm water. Continue until vomit fluid is clear. If the patient vomits on his own assist him with large quantities of warm water. Do not give any other Emetic. If skin or clothes contaminated: Remove contaminated clothes and wash affected parts with soap and plenty of water as promptly as possible.

In inhaled: Carry the patient to fresh air (do not make him walk) Open all doors and windows. Keep the patient warm by wrapping him in a blanket, if necessary. If eye contaminated: Wash for 10 minutes with clean water, or physiological salt holding the lids open.

INFORMATION FOR THE PHYSICIAN

Signs and Symptoms.

Nausea is often the first symptom followed by vomiting, abdominal spasm/pain diarrhea and Salivation:

Headache, giddiness, vertigo, weakness, diarrhea and sense of tightness is experienced in case of doubled exposure.

Blurring or dimness of vision, fixed pinpoint pupils, lachrymation ciliary muscle spasm, loss or accommodation and ocular pain occur when there is primary ocular exposure.

Loss of muscle co-ordination, speech defects, twitching of muscle, generalised weakness.
Mental confusion, disorientation and drowsiness.

Difficulty in breathing, oronasal frothing and cyanosis, pulmonary rales and rhonchi. Hypertension.

Jerky movements, convulsions and coma.

Death by respiratory failure due to depression of respiratory centre.

Differential diagnosis: Cerebral haemorrhage, heat exhaustion, hypoglycaemic episode, gastroenteritis, pneumonia or other respiratory infections.

TREATMENTS:

Antropinize the patient immediately and maintain full atropinisation by repeated doses of 2 to 4 mg. at 5—10 minutes interval for hours together. The need for further atropine administration is indicated by the continuance of symptoms. As much as 25 to 50 mg. may be required in a day. The extent of salivation is a useful criterion to follow in adjusting the dosage of atropine.

Administer 2 pyridine—2-Aldoxine-N-Methyl-iodide (2-P-M.) lg. intravenously (very slowly taking 5 to 10 minutes.)

To relieve upper respiratory obstruction, give oxygen and artificial respiration, if necessary.

Gastric lavage with 5% sodium bicarbonate may be given. Wash contaminated skin and irrigate eyes with normal saline. Maintain electrolyte balance but avoid large amount of intravenous fluids. Do not give morphine, theophylline.

F. PRECAUTIONS:

(i) After every application, the sprayers including the delivery tubes should be rinsed clean of the emulsion with water in order to avoid any clogging etc.

(ii) While spraying partly filled grain-receptacle care should be taken to cover the grain surface with polythene or empty gunny bag to avoid direct contact with the spray. Any other food-stuff lying in the vicinity should also by properly covered.

(iii) Operators wash the body parts exposed to spray with soap and water after the operations each time.

DDVP

PRECAUTIONS:

i) The chemical should be preserved in a air-tight container. After use immediately replace the locking arrangement on the container.

ii) When measuring the chemical, take care that it does not spill on the naked skin. Cover hands by using rubber gloves (Doctors Gloves).
iii) After pouring the chemical in water, mix thoroughly with the wooden stick or ladle.
iv) Keep the spray nozzle at a safe distance to avoid any mist/spray in/on face/body.
v) Use eye shields and gloves while spraying DDVP in the godowns.
vi) The treatments should be completed without undue delay, in about 15-20 minutes of the beginning of the operations (action spray), and all workers removed from inside the godowns before closing the same.
vii) After completion of the spraying operations, wash hands and face thoroughly first with plenty of water and then with soap and water.
viii) Do not rub the fingers on the face or the eyes.

**FIRST AID TREATMENT:**

1. Symptoms of poisoning are headaches, blurred vision, weakness, nausea, cramps diarrhoea, and pain and tightness in chest.
2. If the material has been swallowed, induce vomiting immediately by inserting a finger into the throat or by giving a table-spoonful of salt in a glass of water. Keep the patient prone and quiet.
3. If the insecticide is spilled or splashed on the clothes or skin, remove clothing immediately and wash skin clothing thoroughly with soap and water, using plenty of water in rinsing. If the insecticide has been spilled into the eyes wash immediately with plenty of clean water for at least 10 minutes.
4. Remove the patient immediately from the vicinity of the insecticide to prevent any further exposure to the material.
5. Only if warning symptom appear administer atropine immediately.
6. Summon a physician immediately.

**ALUMINIUM PHOSPHIDE TABLETS**

**PRECAUTIONS:**

i) Like all fumigants, phosphine is highly toxic to mammals. Necessary care should therefore be taken in handling this fumigant. It should be kept under lock and key in cool and dry places.

ii) The tube containing Al. phosphide tablets should be opened in open area.

iii) The tablets should always be handling with hand gloves on.

iv) Once, a tube has been opened, all its contents will have to be used up. Therefore, only the required number of tubes should be opened at a time.
v) No smoking should be allowed within 100 meters of the area under fumigation.

vi) No foodstuffs should be touched while handling the tablets.

vii) The operators should thoroughly wash exposed portions of body with soap and water handling the tablets.

viii) Inhalation of even small quantities of phosphine gas should be avoided.

ix) A danger sign should be displayed prominently and nobody should be allowed to enter the area under fumigation.

x) Aluminium phosphide fumigation should not be undertaken in godowns which form part of residential building.

xi) The tablets should be placed kept inside small paper bags, so that the powdery residue is left behind in the paper bags which may be collected after degassing and buried safely.

DISPOSAL OF EMPTY CONTAINERS (TUBES AND TINS)

The empty tubes of Aluminium Phosphide after consumption should be treated with hot water, given a scrapping and then disposed off to licensed dealers in scrap metals.

FIRST AID:

If the precautions are followed carefully, there would be no hazard. However, in case due to negligence, symptoms such as giddiness, nausea, head-ache and diarrhoea etc. appears, then the affected person should immediately be taken out into open air and made to lie down in a comfortable position. He should be kept warm. Artificial respiration should be resorted to if necessary and a physician called for. In case of pulmonary oedema ordinary circumstances, artificial respiration coupled with the administration of a cardiac tonic or a drug to stimulate blood circulation should suffice.
APPENDIX 12-A-2

RAT CONTROL METHODS

All the rat burrows inside the godown should be closed by filling them with broken glass pieces and stone etc. and then cemented at the mouth.

Trapping:

It is desirable that the rats should not die in grain stacks. When they do the godown remains overcharged with foul smell if the dead bodies are not removed immediately. To do so, it is necessary to break the stack which is a difficult and expensive operation. Trapping avoids this situation. For trapping treadle type trap is preferable. The trap should be so set that the treadle is on the rat run and is close to the wall, and some attractive food placed inside. Fried substances are liked by rats during the winter months and green vegetables and fruits during the summer months. Rats being shy of new objects, it is advisable to keep the trap open so that they can conveniently get in, consume the bait and escape during the first 3 to 4 days. This enables the rats to overcome new object shyness. Thereafter when traps are laid, maximum catch is obtained. It is useless to attempt trapping when the collected rats are released at a short distance. The trapped rats can be killed by submerging the trap in water.

Traps should not be laid at the same place continuously by at fortnightly intervals.

Fumigation:

Control of rat population from the godown surroundings shall be done by fumigating the rat burrows with Aluminium phosphide tablets. These tablets are greyish white in colour. Like all the fumigants phosphine is highly toxic to all forms of animals and human life. The tablets could be introduced into the rat burrows with a spoon having long handle, at different places/depth, and the rat burrows closed with wet mud and sealed.

Anti coagulants and their application:

Ratafin/Warfarin is a powerful anti-coagulant type of rodenticide based on “Fumarin” known chemically as 3(1 furyl 1-2 acetyl) ethyl 1-4 hydroxycoumarin. It is a product designed specifically to kill rats/bandicoots and mice. The latest approach based on the studies indicate that anticoagulants can be used with advantage to wipe out the rodent population. The anti-coagulants have been proved more effective in this respect. Rats, in spite of their keen sense of smell and perception have no way of knowing or even suspecting that they are being baited to death. The chemical Ratafin/Warfarin kills the rats over a period of 5 to 15 days by a process of internal bleeding.

Ratafin is made available and sold in two forms viz., Ratafin concentrate and Ratafin-s.

i) Ratafin concentrate: is a clean white powder carefully formulated in a form acceptable by rats. This is to be used as dry bait only.

ii) Ratafin-S: is a powder formulation that readily dissolves in water.

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Preparation of dry bait:

The dry bait is prepared by mixing about 20 parts of any edible material (grains, flour etc.) with one part of the poison. To smear the poison evenly, a spoonful of any edible oil may also be mixed-up. Place small quantities of this bait in shallow plates in places where rats are known to be frequent. The bait may be replenished as and when necessary. It is not necessary to inspect the baits every-day as it does not deteriorate. It may, however, be ensured that the containers have enough quantity of bait to last for about 10 days for the rats to feed on.

Preparation of wet bait:

A tablespoon of this dissolved in one litre of water and the prepared solution in a shallow container could be placed at easily accessible places for the rats to quench their thirst. However, the usage of this is recommended along with ratatin concentrate.

Precautions:

Although these anti-coagulants are non-hazardous and can even be used inside the premises of residential quarters it is desirable to take ordinary precautions as we do in case of all other pesticides.

Antidotes:

In case of accidental ingestion by the workers/pet animals, natural Vitamin K should be administered orally or intravenously by a physician. Haemorrhage, if any, is to be treated as in the case of overdose of hydroxy coumarin or dicoumarol.
CHAPTER 13

QUALITY CONTROL FOR CAP STORAGE

13.1 Cap Storage—This storage is in the open where grain stacks are kept on plinths or on plain ground, covered with specially fabricated polythene covers. When available accommodation in the godowns, owned and hired, is not adequate this type of storage is resorted to. As grain is in the open in this type of storage great care is needed for maintenance of quality of grain. Rats, birds and moisture are the main enemies of grain in this storage. In view of the risks involved, this type of storage is attempted as a last resort. For high moisture grain and for damaged grain this storage proves useful in dry weather.

13.2 Pre-storage steps:

(1) The site selected for CAP/Open storage shall be above the adjoining ground and away from nullahs and drainage to prevent any flooding of CAP Storage during rainy season. In consultation with the Engineering Wing, wherever necessary, adequate arrangements for outflow of drainage water should be made in advance in case site is likely to be not well drained. Further the CAP Storage site should be cleared of all plant shrub growth and disinfested with DDVP/Pyrethrum.

(2) Anti-termite treatment is essential in CAP/Open storage. Termite attack will result in damage to wooden crates, gunnies and ultimate collapse of the stack. Hence termite nests and run way should be injected with Ethylene Di-bromide as per prescribed dosage to destroy the entire colony. This chemical acts as a good soil fumigant when injected into termite tunnels. Further the storage space/ground intended for CAP Storage should be sprayed with 50 per cent wettable BHC by mixing 2 Kgs. of the powder with 20 litres of water and spraying @ 3 litres per 100 sq. metres to obtain 5 per cent concentration. Wettable BHC needed for local treatment will be purchased locally. The wooden crates used should have been treated with cresote oil or Bison or Soligum paint.

(3) Stack plans shall be drawn in advance with stack numbers indicated on the plinths wherever available. Where no plinths exist, stack numbers can be planted on little posts nearby. The normal stack height in case of rice is 12 bags. The maximum quantity in a stack shall be 150 tonnes of wheat, 130 tonnes of paddy and 100 tonnes of rice. Rice shall not be stored in open without prior permission from the Head Quarters. Length and width of stacks shall not be in excess of 30’ and 20’ (6.7 and 9.1 meters) respectively.

(4) Adequate dunnage shall be provided for all stacks in CAP/Open storage. Wooden crates are preferable. However, cement blocks, wooden rafters casuarina poles, granite blocks, wooden
crates according to local availability, have also been used successfully. The soil conditions and availability of dunngage material locally shall be the main considerations in this regard. The Dunngage material shall invariably be cleaned and disinfested adequately either by fumigation or by treating with contact insecticides such as Pyrethrum, DDVP etc. Polythene sheets should not be used as dunngage in CAP Storage.

(5) The top of the stack shall be built to form a dome in the shape of an inverted ‘U’ to facilitate easy flow of rain water and prevent accumulation of water on the top. A layer of bags filled with paddy husk/Bhusa must be provided on the top layers of all the stacks of foodgrains, irrespective of the commodity, to minimise damage due to rains, birds, high temperature and condensation. Dome formation in case of rice stack shall be after the 12th layer and in case of stacks of 20 bags high this will start after the 16th layer.

(6) To protect the stocks from rain, sun, dew, birds, rodents etc. each stack shall be covered with a polythene cover specially made for this purpose. The outlets provided in the polythene covers shall be kept open without fail to avoid building-up of air pressure under the cover which might blow off the cover. The polythene covers mounted on the stacks should be properly lashed by nylon ropes of 6 mm thickness, only vertically, to prevent damage to the covers due to high velocity winds, rains, dust storms etc. In vast CAP storage complexes such as air-strips, the peripheral stacks will be more subjected to the regurg of high velocity wind and hence these will need nearly four to five kgs. of nylon rope for vertical lashing according to local conditions. In case of stacks inside, 3 kgs. of rope should do for 4 vertical lashings. Stack planning is to be done so that peripheral stacks act as wind breakers and minimise wind action on stacks in the interior rows.

(7) Further, in preference to lashing with nylon ropes, where there is high wind velocity especially in the air-strips and other open storages the use of monofilament nylon twine square mesh nets out of 2 mm dia. nylon ropes, with carbon black, to avoid depolymerisation due to the effect of ultraviolet rays, can be adopted. The use of high or low density cover-tops can also be resorted to. By these, the air getting in from bottom has a more smoother release through the air-ducts, the pressure of the air on the top of the cover gets distributed uniformly and possibility of blowing or rearing of the cover is considerably reduced. The cutting action of nylon ropes on polythene covers due to friction is eliminated.

(8) The life of the polythene covers is very important. Proper handling of the covers by labour during operations is of importance and the local supervisory staff must pay particular attention to this. The durability of the covers depends upon how quick the damage to cover is detected and repairs undertaken. It shall be special responsibility of the local staff to keep a close watch on the condition of the cover and the moment any tear cut or a hole etc. is noticed repairs are undertaken. Use of cobbler’s for stitching the torn portions and pasting the stitched portion with adhesive tapes or by use of ‘Dendrite’ adhesive should be adopted. The surface of the cover to be repaired should be cleaned with Acetone/petrol which renders the surface more effective for pasting tapes.

(9) The use of an electric iron (650 watts) or of heat sealer for repairing large tears is necessary. Sufficient number of these must be available at CAP centres with a capacity of 5,000 tonnes and
more. The senior Quality Control Officers during their squad/surprise inspections should make special mention about the repairs to polythene covers.

13.3 Steps during Storage—

(1) Aeration of stacks is important to check condensation and maintain the health of the stocks. On all clear weather days aeration of the stocks must be done in the day time by lifting the cover to a height of four bags. This can be accomplished either by tucking the bottom edge of the cover between the bags or by sticking 1 meter long bamboo sticks. In the evening it should be brought back to original position. During inclement weather or cloudy days, care should be taken to keep the stacks properly covered. Minimum aeration requirements are:

(i) Aeration with M.C. less than 12 per cent—one day in a fortnight in the morning cool hours only.

(ii) Aeration with M.C. between 12 per cent to 14 per cent—one day in three days in the mornings only.

(iii) Aeration with M.C. above 14 per cent—continuous till the M.C. is brought down to 14 per cent and thereafter as at (ii) and (i) above.

A register should be maintained to indicate the aeration carried out each day.

(2) Inspection of stocks in CAP Storage—A constant vigil is an absolute necessity. At the time of receipt each stack be examined for live infestation, condition and quality of grain. Wet and damaged bags shall not be allowed to go into the stacks but kept separately and salvage operations taken up promptly. For facilitating proper inspection, adequate number of ladders, should be available. In addition to Bamboo ladder, Aluminium ladders can be purchased as per scales recommended. Persons shall not walk with leather shoes on the polythene covers. Only persons without shoes or with only canvas shoes should go up the stack. Minor repairs to covers should be attended then and there. Daily inspection of the covers to detect wear and tear, repairs, lashing, etc. shall be the responsibility of the godown staff.

(3) With proper aeration ensured, usually no surface treatment would be necessary in case of stacks in the open as infestation could be brought under control due to exposure of stocks to high fluctuations of temperature between day and night. However, when found necessary, surface treatment be given during evening hours. Fumigations, where necessary should be taken-up promptly. The dosage, method of use of chemicals which are already in vogue shall be applicable for stacks under CAP Storage also. The combined treatment of DDVP and Aluminium Phoshpide as per instructions should be carried out during fumigations.

(4) Apart from pests, rodents especially rats will do great harm to stocks under open storage. Rat burrows should be treated with Al. Phoshpide and the use of anticoagulants and Zinc phosphide should be undertaken simultaneously for rodent control.
(5) Spilling of grains should be prevented by stitching leaks in the bags; in case there are spilling/sweepings, these should be promptly collected, cleaned and disposed.

(6) District Managers shall pay frequent visits to CAP Storage points to ensure that all instructions are being complied with and that stocks are maintained well.

(7) In CAP storage the possibility of sudden damage to foodgrains due to unexpected heavy rains or cyclonic storms is always there. The loss could be minimised or even avoided if prompt salvaging operations are undertaken where necessary. The AM (QC) and the Depot Incharge should check up all the stacks following rains. Wherever the stacks are affected they should be broken and salvaging operations promptly undertaken. In air-strips one stack space after every ten stacks should be kept vacant for facilitating salvaging operations.

13.4 The Senior Q.C. Officers shall pay regular and surprise visits to CAP Storages and carefully examine whether all the instructions are being carried out or not, whether any of the instructions is falling short of requirement and make specific mention on these. The Regional Technical Reviews shall depict the condition of the stocks in CAP Storage in a separate proforma (App. 1-A-1—Proforma VII).

13.5 Since CAP Storage is taken up wherever open space is available there may be areas where there can be snake trouble. It is advisable to train some persons of the staff at a local Hospital for handling a snakebite kit consisting of the following items of equipment:—

i) Tourniquet,
ii) Sharp scalpel or blade,
iii) Syringe or suction pump
iv) Resuscitator for artificial Respiration
v) A packet of glucose powder,
vi) Coramine drops or injection ampules,
vii) Diazepain or valium ‘S’ tablets to alley apprehension,
viii) Spirit ammonia mixture as stimulant
ix) Potassium Permanganate,
x) Cotton, gauze, rolled bandages etc.

This kit will be available at places where a staff member has been trained to handle it.

13.6 In addition to instructions it needs be added that success in this type of storage depends on the resourcefulness and initiative of local officers to meet and solve any unforeseen problem that may suddenly crop up. In CAP main damage is due to condensation at the top and sometimes at the sides. Condensation will continue to occur when daily variation in Temperature is in excess of 10°C. When moisture content of grain is in excess of 12%, magnitude of condensation will be larger. One way to avoid condensation is to aerate the grain during cool hours and keep it cool. Other is to keep a buffer
like Bhusa bags between grain and cover. Allowing condensation will mean loss of grain moisture and thus grain weight, cool grain will resist loss of moisture. Similarly, anything that will prevent heat transfer like Bhusa, air-column between grain and polythene cover reduce chances of condensation. When, some day covers with same thermal conductivity of grain become available, this problem of condensation may disappear in case of CAP Storage. It also needs to be added that rodent control should be a continuous programme for the area used for CAP Storage. Availability of food and shelter will prove attractive to rodent population and only a continuous programme will keep them under check. Death of a few rats, through the programme, will cause spurts in population rise which needs a continuous programme for maintaining and check on this damage. Among insects, Khapra and the grain borer (Rhizopertha) will find condition favourable in the inner layers. Weevils may not survive climatic regours and bran bugs may find grain accumulations a suitable boring place. Careful inspections will expose these and followed by suitable steps, will keep insect menace under control.
CHAPTER 14

QUALITY CONTROL FOR BULK AND SILO STORAGE

14.1 **Bulk stores**—Bulk storage is considered natural storage for grain and in the west is the common storage for grain that can be kept in bulk. Grain is a poor conductor of heat and in a bulk this characteristic of grain help resist any deteriorative change in the natural course. Only grains with their natural coats like wheat, paddy, millets and whole pulses can be handled in bulk easily. Grains like rice, split pulses, flour need higher technology to handle them in bulk. When grain is kept in insect-proof and temperature humidity proof conditions storability of such grain is far better. In the U.S.A. wheat has been held in storage in bins without affecting quality, for over 40 years. It is the normal experience in the West where millions of tonnes of grain are held in bulk, that grain so stored suffers practically no loss in weight. For success in holding grain in bulk, it needs to be appreciated that in this technique better technology is involved and, therefore characteristics of grain and likely effect of environment on grain must be well understood.

14.2 The Corporation undertakes bulk storage of wheat and paddy in conventional godowns, in flat bins and in silos. In these, use of flat and silo bins is common. Storage in bulk in conventional godowns is rare. Bulk storage takes less space in comparison to bag storage. Where land is a problem, vertical bulk storage can economise use of land. Further, once technology of bulk storage is well understood, it is easy and loss-free storage to operate.

14.3 **Pre-storage requirements**—Requirements in respect of cleanliness, checking for leakage of water and disinfection of empty bins are the same as in conventional storage. Apart from repairs for leakages, if any, attended to in time inside and outside of the storage structure be thoroughly cleaned. Grain accumulates in cracks and crevices of machinery parts and serves as a source of insect infestation. Empty bins need to be, therefore, thoroughly inspected, cleaned and disinfested with DDVP prior to use.

14.4 **During storage**—As far as possible, grain of the fresh harvest be stored in the bins. Grain inspection is to be carried out as in case of conventional storage. In bulk storages, one bin becomes a storage unit irrespective of its capacity. All storage record is, therefore, to be maintained bin wise. Storability of grain is better when bin is filled to capacity. It needs to be borne in mind that no one should enter the bin when it is being filled or emptied. In such cases persons entering the bin is likely to get suffocated or drawn in the mass of the grain. Survival is difficult in such cases. When the bin is being filled space in the bin is charged with dust. There is a likelihood of a fire and explosion if this space gets ignited. Smoking and carrying of matches near a bin being filled needs to be strictly prohibited on this account. Fire fighting equipment is of little use in such cases but needs to be kept ready.
14.5 Grain in bulk be left undisturbed as long as possible. All the work related to silos should be carried out by two persons together. This will avoid accidents. In the bin not opened for long time, carbon dioxide is likely to accumulate at the top. Such bins should be kept open for some time before entering. Any deteriorative change in the grain stored in the bin will be reflected in its temperature. Significant change in the temperature of a spot is an indication of the beginning of deterioration at the place. This temperature rise could be due to insect activity or due to moisture migration, when due to moisture migration moisture content of grain at the top of the bin will also rise. In case of the insect activity insects will be seen at the top layer of grain. Temperatures be recorded in the bins with available device once a fortnight. Further action is necessary when three consecutive readings indicate significant difference. For insect activity, fumigation becomes necessary and in case of moisture migration, aeration. Aeration for moisture shall be undertaken when at the top layer grain shows continuous rise and exceeds 12%. Insect activity can also be checked by aeration when possibility exists of cooling the grain below 20°C and the moisture content is not above 12%. For removal of moisture, air be blown through the bin whereas, for cooling it should be sucked in. Fumigation of grain in bins be done with Aluminium phosphide, using 3 tablets per tonne of grain. After one fumigation, reappearance of infestation be controlled by aeration only. It needs to be appreciated that aeration means loss in weight of grain and on this account aeration be undertaken only on technical recommendation. Aeration when temperatures are below 20°C and relative humidities between 60 and 70% will not affect weight of grain.

15.6 When deterioration starts in bulk, oxygen gets depleted at that point. This helps prevent spread and acceleration of deterioration. Steep rise in temperature or moisture content of the grain will mean deterioration is due to a major factor and the bin is not airtight. Suitable action for checking deterioration becomes necessary in this situation when fumigation and aeration do not check rise in temperature or moisture content. Grain has to be turned over or released for consumption. To facilitate turnover of grain, it is necessary that one bin is always kept empty in the silo set-up. In a turnover, grain suffers breakage and loss in weight due to blowing away of dust. Turnover of grain, therefore, should be the last remedy.

14.7 During release—When emptying the bin it is possible that dust and foreign matter from the grain may accumulate in pockets. Also grain at the periphery may have been damaged by moisture. A close watch is, therefore, necessary to ensure that portions with excess dust and moisture do not get released as such. Otherwise during filling and emptying grain gets well mixed and, therefore, grain taken out from a silo is of uniform quality.

14.8 Fumigation of the grain at the time of storage

As it is likely that the grain at the time of storage in the bins might have infestation in incipient stage, which is not detectable, it is advisable to fumigate the grain as soon as it is introduced in the bins. No insecticidal treatment, other than fumigation, shall be adopted in respect of grain stored in bins. While fumigating the grain in the bins, no one should enter the bins. All precautions be taken while handling the fumigant as in case of conventional store. Operation be carried out by two persons together. Fumigation of bins shall never be undertaken on cloudy and wet days. Aeration of the bins is also not to be carried out on wet and cloudy days.
14.9 To achieve excellent results of safe preservation and health of foodgrains, the following guidelines should be adhered to:

A) OPERATIONAL REQUIREMENTS:

(i) Before storage of foodgrains in bulk, the empty silos/bins should properly be cleaned, disinfested by spraying DDVP and leakages, if any, should be arrested to make the structure air tight as well as rain water proof with the required materials and make all steel structures rust proof inside.

(ii) Moisture content of foodgrains is the limiting factor for safe preservation in bulk. The foodgrains fed into the silos/bins should have a uniform moisture content of below 13%. During storage the same should be maintained between 11 to 12% or less. In respect of paddy, the moisture content should be brought to below 13% by drying before feeding into silos/bins for storage.

(iii) At the time of initial feeding into the silos/bins the grains should be fumigated with the required dosage of fumigants irrespective of the presence/absence of live insects infestation. If it is phosphine gas fumigation, aluminium phosphide/pellets tablets should be mixed with the foodgrains on the conveyors/elevator or with the available applicator devise system so that there is proper distribution of gas in the bulk system followed for storage of foodgrains.

(iv) Care has to be taken to see that water/rain-affected grains are not fed into the bulk storage system during monsoon season. Only dried, cooled and uniform moisture containing grains alone are moved into the system.

(v) Fortnightly and monthly inspection of the stocks by the technical personnel has to be arranged to check the health of the foodgrains stored in bulk with regard to the moisture content, heat development, relative humidity of the grains and insect infestation. The Sr. Q.C. officers must inspect the bulk storage once in a quarter and send their observations as per the proforma enclosed.

(vi) After completion of feeding, the top layer should be levelled and vacant space left should be as minimum as possible.

(vii) Migration of moisture content from one part to another in bulk storage is quite common due to large variations in temperatures during day and night periods. The condensation of such moisture content in the cooler parts leads to heat development due to respiratory and microbial activities of the grains. Periodical removal of such condensed moisture and increased relative humidity of the grains in bulk storage is a must by induced mechanical aeration. Hence grains are to be aerated, cooled and dried when atmospheric relative humidity is less than 70%.

(viii) Temperature of the grains has to be recorded at various depths/levels/spots with the help of inbuilt thermocouples arrangements available in the bulk storages. In the absence of such arrangement, thermo samplers are to be used for recording the temperature of the gains. Hygro meters are to be used to record the relative humidity of the grains inside the bulk storage. If the difference in temperature between the atmosphere and the grains is more than 5 degree Celsius, immediate aeration has to be arranged.
Dehumidifiers attached to the aeration system may also be used when the relative humidity of atmospheric air is very high (beyond 70%). In respect of paddy dehumidiser be used after sample test milling of paddy.

(ix) Development of insects activity in various spots of the bulk stored foodgrains is a possibility in the improperly disinfested stocks moved into the silos/bins. Spot infestation has to be detected with the use of lengthy attachable/detachable probes. Depending upon the type and stage of development of the insects, spot fumigations are to be arranged then and there with the help of lengthy applicators.

The bulk fumigation of the entire stocks has to be arranged if the insect development noticed in various spots and depths by transferring the foodgrains into empty silos/bins and feeding the Al. Phosphide tablets into the convey or elevator system. It is, therefore, necessary to keep one silo and two bins of required capacity for such transfer/preservation purposes.

B. PRECAUTIONARY MEASURES.

Fire hazards will become common if adequate preventive steps are not taken in bulk storage of foodgrains.

a) Dust control system should work properly whenever the conveyors/elevator system functions. There should be no smoking at all to avoid such fire hazards.

b) Cleaning of the entire empty space left inside the bulk storage system once a fortnight is a must.

c) Before entering the silos/bins for inspection/treatment, adequate aeration is a must to remove the accumulated gases given out by the grain/fumigation process. All inlets and outlets be kept open at the time of entering the bulk storages.

d) The temperature of the grains may be kept as minimum as possible in all seasons (less than 20°C also whenever possible) to reduce the moisture well within 12% and insect activity.

e) All safety precautions like use of gas masks, hand gloves etc. may have to be followed while entering the silos/bins for inspections/treatments.
FOOD CORPORATION OF INDIA

Monthly condition report of Stock in storage silo/bins at.
for the month ending.

<table>
<thead>
<tr>
<th>No. of Silo/Bins</th>
<th>Total Storage capacity (in MTs)</th>
<th>Atmospheric temperature °C</th>
<th>Atmospheric Humidity %</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Silo/ Bin No.</th>
<th>Commodity</th>
<th>Qty. stored (MTs)</th>
<th>Date of storage</th>
<th>At the time of storage</th>
<th>At the time of inspection</th>
<th>At the time of issue</th>
<th>Average temp. of grains at the °C Surface</th>
<th>Centre</th>
<th>Bottom</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Humidity inside Bin/Silo</th>
<th>Issue record Date</th>
<th>Qty. (MTs.)</th>
<th>Date of aeration, if done</th>
<th>Date of circulation/ transfer to other Bin/Silo</th>
<th>Date of fumigation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
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</tr>
</tbody>
</table>

Footnotes:
1. Name of insects if infestation observed with qty. (MTs) infested.
2. No. of spots where rain water leakages or condensation noticed if any.

ABSTRACT OF DISINFESTATION:
1. Qty. fumigated during the month.

3. Any other information.

Name and Designation.
CHAPTER 15

QUALITY CONTROL EQUIPMENT IN THE DEPOT

15.1 Equipment required in a storage depot is listed at Appendix 15-A-1 below. Equipment includes requirements for grain inspection and for treatments with chemicals. Fire fighting equipment is not shown in the list as it constitutes list of general storage requirements. Stack cards required also will be from the general storage depot requirements.

15.2 All the equipments shall be properly recorded and kept in working order. Necessary repairs will be carried out in time. Replacements will be made by fresh purchases or by transfers from other depots/regions as considered feasible. Equipment involved in the use of chemicals will be properly cleaned/washed after use before storage. For the handling and storage of chemicals, instructions mentioned in Chapter 12 will be followed.

15.3 Many of the items needed in grain storage are covered by standard specifications. Purchase of such items and their use shall conform to the requirements mentioned in the relevant specification.
APPENDIX—15-A-7

LIST OF EQUIPMENTS IN STORAGE DEPOTS

(1) Parkhi
(2) Bag Trier
(3) Enamel plate
(4) Measuring cylinder
(5) Thermo sampler
(6) Dial Thermometers
(7) Fumigation covers
    Size     i)   40' x 25' x 16' (13.4 x 8.375 x 5.36 m.)
             ii)  30' x 20' x 16' (9.1 x 6.7 x 5.36 m.)
              iii) 18' x 20' x 16' (6.03 x 6.7 x 5.36 m.)
             iv)   10' x 10' x 10' (3.35 x 3.35 x 3.35 m.)
(8) Gas masks
(9) Cannisters
(10) Halide lamps
(11) PH, Tablet Applicators
(12) Foot sprayers
(13) Rocking sprayers
(14) Power sprayers
(15) Dusting Machines
(16) Power Dusters
(17) Bird scarers
(18) Air gun
(19) Cynogas foot pump
(20) Rat Cages
(21) Grain cleaners
(22) Food corp drivers

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PART - III

ISSUES/SALES/DESPATCHES
CHAPTER 16

QUALITY ASSURANCE TO CONSUMERS

16.1 All the activities of the Corporation have the main objective of meeting food grain requirement of portion of the population in the country. This section of the population constitutes 'Consumer' from the view point of the Corporation. Major portion of the food requirement of the Consumer is to be met by the grain supplied by the Corporation. A great responsibility rests, therefore, on the Corporation to ensure that the grain released for sale to the Consumer meets requirements set in the relevant Central Acts, in force. The minimum quality requirements for grain meant for human consumption are specified in the 'Prevention of Food Adulteration Act' of the Govt. of India. Grain to be released from the Corporation depots for human consumption cannot in any way be lower in quality in comparison to the specified standard. (for detailed standard refer to Chapter 5 of the Manual).

16.2 The statutory standard ensures purity and wholesomeness of the grain to be sold for human consumption. Grain to be supplied for human consumption by the corporation is procured either through import or indigenously from practically as many sources as outlets for consumers. Grain purchased from the agricultural markets in the country widely varies in quality from producer to producer. As the grain is transported, stored and released in bags quality variations persist from beginning to end. In transport grain is subjected to handling practices prevalent in the country, weather conditions and contamination hazards. In storage grain is required to be treated with chemicals to ensure damage free storage. The grain ultimately has to reach the consumer in a safe damage free condition. Conformity to specified standard under the Act of the Govt. ensures safety required by the Consumer. The Corporation has, or this account, laid down strict procedures to be followed at each step, to ensure that the grain ultimately reaches the consumer conforming to standard not in any way below the standard specified in the Central Act of the Govt. In reality quality of grain issued from the Corporation depots is of a higher standard and has to continue to be so.

16.3 It is the quality assurance to the Consumers, therefore from the Corporation that the grain supplied through the outlets of the Corporation, at no time will be inferior to or objectionable in relation to the standard specifying purity and health of grain under P. F. A. The Quality Control organisation has to see that this assurance is fully met.
CHAPTER -17

PRIORITIES FOR ISSUES/DESPATCHES

17.1 **Steps during release/issue of food grains:**

It is hardly necessary to emphasize the importance of turnover of stocks at the proper time. The following are the guidelines to be followed in recommending priority for issues of stocks.

(a) **Rice:** Rice like wheat, is now categorised as ‘A’, ‘B’, ‘C’, and ‘D’. In a national buffer, there is every possibility of rice stocks remaining in storage for long periods. It is, therefore, very necessary that stocks are issued in a planned and systematic manner taking various factors into consideration such as, place of storage, type of storage, number of curative treatments imparted to the grain apart from the present quality and likely further storability of the grain. Accordingly the following priorities be strictly followed.

Priority - I :  ‘D; Category stocks having high percentage of loose bran and emitting musty smell.

These stocks require to be aerated and/or cleaned, where necessary before issue. The stocks should conform to PFA requirements and the standing instructions for issues.

Priority - II :  Stocks falling in ‘C’ category conforming to PFA requirements and the standing instructions for issues.

Priority - III :  Stocks stored in sub-standard godowns over six months, irrespective of category.

Priority - IV :  Stocks already fumigated five times, irrespective of category

Priority - V :  Stocks in ‘B’ category.

Priority VI :  Stocks in ‘A’ category.

(b) **Wheat**.—Wheat issues should be planned on the basis of category, variety of wheat, location of storage and the number of curative treatments given to the stocks. Regarding category, this is known at the end of every fortnight and planning for issue categorywise becomes possible a month later. A gap of two months should always, therefore, be accounted for planning and turnover.
& D categories will be issued to Roller Flour Mills and in case of ‘D’ where cleaning is required this should be got done. While issuing stocks to Roller Flour Mills according to instructions in force at the time of issue it should be clearly indicated on the despatch documents that such wheat is not for sale and direct consumption. The Assistant Manager (Q.C.) of the depot will check each and every ‘C’ & ‘D’ category stock and it is only after inspecting the ‘C’ & ‘D’ category and verifying the category such wheat shall be moved/issued. A & B categories should be issued only to State Governments and Fair price shops and ‘A’ shall be issued only after liquidating ‘B’ category stocks. While issuing to fair price shops as per standing instructions, the fair price shopkeepers should be allowed to check the stocks thoroughly to satisfy themselves that it is within PFA limits. Joint sampling and sealing of stocks under issue to be done and the dealer should be advised to exhibit the sample prominently in the Fair price shops.

Priorities for issue of wheat:

(I) State Governments and Fair Price Shops
   1st Priority —
   ‘B’ Category as per age of stock.
   2nd Priority—
   ‘A’ Category as per age of stock
   Basis of priority within the age group shall be the percentage of weevilled grain.

(II) Priorities locationwise:
   1st Priority : Temporary hired sheds such as school building, rice and sugar mill godowns etc.
   CAP on Kacha ground.
   2nd Priority : CAP on air fields, SWC Godowns, CAP on roads, hired godowns of the FCI
   3rd Priority : CWC godowns, open plinths, FSD of the FCI
   4th Priority : Issue from port.
   5th Priority : Wheat below ‘D’ category is to be disposed of at a price intimated by the Head Quarters to registered parties as cattle feed after satisfying that upgradation for issue to Roller flour mills in not possible.

Following procedure will be followed for disposal of below ‘D’ category wheat:

(a) Since the initial categorisation is based on the basis of sampling of peripheral bags each stack/lot of below ‘D’ category wheat so categorised by the depot technical staff will invariably be further examined by the AM (QC) concerned. Such stacks should be got broken and wheat bags fit for human consumption are segregated out for disposal in the manner prescribed in the preceding paragraph on priority.

(b) Each lot of below ‘D’ category obtained in the above prescribed manner and so certified by the
AM (QC) should be further inspected and categorised by committee consisting of DM (QC), AM (Accounts) and AM (Depot), the two to be nominated by the District Manager of the concerned FCI district.

c) The below 'D' category wheat stocks should invariably be labelled” below ‘D’ category wheat beyond PFA and unfit for human consumption.

d) Such stocks would be offered for sale to the registered parties at price intimated by the Head Quarters (FCI.)

e) The Distt. Manager concerned should record the following certificate in case of each stack or lot of below ‘D’ category wheat before the same is sold out to the organisation:—

i) The quantity mentioned in the stack (full details of stack number, number of bags and name of godown) is as per book balance.

ii) In case deterioration is due to negligence or carelessness, disciplinary action has been or is being initiated. Stacks have been received from other District/Region indicate Name of District/Region for which proper prescribed quality complaint has been lodged.

Certificate as at (ii) above as applicable would be recorded deleting that which is not applicable.)

f) It should be ensured that necessary investigation with regard to fixation of responsibility for down gradation of stocks is completed immediately by the Committee referred to in para (b) at the time of inspection/categorisation of stocks but there should be no delay in the disposal of stocks.

g) Monthly report of progress of issue of below ‘D’ category wheat should be sent to the Hqrs. by the concerned Regional Manager/Sr. Regional Manager every month. A Nil statement should also be sent in case no issue has been made in a particular month.

c) Pulses:—Pulses, whole and split and other grains like maize, Jowar, bajra, milo will be issued as early as possible giving priority to lower categories.

17.2 Special steps at the time of issue of foodgrains:

At the time of issue of foodgrains, particular attention has to be paid to the following points:—

i) The bottom most layer of bags in every stack shall be very carefully examined before being issued. Normally, with proper dunnage, there should be no damage to the bags. But in case there is any damage due to damp on account of inadequate dunnage, the affected bags shall be opened and good grain separated from damaged grain.

iii) On account of leakage of water from the roof some bags may become partially wet and the effected grain turns mouldy. All such bags shall be immediately segregated and good grain separated from the damaged grain. (Precautions required to be taken to avoid damage to foodgrains by rain water are given in Appendix 11-A-2.
CHAPTER - 18

JOINT INSPECTION AND SAMPLING

18.1 Stocks of grain proposed to be issued to the State Govts., 'Fair Price Shops', Cooperatives etc., based on Priorities mentioned in Chapter 17 of the Manual, shall be jointly inspected and it will be ensured that these conform to the standard for such issues. A representative sample shall then be drawn in the presence of the authorised representative of the agency taking delivery. In case the representative so desires samples shall be drawn jointly. Standard procedure will be adopted for drawing the sample. Grain sample will be about 500 gms. The sample will be well mixed and divided into three equal parts. These three equal parts will be placed in sample bags and a sample slip mentioning details of the grain issued, date and place of issue, and names and designations of the Officers who have inspected and sampled the lot under issue placed in each sample-bag. The sample slip will be signed by the officers who have inspected and sampled the lot. After placing slips with these details in the sample bags, these will be sealed with joint seals. One of such jointly sealed bags will be given to the authorised representative taking delivery, one will be sent to the District Office and one will be retained in the depot from where the delivery is effected.

18.2 This is to safeguard the interest of FCI at a later date, if any quality complaints arise. This aspect has been stressed under PFA also. This must be scrupulously followed. Samples of issued grain shall be retained for a period of 3 months in token of quality released to the concerned agency for distribution to consumers.

18.3 Inspection by Officers to ensure maintenance of Quality:

The Assistant Managers (QC) during their monthly inspection of the Depots should test check the categorisation of at least 30 per cent of stocks which should invariably include all such stacks that have been downgraded by the technical staff at the depot since his last inspection and certify the correctness of the categorisation and classification of the Technical Assistants in the Stack-wise register as well as stock cards. The AMs (QC) should also check the priority lists drawn by Technical Assistants for issue of food grains based on place and type of storage. The DMs (QC) should inspect every depot under their jurisdiction once in four months and stocks under CAP every 15 days during monsoon months and submit their squad inspection reports to Regional Office/Zonal Office. The Deputy Managers (QC) should ensure during their surprise inspection that the categorisation is correct and satisfy themselves that efforts are being made for the proper upkeep of the health of the grain. The depot staff should be instructed to follow the priorities strictly as prescribed by the Q. C. staff and any violation of the priority, when noticed by visiting officers should be brought to the notice of Regional Manager for disciplinary action.

18.4 Though proformae have been prescribed for the squad inspection reports and for surprise checks, the reports furnished by senior Officers should not be just proforma reports but should cover all relevant points in a comprehensive manner and project the factual position. Only correct knowledge will enable maintenance of quality in storage.

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PART-IV
OTHER FUNCTIONAL AREAS
CHAPTER 19

PROCEDURE OF LODGING AND FINALISING QUALITY COMPLAINTS

19.1 These instructions outline the steps to be taken at various levels in case of receipt of foodgrains in FCI depots which are found sub-standard. The procedure will also hold good for stocks of foodgrains moved under Central Pool to the FCI depots or to the depots of the CWC/SWC.

19.2 Steps to be taken for stocks from FCI to FCI:

(i) On receipt of foodgrains by trucks or through wagons, a representative sample of stocks, truck-wise/wagonwise, be drawn by the consignee. The sample be analysed with reference to the quality specifications and standards in force. On such analysis, if the stock represented by the sample does not conform to the standards/specifications, a telegraphic intimation will be sent to the consignor Regional Manager and the consignor District Manager within 48 hrs. of the receipt of such stocks.

(ii) This telegraphic intimation should be followed by a post copy in confirmation to be sent by registered post to the consignor Regional Manager, the consignor District Manager and to the consignee Regional Manager. One copy of the post copy of the telegram in confirmation should be sent to the Hqrs. also without fail. The post copy in confirmation should contain all relevant details regarding the R.R.: No., Wagon Nos., date of despatch and receipt, refractions exceeding the prescribed limits, number of bags involved etc.

(iii) The stocks under complaint shall be preferably stacked separately or their identity maintained by other means, until the joint inspection is completed.

(iv) The stocks under complaint will be inspected by an AM (QC) other than the consignee AM (QC) from the Distt. Office, as nominated by the District Manager of the Consignee region. This inspection should be carried out within 15 days of the receipt of the stocks under complaint. He will examine the stocks and make his assessment on the quality and condition of the stocks and give his recommendations regarding the measures to be adopted either to upgrade or recondition the stocks for rendering them fit for issue through normal channel or for disposal otherwise, as the case may be. The assessment report of the inspecting officer will be recorded in a proforma as per Appendix 19-A-1. This report, in the prescribed proforma, should be forwarded immediately after completing the inspection, to the consignor Regional manager with a copy to the concerned consignor District Manager by registered post. As per standing instructions, the DMS (QC),
during their squad inspection, should check-up the stocks under complaint also and satisfy themselves that the assessment of the AM (QC) has been correct. Wherever they find that this assessment has not been correctly done, this should be pointed out immediately through a special report to the District Manager as well as to the consignee Regional Manager. The proposal for carrying out the inspection at the level of AM (QC) has been done to expedite the inspection and submission of the report on the stocks under complaint so that all other follow-up actions also are expedited and the complaints are finalised quickly. Any wrong assessment at the level of the AM (QC) subsequently detected will be viewed seriously and reflect on the calibre of the AM (QC) concerned. Representative sample of complained stocks, in duplicate, should also be drawn and these should be deposited with the concerned District Manager for any future reference.

(v) On receipt of the report of the AM (QC) of the consignee region and based on the findings therein, the Regional Head of the consignor will initiate necessary follow up action for finalising the complaint. On the merit of the case, the SRM of the despatching region may allow an opportunity to the staff concerned to satisfy himself/ themselves with regard to genuineness of the complaint, (if he or they, so desire). Where an official is deputed for joint inspection, telegraphic intimation should be sent to the consignee about his visit. The joint inspection should be completed within 21 days (three weeks) of the receipt of the AM (QC)’s report. Any delay in this regard will be at the risk of the consignor region, following the joint inspection, if the complaint is confirmed as genuine, the concerned official shall not be eligible for any TA/DA for the journey and any advance paid in this regard will be recoverable along with the losses incurred by the FCI for the despatch of such sub-standard stocks. The consignor Distt. Manager will be responsible to take necessary action in this regard.

(vi) A provisional LAS (Loss Assessment Statement) should be forwarded by the consignee Regional Manager soon after the inspection by the AM (QC) on receipt of the consignment. This must be done within 2 days of forwarding the AM (QC)’s report of the consignee region. The consignee region should take steps for disposing of the stocks under complaint immediately after the joint inspection is over and after waiting for 30 days from the date of despatch of AM (QC)’s report whichever is earlier. Top priority should be given for the disposal of these stocks. Whenever it is sub-standard, it has to be got properly upgraded and issued out through normal channel. Where the stocks are totally damaged and unfit for human consumption even if upgraded, their categorisation should be completed on top priority and its disposal arranged as per procedure laid down. The disposal should be taken up immediately and its disposal arranged. Where the disposal is likely to take a longer time, the final loss Assessment can be worked out based on the formula rates for various categories of damaged foodgrains. The whole aim should be to work out the final Loss Assessment within ten weeks of the receipt of the stock under complaint.

(vii) The final LAS will reflect all expenses incurred to render the stocks fit for issues through normal channel or the losses incurred in disposing them as damaged under various categories. The expenses under various heads should be indicated in the final LAS.

(viii) On receipt of final LAS from the consignee region, the regional head of the consignor region shall take immediate action to examine the LAS, get clarifications required from the consignee region,
if any, and intimate the acceptance of the loss reflected in the final LAS. This should be done within six weeks of the receipt of the final LAS. Any delay in not scrutinizing the final LAS in time and accepting the same within the period of six weeks from the date of its receipt will be viewed seriously and for all consequences the responsibility will lie only on the Consignor Region. The acceptance of the final LAS by the consignor regional heads mark the settling/finalisation of Quality Complaints.

(ix) With the acceptance of the final LAS, the regional heads of the consignor region should take disciplinary action against the officials concerned and recover the loss reflected in the final LAS. In case where due to reasons of normal administrative authority, recovery of the loss from the defaulting officials is not possible, the consignor regional head should record such reasons and the same should be got approved by the ZM concerned for necessary write-off. As per instructions of Vigilance Divn. Hqrs., the financial losses as per final LAS need not form the basis of a charge sheet. Disciplinary proceedings may be initiated on receipt of Provisional LAS. Wherever the amount of losses as per LAS of the consignee Region is within Rs. 500/- or less, it could be written off provided it is sanctioned by related finance in consultation with Zonal finance. The write off of any losses by ZM should be in consultation with Zonal finance. In all cases, however, disciplinary action against defaulters will have to be taken as per rules irrespective of financial loss.

(x) Thus, the whole process of finalising a quality complaint should be completed within sixteen weeks from the date of lodging of the complaint by the consignee. No quality complaint should lie pending for finalisation normally beyond this period of sixteen weeks. However, if in exceptional cases due to genuine reasons, the finalisation is not possible within the stipulated period of sixteen weeks, such delay could be condoned with the mutual consent of the concerned ZM/RM. Requests for condonation of delays need not be routine, rather these should be exceptions.

Also requests for condonation should be made within the stipulated period of ten weeks at consignee end and six weeks thereafter at consignor’s ends.

19.3 Despatches by other agencies:

In case of stocks under complaint despatched by the State Govt. and their agencies or by SWC/CWC etc., the consignor will recover the losses, on the basis of the telegraphic complaint/post copy of the telegraphic intimation, out of the withheld amount of 5% of the bills for the stocks in question. The final deduction will, however, be made on receipt of final SAS and in case the amount of loss goes more than 5% payment withheld already, the deficit will be recovered from the next bill of the agency concerned. This problem is mostly confined to Punjab and Haryana Regions, but as on date the procedure of despatching the stocks on super inspection basis has been discontinued and whatever stocks are despatched from these two regions, these are already taken over stocks by the FCI from the State Govt. and their agencies. As such, the question of any stock being despatched by State Govt. or their agencies in these two regions also does not arise and the movement will be from FCI to FCI and responsibility for moving any substandard stocks will squarely lie with the FCI Officials/officers. However, the above
point has been included in case if there happens to be any such cases of despatch by State Govt. and their agencies in future.

19.4 From the foregoing, it should be evident to the consignor that whenever any stock is despatched the full set of despatch documents should reach the consignor before the consignment reaches. The responsibility for despatching the despatch documents, complete with all details to the consignee region lies with the consignor region so that in case of receipt of any substandard stocks, the consignee will be able to take action without any ambiguity and in time. All the standing instructions with regard to sending of all despatch documents and also the provision of convey notes being properly placed in the wagons should be rigidly followed. The despatch documents should also include certificates regarding the pest free nature of the stocks and their conformity to quality standards.

19.5 As on date, the movement of stocks is between FCI to FCI only and as such all complaint cases will also naturally be between one unit of the FCI to another. In respect of quality complaints between FCI to FCI, there is no need to raise any IOG by the consignee based on the accepted final LAS. All such cases need to be reflected in the Annual Statement of Account of the consignee region after the acceptance of the final LAS by the consignor.

19.6 (i) In case of stocks received in infested condition, webbing, weevilled with atta formation consequent to uncontrolled infestation, loose bran etc. and also received in lower category, the complaint lodged will not be through a telegram, but by a savingram giving all relevant details. A copy of the savingram will be sent to the Hqrs. also.

(ii) Necessary action to clean the stocks in question should be taken expeditiously for removing the dust, webbing, etc., maintaining the identity of the stocks in question. The stencil mark on the container i.e. gunny should also be made proper note of.

(iii) Incase of wetting by rain prior to loading or any moulds or pockets of heating, etc., action should be taken to segregate such bags on receipt immediately, have them cut open for aeration and salvaging should be resorted to avoid damage spreading up. The identity of the stocks as per the stencil marks on the container need to be maintained. In both cases i.e., upgrading due to webbing, atta formation, etc., and also wetting by rain prior to loading or due to excess moisture, the LAS prepared should contain the expenses incurred onward handling, cleaning, physical visible and invisible losses. The LAS should be sent as in other cases to the consignor for the losses recoverable and for disciplinary action being taken against the defaulters.

(iv) In case of stocks received with excess moisture content beyond the rejection limits, the loss has to be worked out at the rate of cut at full value for the percentage by which the stocks exceed in moisture content with reference to the prescribed rejection limits laid down. This value has to be shown in the final LAS. On the acceptance of the final LAS by the consignor, the loss will be passed on to the consignor for recovery from the officials/Agencies concerned. The consignor regional head should also take disciplinary action against the defaulting officials and recover the losses in question.
19.7 Complaints for contaminated stock:

Complaints regarding contamination will not form part of regular quality complaints and will have to be dealt with separately. In such cases, claims will be lodged by the consignee region with the transporter/swallays for compensation as also in case of losses due to damage in transit. If such claim are turned down by the railways, the fixation of responsibility need not be examined by the Q.C. Division though it will initiate the action for disposal of contaminated stock. The Storage/Movt. Vigilance Divn. of the concerned despatching region will fix the responsibility for such loss. The action for disposal of contaminated stocks will be taken in accordance with the instructions laid down.

19.8 Complaint for lower category stocks:

As per existing procedures for quality complaints, complaint has to be lodged by the consignee in usual manner in respect of receipt of lower category foodgrains also and for the financial losses sustained by the consignee region in the disposal of these stocks under complaint, LAS is raised. On account of difference in the issue price between lower and higher category wheat stocks, the consignee regions are to raise loss assessment statement with the consignor regions as financial losses are incurred in its issue even without upgradation. Since due to the disposal of lower category wheat stocks by the receipt region, financial loss is incurred by the Corporation, the responsibility will have to be fixed on the staff at the despatching end responsible for incorrect categorisation of wheat stocks leading to down gradation of stocks to lower category and despatch of these stocks in the garb of higher category.

The receipt of lower category wheat stocks at the destination can be due to following reasons:

(i) The despatching regions have despatched lower category wheat stocks against proper allocation of lower category. In such cases, all the despatches/TOI etc. shall clearly indicate regarding despatch of stocks in lower category and in addition a telegram will also be sent to the recipient end in this regard.

(ii) The despatching ends have despatched lower category wheat stocks in the garb of higher category. In this case it will be a clear cut lapse of the staff of the despatching region:

(a) for incorrect categorisation,

(b) despatch of lower category wheat in place of A & B category.

LAS received from the recipient region in respect of later case (II) above will have to be accepted and action taken against the defaulting staff. In order to satisfy the despatching region to accept the LASs, it will be essential for the recipient region to strictly adhere to the existing instructions regarding certification of lower category wheat at the level of AM (QC) before issue as laid down. The certificate will be sent to the despatching region with the LAS.
19.9 **Statements to be submitted**:

(a) To keep the R.O. fully informed and to enable the consolidation and submission of the monthly statements of quality complaints to the Z.O. and Hqrs. the Distt. Managers will send a fortnightly report to the RMs concerned as per proforma at App. 19-A-2.

The RM in turn will send the monthly statement of quality complaints to the ZM of the consignee as well as the consignor regions in proforma at App. 19-A-3 and 9-A-4. A consolidated LAS position will also be sent to the ZM every month as per proforma at App. 19-A-5. The copies of these consolidated monthly reports emanating from the regional level should be marked to M (QC), FCI, Hqrs. also indicating the progress of the quality complaints and the acceptance position of the final LAS. All these monthly statements should be received at Hqrs. by the 5th of the following month. Distt. Managers should, therefore, send their statements with complete particulars to the respective ROs by 17th for the first fortnight and by 2nd of the following month for the second fortnight.

(b) In the quality complaints statement consolidated at Regional level referred to above, cases involving infestation, excess moisture content and contamination will not be reflected.

19.10 All the above instructions are applicable to inter-zonal and intra-zonal quality complaints. In both these categories, it is the concerned ZM who should ensure the follow-up action being taken as per the time schedule laid-down for the finalisation of the quality complaints and also takes disciplinary action and effect recoveries of losses. The regional heads both of the consignor and the consignee regions are also fully responsible for taking all the follow-up action on lodging and receipt of quality complaints. Distt. Managers concerned should give the necessary material and any investigation report asked for by the RO on top priority basis.

19.11 No copies of correspondence or samples be marked to M (QC), FCI, Hqrs., in respect of either inter-zonal or intra-zonal quality complaints. Only a copy of the post copy in confirmation of the telegraphic complaint or the copy of the savingogram in case of infestation complaint pertaining to inter-zonal quality complaint should be sent to the Hqrs. as also copies of the monthly statements of quality complaints pertaining to inter-zonal complaints. With regard to intra-zonal complaints, these monthly statements are not also required by the Hqrs. It is the ZO which has to settle the quality complaints whether inter-zonal or intra-zonal.

19.12 The procedure for settlement of quality complaints has been revised and issued vide correspondence No. Q.C. 5(22)/Proc. Quality Comp/90 dated 1.10.91 which is appended herewith Appendix—19.12.

19.13 **Intervarietal changes instructions**:

Instances have come to the notice of office that quite often the rice stocks despatched from various regions on receipt at the destination do not contain convoy notes including details about the stocks such as name of variety or group of rice etc. The stencilling on the bags is also not proper and legible with the result that it becomes impossible for the recipients to issue out the stocks immediately to meet the
urgent requirements of the particular areas. In the absence of convoy notes despatch documents from the despatching ends, the receiving ends can not wait for indefinitely for the details for issuing such stocks. No doubt the despatching end is responsible for intimating the receiving end about quality/quantity, variety/group of rice so despatched along with crop year etc. either by telegram or some other means so that receiving end could take action to record such things and issue the stocks in the areas where there is scarcity and the stocks are required to be issued immediately to the State Govts. However, in the absence of convoy notes/such details and to over come these problems it is necessary that the receiving ends form district level committees consisting of depo/Q.C. officers and classify such unknown varieties/groups in accordance with the recommendations of the Balasubramaniam Committee and issue the stocks accordingly keeping in view the uniform specifications of Govt. of India. the information about the variety/group so arrived at by the Committee should be sent by telegram/telex to the despatching end.

On receipt of the documents about the variety/group of rice from the despatching end, if it is noticed that there is any loss to the Corporation for having issued out a higher group under lower groups, the difference in the cost shall be passed on to the despatching end for fixing responsibility and making good of the loss from the concerned who had despatched the stocks without any convoy notes/particulars about the consignment. This stringent action is being introduced to make the despatching end responsible as also to adhere to the instructions regarding procurement of rice bags with proper stencilling and placement of convoy notes in each wagon and other details which are found lacking in quite a few cases even today.

A copy of the report of the unknown variety/group of rice stocks so classified/identified by the District level committee should also be made available to the accounts/complaint branch of the Distt. office for making necessary entries in their records.

The transfer of the sound stocks in the damaged as well as change in the variety/group declared by the district committees should be got approved from the Regional Heads concerned in accordance with item 27(IV) of “delegation of powers” effective from 1/7/80 amended upto 6.12.85) and then only disposed of by all concerned following the existing instructions.
APPENDIX—19.12

QUALITY COMPLAINTS PROCEDURE OF LODGING AND FINALISING QUALITY COMPLAINTS


In the Hqrs. circular cited, instructions on the procedure to be followed for lodging of the quality complaints and their finalisation were issued, in order to ensure early finalisation of quality complaint cases, the matter has been examined afresh at Hqrs. and in supercession of our earlier instructions on the subject, the following procedure is to be followed in respect of lodging of complaints. Joint Inspection of stocks and submission of final LAS etc. whenever sub-standard and infested stocks are received.

(i) On receipt of foodgrains by trucks or through wagons, a representative sample of the stocks, truckwise/wagonwise will be drawn by the consignee. The sample thus drawn will be analysed with reference to the quality specifications and standards in force by the consignee TA/I/AM/QC. On such analysis if the stocks represented by the sample do not conform to the standards/specification a telegraphic intimation will be sent to the consignor Regional Manager and the consignor District Manager within 96 hours of the receipt of such stocks.

(ii) This telegraphic intimation should be followed by a post copy in confirmation to be sent by registered post to the consignor District Manager/Regional Manager/Zonal Manager and to the consignee District Manager/Regional Manager/Zonal Manager. One copy of the post copy of the telegram in confirmation should also be sent to the Hqrs. without fail. Instructions, given in Hqrs. letter No. 5(22)/Procedure Quality Complaints/84 dated 5.5.84 are relevant in this regard. The post copy in confirmation should contain all relevant details regarding the RR/GR No., Wagon Truck Nos. date of despatch, place of despatch/Name of the depot, contract No., Lot No., Name of the Party and Date of receipt, details of retractins exceeding the prescribed limits, number of bags involved etc. based on which complaints were lodged.

(iii) The stocks under complaint shall be preferably stacked separately or their identity be maintained by other means to the extent possible depending upon the operational exigencies until the joint inspection is completed.

(iv) For stocks which got damaged in transit, immediate salvaging should be undertaken and claims be lodged with the concerned, if it is a tenable claim as per rules for lodging such claims and this will not form part of the quality complaint. Similarly, for the stocks with high incidence of moisture, immediate action should be taken for proper aeration and examination of stocks to avoid damages to the stocks. A quality complaint will also be lodged in this case. In case, if damage occurs in transit due to selection of non-watertight wagons, an attempt be made to obtain a certificate from the Railways at the receiving end. Similarly, if the stocks are despatched in fertilizer or other chemicals contaminated wagons, the stocks should be stored separately and samples be referred to Public Analyst from the grains which had
come in direct contact or from other stocks if it is suspected that stocks were contaminated with fertilizer/chemical stock and necessary complaints be lodged with the consignor in both the cases.

After lodging of the initial complaint, the stocks under complaint should be inspected by the consignee AM (QC) thoroughly and he will make a general assessment of the quality and condition be adopted before issue either to upgrade or recondition the stocks for rendering them fit for issue through normal channel or for disposal otherwise, as the case may be within 10 days of the receipt of the stocks at the consignee depot. The findings of the assessment of the inspecting officer will be recorded in a proforma as per Annexure I. The report, in the prescribed proforma should be forwarded immediately to the consignor, Zonal Manager/Regional Manager with a copy to the concerned consignor District Manager by Registered post as well as the consignee District/Regional/Zonal Manager.

The consignor District Manager/Regional Manager/Sr. Regional Manager on receipt of the assessment report about the quality complaint pertaining to various refractions in foodgrains from the consignee depot will allow the concerned Q.C. Officials who despatched the stocks to visit the destination on the merit of the case, if they so desire, within 30 days of the receipt of the report. No visit however, will be necessary in case of quality complaint for infestation moisture or for the stock which need immediate fumigation, salting etc. where the stocks cannot be kept as such and immediate operation is required.

Where an official(s) is deputed for joint inspection, telegraphic intimation should be sent to the consignee about their visit. The joint inspection should be completed within 30 days of the receipt of the consignee A.M. (QC)’s report. In case the telegraphic intimation is not sent within one week of receipt of the report by the consignor on the visit/deputing of the official, the consignee has the liberty to dispose of the stocks without waiting for joint inspection by the officials of consignor Region. Any delay in this regard will be at the risk of the consignor region.

For the receipt of ‘C’ and ‘D’ category wheat against the despatch of ‘A’ and ‘B’ category: stocks at the consignee depot should be stored separately and also be examined by the Senior most AM/QC/ D.M. (QC) of the District/Region and the stocks should be released for sale only after their inspection and no joint inspection is necessary. In case of complaint of rice stocks, if no telegraphic intimation is received from the consignor to the consignee within one week to detain the stocks for joint inspection from the date of receipt of assessment report or three weeks from the date of lodging the initial complaint to the consignor, the stocks can be disposed off by the consignee region as early as possible to avoid further deterioration in the depots. In this case the consignee’s verdict will be taken as final in respect of the complaint lodged for despatching of the same.

In case of complaint stocks of rice/wheat (for wheat for despatch of dry damaged grain mixed with sound grains) when the quality complaint is lodged, the joint inspection should be completed within 45 days from the date of issue of telegram addressed to the consignor District Manager/Regional Manager/Zonal Manager at consignee’s point i.e. depot. No relaxation in above time limit will be allowed either for lodging the complaint or for inspection of stocks or for sending the assessment report by the consignee to consignors. After joint inspection of stocks, the results will be recorded and jointly signed and this will be final for all purposes of disposal of the complaint.
The officials deputed for joint inspection by the consignor Regional Manager/Sr. Regional Manager shall be entitled to TA/DA. They will obtain attendance certificate from the consignee Depot/District Manager concerned only. Following the joint inspection, if the complaint is confirmed as genuine, the concerned official(s) shall not be eligible for any TA/DA for the journey and any advance paid in this regard will be recoverable alongwith the losses incurred by the Food Corporation of India for despatch of such sub-standard stocks. The consignor District Manager will be responsible to take necessary action in this regard. In case the complaint is found untenable, the consignee Regional Manager/Sr. Regional Manager will initiate disciplinary action against the officials of the consignee depot who lodged the complaint without proper verification of the quality for recovery of the TA/DA amount paid to the officials of consignor region and other losses to the Corporation for their negligence/callousness. If the consignor official/officers did not turn up for joint inspection to complete the above formalities within the stipulated time, the consignee’s complaint will be taken as final and he will be at liberty to dispose off the stocks without awaiting further as per the procedure.

After the finalisation of quality complaint cases wherever the complaints lodged were found to be correct, the losses should be assessed and preferred with the consignor Regions/District Manager as per the guidelines given below.

PREPARATION OF LOSS ASSESSMENT STATEMENT:

No provisional LAS should be preferred as was done earlier. In case the joint inspection of complaint stocks is not carried out within the stipulated time, it will be considered that sender accepts the quality complaint without any reservation and the receiving end shall thereafter prepare the LAS and send copies of the same to the consignor as well as consignee District Manager/Regional Manager/Sr. Regional Manager/Zonal Manager by registered post within 45 days of lodging the complaint. The LAS to be prepared after the expiry of the period of 45 days either on the basis of results of joint inspection or otherwise should be on the following lines. The LAS should be submitted by the consignee within 45 days of the lodging of the complaint. In case the consignee District Manager does not send the LAS within prescribed period, the responsibility for non-finalisation of the complaint will be that of the consignee District Manager.

A. WHEAT

1) RECEIPT OF LOWER CATEGORY WHEAT STOCKS AGAINST THE DESPATCH OF HIGHER CATEGORY WHEAT STOCKS

The criteria for preparation of LAS will be the differential between the issue price of wheat of the relevant category and crop and the value realised through sale/disposal of lower category wheat. The defaulting staff who have despatched lower category wheat against the requirements of higher will otherwise be proceeded against for their negligence of duties and misconduct irrespective of gain or loss in the transaction because the purpose of despatch of higher category wheat cannot be met with the lower category wheat.
ii) **DESPATCH OF BELOW ‘D’ CATEGORY WHEAT (SUB-STANDARD) AGAINST HIGHER/LOWER CATEGORY WHEAT**

The criteria for preparation of LAS in such cases will be difference between the issue price of higher/lower and below ‘D’ category as per the price fixed from time to time or the average rate of last three tenders or last tender rate whichever is higher. The prevailing upgradation charges for upgrading ‘D’ category (sub-standard) wheat will be added if such work is undertaken.

**B. RICE**

i) **Receipt of lower category rice against despatch of higher category and stocks received beyond rejection limit for any refraction.**

The final LAS shall be prepared either by estimation of likely expenditure to be incurred on upgradation of rice stocks or on the basis of expenditure/losses incurred during the last upgradation or by imposing quality cuts for the refractions beyond rejection limits at double value as was in vogue earlier in the Uniform Specifications of the Govt. of India whichever is higher. In case the stocks could not be issued, subsequently by upgradation and are sold through tenders, the difference of cost if any be intimated in continuation to the loss Assessment Statement.

**C. PADDY**

In case of despatch of paddy, the consignor will have to indicate the category and the designation to the consignee before despatch. The consignee will verify the same and will lodge complaint with the consignor after verifying the quality if it is found that such paddy on conversion into rice will not conform to the Uniform Specifications of Govt. of India in respect of all refractions, foreign matter, admixture of lower grades etc. and LAS will be sent to the consignor on the basis of quality cuts likely to be imposed on such stocks on conversion into rice.

**XI (A) FOR ALL FOODGRAINS**

Whenever the foodgrain stocks are received in wet/damaged condition due to leakage in the wagons or through flap doors, the expenditure on salvaging operations should be indicated in the LAS.

The loss incurred due to the stocks for having rendered damaged and unfit for human consumption should be worked out at the rate of sound grain as in vogue and this may be intimated to the consignor. If any difference is noticed subsequently after actual realization on sale of such stocks, this can be intimated in continuation to the earlier LAS already sent to the consignor who in turn will deduct/add this amount from to the original LAS. In these cases where the stocks are damaged due to acceptance of non-waterproof wagons, the depot/railway staff who are responsible for loading of foodgrain stocks in such wagons be held responsible and necessary disciplinary proceedings be initiated against them for their negligence.

In case the stocks are received in fairly dry condition mixed with dry damaged grain beyond 5% against PFA Act standards, the full value of the consignment should be shown in the LAS and necessary action
be taken against the staff/officers responsible for such despatches as well as acceptance of such stocks at the consignor's level. In case of any realisation of amount subsequently by sale of such stocks, this may be intimated to the consignor.

XI (B) CLARIFICATIONS ABOUT LOSS ASSESSMENT STATEMENT:

1. Whether economic price should be taken in the LAS or the issue price.

   While preparing the LAS, the issue price should be taken and not the economic price.

2. Whether issue price should be taken as was prevalent at the time of receipt of stocks under complaint or prevalent at the time of disposal of stocks under complaint: One hundred fifty per cent (150%) of the issue price prevalent at the time of disposal of the stocks under complaint should be claimed in the LAS.

3. Whether the freight charges are to be included in the LAS or not:

   Freight charges should not be claimed in the LAS.

4. Whether local transportation charges from rail head to the depot, handling charges both at the time of unloading and their storage in the depots, interest of the blocked capital and storage charges/losses should be claimed in the LAS.

   The above charges should not be claimed in the LAS.

5. Non committal of Regional/Zonal finance to give their concurrence to write off losses below Rs. 1000/- on the plea that amount does not appear in the books of Accounts:

   The procedure to be followed to drop cases involving losses below Rs. 1000/- on the basis of LAS has also been examined and it is clarified that there is no need for raising debit IOG Advice. The cases involving losses up to Rs. 1000/- may be processed on the same analogy as in the case of storage/transit losses in consultation with the District Finance for dropping. The contaminated stocks should be got analysed through local public analyst and based on the findings, the disposal of the stocks shall be arranged. In case, it is found that the sender had loaded contaminated stocks or loaded the stocks in uncleared wagon or trucks containing chemical contamination which had resulted in contamination to the foodgrains, then the LAS should be prepared on the basis of the report of the Public Analyst depending upon the fitness of the stocks for human consumption or otherwise as explained in the preceding paras. In case of receipt of contaminated stocks, quality complaint will be sent to the consignor District Manager/Regional Manager/St. Regional Manager/Zonal Manager with a copy to Hqrs. along with the attested copies of the chemical analysis results. In case of the complaint pertaining to chemical contamination of foodgrain stocks, the consignor region need not depute any staff/officers for joint inspection. This LAS will show the entire cost of the stocks which had become unfit for issue for human consumption. The Assistant Manager (D) and the Depot staff posted at the rail-head will be held responsible for loading stocks in chemical contaminated wagons and necessary disciplinary action be taken for negligence of duties.

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XIII STOCKS RECEIVED IN INFESTED CONDITION:

For stocks received in infested condition, webbing, weevilled with waste flour formation, loose bran etc., a written complaint will be lodged by Express Sangingram to all concerned with a copy to Hqrs. New Delhi instead of a telegram. Simultaneously, immediate arrangements will be made for fumigation of such stocks. No official from the despatching end shall be deputed to the destination on such complaints and the despatching region shall accept the complaint for proper investigation and suitable action against the official(s)/officers concerned.

In case of direct despatch of stocks by CWC/SWC/Agencies without supervision of FCI staff/officers inspite of protest by FCI, recovery of initial fumigation charges shall be effected from the concerned Agency, on the basis of destination’s Quality complaint, by the consigner regions. In the LAS, freight charges are not to be included in this case. However for receipt of stocks from FCI consignor by CWC/SWC consignee in infested condition the FCI officials of the District will be intimated by the CWC/SWC authorities. This inspection by FCI officials will be completed within ten days of the receipt of the stocks. However the CWC/SWC will lodge the claim for initial fumigation with the consignee District Manager, FCI, under intimation to the consignor District Manager of FCI.

XIV STOCKS RECEIVED WITH EXCESS PERCENTAGE OF MOISTURE:

In case of stocks received with excess percentage of moisture content beyond the rejection limits, the loss has to be worked out at the rate of quality cut of full value for the percentage by which the stocks exceed in moisture content with reference to the prescribed limits laid down. This value has to be shown in the LAS. On receipt of the LAS by the consigner, the consigner regional head should take disciplinary action against the defaulting officials and recover the losses in question as per the procedure.

XV) Procedure of Quality complaints for the stocks stored in CWC godowns:

1. AUTHENTICATING OF MOISTURE PERCENTAGE AND INFESTATION IN STOCKS BY FCI STAFF AT THE TIME OF RECEIPT AND ISSUE.

2. When the FCI representative(s) is/are available at the Warehouse, they should authenticate the condition of stocks and determine the moisture content at the time of receipt/issue. However if no FCI representative is available, the warehouse Manager would take the following action:

   (a) In case of abnormal moisture content, he would draw 3 representative samples, one of which would be tested for moist content and the percentage recorded. The second sample would be sent to the District Manager, FCI concerned indicating the percentage observed at the time of receipt by the Warehouse Manager. The District Manager, FCI would test the sample and if the percentage almost tallies with that observed by the Warehouse Manager, no further action would need to be taken and complaint lodged with destination should be persisted. If there is wide variation in the tests, the third sample would be tested jointly by the CWC and FCI representatives. The entire exercise should be completed within a week’s time.

   (b) In case of infestation, a telegraphic intimation would be sent by the Warehouse Manager to District Manager, FCI concerned about the nature and intensity of infestation and request
him to get the stocks inspected by any FCI officer within 3 days. If no one inspects the stocks within 3 days the Warehouse Manager would go ahead with the fumigation immediately, thereafter, but not later than 2 weeks and maintain the records for inspection by the representative of the District Manager, which would be acceptable to the FCI.

(c) As regards the receipt of lower category, damaged and other sub-standard stocks, an intimation would be sent to the concerned District Manager, FCI alongwith a representative sample and the stocks would be kept separately for inspection if necessary, with a label “Not for Issue”.

XVI. On receipt of LAS, the Regional Heads of the consignor region should take disciplinary action against the officials/officers concerned and recover the loss reflected in the LAS as per laid down procedure.

In case where due to reason of normal administrative instructions if recovery of the loss is not possible, the consignor region Head should record such reasons and the same should be got approved by the Zonal Manager concerned for necessary dropping of the case, apart from instituting disciplinary proceedings against the defaulting staff/officers as per rules irrespective of financial loss. Whenever the amount of losses as per LAS of the consignee Region is Rs. 1000/- or less, it could be considered for dropping in consultation with District Finance.

XVII. In all the above cases where the FCI is put to loss by way of purchase of inferior sub-standard quality foodgrains/ despatch of damaged stocks or by way of despatch of such stocks by incurring extra expenditure towards railway freight, handling and transportation cost, upgradation, salvaging operations, not only the quality control officials/officers/Depot staff be held responsible but also the concerned District Manager for lack of proper supervision and administrative control over the activities in his district including the Regional Heads being the overall incharge of the Region. The comments of District Manager/Sr. Regional Manager always be obtained by the Disciplinary Authority before initiating disciplinary action against the concerned staff and officer to examine the merit of the case.

Thus the whole process of finalisation of quality complaint should not take more than two months from the date of lodging of the complaint by the consignee as indicated in the preceding paragraphs which in nutshell is indicated as below:

1) Lodging of complaints

Within 4 days of the receipt of sub-standard quality of stocks.

2) Sending the quality assessment report by consignee AM/QC to consignor DM/SRM/ with a copy to Hqrs.

Within ten days of the receipt of the stocks by registered post.

3) Receipt of consignee’s intimation for joint inspection of stocks from consignor— despatching regions.

Within 21 days of the receipt of the stocks by telex/telegram.
4) Completion of joint inspection within 45 days of the receipt of the stocks.

5) Submission of LAS on the basis of joint inspection report or otherwise. within 60 days of the receipt of the stocks.

No stocks will be retained by the consignee beyond sixty days without inspection and despatch of LAS and where the above procedure is not followed, the consignees complaint will be taken as final for all purpose.

XVIII. STATEMENTS TO BE SUBMITTED:

a) To keep the Regional Office fully informed and to enable the consolidation and submission of the monthly statements of quality complaints to the Zonal Office and Headquarters, the District Offices will send a fortnightly report to the Regions concerned as per Annexure II enclosed herewith on quality complaints lodged and received. The Regional Office in turn will send the monthly statement of quality complaint to the Zonal Manager of the consignee zone as well as the consignor regions in Annexure III (A & B) enclosed herewith. A consolidated LAS position will also be sent to the Zonal Manager/Headquarters every month as per Annexure IV enclosed herewith. The copies of these consolidated monthly reports from the Regional level should also be marked to the Manager (QC), FCI, Hqrs., indicating the progress of the quality complaints and the acceptance position of the LAS. All these monthly statements should be sent to Headquarters along with RTR every month. District Managers should, therefore, send their statements with complaint particulars, to the respective Regional Office(s) by 17th for the first fortnight and by 3rd of the following month for the second fortnight. To monitor the complaints at Headquarters level, the Q.C. division will maintain the register and enter the details of complaints on the basis of monthly statements so as to facilitate review at Manager (QC/ED(C)/Managing Director’s level.

b) In the quality complaints statement consolidated at Regional level referred to above, cases involving infestation, excess moisture content and contamination, will not be reflected.

All the above instructions are applicable to inter-zonal and intra-zonal quality complaints. In both these categories, it is the concerned Zonal Manager who should ensure that the follow up actions are taken as per the time schedule laid down for the finalisation of quality complaints and also take disciplinary action and effect recoveries of losses where necessary. The Regional heads both of the consignor and consignee regions are also fully responsible for taking all the follow up actions on lodging and receipt of quality complaints. District Managers concerned should give the necessary material and investigation report if any asked for by the Regional Office on top priority basis.

No copies of correspondence or samples be marked to the Manager (QC) Food Corporation of India. Headquarters in respect of either inter-zonal or intra-zonal quality complaints. Only a copy of the post copy in confirmation of the telegraphic complaints or the copy of the savingram in case of infestation complaint pertaining to inter-zonal quality complaints as also copies of the monthly
statements of quality complaints pertaining to inter-zonal complaint should be sent to the Headquarters. With regard to Intra-zonal complaints these monthly statements are not required by the Headquarters. It is emphasised that it is the Zonal Office which is responsible for early and timely settlement of the quality complaints, whether Inter Zonal or Intra Zonal. However, Headquarters will adjudicate disputes between two zones on policy matters.

It is clarified that the old cases in respect of quality complaints should continue to be decided as usual on the instructions in vogue before 1.10.91. However, the new cases be decided in accordance with the instructions contained in revised procedure circulated vide this office circular letter dated 1.10.91 i.e. the date for finalisation of new cases will be effective from 1.10.91 only.
APPENDIX 19-A-1 (ANNEXURE I)

THE FOOD CORPORATION OF INDIA

REGIONAL OFFICE

INSPECTION REPORT OF ASSISTANT/DEPUTY MANAGER (QC) IN RESPECT OF STOCKS HELD UNDER QUALITY COMPLAINTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Name of Receiving depot/district</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Place of despatch/region</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Shed No./Stack No.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Invoice No. &amp; date</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>R.R. No.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>No. of Bags/Weight</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Commodity</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>No. of bags under complaint</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Date of receipt</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Stencil markings</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Nature of complaint</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Original reference</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>General remarks</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Date of inspection by AM/DM(QC)</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Observations of AM/DM(QC)</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Analysis results</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Recommendations</td>
<td></td>
</tr>
</tbody>
</table>
**APPENDIX 19-A 2 (ANNEXURE II)**

District: ..........................

Region: ..........................

FORTNIGHTLY REPORT REGARDING QUALITY COMPLAINTS FOR FOODGRAINS RECEIVED IN THE DISTRICT DURING THE FORTNIGHT ENDING: ..........................

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Name of Recipient Centre</th>
<th>Total Qty. received</th>
<th>Qty. under complaint</th>
<th>Nature of Complaint</th>
<th>Super Inspection of Stocks by AM(QC)</th>
<th>Observation of Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of wagons</td>
<td>Bags</td>
<td>No. of wagons</td>
<td>Bags</td>
<td>Qty.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Qty. in MTs.</td>
<td></td>
<td>Qty. in MTs.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>1</td>
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<td>3</td>
<td>4</td>
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<td>6</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>

Stocks lying uninspected by AM(QC)

| 13    |                          |
| 14    |                          |

To
REGIONAL MANAGER
Food Corporation of India
### APPENDIX - 19-A-3 [ANEXURE III (A)]

Details of all quality complaints lodged are to be given in the statement till receipt of LAS as is acknowledged by the consignor region.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars of Consignment</th>
<th>Particulars of Quality Complaints</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Commodity/varieties</td>
<td>Despatching station</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Despatching Agency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RR/Invoice No. &amp; date</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wagon No.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. of bags in the wagon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Date of receipt of stocks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Letter No. &amp; date of lodging</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quality complaints by telegram</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Name of consignor Region</td>
</tr>
<tr>
<td></td>
<td></td>
<td>With whom complaint lodged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. of bags/weight under complaint</td>
</tr>
<tr>
<td>1.</td>
<td>2.</td>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
<td>5.</td>
<td>6.</td>
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<td>7.</td>
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<td>9.</td>
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<tr>
<td>10.</td>
<td>11.</td>
<td></td>
</tr>
</tbody>
</table>

#### Particulars of Submission and Acknowledgement of LAS

<table>
<thead>
<tr>
<th>Brief description of quality complaints mentioning the specific failures exceeding the laid down limits and the condition of the wagons etc.</th>
<th>Reference of Inspection</th>
<th>Whether AM (QC)‘s report tally with the nature of complaint or not</th>
<th>No. of cases where DM (QC) during his squad inspection has checked the stocks under complaint</th>
<th>No. of cases where the DM (QC) has found AM (QC) assessment wrong and details</th>
<th>Value of LAS</th>
<th>Regd. Letter No. &amp; date for which LAS has been submitted to consignor Region</th>
<th>Particulars of letters of acknowledgement of receipt of LAS</th>
</tr>
</thead>
</table>

Copy to
1. Sr. Regional Manager, FCI (Consignor/Consignee Region)
2. Distt. Manager (FCI Consignor Region)/Zonal Manager/Consignor/Consignee Region)...........................(Only for inter-zonal complaints)
3. Manager (QC) FCI, Hqrs., New Delhi
**APPENDIX --19-A-4 [ANNEXURE-III(b)]**

STATEMENT SHOWING THE PROGRESS OF INTER ZONAL QUALITY COMPLAINT FOR THE MONTH OF

(All Figs. in No. of Bags and weight in MT.)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Opening Balance</th>
<th>No. of complaints lodged</th>
<th>No. of Complaints settled</th>
<th>Total No. of cases in hand</th>
<th>1-3 months</th>
<th>3-6 months</th>
<th>6-9 months</th>
<th>9-12 months</th>
<th>over one year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total No. of cases settled</th>
<th>Reasons for delay in settlement of pending complaints</th>
<th>Action to be taken for settlement</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. **Commodity**

A. ADMIXTURE OF LOWER GRADE AFFECTING THE CLASSIFICATION AS NOTIFIED.
B. DAMAGED/DISCOLOURED/CHALKY GRAINS/BROKEN/DEHUSKED
C. MOISTURE
D. MISCELLANEOUS (CONTAMINATION)

Copy to: ZM (Consignee Zone)
Manager (QC), FCI, Hqrs. New Delhi.

ZONAL MANAGER (CONSIGNOR ZONE)
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Commodity/variety and date</th>
<th>RR No.</th>
<th>Wagon No.</th>
<th>No. of bags as per RR</th>
<th>Date of despatch</th>
<th>Despatching Agency</th>
<th>Despatching station</th>
<th>Destination</th>
<th>No. of bags and weight for which complaint lodged</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
<td>5.</td>
<td>6.</td>
<td>7.</td>
<td>8.</td>
<td>9.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nature of Complaint</th>
<th>Ref. No. of original complaint</th>
<th>Details of losses suffered including expenditure</th>
<th>Loss in monetary value estimated</th>
<th>Total Loss in monetary value</th>
<th>Whether the stocks inferior full analysis report</th>
<th>Remarks</th>
</tr>
</thead>
</table>

To
1. RM, FCI (Consignee Region/Consignor Region)
2. Zonal Manager (Consignee Region/Consignor Region)
3. Manager (QC), Hqrs. New Delhi
CHAPTER 20

PROCEDURE FOR HANDLING AND DISPOSAL OF DAMAGED FOOD GRAINS

20.1 A distinction needs to be made between 'adulterated' and damaged grain. Whatever quantity of food grain does not conform to PFA standard may be adulterated but not damaged. Only such grain which does not conform to PFA and further cannot be reconditioned for normal issues will only be considered 'damaged grain'. It needs to be added further, that grain contaminated with chemicals or that contains injurious admixtures should be treated as contaminated' and neither as 'adulterated' nor damaged. Contaminated grains or grain with injurious seeds shall be kept isolated in separate lots and clearly labelled as not for release for human consumption'. Procedure for release of such grain will be issued from H.Qrs. after ascertaining the nature and proportion of admixture. Instructions be, therefore, separately obtained from the H.Qrs. for such grain. Damage to stocks can occur in the godowns, in CAP storage or in transit. Such stocks need to be salvaged to segregate sound grain for issue under normal channels. Stocks not fit for normal issues will have to be dealt with as 'Damaged grain'.

20.2 Damaged Foodgrains:

(i) The damaged stocks on receipt in the godowns or detected in the Depot, shall be properly checked and segregated on the basis of condition and proportion of sound grain present into different lots, as per classification given under para 20.4. Each lot shall be kept separately and will have a stock card showing all details. One representative sample from each lot shall be drawn and sent to the District Laboratory for the purpose of categorisation of damaged grain. Each sample shall not be less than 500 gms. The sample slip as shown in Appendix 20.A-1 shall be placed inside the bags and two copies of the same will accompany the covering letter. Samples of damaged/sub-standard food grains shall be sent to the District Laboratory within 7 days from the date of receipt/detection in the Depot.

(ii) Maintenance of record at the District Laboratory:

A record will be maintained of the samples received in the District Laboratory as per details at Appendix 20.A-2.

The samples shall be analysed and the results of analysis recorded in the analysis slip as at Appendix 20.A-2. The rejections to be assessed are:
(a) Sound grains of Wheat/Rice etc.
(b) Brokens of sound grains.
(c) Slightly damaged grains.
(d) Touched/Discoloured/Chalky grains.
(e) Completely damaged grains.
(f) Foreign matter.
(g) Weevilled grains

Besides, it would also be necessary to record details like the appearance, smell, colour, contamination etc.

20.3 Categorisation of Damaged stocks:

(i) For the lots of damaged foodgrains being less than 50 MTs, the categorisation of damaged lots shall be done by the Dist. Categorisation Committee, consisting of the District Manager, AM(QC) and Tech. Asstt. looking after the technical work of the depot. For the individual lots having more than 50 MTs, one Dy. Manager (QC) shall also be associated with the categorisation. Wherever the rate running contract is operative with the State Govt. / Agro Industries Corp./Agri. Colleges/Military Dairy Farms or Municipal/Co-Op. Dairy Farms, a member of such institution shall also be associated in the Categorisation committee. If on the basis of the inspection of the sample of the damaged foodgrains of any lot, the district categorisation committee feels that personal inspection of any lot is necessary, it may do so. In the case of chemical contamination, lot-wise representative sample shall be referred to the Government/recognised public laboratory for chemical analysis and advice, and report of the Public Analyst in such cases shall be sent to the QC Division at Z.O./H.Qrs. for disposal orders.

(ii) The categorisation Committee is the authority responsible for the categorisation of damaged grain stocks. The committee shall meet as frequently as necessary and categorises the samples of the lots received, within one month. Wherever the representative of the State Govt. or the Co-op., is required to be associated in the categorisation committee, intimation for the categorisation/ analysis be sent at least 10 days in advance, to enable the representative to be present on the date of the categorisation/analysis. However, in case the representative is not available on the date of the categorisation/analysis, the analysis should be done and the results intimated to the representative of the State Govt., or the concerned Co-op. Notwithstanding the sampling of damaged foodgrains lots and its analysis, the investigations into the reasons for the damage and consequent action has to be taken by the District Manager.

20.4 Basis of Categorisation of Damaged Foodgrains:

On the basis of proportion of the refractious in the lot, the lot can be categorised into one of the following 5 categories:
(1) Fit for Cattle feed.

(2) Fit for Poultry Feed

(3) Fit for Industrial use.

(4) Fit for Manure

(5) Fit for dumping.

For the purpose of the categorisation in the above groups the categorisation committee shall consider the results of the analysis and also the general appearance/colour/smell etc. of the sample. Based on the visual examination, and the analysis, the following general guidelines can be adopted for categorising the stocks into various categories. These guidelines are based on the presence of sound grains/sound brokens/SLightly damaged grains, touched and weevilled grains and discoloured and chalky grains present in the sample.

<table>
<thead>
<tr>
<th>No.</th>
<th>% of sound grains</th>
<th>Category for which stocks may be declared fit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>70% and over (upto 85%)</td>
<td>Cattle Feed</td>
</tr>
<tr>
<td>(2)</td>
<td>55% to less than 70%</td>
<td>Poultry feed</td>
</tr>
<tr>
<td>(3)</td>
<td>30% to less than 55%</td>
<td>Industrial use</td>
</tr>
<tr>
<td>(4)</td>
<td>10% to less than 30%</td>
<td>Manure</td>
</tr>
<tr>
<td>(5)</td>
<td>Less than 10%</td>
<td>Dumping</td>
</tr>
</tbody>
</table>

The above basis is mentioned only to serve as a guideline. The category should be recorded on the sample slip itself and shall be signed by all the members. The decision of the committee shall be final. The analysis results will also be recorded on the prescribed analysis slip (as at App. 20-A-3) and shall be signed by all the members of the categorisation committee. The results of the categorisation will be communicated to the depot office concerned immediately but not later than 4 days from the date of categorisation. The Depot Officer on receipt of the results will submit the proposal for sanction for disposal of damaged foodgrains (as at App.20-A-4) along with the 4 point Certificate (App.20-A-5) in triplicate, to the Distt. Manager concerned. The District Manager will consolidate the position for the depots under him and send the same to the Regional Office.

20.5 Disposal :

Steps shall be taken to enter into rate running contracts with the State Governments/Arigo-industrial Corporations and Agencies like Agricultural Colleges, Military Dairy farms and either Municipal or
Co-Operative Dairy Farms. The Form for entering into rate running contract is at Appendix 20-A-6. The rate running contract shall be entered into only for the stocks declared fit for cattle feed and poultry feed at the terms and conditions for the rate running contract and also for the stocks under rate running contract may be referred to at Schedule attached to App. 20-A-6.

20.6 Where there is no rate running contract in force, the offer for disposal of various lots in the first instance should be given to the State Government/Agro Industrial Corporation and Agencies like Agricultural Colleges, Military Dairy Farms and either Municipal or Co-operative Dairy Farms indicating the highest rate amongst the rate running contract rate, average rate of the last three tenders, or the highest rate obtained in the last tender, and they may be asked to send their acceptance within 15 days.

If no reply is received within 15 days, from the State Governments or other agencies to whom the stocks have been offered in the first instance, the decision may be taken to dispose of the stocks by calling All India Tenders or by auction, to obtain the best possible price. In deciding the acceptance of rates obtained in the tenders/auction, the condition of the stocks, the period of storage, the prevailing rates, etc. should form the basis, keeping also in view that the damaged stocks occupy valuable storage space and are also a source of infestation of the sound stocks. Release of stocks to the bona fide registered parties is subject to their giving an undertaking that the damaged stocks will not be used for human consumption. The concerned state governments where the buyer of the damaged foodgrains is having his business shall be informed about the movement of the damaged stocks to their states with a request to ensure that the damaged foodgrains have been sold for the specific use, are not misused by putting them in circulation for human consumption. The stocks categorised as fit for cattle feed or poultry feed would form one category for the purpose of auction/tender. If no offers are received for the stocks categorised as fit for cattle/poultry feed in the auction/tender from the registered parties for this purpose fresh auction shall be held for the same stocks where all the registered parties including the parties registered for manufacturing of industrial use/manure also shall be invited. If no offer is received, at 7 successive auctions/tenders i.e. once as stocks declared as fit for cattle/poultry feed and secondly as stocks declared as fit for other purposes as well, dumping should be resorted.

20.7 In case of the stocks fit for industrial use, if no offer is received in two successive auctions/tenders, dumping is to be resorted to. The stocks fit for manure will be put for Tender/Auction sale only once, and in the absence of any response, shall be dumped.

20.8 Consequent upon the promulgation of the Foodgrains (Prohibition of the use in the manufacturing of starch) Order, 1966, it becomes necessary that the damaged foodgrains fit for manufacturing of starch are used only on production of permission by the Perspect Buyer from the Centre/State Government Authorities and any undertaking shall be obtained from the purchaser as per Annexure at Appendix 20-A-7. The stock declared fit for dumping, in the first instance, shall be offered to the parties registered for use of stocks as manure, and if no offers are received for such stocks, then these stocks shall be offered to the local corporations/municipal/panchayat boards free of cost except godown without containers and labour charges, giving 10 days time for lifting the same. In case of no response from them, the stocks shall be dumped in the presence of two officers nominated by the District Manager, not below the rank of Assistant Manager, and necessary certificate recorded. In case of lifting of stocks by the local corporations/municipality/panchayat boards, a certificate shall be obtained to the effect that the stocks handed over by the FCI have been actually dumped by them.
The quantities of damaged foodgrains available in excess of the requirement of the state government and/or agencies like industries development corporation etc. and the quantities for which no response from the state government or any other agency has been received and the quantities surplus to the requirements under the rate running contract, shall only be sold through tenders/auction to the parties who are registered with Food Corporation and are eligible to purchase such stocks as under.

<table>
<thead>
<tr>
<th>Category of stocks</th>
<th>Parties eligible to purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Fit for cattle/poultry feed cattle/poultry</td>
<td>Manufacturers/direct consumers of cattle/poultry feed and dealers possessing plant and machinery for processing of such stocks into cattle/poultry feed registered with the Food Corporation.</td>
</tr>
<tr>
<td>(B) Fit for use as Manure</td>
<td>Manufacturers/direct consumers of Manure and manufacturers possessing plant and machinery for conversion of such stocks into manure registered with the Food Corporation.</td>
</tr>
<tr>
<td>(C) Fit for industrial use (except for manufacture of inedible starch)</td>
<td>Starch manufacturers/manure manufacturers registered with the Food Corporation.</td>
</tr>
<tr>
<td>(D) Contaminated stocks fit for inedible starch</td>
<td>Starch manufacturers only registered with the Food Corporation.</td>
</tr>
</tbody>
</table>

The terms and conditions governing the sale by auction are at Appendix 20-A-8.

The terms and conditions governing the sale by tenders are at Appendix 20-A-9. List of depots and quantities available are to be annexed while issuing tender.

20.10 **Delegation of powers for sale of damaged foodgrains (Authority :**

144th Meeting of Boards of Directors held on 31-7-82, 9th and 10th Aug., 1982)

<table>
<thead>
<tr>
<th>Nature of powers delegated</th>
<th>Authority</th>
<th>Powers</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) District level</td>
<td>DM</td>
<td>Upto Rs. 20000/- of value per annum</td>
</tr>
<tr>
<td>(2) Regional level</td>
<td>RM</td>
<td>Full powers</td>
</tr>
<tr>
<td>(3) Zonal level</td>
<td>ZM</td>
<td>Full powers</td>
</tr>
<tr>
<td>(4) Head Office</td>
<td>ED (C)</td>
<td>Full powers</td>
</tr>
</tbody>
</table>
Remarks: In accordance with the respective policies and procedures of the corporation, the declaration of stocks sub-standard, damaged, and deteriorated should be got approved by the Regional Manager before sale. The scale of rates/maintained rates should also be approved by the Regional Manager, the responsibility for the damaged/deteriorated stocks would be fixed by the Regional Manager.

2011 Registration of Approved Parties:

To ensure that the damaged foodgrains sold are not issued for malafide purposes, dealers or manufacturers as approved parties for purchasing damaged foodgrains be registered. The authority competent to register the approved parties is the Regional Manager.

A notification shall be issued by the Regional Manager in important papers in his own jurisdiction calling for applications from parties who are desirous of enlisting themselves as 'approved parties' for purchase of damaged foodgrains from Food Corporation of India depots.

(a) The parties are to fill up an application form Appendix 20-A-10 and the same shall be sent to the Regional Manager concerned, along with registration fee of Rs. 5/-. Each application should have the support of certificate from the District Revenue Divisional Officer or District Veterinary Officer stating that he is a genuine dealer/manufacturer/consumer. In case the party is a manufacturer of cattle/poultry feed or strach materials, a certificate shall be obtained regarding the capacity of the plant and the type of products manufactured, etc., from the concerned District Authorities. On receipt of applications from the parties, the Regional Manager will examine thoroughly the certificates issued to each of them by the District and Revenue authorities. If the Regional Manager feels that the party can be entrusted with the responsibility of dealing in damaged foodgrains, the party shall be registered as an approved party viz. direct consumer, trader, or manufacturer as the case may be.

(b) Any dealer or party not possessing plant or machinery for processing damaged foodgrains into cattle/poultry feed shall not be registered for the purpose of sale of damaged foodgrains categorised as fit for cattle/poultry feed. However, direct users of this category of damaged foodgrains such as poultry and agriculture farms which are certified as such by the local authorities may be registered for purchase of damaged grain, even though, they do not possess machinery for processing.

(c) Starch manufacturers having their own factory/place are alone eligible for registration for purpose of sale of stock fit for industrial use/ manufacture of starch. Dealers in starch cannot be considered for registration unless they are also manufacturers having their own plant/factory. Dealer in starch not satisfying the above conditions shall, therefore, not be registered.

(d) The Clause (c) above also equally applies to dealers in manure. Thus dealers in manure not possessing plant/machinery for conversion of damaged grain categorised as fit for manure into manure will not be eligible for registration. Direct consumer for this category of damaged grains and manufacturers possessing plant and machinery for conversion of such stock into manure will be registered.
20.12 A separate register shall be maintained by each of the Regional Manager in the form of Appendix 20- A 11 and as soon as the party is registered, the party will be given a serial number and entered in the register. The fact that the party has been registered as an approved party shall be intimated to each of the parties. The form of letter to be issued to the party is in Appendix 20-A 12. A copy of the letter communicating the registration shall be marked to all the other Regional Managers/Deputy Zonal Managers/ Zonal Managers/ Head Office District Managers for their information.

20.13 In case, where it comes to the notice of the Regional Manager/District Manager that any of the approved parties has misused the damaged foodgrains, immediate action shall be taken to blacklist the party and make a note to this effect in the register and the fact communicated to all the Regional Managers/Deputy Zonal Managers/ Zonal Managers/Head Office District Managers/Head Office.

20.14 Disposal of stocks of Dust and Dockage: The procedure for disposal of Dust and Dockage stocks is broadly the same as prescribed for disposal of damaged grain but in the case of Dust and Dockage bags, the presence of foodgrains will not be uniform and the extent or their presence varies from periphery to the core and even from bag to bag. Therefore, the sampling/analysis of each lot of dust and dockage shall be done carefully, preferably under the direct supervision of the District categorisation committee. Where the sampling/analysis of each stock is to be done for the purpose of determining the price, the same shall be taken from at least 20 per cent of the bags in the periphery and top layers of the bags of the stocks/ lots. In the alternative, sample from any 5th bag shall be drawn at the time of delivery/despatch. Besides, a sample may also be drawn from some of the bags after getting them opened by inserting the hand elbow deep. All the sample so drawn shall be mixed up to form a composite sample and divided in three parts, each being of 500 grams. One part of the sample shall be given to the purchaser, second part got analysed and the third part be retained for future reference.

20.15 Procedure for regulating the payment for the sale of damaged foodgrains. The payments may be allowed to be made in three instalments to be decided by the RMs/ZMs depending on the size of the stocks purchased, capacity of the party etc. as indicated below:

The first instalment will be paid within 7 days of the issue of acceptance letter. The release order will have to be issued within 3 days of the receipt of payment. Quantity covered by the 1st instalment shall be lifted within 15 days from the date of release order, without levy of storage charges. The second instalment would be paid latest within 25 days from the date of issue of acceptance letter and the quantity covered by the second instalment should be lifted within 15 days of the release order to be issued within three days of the receipt of payments without levy of storage charges. The payment for third instalment would be made within 45 days from the date of issue of acceptance letter and the quantity covered by the 1st instalment would be lifted within 15 days from the date of issue of release order to be issued within three days of the receipt of payments without levy of storage charges. An example showing the above position is illustrated below:

1) Date of issue of acceptance letter: 1-1-81
2) Date of payment of 1st instalment: 8-1-81
(3) Date by which release order to be issued 11-1-81
(4) Date by which lifting against 1st instalment to be completed without levy of storage charges 26-1-81
(5) Date of payment of 1st instalment 26-1-81
(6) Date by which release order to be issued 29-1-81
(7) Lifting should be completed against 1st instalment without levy of storage charges 13-2-81
(8) Date of payment for 2nd instalment 13-2-81
(9) Date by which release order to be issued for 2nd instalment 16-2-81
(10) Lifting to be completed against 2nd instalment without levy of storage charges 1-3-81

In case, the party wants to make full payment in one instalment, then the maximum period by which the party can lift the entire stocks will be restricted to 60 days from the date of issue of acceptance letter. An example of the above position is illustrated below:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Date of issue of acceptance letter 1-1-81</td>
</tr>
<tr>
<td>2</td>
<td>Date of payment 8-1-81</td>
</tr>
<tr>
<td>3</td>
<td>Date by which release order to be issued 11-1-81</td>
</tr>
<tr>
<td>4</td>
<td>Date by which entire lifting has to be completed 1-3-81</td>
</tr>
</tbody>
</table>

20.16 Action for belated payments will be taken as per clause g(ii) of the tender and d (iv) of action form.

20.17 Since the above decision regarding the payment of cost instalment is purely an administrative decision to be taken by the Regional Manager/Zonal Managers on the request made by the party to whom the damaged stocks are sold, it is not considered necessary to make any alteration/amendment in the existing model tender form.

20.18 In case of default from any contractual obligation, action may be taken as per the terms and conditions of the tender.

20.19 As regards imposition of storage charges, it has to be made effective from the date of issue of release order and not from the date of issue of acceptance letter and regarding interest to be levied for belated payments the same has to be made effective from the date of issue of acceptance letter.

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Proforma showing details of samples to be indicated on the sample slip in case of damaged/sub-standard foodgrains.

1. Name of the Storage Depot/Centre  
2. Name of Godown and number  
3. Stack Number  
4. Name of commodity/variety and grade etc.  
5. Sample Number  
6. Date of despatch of sample  
7. Quantity in bags  
8. Quantity in tonnes  
9. Whether damaged or sub-standard  
10. Reasons for damage and sub-standard  
11. If ship/rail/transit damaged, whether necessary claim, lodged with the carriers and if so, with what results.  
12. Date of receipt of the lot in the godown  
13. Source of origin of supply  
14. Certificate that the lots represented by this sample were not referred to the District Manager earlier and disposal instructions received.
**PROFORMA FOR THE REGISTER**

<table>
<thead>
<tr>
<th>Date</th>
<th>Depot</th>
<th>Lab</th>
<th>Depot</th>
<th>Lot</th>
<th>Shed</th>
<th>Common No of Weight</th>
<th>Reasons</th>
<th>Date</th>
<th>Analysis</th>
<th>Date</th>
<th>Category</th>
<th>Initials</th>
<th>Initials</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No. of duty bags (gross) for</td>
<td>M.T. damage analysis &amp; date category</td>
<td>Fit for</td>
<td>Analysis</td>
<td>Lab</td>
<td>Incharge</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |

Ship damage
Rail damage
Road damage
Godown damage
APPENDIX : 20 - A - 3

FOOD CORPORATION OF INDIA
OFFICE OF THE DISTRICT MANAGER

No

File No.

Ref. No.

Date:

Damaged/Sub-standard Foodgrains — Analysis Slips

Date of receipt of sample

Date of analysis

Received from:

A

1. Lab. Sample No.

2. Depot Sample No.

3. Commodity

4. Number of bags

5. Weight (M. Tons) (Gross)

6. Date of receipt in godown

7. Reasons for damage

8. Analysis / Results

(a) Dirt

(b) Damaged

(c) Slightly mouldy/touched grains

(d) Weevilled

(e) Sound grain of wheat broken

(f) Sound grain of rice broken

Analyser

B

1. Appearance

2. General condition of grains

3. Categorisation (recommended)

Assistant Manager (Tech)
Categorisation by the Committee:

Certified that the stocks represented by this sample are fit/not fit for issue to Fair Price Shops

Signature of the member of the Committee:
**APPENDIX : 20 - A - 4**

**PROFORMA FOR SUBMISSION PROPOSAL FOR SANCTION DISPOSAL OF DAMAGED FOODGRAINS LYING AT .................**

1. Name of Steamer with date of arrival : 
2. Commodity : 
3. Name of Godown or Shed No. : 
4. Lot No. or Stack No. : 
5. Sample No. : 
6. Quantity No. : 
   (a) No. of bags : 
   (b) Weight in M.T. (Gross) : 
7. Reasons for damage : 
8. If received in damaged condition state whether claims against shipping agents/Railways were lodged and with what result ? : 
9. If damage occurred after discharge at docks or during storage in godowns and whether responsibility can be fixed and on whom ? : 
10. Authority for declaring the stocks as unfit for human consumption : 
11. Category proposed for which particular lot is considered to be fit according to District Categorisation Committee or Public Analyst. : 
12. Whether possibilities of rendering the stocks fit for human consumption were explored and with what result. : 
13. Recommendations for disposal. : 
14. Remarks : 

**Depot In-charge** Technical Asstt. Asst. Manager (Tech) 

Countersigned District Manager 

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APPENDIX 20-A-5
FOUR POINT CERTIFICATE

IN RESPECT OF DAMAGED FOODGRAINS LYING AT

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Sample No.</th>
<th>Commodity</th>
<th>No. of bags</th>
<th>Weight (Gross)</th>
<th>Category declared for use</th>
<th>Authority for declaring the stocks for said use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CERTIFICATES

Certified that:

1. The quantity mentioned in each lot is correct.
2. No part of the damaged grain in question has been brought over from any previous consignment already written off.
3. The grain in question is unfit for human consumption and cannot be rendered fit for human consumption by any process of reconditioning, cleaning and salvaging etc.
4. The loss involved is not legally recoverable from anybody.

Godown In-charge

Countersigned

Assistant Manager (Tech)

District Manager
FORM FOR ENTERING INTO RATE RUNNING CONTRACT

This Agreement made this ........ day of ................ between the Food Corporation of India established under the Food Corporation of India Act 1954 and having its Hqrs. at New Delhi -1 and represented by .......................................................................................... hereinafter called the “Seller” (which expression shall, where the context so admits include its successors or assigns) of the ONE Part and the Government of .............................................................................................................................. represented by .............................................................................................................. hereinafter called the “Purchaser” (which expression shall, where the context so admits include his successors or assigns) of the OTHER Part.

2. The Purchaser agrees to purchase from the Seller damaged foodgrains declared as fit for cattle feed/poultry feed and so notified from time to time by the “Seller” as available with the Food Corporation of India at various locations within the State of ......................... on the terms and conditions specified hereunder and in the Schedule annexed hereto.

3. Quantity:

The Purchaser agrees to purchase all the damaged foodgrains declared as fit for cattle/poultry feed by the District Categorisation Committee constituted by the “Seller” for this purpose.

The purchaser Director of Animal Husbandry or his representative shall be as one of the members of the District Categorisation Committee, for the purpose of categorisation of damaged foodgrains suitable for cattle or poultry feeds to be purchased by the Animal Husbandry Department.

In case the Director of Animal Husbandry or his representative is not able to attend the meeting for any reason the District/Categorisation Committee will proceed with the categorisation, and the Animal Husbandry Department shall accept the results of the categorisation.

4. Price:

The price payable towards the cost of damaged foodgrains/wheat product shall be decided on the basis of the formula fixed by the Director General of Food, Ministry of Food and Agriculture Department of Food, New Delhi vide extract of his letter No. 8(3)/65-PDV/IV, dated 24.3.1965 at Annexure I.

5. Payment:

Payment for the stocks will be made to the Seller within 15 days from the date of receipt of the letter from him indicating the availability of damaged foodgrains fit for cattle and poultry feed and the amount to be paid towards their cost.
The agreement shall be for a period of one year from the date of this agreement.

The other terms and conditions governing this agreement are specified in Schedule to this agreement.

In Witness whereof .......................................................... for and on behalf of the Food corporation of India and the Purchaser have hereunto set their hands this day and year first above written.

Witness:

1

2
SCHEDULE
(for Appendix 20 - A - 6)
Draft Agreement for sale of Damaged Grain to State Govts.

1. Quantity:

The total quantities of damaged foodgrains (wheat or rice or millet or jowar) declared fit for cattle feed/poultry feed purposes now available and become available later with the Food Corporation of India in the .............................................. State will be sold to Government of .............................................. subject to the provisions mentioned in clause 3 of the agreement.

2. Price:

Price of the damaged foodgrains will be payable on the gross weight and will include the cost of gunny bags. All taxes and other charges of any nature whatsoever leviable by any authority, shall be payable by the Purchaser in addition to the price fixed.

For purpose of fixing a price, the results of analysis of the damaged foodgrains conducted as per the procedure in vogue, in the District/Regional Laboratory at ................. shall form the basis.

3. Payment:

The delivery of the damaged foodgrains, will be given by the Food Corporation of India after the District/Regional Manager, Food Corporation of India .............................................. or the representative authorised by him receives the cost of the grains together with the sales tax if any, within 15 days of the issue of the notification about the availability of damaged stocks. At the time of giving delivery if there is a short-fall in the declared quantity, proportionate refund will be allowed and if on the other hand there is found to be an excess, proportionate additional payment will be obtained before giving delivery of the said excess quantity and the additional payment will be made by the State Government within 7 days from the date of intimation to the effect by the District/Regional Manager, Food Corporation in India .............................................. or by the representative authorised by him.

4. Delivery:

The damaged stocks are sold in the same condition as they lie on 'as is where is' basis. They shall be removed by the Purchaser within the period specified in the said order within all the defects if any and notwithstanding any errors or mis-statements of description, measurements, quantity, weight, enumeration or otherwise and without any objection on the part of the buyer and no claim shall lie against Food Corporation of India for compensation nor shall any allowance be made on account of such faults, mis-statements, or errors, although the same may be of considerable nature.

The Purchaser shall make his own arrangements for transport and will not be entitled to claim any facility or assistance for transport from the Food Corporation of India. The bags shall be placed at Food Corporation of India cost by godown labour on Purchaser's trucks at the godown gates or wagons at godown siding but the Purchaser will be responsible for subsequent handling including stacking of the
bags in the trucks/wagons. Should the original Purchaser wish to take delivery of the damaged stocks purchased through a representative, he must authorise the later, by a letter of authority which shall be presented to the officer in whose charge the store is held. Delivery by proxy shall be at Purchaser’s sole responsibility and risk and no claim shall lie against the Food Corporation of India on any account whatsoever if delivery is affected to a wrong person.

5 Weighment:

The stocks sold shall be weighed under Food Corporation of India’s arrangements and delivery will be gross weight. The weighment sheets shall be prepared in triplicate and be signed by the Purchaser or his representative and an officer of the Food Corporation of India. The weighment will be on the basis of 10% of the standardised bags and 100% of non-standardised bags. If however, the Purchaser so demands entire percent weighment of standardised bags, may be given, provided the cost of the weighment is borne by the Purchaser in addition to the price paid for the damaged foodgrains.

10 Period of Delivery:

The goods sold will be removed by the Purchaser from the site of accumulation within the period specified in the release order. The free period of delivery for the purpose of this agreement shall be 30 days from the date of Release Order. If the stocks sold are not removed within the time specified or delivery is not taken at the time and date given in the release order, Food Corporation of India may resell the stocks at the buyer’s risk and expense. If the Food Corporation of India be unable to resell the Goods, the Food Corporation of India may, at its discretion, dump or may destroy the same, without prejudice to its other remedies against the buyer. The buyer shall also be liable to pay storage charges at the rate of 3 Paise per bag or part of the bag per day subject to a minimum of 12 paise per bag or part thereof. These charges will be recovered in respect of the entire quantities of the unlifted stocks at the end of the free period before the delivery of such stocks is actually effected. Delivery would be given only during the working hours on all the working days on presentation by the Purchaser to the stocks holder of the copy of the release/delivery order issued by the District/Regional Manager, Food Corporation of India,.................. or officer authorised by him. The Food Corporation of India reserves the right to extend the free period of delivery without assigning any reason at any time after the issue of the original delivery or release order and the Purchaser shall not be entitled to any compensation or damages for such extension of the free period of delivery.

An express condition of this sale is that the stocks should be strictly used for the bonafide purpose for which they are purchased and that there is no attempt at misuse of the stocks.

Arbitration:

All disputes and differences arising out of or in any way touching or connecting this agreement, whatsoever, shall be referred to the sole arbitration of any person appointed by the Managing Director, Food Corporation of India, administratively or if dealing with the contract at the time of such appointment there be no Managing Director, the Administrative Head of such Food Corporation of India at the time of such appointment. It will be no objection to such appointment that such persons
appointed is a Food Corporation of India employee, that he had to deal with the matters to which the agreement relates and that in the course of his duties as an employee of the Food Corporation of India he has expressed views on all or any of the matters in dispute or difference. The award of such Arbitrator shall be final and binding on the parties to this agreement. It is a term of this agreement that in the event of such Arbitrator to whom the matter is originally referred being transferred or vacating his office or being unable to act on any reason such Managing Director or administrative head as aforesaid at the time of transfer, vacation of office or inability to act, shall appoint another person to act as Arbitrator in accordance with the terms and conditions of this agreement. Such person shall be entitled to proceed with the reference from the stage at which it was left by his predecessor. It is also a term of this agreement that no person other than a person nominated by the Managing Director or Administrative head of the Food Corporation of India as aforesaid should act as Arbitrator, and, if for any reason that is not possible, the matter is not to be referred to Arbitration at all.

Subject as aforesaid the provision of the Arbitration Act, 1940, or any statutory modification or re-enactment thereof and of the rules made thereunder for the time being in force shall apply to the Arbitration proceedings under this clause. The cost and venue of arbitration shall be at the discretion of the Arbitrator.
MINISTRY OF FOOD & CIVIL SUPPLIES  
(DEPTT. OF FOOD)  
GOVT. OF INDIA  
KRISHI BHAVAN  
NEW DELHI

K.K. Singh  
Under Secretary (DR)

D.D No. 17 (9) - DR - III  
December, 1991

Dear Shri Ajay,

Kindly refer to Shri Bhatt’s d.o. of even number dated 10th December, 1991 and your reply there to dated December 13, 1991 regarding M.O.F. directions to stop the sale of sub-standard/damaged rice and wheat with immediate effect.

The matter has been reviewed and it has been decided that the sub-standard damaged stocks of wheat and rice already auctioned by 10th December 1991 may be disposed off as per procedure. However, the balance quantity of stocks not yet auctioned should be offered to Department of Animal Husbandry and Dairy, Ministry of Agriculture, whose requirement is about 5 lakh tonnes of grains for poultry feed. In case they do not indicate their acceptance fully or partly within a fortnight, disposal of balance stocks should be taken up in accordance with the existing procedure followed by FCI including to the poultry units.

A report in this regard may be sent to this Ministry after one month.

with regards.

Yours sincerely,

Sd/-

(K.K. Singh)

Shri Ajay,  
Manager (Sales),  
Food Corporation of India,  
New Delhi.
ANNEXURE TO APPENDIX 20 - A -6

EXTRACT OF--

Copy of letter No. 8(3)/65-PDV/IV dated 24th March, 1965 from the Director General of Food, Government of India, Ministry of Food & Agriculture, Department of Food, New Delhi addressed to the Regional Director, Food, Bombay/Madras/New Delhi.

Sub: Disposal of damaged foodgrains fit for cattle/poultry feed - standing arrangements with Govt. establishment/running contracts with reputed cattle feed producers/consumers:

I am directed to invite your attention to this Ministry’s letter No. 8(3)/63-PDV, dated the 19th December, 64; wherein this Ministry’s decision with regard to the procedure to be adopted for the disposal of damaged foodgrains fit for cattle/poultry feed has been communicated. Since then, this Ministry in consultation with the Ministry of Finance, have evolved a requisite formula which is being adopted for entering into a standing rate running contract with the Government of West Bengal for sale of damaged foodgrains fit for cattle/poultry feed ex-Calcutta godowns. The formula envisages the categorisation of such foodgrains and their disposal as under:—

The sale price of damaged foodgrains will be determined on the basis of the prevailing issue price of normal wholesome and undamaged grains from time to time. Assuming the prevailing price of such grains at a particular time as ‘X’ the stock declared unfit for human consumption will be disposed of:

(a) at half the rate of ‘X’ provided the damaged stock is found suitable for feeding livestock upto and above 75% of the weight of the quantity under disposal;

(b) at one-fourth the rate of ‘X’ provided the damaged stock for disposal is found suitable for feeding livestock below 75% but not less than 50% of the weight of the quantity under disposal;

(c) at one-eighth the rate of ‘X’ provided the damaged stock for disposal is found suitable for feeding livestock below 50% but not less than 25% of the weight of the quantity under disposal; and

(d) at one-sixteenth of the rate ‘X’ provided the damaged stock for disposal is found suitable for feeding livestock below 25% but not less than 10% of the weight of the quantity under disposal.

Note: Prices determined under (a) to (d) above will be for gross weight.
I/We, representing M/S ...........................................................(name of the Purchaser) do hereby undertake that the necessary permit as envisaged in the Foodgrains (Prohibition of Use in the Manufacture of Starch) Order, 1966 and as amended from time to time will be obtained by me/us from the concerned authorities before processing the foodgrains, purchased by me/us against the delivery Order Nos ................................................................. dated .................................................. of ................................................................. covering .................................................. lots comprising of ................................................................. bags weighing M.T. .................................................. It is clearly understood by me/us that this sale of damaged grains for manufacture of Starch is subject to the above undertaking, and the provisions of the said order will be adhered to by me/us scrupulously.

Signature of Party.
APPENDIX—20-A-8

TERMS AND CONDITIONS FOR SALE OF DAMAGED STOCKS LYING AT ...............DEPOT BY AUCTION

(a) The stores can be inspected by the prospective bidders at godowns from where the delivery of stores will be given (List of stocks to be attached).

(b) Food Corporation of India do not guarantee to make any definite quantity or particular quality of damaged grain available to the buyer.

(c) The Food Corporation of India reserves the right to accept or reject without assigning any reason, the highest or any bid. Acceptance or rejection of bids will be announced on the spot, it being understood that the bidder is being permitted to bid in the auction in consideration of his agreement to this stipulation.

(d) (i) Cash payment or Demand Draft/DCR on the State Bank of India or any other Scheduled Nationalised Bank in favour of the Distt. Manager, Food Corporation of India, not less than 25 percent of the amount on the total price calculated on the declared quantity be made on the spot (as earnest Money) immediately on the fall of the hammer. The balance 75 percent shall be paid within 10 days from the date of auction. The Earnest Money will be liable to be forfeited if the successful bidder fails to pay the balance amount within aforesaid period.

(ii) If on the fall of the hammer, the bidder fails to pay the Earnest Money required, the bid shall forthwith be cancelled and the lot re-auctioned at his risk and cost. The Food Corporation of India reserves the right to take such action against the defaulting bidder as may be permissible under law.

(iii) The balance of the total price calculated on the declared quantity on the basis of the accepted bid per unit shall be payable on confirmation of the sale by District Manager/Regional Manager or an Officer on his behalf on the spot and shall be paid by the buyer in any Branch of the State Bank of India within 10 days from the date of auction. Deposit at Call Receipt/Demand Draft shall be obtained in favour of the Distt. Manager, Food Corporation of India and handed over in the Office of the Distt. Manager. FCI within the aforesaid period of 10 days when necessary Release/Delivery orders will be issued. The Earnest Money may be adjusted while paying the balance of the stocks. At the time of giving delivery if there is shortfall in the declared quantity proportionate refund to the party will be allowed. If on the other hand, there is found to be an excess, proportionate additional payment will be obtained from the party before giving delivery of the said excess quantity and this additional payment will be made by the party within seven days from the date of intimation to that effect by the Distt. Manager, Food Corporation of India.

(iv) In the event of failure to complete the payment within the specified time, and to present the demand draft or deposit at call receipt within the aforesaid period of ten days the Food Corporation of India shall have the option to forfeit the Earnest Money in full and resell the stocks at the risk and cost of the original buyer and also to recover the loss sustained by the Food Corporation of India as a
result of such failure, or to extend the period by seven days for making the payments provided, an interest of 18% per annum and storage charges at the rate of 10 paise per bag or part of bag, per day, subject to minimum of 40 paise per bag or part thereof, are paid by the party. Any saving or profit on resale as aforesaid shall be exclusively to the account to the Food Corporation of India.

(e) The bids shall be by lots. All taxes and other charges of any nature whatsoever applicable shall be payable by the buyer in addition to the sale price before he shall be entitled to remove the goods.

(f) Price of the damaged stocks will be payable on the gross weight and will include the cost of the gunny.

(g) After total cost is deposited by the successful bidder in the manner indicated in clause (d) above, the delivery of the stocks will be given by the Food Corporation of India.

The goods sold shall be removed by the buyer from the site of accumulation within 7 days from the date of issue of the Release/Delivery order including the date of issue. Delivery would be given only during the working hours on all working days on presentation by the Purchaser to the stock holder the copy of Sale Release/Delivery order issued by the District Manager, Food Corporation of India. The Purchaser shall make his own arrangements for transport and he will not be entitled to claim any facilities or assistance for transport from the Food Corporation of India.

Should the buyer wish to take delivery of the stocks purchased through a representative, he must authorise the later by a letter of authority which shall be presented to the Officer in whose charge the stores are held. Such Officer may in his entire discretion decline to act on any such authority and it shall in all cases, be for the buyer to satisfy such officer that the authority is genuine. Delivery by proxy will be at purchaser’s sole responsibility and risk and no claim shall lie against the Food Corporation of India on any account whatsoever if delivery is effected to a wrong person.

(h) The stocks are sold on “as is where is” basis and they shall be removed by the buyer with all faults and notwithstanding any errors, or mis-statements of description, measurements, quantity, quality, weight, enumeration or otherwise and without any question on the part of the buyer and no claim shall lie against Food Corporation of India for compensation. The buyer will not be permitted to select any portion out of the lots sold to him nor shall any allowance be made or claim lie against the Food Corporation of India, for compensation on account of any such faults, mis-statements, or errors although the same may be of considerable nature. The buyer should satisfy himself thoroughly as to what is offered for sale, before bidding at the auction and shall be deemed (whether or not such inspection shall have in fact taken place) to have had notice of all defects and faults whether rendering the goods unmerchantable or otherwise and any errors and misstatements as aforesaid which he might have discovered on inspection and shall not be entitled to any compensation on account thereof. Nor shall any party to the sale be entitled to claim or recover from the other any compensation by way of damages or otherwise if the goods sold are not available by reason of not being at the specified place and the contract shall stand cancelled.

(i) Delivery will be ex-godown. The goods will be weighed under Food Corporation of India arrangements and delivered. The weighing sheet shall be prepared in triplicate and be signed by buyer or his authorised representative and an officer of the Food Corporation of India.
(j) The stock sold to a buyer shall from the date of the bid be at his risk and the Food Corporation of India shall not be responsible for the safe custody or preservation thereof.

(k) If the stocks sold are not removed within the time specified or delivery is not taken at the time and date given in the release order, Food Corporation of India may resell the stocks at the buyer’s risk and cost and if the Food Corporation of India be unable to resell the stocks within three months from the date of expiry of the release order (the decision of the Food Corporation of India in this behalf will be final) the Food Corporation of India may at its absolute discretion dump or may destroy the same, without prejudice to other remedies against the buyer. The buyer shall also be liable to pay storage charges at the rate of 10 paise per bag or part thereof per day subject to a minimum of 40 paise per bag for the quantity or portion thereof remaining uncleared from the date following the last free period of delivery given in the release order till the date of release (inclusive). Any gain on any resale as aforesaid shall belong to the Food Corporation of India. Without prejudice to its right to resell, the FCI may at their option permit the buyer to remove, on payment in advance of charges on account of storage space at above-mentioned rate from the date following the last date of the free period of delivery given in the Release Order the said articles or any part thereof remaining uncleared, within an extended period. Food Corporation of India reserves the right to extend the free period of delivery without assigning any reason at any time after the issue of the original delivery or release order and the buyer shall not be entitled to any compensation or damage for such extension of the free period of delivery.

(l) The buyer shall not sublet, transfer or assign the contract or any part thereof without the previous written approval of the Food Corporation of India.

(m) A person bidding on behalf of another person should produce a written authority from such other person authorising him to act on behalf of such other person in all matters at the auction sale. In the absence of such authority, the bid, if accepted, shall be registered in the name of actual bidder and he shall be responsible to the Food Corporation of India as a result of his action without proper authority.

(n) An express condition of sale is that the stocks of damaged grain shall be used only for the purpose as indicated by the District/Regional Manager/Deputy Zonal Manager viz:—

(a) Fit for Cattle/Poultry feed.
(b) Fit for use as manure only.
(c) Fit for industrial use as well as for use as manure.
(d) Fit for manufacture of inedible starch only.

It is absolutely necessary that buyer of any particular category of stocks shall use the same only for the purpose indicated and shall make no attempt whatsoever for adulteration or misuse of the stocks. The Food Corporation of India will take a serious view of any breach of these conditions of the sale. It will also not be open to the buyer to question the categorisation of the stocks as shown in the tender.
APPENDIX 20-A-9

TENDER NOTICE NO. QC/...........DATED.................. FOR THE DISPOSAL
OF DAMAGED FOOD GRAINS FOR CATTLE FEED/POULTRY FEED/
INDUSTRIAL, MANURE USE LYING AT .........................

Last day for Receipt of Tender : Upto on
Opening of Tender : At on
Offer to remain open for acceptance up and inclusive of .................

N.B. : 1. If the said date is declared to be a holiday for the Food Corporation of India Office, it shall be
deemed to remain open for acceptance on the following working day.

2. The District Manager may at his discretion extend this date by a fortnight and such extension shall be
binding on the tenderer(s)

From : TO :
THE DISTRICT MANAGER ALL REGISTERED PARTIES
FOOD CORPORATION OF INDIA

Gentlemen/Sir,

On behalf of Food Corporation of India, the Distriict Manager invited sealed tenders for the purchase of
damaged foodgrains declared fit for Cattle/Poultry/Industrial/manure use as detailed in appendix ‘C’ attached
lying at .......................................................... “As IS WHERE IS BASIS”.

1. The Terms and Conditions :—The terms and conditions governing the sale are given in Annexure
‘A’ attached herewith. Each tenderer may quote for one or more of the lots given in App. ‘C’
attached. The instructions to be followed for submitting the tender are set out below:

2. Earnest Money & Security Deposit :—Earnest money must accompany each tender as stipulated
in clause (E) I. and security Deposit is payable as per clause (E) II. of the terms and conditions.

2a. In case of parties Registered as small scale industries and on this account, claim exemption from
Earnest Money Deposit they are requested to produce the latest certificates issued by small Scale
Industries valid currently in support of their claim for exemption of Earnest Money Deposit or else
such parties run the risk of their tenders being rejected.
3. Sample of Consignment:—The consignment may be inspected by the intending tenderers on the authority of this letter at the godown on any working day wherefrom the delivery of the consignment shall be given.

4. Signing of Tenders:—Person signing the tender should state in what capacity he/she signing the tender i.e. Sole Proprietor of a firm, or as Secretary, Managing Director, etc., of a limited company. In case of partnership Firm, the tender must be signed by all the partners. The person signing the tender form or any other documents forming part of the tender on behalf of another shall produce a proper power of Attorney duly executed in his favour stating that he had authority to bind such other person in all matters pertaining to the contract. If the person subsequently failed to produce the said power of Attorney within a reasonable time, the Food Corporation of India may without prejudice to other Civil and Criminal remedies cancel the contract and hold the signatory liable for all the costs and damages. The Power of Attorney should be signed by all Partners in case of Proprietary concern and in the case of limited companies it should be under the Common Seal of the Company.

5. Submission of Tenders:—The Tender should be submitted in the Prescribed form Annexure ‘B’, ‘C’ and ‘D’ attached herewith along with Annexure ‘A’ duly signed and cash receipt issued by this office towards the cost of Tender Form. The number of tender and the last date of submission should be shown on the envelope and it should be addressed to ‘The District Manager, Food Corporation of India………………. Tenderers wishing to deposit their quotations by hand should deposit them in the Tender Box provided at District Manager’s office for the purpose not later then 2 P. M. on the specified date. Separate rates should be indicated, when there are two or more items in a tender and District Manager has the option to accept or reject a tender for any one or more items.

Yours faithfully,

DISTRICT MANAGER

For and on behalf of Food corporation of India.
A

i. The stocks can be inspected by prospective tenderers at the godown from where the delivery of the consignment will be given.

ii. The buyer should have a licence under the............... paddy and Rice dealers (Licence and regulations) Order 1968.

iii. The Food Corporation of India do not have any responsibility for obtaining permits from the State Government in favour of the buyer nor do they accept any liability for despatching the stocks by rail in the absence of any permit.

iv. It will be responsibility of the buyer to obtain necessary Import/Export permits from the concerned authorities in case the stocks are to be moved to places out side the zone, where they are held. Such permits shall have to be produced at the time of taking delivery.

B

The Food Corporation of India do not guarantee to make any definite quantity or quality damaged food grains available, to the buyer.

C

The buyer is at liberty to quote for any quantity required.

D

The Food Corporation of India reserve the right to accept or reject without assigning any reason, the highest or any tender. All tenders shall be irrevocable and remain open for acceptance for a period of one month from the date of opening tenders. If the said date is declared to be a closed holiday for Food Corporation of India Offices, the tenders shall be deemed to remain open for acceptance on the following working day. The District Manager, Food Corporation of India........... will have the discretion to extend this date by another fifteen days.

E

i. The Tenderer shall pay to the Food Corporation of India, by way of Earnest Money for the due performance of stipulations to keep the offer open, ten percent of value of goods for which the offer has been made, calculated at the rate offered. The earnest money shall be paid in the form of Draft or Deposit at call receipt on any Scheduled Bank in favour of District Manager, Food Corporation of India........... Tenders not accompanied by the required amount of Earnest Money are liable to be rejected summarily. The earnest money paid will be liable for forfeiture if the tenderer after submitting his tender does not keep his offer open or modifies the terms and conditions thereof in a manner not acceptable to the Food Corporation of India it being understood that tender documents have been sold/issued to him and he is being permitted to tender in consideration of his agreement of this stipulation. Subject as aforesaid the EARNEST Money of all Unsuccessful Tenderers will be Refunded to but the Food Corporation of India shall not be liable to pay any Interest thereon. In case the parties are exempted for payment of EMD/SD they
should produce latest certificate issued by Small Scale Industries/National Small Industries Corporation. They should also produce an authenticated copies of the exemption for payment of EMD/SD issued by the competent authority.

ii. The Earnest Money of successful tenderers will be retained as Security Deposit.

iii. a. If the tenderer fails or neglects to observe or perform any of his obligations under the contract it shall be lawful for the Corporation to forfeit either in whole or in its absolute discretion the Security Deposit furnished by the tenderer or any part thereof, towards the satisfaction of any sum due to the claim from the tenderer for any damage losses, charges, expenses or costs they may be suffered or incurred by the Corporation. The decision of the Corporation in this respect shall be final and binding on the tenderer.

b. In the event of the security deposit being insufficient or if such security deposit has been wholly forfeited the balance or the total sum recoverable as the case may be shall be deducted from the sum then due or which at any time thereafter may become due to the tenderer under this or any other contract with Corporation. Should that sum also, be not sufficient to cover the full amount recoverable, the tenderer shall pay to the Corporation on demand the balance due.

c. Same as aforesaid, if the tenderer duly performs and complete the contract in all respect and presents on absolute “NO Demand Certificate” in the prescribed form, the Corporation shall refund the Security Deposit to the tenderer after deduction of all costs and other expenses that the Corporation may have incurred and all dues and other moneys including all losses and damages which the Corporation is entitled to recover from the Tenderer.

d. Price of the damaged food grains will be payable on the gross weight and will include the cost of the gunny. All taxes and other charges of any nature what so ever leviable by any authority shall be payable by the buyer in addition the price offered.

e. 1) The total price calculated on the declared quantity in each lot on the basis of accepted rates shall be paid together with sales Tax if any within seven days of the issue of confirmation or acceptance of tender by the District Manager, Food Corporation of India. The amount will be paid by the buyer in any branch of any scheduled bank and the deposit-at-call receipt/demand draft obtained in favour of the District Manager, Food Corporation of India, within the aforesaid seven days when necessary delivery order will be issued by him or an officer acting on this behalf.

2) In the event of failure to complete the payment within the specified time, and to present the demand draft or deposit at call receipt within the aforesaid period of seven days, the Food Corporation of India shall have the option to forfeit the Earnest Money in full and resale the stocks at the risk and cost of the original buyer and also to recover the loss sustained by the Food Corporation of India as a result of such failure, or to extend the period by seven days for making the payments provided, an interest of 18% per annum and storage charges at the rate of 10 paise per bag or part of a bag per day, subject to minimum of 40 paise per bag or part thereof, are paid by the party. Any saving or profit on resale as aforesaid shall be exclusively to the account of the Food Corporation of India.
It is further clarified that if the tenderer modifies or withdraws his tender before our acceptance, only his EMD is liable to be forfeited. On the other hand, if he does so or fails to deposit the cost within the time prescribed after we issue our acceptance letter not only his EMD is liable to be forfeited but the stocks have to be resold at the risk and cost of the defaulting party.

3) At the time of giving delivery if there is a short fall in the declared quantity proportionate refund of the buyer will be allowed on presentation of a duly supported bill, in the prescribed form, if on the other hand there is found to be an excess, proportionate additional payment shall be made by the buyer in the same manner as referred to above, within seven days from the date of intimation to that effect by the District Manager, Food Corporation of India.

F. The damaged goods are sold in the same conditions as they lie, “As Is Where is Basis”. They shall be recovered by the buyer within the period specified in the delivery order, with all the defects if any lot with standing any error or mis-statements of description, measurement, quantity, weight, numbering or other wise and without any objection on the part of the buyer and no claim shall lie against Food Corporation of India, for compensation nor shall any allowance be made on account of such faults, mis-statements of errors although the same may be of considerable nature. Particulars, the description of damaged goods may be identical or similar to the description of same goods in some previous sale by tender and no reliance should be placed on any such description. The buyer should satisfy himself thoroughly as to what is offered for sale before submitting his tender and may inspect damaged foods prior to tendering and shall be deemed whether or not such inspection shall have in fact taken place to have had notice of all defects and faults and any error and mis-statement as aforesaid which he might have discovered on inspection shall not be entitled to any compensation on account thereof. Nor shall any party to this contract be entitled to claim or recover from the other any compensation by way of damages or otherwise, if the damaged goods sold are not available by reason of not being at the specified place. The Food Corporation of India reserve the right to withdraw from the sale any lot/lot included in the tender prior to the acceptance of any offer for such lot/lot without assigning any reason.

G. The buyer will make his own arrangement for transport and will not be entitled to claim any facility or assistance for transport from the Food Corporation of India. The bags shall be placed at Food Corporation of India cost by godown labour on buyer truck at the godowns gate, wagons at godown siding but the buyer will be responsible for subsequent handling including stacking of bags in the trucks/ wagons.

H. Should the original buyer wish to take delivery of the damaged goods purchased through a representative he must authorise the later by a letter of authority which shall be presented to the Officer in whose charge at the store is held. Such officer may in his entire discretion decline to act on any such authority and it shall be in all cases of the buyer to satisfy such officer that the authority is genuine. Delivery by proxy shall be at purchaser’s sole responsibility and risk and no claim shall lie against the Food Corporation of India on any account what so ever if delivery is offered to a wrong person.

I. The stocks shall be weighed under Food Corporation of India arrangements and delivery will be by gross weight. The weighment sheets shall be prepared in triplicate and be signed by the buyer or his representative and an officer of the Food Corporation of India. The weighment will be on the basis of 10% of the standardised bags and 100% weighment of non-standardised bags. If however, the buyer so
demands 100% weighment of standardised bags, the cost of weighment is borne by the buyer in addition to the price paid for the damaged grains.

J. The stocks sold to a buyer shall from the date of acceptance of this tender be at his risk and Food Corporation of India shall not be responsible for the safe custody or preservation thereof.

K. The goods sold will be removed by the buyer from the site of accumulation within the period specified in the Release order. If the stocks sold are not removed within the time specified or delivery is not taken at the time and date given in the Release Order, Food Corporation of India may resell the stocks at the buyer’s risk and cost. If the Food Corporation of India be unable to resell the goods within 3 months from the date of expiry given in the Release Order (the decision of the Food Corporation of India in this behalf will be final) The Food Corporation of India may at its absolute discretion dump or destroy the same without prejudice to its other remedies against the buyer. The buyer shall be liable to pay storage charges at the rate of Ten paise per bag or part of a bag per day subject to a minimum forty paise per bag or part thereof. These charges will be recovered in respect of the entire quantities of the unlifted stocks at the end of free period before the delivery of such stocks is actually effected or till the date of release (inclusive). Delivery would be given only during the working hours on all working days on presentation by the buyer to the stocks holder of the copy of Release/Delivery Order issued by the District Manager, Food Corporation of India or an Officer authorised by him. Without prejudice of the right to resell, the Food Corporation of India, may at their option permit the buyer to remove on payment in advance of aforesaid charges on account of storage space from the date following the last date of the free period of delivery given in the Release order, the said consignment or any part thereof remaining uncollected within the extended period.

The Food Corporation of India reserves the right to extend the period of delivery of release order and the buyer shall not be entitled to any compensation for such extension of the free period of delivery.

L. i. An express condition to sale is that the stocks of damaged food grains shall be used only for the purpose as indicated in the tender viz.

a. Fit for cattle Poultry Feed.

b. Fit for use as Manure only.

c. Fit for Industrial Use as well as for use as Manure.

d. Fit for manufacture of Inedible Starch only.

It is absolutely necessary that the buyer of any particular category of stocks shall use the same only for the purpose indicated and shall make no attempt what so ever for adulteration or misuse of the stocks. The Food Corporation of India will take a serious view of any breach of these conditions of sale. It will also not be open to the buyer to question the categorisation of the stocks as shown in the tender.
ii. The buyer shall tender full account of the damaged stocks purchased to the District Manager, Food Corporation of India as well as the Collector of the District, if so required. In Order to ensure proper performance of the contract, of the district in this regard the Food Corporation of India reserve the right to inspect the premises of factory of the buyer and where the foodgrains are stocked or processed without any notice to the buyer and the buyer shall be bound to provide necessary facilities for such inspection of the Officials of the State Govt., or Food corporation of India.

iii. Damaged food grains sold for manufacture of inedible starch should necessarily be utilised for that purpose only in the buyer's own factory and in no case shall be sold, transferred, or used for any other purpose, whatsoever. The buyer shall give full information about the movement of such grains from the FCI Godowns to the place of utilisation/ manufacture/ processings etc., to the District Manager, Food Corporation of India/ Regional Manager/ RM, as well as the collector of the District for exercising proper vigilance over their movements and proper utilisation thereof. Account of sale of finished products from such stocks shall also be rendered to the District manager, Food Corporation of India.

iv. The stocks of categories mentioned in (a) and (b), (c) of sub-clause (L) thereof when sold to a manufacturer shall be processed only in the buyer's factory/ plant/ machine.

M. Failure on the part of the buyer to render full and satisfactory accounts of utilisation of the damaged stocks will constitute a breach of the contract and in such cases the buyer shall be liable to pay the Food Corporation of India. Liquidated damages to be decided by the undersigned.

N. The buyer shall not sublet, transfer or assign the contract or any part thereof, without the previous written approval of the Food Corporation of India.

O. The person signing the tender form or any other documents forming part of the tender on behalf of another, shall produce a proper power of Attorney duly executed in his favour stating that he has authority to bind such other person in all matter pertaining to the contract.

P. The Tenderer should give an undertaking in the form enclosed Annex. B for the proper utilization of the damaged foodgrains, as purchased by him.
APPENDIX 20-A-9 (CONTD.) ANNEXURE-'B'
TO TENDR NO. ...................... DT ......................

From

..............................................

..............................................

..............................................

To
The District Manager,
Food Corporation of India,

Dear Sir,

I/We hereby offer to purchase from the Food Corporation of India the damaged foodgrains unfit for human consumption as per details in appendix ‘C’ or such portion thereof as you may specify in the acceptance of tender at the price quoted in appendix ‘C’ and agree to hold this offer open up to and inclusive of ............... 199... I/We shall be bound by a communication of acceptance despatched within the prescribed time.

I/We have thoroughly examined and understood the terms and conditions of the tender as Appendix ‘A’ issued by Food Corporation of India in connection with this notice.

I/We enclose herewith a Demand Draft/Deposit at call Receipt No..............................................
dated ........................................ Bank of ........................................ Rs. ........................................ (Rupees ........................................) in favour of the District Manager, Food Corporation of India as Earnest Money/Security Deposit for this tender. I/We agree to deposit the balance cost of the tender.

My/Our Particulars are as follows:—

1. Name (with Name of father in case of an individual) :

2. Business Name

3. Constitution of the Firm, i.e. registered under the Indian Partnership Act.

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a. Name of seal under which it is registered:

b. Place and Date of Registration:

c. Name and Address of all Partners and the extent of their shares:

In case of Co-operative Society:

i. No. & Date of Registration Certificate:

ii. Attach a copy of resolution of the Society authorising this transaction:

iii. Address Postal:

Telegraphic:

5. I/We hereby offer to purchase from the Food Corporation of India and to take delivery of damaged food grains as per terms and conditions laid down in the instructions to the tenderers and insured in Appendix 'A' the quantities of damaged food grains at the price shown against lot as given and subject to the conditions governing such purchases as stipulated by the District Manager, Food Corporation of India in the documents mentioned above which I/We have read and understood and agree to abide by them.

6. The Sales-tax and other taxes leviable on this sale shall be paid by me/us directly to the authorities concerned.

7. I/We agree to hold the offer open upto and inclusive of and if the said date be declared to be a holiday for FCI office till the next following working day and shall be bound by the communication of acceptance despatched within this time. I/We further undertake that this offer shall not be retracted or withdrawn by me/us hereafter till..............

8. I/We hereby declare that the entries made in this tender form are to the best of my/our knowledge and I/We shall be bound by the Act of my/our constituted attorney, Shri........................................ whose signature is appended hereto in the space specified person who in future may be appointed by me/us in his status to carry on the business of the concern. whether an intimation of such change is given to the Food Corporation of India or not.

9. Acceptance of this tender by the District Manager, Food Corporation of India or by an officer authorised by him despatched within the prescribed time shall constitute a valid and legal contract between me/us and the Food Corporation of India. No execution of a separate deed would be necessary.

10. I/We are prepared to offer facilities for the inspection of the factory to the District Manager, Food Corporation of India or an officer deputed by him/Office of Food Department, Government of India/
Officer of the State Government.

1. List of Documents enclosed:

2. I/we hereby give an undertaking that the stocks will be strictly used for the manufacture of Cattle Feed/Poultry Feed/Manure/Starch for which this foodgrain is being purchased.

3. I/we hereby declare that we will abide by the terms and conditions governing the sale of this damaged foodgrains as laid down by the Food Corporation of India.

4. I/we confirm that person(s) who has/have signed below have the authority to sign the tender and give the above offer on behalf of M/s..................................................

Signature of constituted attorney

Yours faithfully,

(Signature(s) of Tenderer(s)
Indicating capacity in
which the Signatory is/are signing)

Place:

Date:
To Tender No. ....................

Date ....................

FOOD CORPORATION OF INDIA

OFFICE OF THE DISTRICT MANAGER .....................

STATEMENT SHOWING THE STOCK POSITION OF DAMAGED FOODGRAINS AVAILABLE AT .....................

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of the Shed</th>
<th>Lot No.</th>
<th>Distt Lab. Sample No.</th>
<th>Commodity</th>
<th>Categorisation</th>
<th>No. of bags</th>
<th>Weight (MTs.)</th>
<th>Rate Quoted by the party</th>
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</table>

Signature of the Tenderer/Tenderers

320
APPENDIX 20-A-9 (CONTD.) ANNEXURE—‘D’
TO TENDER NO...........................DT........................

DETAILS OF QUANTITIES OF DAMAGED FOODGRAINS ALREADY PURCHASED BY
THE TENDERER DURING THE CALENDER YEAR FROM STOCKS UNDER
CONTROL OF FOOD CORPORATION OF INDIA

Annual requirement as mentioned in the registration letter..........................

<table>
<thead>
<tr>
<th>Tender No. and Date</th>
<th>Categorisation of stocks</th>
<th>R.O. No. &amp; Date</th>
<th>Quantity as per the R.O.</th>
<th>Quantity actually lifted</th>
<th>Location of Stocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</table>

Note: Quantity lifted so far should be indicated separately.

Signature of the Tenderer/Tenderers

321
APPENDIX—20-A-10

FORM OF APPLICATION FOR USE BY PARTIES/PERSONS FOR ENLISTING AS APPROVED PURCHASERS OF DAMAGED FOODGRAINS UNFIT FOR HUMAN CONSUMPTION LYING IN THE FOOD CORPORATION OF INDIA DEPOTS

N.B.: Complete and definite answers to questions must be given otherwise the application is liable to be ignored.

1. Name of firm/person

2. Address: Head Office
   District
   Branch

3. Telegraphic Address

4. Telephone No.

4. Whether a direct consumer/manufacturer (A Certificate to that effect from the District Revenue/Veterinary Officers not below the rank of Revenue Divisional Officer or District Veterinary Officer to be enclosed).

5. Purpose for which damaged stocks required

6. (a) If you are a licensed manufacturer, please give-

   (i) Product manufactured.

   (ii) Full address of the factory or workshop owned by you with documentary proof of ownership.

   (iii) Capacity of your plant

   322
(iv) Whether it is equipped for making cattle feed/poultry feed/starch from damaged grains.
     (Certificate to be enclosed in support of item 6(a)).

(b) If you require damaged grains for feeding cattle or poultry, please state—

(i) Name and address of such farm :

(ii) No. of animals and birds :

(iii) Average consumption of grain per day. :

(c) Do you require damaged grains for the use as manure (Enclose a certificate from the State Government authorities)

(d) If you require damaged grains for export outside the country, please indicate the complete details of your foreign counterparts, shipping arrangements etc. made by you or proposed to be made by you.

(7) Financial Status—(Supporting document to be enclosed)

I/We hereby declare that the entries made in this application form are true to the best of my/our knowledge.

I/We hereby declare that I/We are open for inspection regarding utilisation of damaged grains purchased and that it will be put to use for the purpose of which it is purchased.

I/We hereby declare that I/We will abide by the terms and conditions governing the sale of damaged grains as laid down by the Food Corporation of India from time to time.

Applicant’s signature with date together with his name in block capitals.
APPENDIX - 20-A-11

REGISTER OF APPROVED PARTIES

<table>
<thead>
<tr>
<th>Registration No.</th>
<th>Letter No. &amp; datevide which the registration was communicated</th>
<th>Name &amp; address of the party (with telegraphic address if any)</th>
<th>Nature of registration whether consumer, manufacturer or dealer</th>
<th>Category of stocks in which dealing</th>
<th>In case of manufacturer &amp; location &amp; address of the factory</th>
<th>Product manufactured</th>
<th>Signature of the authority registering the party</th>
<th>Remarks</th>
</tr>
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From
The Regional Manager.
Food Corporation of India,

To
Messrs........................................................................

Ref. No.

Dated:

Gentleman,

Sub.: Registration as an ‘Approved Party’

With reference to your application dated.................................................., it is informed that M/s..........................
............................................................ (name of the party) has been registered as ‘Approved Party’ as a manufac-
turer/direct consumer of cattle feed/poultry feed/starch manufacturer/manure (delete which is not necessary)
and the No. allotted is ........................................and the annual requirement is ....................... Metric
Tonnes. However, this Registration does not confer any right to continue to be on the Register for any specific
period and the FCI reserves the right to deregister you at any time without any notice or assigning any reason.

As per terms of this Registration you are entitled to quote only for such of the categories for which you have
been specifically registered like C/Feed/P/Feed/Ind. use/Manure etc. Any deviation is likely to result in the
offers being rejected without further intimation.

Yours faithfully,

Regional Manager.

Copy to:-- (1) The Regional Manager,
Food Corporation of India,

....................................................................................

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(2) The Deputy Zonal Manager.
Food Corporation of India.
.................................................................

(3) The Zonal Manager.
Food Corporation of India.
.................................................................

(4) The Deputy Zonal Manager.
Food Corporation of India.
.................................................................

(5) The Manager (QC).
Food Corporation of India.
.................................................................

(6) The Deputy Manager.
Food Corporation of India.
.................................................................
ANNEXURE — E

Name of the Firm/Institution

Address

Foodgrains Dealer’s licence No.

UNDERTAKING BY THE PURCHASER OF DAMAGED FOODGRAINS IN REGARD TO
THE UTILISATION

Owner/Partner of M/s ................................................................. Having Office at .................................................................

and godowns at ................................................................. state as follows :-

I have purchased ........................................ Quintals of damaged foodgrains from the Food Corporation of
India for use/Sale as Cattle/Poultry feed. I am aware that this damaged stocks is to be used as Cattle/Poultry feed
only and is not to be used for human consumption in any form. Utmost care will therefore be taken in regard
to its use/sale and that any harmful effect arising from its wrongful use either by myself or those who have
purchased the stocks from me may result in criminal liability on my part. I hereby undertake on my own behalf
and on behalf of firm/institution to see that the said stuff of damaged foodgrains will be used/sold to genuine
users/manufacturers and Cattle/Poultry feed only and not for human consumption.

Date :

Place :

Signature :

Name :
CHAPTER 21

QUALITY CONTROL IN MODERN RICE MILLS

21.1 The Food Corporation of India has a net work of Modern Rice Mills where either Raw Paddy or parboiled paddy is processed into rice. In these mills the entire process of parboiling and milling is mechanised with the aim of getting the maximum out-turn, minimum processing loss and FAQ rice. Bran which is one of the by-products is also got with a higher purity.

The Q.C. staff posted in these mills are responsible for ensuring that the best quality of rice with maximum out-turn is got. They should understand the working of the different units in the mill machinery, the function of the different parts and how they contribute to the successful hulling of paddy compared to the performance in traditional Mills. Further it has to be ensured that the rice produced conforms to PFA in all respects.

21.2 In case of raw paddy hulling, paddy of moisture content ranging from 13.5 per cent to 15.00 per cent should give the maximum out-turn. As usual, the paddy, at the time of receipt, should be examined for its general quality and moisture content. In case there is need for storing, standing instructions with regard to storage of foodgrains should be followed. At the time of actual feeding of paddy, samples should be drawn at regular intervals, analysed for refractions and moisture content and the result should be tabulated in a register indicating the date, variety and approximate quantity represented by the sample. Similarly sample of rice under production should be checked often to ensure that every day's production is conforming to quality standards. While checking the quality of rice, apart from the prescribed refractions, it has to be seen whether the rice is free from loose bran and is adequately polished. The consumer resistance should be kept in view always and the general appearance of rice should be good. If there are any quality defects it should be brought to the notice of the operating staff for immediate remedial action and such rice with defects re-processed as necessary. In case defects are due to negligence of the operating staff, action should be taken suitably against them.

21.3 Regular qualitative check on the laboratory mini huskers, mini polishers and mini mill should essentially be carried out—

(i) to study the hull kernel ratio of different varieties of paddy, (ii) to prepare type samples of rice with 5 per cent polish, (iii) to study the out-turn ratio in different varieties of paddy with reference to different ranges of moisture content etc.
21.4 In mill provided with parboiling units following instructions should be borne in mind:

In the modern method of parboiling, paddy is subjected to hot soaking, steaming and drying in the mechanical driers. This is done in batches in most of the mills. Since three sheet treatments are involved viz. hot soaking, steaming and drying with hot air, it is of utmost importance that the optimum temperature and optimum period are maintained at the time of soaking, steaming and drying as otherwise, there is every possibility of rice getting a deep brown colour as also of paddy kernel getting over burnt or cooked. Batchwise samples of the parboiled dried paddy should be drawn and checked for moisture content and mini milled. If the drying is satisfactory and appearance uniform then soaking, steaming and drying have been done alright. But if there is any discoloration, especially deep orange colour grains, then it is an indication of excess heat treatment at the stages of steaming and drying. If the rice on mini milling shows the incidence of belly white grains, it indicates improper soaking. The parboiled paddy, after drying, should have not more than 13.5 per cent to 14.0 per cent moisture. Sometimes, due to defective parts in the dryers or defective feed rollers, the drying may not be uniform. Thus by drawing batchwise samples immediately after drying, and mini-milling, it could be established in which batch of paddy the things have gone wrong and corrective action can be taken without delay.

Samples of processed parboiled rice also should be checked up as in the case of raw rice. The danger of aflatoxin appearing is more in case of boiled rice unless it is processed at the prescribed moisture levels and stored dry and cool. The polished rice coming out from the Auto-shutter would be hot and therefore should be bagged after allowing it to cool to room temperature.

The parboiled rice bran as obtained in MRM is a rich source of bran oil. Hence care has to be taken to check that the bran got is pure without impurities like husk chips, germs, fragments etc. To watch this bran is analysed physically for admixture of impurities and to caution operating staff in the mill for rectification of the defect.

21.5 Thus the QC staff posted in MRM should have a clear understanding of outturn ratios against uncleaned and cleaned paddy and must keep a close watch on the processing mechanism and frequently check paddy and rice for quality to ensure production of FAQ rice. They should keep all their analysis equipments in perfect order and moisture meters duly calibrated.

21.6 Fixing of outturn for custom milling:

With paddy procurements in different states by the FCI, MRM alone are not able to cope with the hulling of all paddy procured. Paddy has to be then given for custom hulling. However private mills vary largely in the extent to which their mill machineries are modernised. Some have mechanised whole process using rubber rolls for shelling, fixing separators of modern type, using modern types of polishers etc. On the other hand, there are millers who are still depending on hullers with manual handling of different stages of milling. Where maximum modernisation has been effected the FCI get, the optimum outturn ratio.

21.7 Thus during every procurement season a close watch is kept on the quality of paddy procured and this depends upon the optimum climatic conditions obtained and on the absence of pest attacks during the raising of the crop.
Everything normal, the general quality of paddy should also be normal. To determine the outturn ratio from paddy procured by the FCI in different regions a committee of QC officers (of the rank of Deputy Managers) visit the different Districts and after making a general study of the quality of paddy, carry out milling trials in the conventional mills of each district. The places and the mills are selected in such a way that the results of the trials could be applied to the District in general. The data such as range of moisture content at the time of receipt, the moisture content at the time of conducting trials, the general quality pattern of paddy in the Distt., are carefully studied and representative lots of paddy are taken for milling trials.

Before starting the trial it is ensured that the mill is in proper working condition and that it is clean. A convenient quantity of paddy say 20 qtls. to 50 qtls. representing the paddy quality available is weighed before the committee. Here before feeding paddy the clean mill is made to run for a few minutes. Then the trial paddy is milled and the outturn ratio arrived at about 5% polish. It may be that the paddy taken for trial is having 15 to 16% moisture and during milling trials, the polish as per pure bran weight may be 4%, 6% or 8%. The outturn, however, is standardised to paddy at 14% moisture content and rice at 5% polish. The traders also will be having their paddy and for a comparative study, the trial milling of trade paddy of equivalent weight in the same mill is also carried out. Better quality paddy with a moisture level of 14% will give better yield. After conducting a series of trials representing different qualities purchased in different Districts, the committee recommends the optimum outturn rate valid for a certain period, say a season.

From the above it could be seen that for thoroughly watching the milling operations, a practical background of such machinery would be useful.

The Zonal Manager/SRM should see that AMI(QC)/DM(QC) acquire a fairly thorough knowledge of the working of the conventional mills, in the area where they are posted and keep correct data about the quality of paddy procured from the beginning of the season.
PART - V

FOODGRAINS OTHER THAN WHEAT AND RICE
CHAPTER 22

COARSE GRAINS

22.1 Food grains produced are grouped as cereals, millets and pulses. Cereal and millets are monocotyledon grains botanically, whereas, pulses are dicotyledon grains. Cereals comprise, wheat, rice, maize, barley and oats. Millets include, jowar, bajra, ragi, codon, savan, china, kangani, bhagar and varai. Pulses include, chana, tur, moong, urud, daluki, val, lohia moth matar and masur. In the statistical production of food grains production of wheat and rice is shown individual grainwise but for others it is groupwise. All cereals other than wheat and rice are group coarse grain and pulses as pulses. In the total production of 172.18 million tonnes of food grains in 1988-89, wheat figures 54.14, rice 70.74, coarse grain 32.65 and pulses 14.92 m. tonnes.

22.2 Maize, barley, oat, jowar, bajra, ragi, savan and other millets constitute the group 'Coarse grain'. The term coarse grain seems to be a misnomer as some of these constitute staplefood of a portion of a population, in the areas where they are produced. Generally they are cheaper in comparison to wheat and rice and a large portion of the production is fed to the cattle. From nutrition point of view, some are considered better in relation to wheat and rice. Possibly because of price and traditions they find a place in the diet of low income group and on this account are labelled 'coarse grain'. Insect pests and microbes seem to prefer them in relation to wheat and rice and on this account they deteriorate faster in storage.

22.3 Jowar — (Sorghum vulgare Pers) It is called sorghum or milo in European and African countries. It is grown in Maharashtra, Andhra Pradesh and Karnataka on a large scale and in Rajasthan, Madhya Pradesh and in Tamilnadu as a minor crop. Crop is grown as a kharif and rabi crop and this is meant for human consumption. Crop grown during summer is mainly for use as cattle feed. Indian crop is creamy white and yellow coloured whereas, that grown in America and Africa is red in addition to yellow crop. In Maharashtra, Karnataka and Andhra Pradesh crop grown in kharif and rabi seasons is largely used for human consumption whereas, crop grown is largely used as cattle feed. Red coloured grain where produced is all used as cattle feed. Crop that yields bold glume free grain of white or yellow colour, is used for human consumption. Grain with glumes is generally not acceptable to consumers. Such grain has problems if grinding. This grain is also not readily acceptable for human consumption where rice and wheat are the main cereals used for consumption.

22.4 Grain produced during kharif season is relatively soft and therefore, difficult to store. In practice this grain is consumed during the season it is produced. Rabi grain is relatively hard and has better acceptance. It can be stored longer with due care. Rain damage is common and affected grain turns black. Consumer acceptance is poor for such grain and normally such grain is used as feed. Rain affected grain cannot be stored for more than few months. Major quality problem is grain with glumes. Some varieties are prone to this problem. Generally varieties where glumes cannot be easily separated, are grown for cattle. Grain produced as feed is blackish, soft and with large proportion of grain with glumes. Care needs to be exercised in purchase to see that feedgrain is not purchased foodgrain.
There are no reports of high aflatoxin development in the grain. Rain affected grain turns black and flour from it turns bitter in a few days. Consumer acceptance for such grain, therefore, is poor. Jowar constitutes a major portion of coarse grain as far as production in the country is concerned. Consumers for the grain are limited to the Central and Southern parts of the country. Purchase specification is at 0 - A - 10. Purchase of grain with large proportion of kernels with glumes may create a consumer acceptance problem.

Bajra - \( \textit{Pennisetum typhoides} \text{L.} \)

This is next in importance to jowar as far as production is concerned. It is grown as a kharif crop in Haryana, Rajasthan, Gujarat and Maharashtra to some considerable extent whereas, in Karnataka to a small extent. In Tamilnadu grain is known as Sajjalu. In the North Bajra is consumed only during winter months whereas, in other areas it is consumed throughout the year. In the North the crop is cropped and consumed after storage of 3 to 4 years but, in the South it is not stored for more than a year. Flour of older crop is reported to get bitter in a few days.

In the lots marketed grain with glumes or glumes alone present a problem as in some varieties glumes do not get separated easily from the kernels. Such grain poses problems in grinding and therefore, consumer acceptance for it is low. The crop is also sometimes affected by ergot in the field. Ergot affected grain is dark grey to black in colour and can be easily made out from the sound grain. Crop is also sometimes affected by rains at harvest. Rain affected grain is black and has to be consumed within a few days of harvest. Such grain has a very low storability and consumer acceptance. Flour of rain affected grain is reported to be turning bitter in 2 to 3 days. Purchase specification is at 0 - A - 11.

In India this grain is fed to cattle, particularly milch cattle and grown for that purpose. In such production glumes does not pose a problem. Care needs to be taken that such grain is not purchased for human consumption. Some ill effects of grain affected by ergot when consumed by human population are on record. Storability of grain is seen to be good in dry areas like Rajasthan where it could be stored as long as 5 years. In other areas it is not satisfactory. Damage in storage is mainly due to grain borer and the flour moth.

Maize \( \textit{Zea mays} \) This is grown all over the country and in all seasons. Crop is used mainly as poultry and cattle feed. In Punjab and Haryana it is consumed by human population only during winter months. It constitutes staple food of some adivasi tribes in Rajasthan and Gujarat. Crop grown in kharif months has moisture as a major problem. In the absence of drying facilities, considerable damage is possible. Moisture affected grain develops aflatoxin in it. Such grain is harmful for human consumption and more so for poultry consumption. Ill effects and deaths of human consumers are on record due to eating aflatoxin affected grain. A close watch is, therefore, required to be kept on development of aflatoxin in this grain in storage or prior to storage. In general storability of grain is low particularly of the white variety. In storage grain is attacked mainly by the weevil and the paddy moth. Purchase specification is as at 0 - A - 0. Grain produced may be either white or yellow. White grain has better consumer acceptance.
22.10.7 Ragi - Finger millet (*Eleusine coracana*).

In some parts of the country it is also called nacham. It is grown as a kharif crop, in high rainfall coastal areas. Interior soils not suited for growing of rice is used for growing of ragi. Ragi, therefore is a secondary crop in rice growing areas. The grain is reported to be relatively nutritious and is consumed by low income group people in the area where it is produced. It has a better storability in comparison to rice. It turns soft in storage and after long storage has a poor consumer acceptance. Purchase specification for ragi is at 6-A-8.

22.11 A few other millets grown are kodo millet known as kodo and kutki, burrayard millet - sava, little millet - sava, proso - china, foxtail millet - kangari, bhugar or varai. These are all kharif crops and are grown in remote areas. Production is small and quantities marketed are very small from commercial point. Only a small section of the population consume them in remote areas. Storability of these is poor. After about 4 months storage these are likely to go bitter. Damage in storage is mainly due to grain borer and the flour moth. Purchase specification for these millets is at 6-A-12.

22.12 Barley and oats - These are winter crops and are grown, as well as used, as feed. Storability of these is same as wheat. Purchase specification is at 6-A-15.
PART - VI

SCIENTIFIC BACKGROUND
CHAPTER 23

TECHNOLOGY OF GRAIN STORAGE

23.1 In commercial grain storage, loss in weight of the grain assumes significance. When loss in weight is associated with quality changes, loss is attributed to these changes. Various versions have appeared in scientific literature about loss to stored grain. These versions confuse workers engaged in storage because, their experience leads them to different conclusions. Much of Scientific work is based on laboratory findings where grain is kept under controlled conditions. In practice, conditions vary widely. Another problem confronting a worker is justification of loss. When a grain lot shows loss in weight, explanation is attempted based on many factors that are supposed to contribute to loss. These attempts get exposed when grain lots kept under identical conditions, for the same period, give different results. A silo is stated to be capable of storing grain free of loss for years. In the U.S., where silo storage is widely followed, operational records will show gains and rarely a loss. It is necessary to understand technology of grain storage to be able to explain some of these aspects.

23.2 Grain is a biological material and some of it is living while being handled. Grain quality has many facets and to explain each in this short account is not possible. The attempt is to acquaint the worker with main constituents that react with the weight of grain. In scientific works, reference is to nutritional value and not so much to weight of grain. In commercial dealings, as long as quality satisfies certain standards, weight is significant. It needs to be added that foodgrains are mainly a source of calories for the consumers. For nutrients dependence is not so much on food grains. Available calories will be related to dry weight of grain and, therefore, calculation of loss on weight basis should not be an under estimate of loss. The question then is, can this loss be directly related to factors causing loss and one can have a scientific justification of loss.

23.3 It is not correct that all grain stored suffers a loss. In India, stored grain records both gain and loss. It is possible to manipulate gain/loss by following scientific techniques. Till a few years back, in India, khapra beetle was used to keep grain safe in storage. Understanding the behaviour of grain and the beetle made this possible. Presently, Khapra beetle is considered a serious pest of stored grain not only in India but all over the world.

23.4 Where qualitative changes are associated with changes in weight, birds, rodents, insects, mites and moisture are responsible factors for such changes. Of these birds, rodents, insects and mites are capable of control through human effort. Moisture, on the other hand is very difficult to be controlled particularly, for grain stored in jute bags. Through technological understanding it will be possible to control changes brought about by moisture in conventional type stores.

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23.5 Birds—Pigeons and sparrows are the common birds that invade food stores and damage grain. Of these, pigeons are significant because of their size and nuisance.

(i) Pigeon—A bird weighs 1.2 to 1.5 kgs and consumes about 40 gms. food each day. In the population, males and females are evenly distributed. They are monogamous. A female lays 1 to 2 eggs each time which hatch after 18 to 20 days. The male cares for and guards female and eggs. The young ones are fed predigested food (pigeon milk). Young ones leave the nest in about 5 weeks time and new eggs are laid before that. Pigeons live for 15 years. Pigeon droppings deface and accelerate deterioration of buildings. Pigeon droppings, regurgitated pellets, feathers and nesting material are common contaminants of grain where pigeon trouble exists. Pigeons steal bright articles. They also are carriers of many human diseases.

(ii) Sparrow—Being smaller in size, they are not as conspicuous as pigeons. They move in pairs and flocks. Their attacks render the jute bags weak and susceptible to bleeding. They also try to build nests in the godowns and their feathers, droppings and waste material contaminate the grain apart from quantitative loss caused due to feeding.

(iii) Bird control is not easy because national laws ban killing of these common birds. Bird proofing is, therefore, most effective and a safe measure. Where this is not possible, it is necessary to learn their habits and use perches with poison, outside the godown where they rest before entering the store. In Western Countries AVITROL, with 4 - Aminopyredine as active ingredient, is used for control of these birds with desired success.

23.6 Rodents—With the ever increasing human populations, destruction of food by rats is of growing importance. Two important species that attack stored food in India are Rattus rattus, commonly known as roof or black rat and Rattus norvegicus, commonly known as brown rat. Brown rat has its eyes small and ears do not reach the eyes in this type. In case of black rat, eyes are big and ears do reach the eyes.

(i) Rats are quite omnivorous, eating nearly any type of food, although each kind and population has its own preferences. They all feed to varying degrees on cereals, nuts, fruit, vegetables, invertebrates fish, and even manure, depending on habitant conditions. Rats usually begin searching for food shortly after sunset. When hungry or under crowded conditions, they may be seen eating food in day light. If the food is in an exposed area and too large to be eaten quickly they will usually drag it or carry it to a hiding place before eating it. The water requirement varies with species and diet, but most rats drink water regularly, if it is available. Their local diet may also provide adequate amount of water. When rats approach a food item for the first time, they may be cautious feeders. For this reason, pre-baiting before control programme is carried out to enhance later acceptance of the toxic bait. Totally different types of food may be highly preferred, particularly if they fulfil a dietary need for the particular rat population. Rats are considered to be colour blind, responding only to the degree of lightness and darkness of colours. Baits can be, therefore, be made of different colours without affecting their acceptance by rats. Rats in general see poorly, relying more on smell taste touch and hearing. Rat damage occurs during all phases of production and storage. Rats eat about 10 times of their weight - 10 to 20 kg. of food in a year. They contaminate food with urine and faeces and a single rat will produce about 25000 droppings in
a year. Other types of damage are many including damage to buildings, cables, jute bags, covers and even as a source of fire.

(ii) Rats are a major pest because, they are so well adopted to man made environments. They can tolerate a wide range of conditions and because of their high fertility rates, have considerable power of population recuperation. Since rats have steep population growths, control operations must reduce their number to a very low level. Otherwise, they will reproduce rapidly and often soon exceed their earlier density level. The most important factor determining rat densities is the suitability of habitat and the amount of palatable food, protective cover from enemies and weather, and availability of breeding conditions. Quite frequently, their numbers will increase further if food and shelter become available. It is important to note, however, that free living population of rats will not continue to increase indefinitely, even if food and shelter is available. This is because of built-in self limiting factors.

(iii) Rat control is applied ecology, and all control programmes should be based on a proper translation of ecological factors into management policies. Effective rat control requires, both administratively and operationally, prior consideration of biology and ecology of rat involved. Successful control is often the regulation of population levels, not merely the destruction of individuals. The reason rats are such serious pests, and difficult to control is that they have adopted so well, genetically and biologically, to man’s modified environment. The primary objective of all rodent control programmes should be relief from these pestiferous animal with a maximum of safety to man and forms of life useful and of value. The methods used also, should involve minimum undesirable disturbance to biotic community involved.

(iv) Method of control to be used are given in Chapter 12 of the Manual.

23.7 Insects:—Long before man made his debut on earth, insects were active here. Scientists feel, insects will continue to exist on earth regardless of man’s effort to eliminate them. This makes it extremely important to recognise the insect and understand its habits. Recognising the type and understanding habit will lead one to source or cause of the problem and prepare for correction/prevention.

(i) Majority of foodgrain insects are small in size and get easily overlooked. The most damage done to whole grain, in storage, movement and distribution is caused by 5 species of insects. These are, the rice weevil, the lesser grain borer, the khapra beetle, the paddy moth and the flour moth. These are, therefore, known as primary or major pests of grain. Larvae of the weevil and paddy moth are incapable of living outside the grain kernel. Activity of these major insect species in grain opens up an avenue of entry for myriad secondary insects which are known as bran bugs or minor pests of grain, and which otherwise are incapable of damaging grain under normal conditions.

(ii) From the point of view of PFA no distinction exist between major and minor pests. However, primary insects, infesting grain internally, are the greatest contributors to fragments which may be found inside infested kernels and their milled products. A major portion of the life cycle of these insect is spent inside the grain, and as larvae grow they pass through several moulds. Each of these moulds, leaves a cast skin in the kernel along with certain amount of frass and excrement. It is not
easy to remove frass and excreta from grain completely. Prevention of insect infestation is the only way to avoid presence of frass and excreta in the grain.

(iii) Bran bugs—Several of the beetles found in the godowns and on the grain are not primarily grain feeding insects and are known as bran bugs. These generally feed on grain dust and broken grain. They breed in dust and accumulation of broken grain, and cracks and crevices of the building. Only when moisture content of grain exceeds 15%, whole grain may be attacked and damaged. These include, red flour beetle, saw-toothed grain beetle, flat grain beetle, long headed flour beetle, cadelle and several others. When hygienic conditions deteriorate there could be a spurt in the activity of these beetles.

(iv) Preventive measures—Experience suggests that a good housekeeping practices enables not only prevent but also control infestations. Cleanliness supplemented by a good chemical treatment programme should produce insect free operation for all practical purpose. Insecticides and fumigants have their proper place in a well regulated programme but there are many instances where brush and broom produce good long lasting results which are economical and effective. A perfectly clean area, without the use of chemicals will more surely eliminate insect population than the heavy use of chemicals without proper cleaning.

The best insecticides can not produce the desired result if applied over dusty and dirty surfaces. The most toxic fumigant will yield low percentage kill, if insects are allowed to harbour deep in dust and grain accumulations. A 100% kill through fumigation is difficult under best of conditions. Best results are obtained, however when good circulation of gas is maintained over clean surfaces and through clean bags. In combating insects it is well to remember that any material that can provide food and harbourage to insects must be kept moving. Stagnant conditions, when allowed to exist, are conducive to an increase of insect population.

(v) Description of insects :—

(a) Rice weevil—Sitophilus oryzae L. This is rated as the most destructive pest of stored grain. The mouth parts of the adult weevil are located at the outer end of the snout and are equipped with a pair of strong sharp mandibles. The female drills a tiny hole in a selected kernel of grain, deposits an egg in the cavity and seals the hole with a gelatinous secretion. It is difficult to locate the hole after it is sealed. As many as 250 eggs may be laid by each female under favourable conditions. In a few days a white legless grub comes out of the egg tunnels through the kernel. Larva feeds on the inside of the kernel leaving only shell.

Entire life cycle occupies 4 weeks under favourable conditions. The adult is a strong flier. The weevil attacks and breeds in all cereals and millets. In grain with moisture content less than 10% at temperatures of less than 15°C and in excess of 40°C its activity will be restricted.

(b) Sitophilus granarius (Linnacus)—

Grain weevil. Adults are (2.4 mm) and can be distinguished from S. Oryzae by its highly polished appearance and absence of lighter spots on elytra. The adults are wingless and do
not fly. It is a serious pest of cereals in temperate countries and in India is rarely seen attacking grain. The minimum moisture content for breeding is 9.5%.

(c) Lesser grain borer—Rhizopertha dominica F. Though small in size, it is capable of great damage to cereals, millets and split pulses. These beetles are equipped with strong jaws enabling them to bore into sound grain kernels, where they feed till nothing but outer hull remains. Eggs are laid singly or in clusters. Each female lays up to 500 eggs. Tiny larvae are very active and in the early stages feed on the flour produced by the feeding of adults. These larvae can complete their growth in side or out side the kernel. Life cycle is completed in about 30 days. As compared to the weevil it is tolerant of drier conditions and higher temperature. Wherever the insects feed there is considerable powder formation. Activity of the insect continues under this powder. This insect on this account is relatively difficult to be controlled. A thorough cleaning before application of insecticide is necessary for this insect.

(d) Paddy moth—Sitotroga cerealella Oliv. Angoumois grain moth. Activity of the insect starts mostly in the field before grain is harvested. Adult is a buff coloured moth with wing spread of 1.5 inches (3.8 cm). Eggs are laid in hundreds in clusters on the grain where larvae will feed. The larva completes growth in the kernel and feeds on the entire inside. Life cycle is completed in about 5 weeks under favourable conditions. All cereals are attacked by the insect but paddy is most favoured. In bulks, attack is restricted to the surface only.

(e) Important moth pests—

EPhestia (Cadra) Cautella (Walker)

A dry fruit moth. The adult is small, grey in colour having a wing span of about 20 mm. It develops rapidly in stores, having cereals, oil seeds and their products, particularly during monsoon months. In case of whole grains only the germ is eaten leaving the rest of the kernel undamaged. In heavy infestations larvae cover all available surface with webbing. The female lays about 250 eggs and the life cycle occupies 4-6 weeks. Mature larvae move about in search of pupation sites and large numbers can be seen in infested stores. Moths are attracted to water and moist surface. One larva is observed to consume the germ of as many as 64 wheat kernels in its life time. In bulk grain damage is confined to surface but in bagged grain it is wide spread. Under dry, well lighted conditions development is slowed down. Favourable temperatures are in the range of 32°C - 38°C.

Plodia interpunctella (Hubner)—

An Indian meal moth. It is of the same size as Cadra cautella but, the fore wings are characteristically coloured red brown with the inner side being creamy white. It is a pest of the same food materials as C. Cautella. It is not, however, as frequently occurring as the other moth. In India, outbreaks of the insect have been sudden and short lived. The damage in case of wheat is confined to germ. The female lays about 200 eggs and the life cycle takes 4-6 weeks.
Coreyra cephalonica (Stanley)

A small moth. The adults are medium sized with a wing span of about 25 mm. Forewings are brown or brownish brown. A wide range of stored products are attacked such as whole cereals, flour, products, dals, processed products of cereals, pulses and other seeds, nuts and dried fruits. They are also seen attacking milled species. Larvae produce dense webbings and in cases where large numbers are found into large masses. The female lays about 150 eggs each and tend to oviposit by night.

Khapra Beetle: Trogoderma granarium (Everts). Adults are tiny beetles with females being almost twice the size of males. Larvae is yellowish brown and covered with long hair on its sides and back. The insect is peculiar because of its capacity to breed under extreme conditions and remain inactive but alive for long periods extending years. It attacks all grains and milled products with moisture as low as 5% may be attacked. This is the only insect capable of attacking grains with such low moisture content. Only larvae feed on the grain. Insects can attack grains at temperatures of 40° C and above. Activity of the larvae is high the temperatures of grains are 45°C in bulk restrict activity of this and other insects on such grain. Larvae in bulk this insect produces attacks of other insects and at the same time remains restricted to the top and middle layer. In damaged grains it spreads fast and because of its habit to remain hidden at these conditions it is difficult to be controlled with normal doses of insecticides. It is also difficult to be controlled in stored grains as the seeds become a major source of reinestation. Larvae can remain in the grain, out of the lobe down for years without food. It is one of the most harmful stored grain insects.

Asian Flour Beetle: Cryptolestes ferrugineus Olivier. Long rounded, reddish-brown in color, fairly well and some others

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In cases stores are dark, dingy and unhygienic cockroaches establish in them and apart from being a nuisance for operations impart a bad smell to stored foods. Cockroaches are potential disseminators of enteric bacteria, other parasites and even polyomaviruses as well as bacteria which causes gastroenteritis and food poisoning. The insect takes 250-270 days for development and adults can live for long periods. They can live without food and water up to 4 months. They are carnivorous and eat almost all kinds of foodstuffs.

**Book lice:**

These small active insects are an indication of the need for aeration in stored foodgrains. These insects live on insect fragments, vegetable matter and moulds. They appear in the stores particularly when mould is present. When present in large numbers germ of the grain is attacked.

**(vi)** Mites— Mites are different from insects though they are confused for insects. These are minute, whitish to pale yellow creatures, breeding very fast particularly under damp conditions. In the initial stage they appear on grain residues and spread to sound material when damp conditions prevail due to lack of aeration or moisture migration. In case of grain, germ is attacked and infested grain assumes peculiar taste which cannot be removed. Mites would also be predating on live and dead insects. *Acarus Siro* L. is the common mite in Indian grain stores. It develops at 23°C and 70% humidity. Life cycle takes 9 to 12 days. Inactive hypopi when formed these will remain in the godowns for long periods.

**(vii)** Till a few years back, occurrence of insects in stored foods, particularly grain was considered natural. With the development of technology, insect infestations are no more taken for granted. It is realised that infestation is of external origin. Sources of infestation are also well defined. In India, foodgrains such as pulses may be infested in the field by bruchids, paddy and jowar may catch infestation of *S. Cerealella* in the field, and maize is also possibly infested in the field before harvest. *S. Oryzae* is capable of infesting grain in the field but little evidence is on record to state its role in this connection.

Thrashing yard, container, transport and stores are the other sources of infestation. On the thrashing yard, insects capable of flying invariably get access to the harvested grain. Insects *harbouring* in bird-nests also find an easy access to grain in the thrashing yard.

Container commonly used in India is the jute sack. The agriculturist and the trade invariably use old sacks. Use of old sacks almost always leads to insects *harbouring* on the sacks from previous usage, becoming active and starting development on the fresh crop grain. Public sector agencies use only new sacks and on this account stocks handled by them are free from this danger.

Any vehicle, particularly when it is used repeatedly for movement of food articles, is likely to be a source of infestation for the new stocks. Extent to which this source can be a potential danger does not seem to have been well studied in India where carriers are subjected to the multi-purpose uses, to-and-fro movements and to carry diverse substances like coal, iron ore, foodgrains, etc.
It will not be an exaggeration to state that every store in the country carries one or the other type of insect infestation almost always. Cracks and crevices, residues and sacks provide required shelter to insects, and once they enter the store it is not easy to wipe them out on account of these harboursages being always available. An interesting account of insect survival is on record stating a warehouse and a flour mill not in use for many years still continuing to serve as sheltering place for grain pests.

Contribution of international trade to the spread of infestations has been discussed by scientists. It is pointed out that existing standards aim at freedom from living infestation and suppliers take advantage by attempting control of moving infestation to satisfy the requirement. Methods employed, therefore, leave the hidden or immature infestation un-affected and this leads to imports contributing to serious infestations in the receiving countries. With the background of increasing international trade in food articles, this source assumes considerable significance. Establishing rigid standards of inspection and enforcing them scrupulously can alone help minimize hazards through this source.

(viii) Movement—Next to the source, knowledge about the pattern of movement followed by infestation in a lot of stored grain is useful in planning control. However, in a study on bulk grain in tubes it is observed that natural movement of insects is downward, and upward movement is a result of either over-crowding or rise in temperature. Experimenting on bagged grain, it was observed that the insects either entering or emerging from existing immature stage move from layer to layer of the bags. In this, the downward movement is faster and restricted to a narrower column than the upward movement. Light and moisture of increasing intensity slowed down the movement but aeration had little effect.

(ix) Development of infestations in a bag-stack of wheat, was studied. A tightly built bag-stack was observed to behave like a bulk in respect of infestation. A correlation of insect population to temperature appeared possible only in the central portion of the stack. Some succession of species was noticed. Initially, T. Castaneum, O. Surinamensis and L. minutus were present.

S. Oryzae and R. Dominica become perceptible after about four months of storage. S. Oryzae remained confined to periphery probably because of loss of heat through dissipation being possible here and higher moisture content, whereas R. dominica was predominant in the interior of the stack.

The chart of insect-pests is included at the end of this chapter (on page 352).

23.8 Ecology of Stored Grain Pests:

Insect pests of stored grains are prolific. In case they continue to multiply at the optimal rate, a single pair of many of these would reach phenomenal levels in a few days. Scientists have worked out that the progeny of a pair of T. Confusum would exceed a million in 150 days provided optimum conditions prevailed. Environment comprising temperature, moisture, light and other factors such as food, population density and competition, however, do not allow insect pests to develop indefinitely. A study of these factors is, therefore, useful in planning storage.
Temperature. Temperature is the most important factor that affects reproduction growth and general behaviour of the insect. Every insect has a zone of effective temerature within which it is active. Below and above this zone are the zones of inactivity, which end in low and high lethal temperatures at which the insect dies. Within the zone of effective temperature, there is a small range at which metabolism of the insect is at its peak.

In storage, insects would be exposed to varying temperatures if the store is empty or the insect is at the periphery. If the interior insect activities would raise the temperature to the level of high-lethal temperature thereby forcing the insect to move to adjoining cooler areas. In regard to cooler temperatures, insects adjust to the rigour of very low and freezing temperatures with considerable individual variation. This phenomenon is known as ‘cold hardiness’.

Losses from rates that are not immediately lethal cause the death of many insects by rendering them inactive and preventing them from feeding. As most of the stored grain pests do not hibernate, their life processes are not sufficiently retarded by low temperatures to allow the food reserves of their bodies to sustain them through an extended period of dormancy, as a result they die from starvation. A grain temperature of 25°C can be considered a danger line on the lower side of the range of viable insect activity. At this or higher temperature, a severe damage to stored grains from insects may be expected, whereas below this temperature level, no serious damage is likely to occur.

Temperature above 44°C cause the death of most of the insects. Only the Khapra beetle, the grain weevil, and the wireworms are known to tolerate higher temperature up to 44°C. Temperature also has a pronounced inhibiting effect on the abundance of various species. All the insects are not capable of thriving in all locations may be explained to be the result of this limiting factor. The Khapra beetle can be cited as an example of regional abundance. The insect is a serious pest in the north and is rarely seen in stores in the south.

Moisture is water needed in the metabolism of the stored product is secured through the food. For this reason, the moisture is an important factor in the life economy of these insects. The microorganisms, including fungi in the grain, favour rapid increase in the numbers present in the grain. The microorganisms vary with different insects, as does the ability of the insects to resist the attack of fungi. The moisture levels reported as low as 12%. The weevil Sitophacila would not breed in grains with moisture lower than 6.5 to 7%. Optimum conditions are largely obtained when the moisture content of the food reaches 14% level. This is a critical point, above which other deteriorative changes set in and this is therefore considered the safe moisture content for storage.

Food. Nutritional requirements of the insect and availability of food could to a certain extent modify the effect of moisture and temperature. At lower moisture content, more food is eaten by the insect, and a high level of body weight and therefore, in such a situation, the larval period decreases as the rate of weight gain increases. Food as a component of the environment is therefore, at a point, the survival and multiplications of the insect by modifying its fecundity, longevity, and the rate of development. Studies on weevils showed that larger grains produced heavier larvae and this occurred even when the whole grain is not used by the developing larvae.
Females also were seen to select larger grains for oviposition. When halved and whole kernels were provided for oviposition females laid more eggs on whole than on halved kernels. It was further observed that the adults of *S. Oryzae* reared on wheat were larger and heavier than those fed on rice and maize. Further, adults fed on boiled wheat were larger than those fed on raw wheat.

(iv) Population density—The population complex of insects in bulk foods is seldom static for very long periods. The numerous factors that influence insect abundance cause continual changes in the predominance of various species throughout the year. Original infestation may be provided by the insect that is capable of flying to the field and attacking maturing grain or by others that get access to it at any one stage of handling. The insects that attack the grain increase to unbelievable numbers as conditions become favourable. Then, there may start the inter- and intraspecific competition and a succession of species. With increase in population density, condition favourable for parasitic and predatory insects improve and sometimes under conditions of crowding microbial diseases may reach epidemic proportions.

Crowding affects the reproduction rate of insects. Slight crowding may stimulate fecundity, while intense crowding usually decreases it. It has been observed with *Tribolium* species that the increase of population is proportional to the size of the environment and inversely proportional to the environmental resistance. In *sitophilus*, lesser the space available, the more efficiently the female utilises the grain. This is, however, possible to a certain extent. Beyond a certain population level the rate of oviposition continues to decrease and ceases altogether ultimately. It is observed that to a certain level of density, increasing density, increases the fecundity, and beyond the level, the production of eggs decreases either due to lower fecundity or eating of the eggs by the female.

Studies on inter- and intra-specific competition in *R. dominica* and *S. cerealella* resulted in the following observations:—

i) There was neither migration nor death when only one larva was present per kernel.

ii) Larvae of either species attacked the other larvae that entered the kernel, and whenever two larvae happened to be in a kernel, at least one was always dead.

iii) Over-crowding of larvae had no other effect on the adult density than increased mortality of the larvae and thus retarded development.

iv) Each species reduced the possibility of survival of the other in direct proportion to its own numbers. Among the two species, *R. dominica* was always successful in ousting the other.

In respect of two species competing as a mixed population, the following results are recorded:—

(i) When two species are comparable in habits and make a common demand on the shared environment population, the weaker of one species gets extinct.

(ii) The populations of the two species reach an equilibrium if the two species exhibit something different niches. The equilibria are not constant and change depending upon the change in the environment.
(iii) The populations vary in either synchronous or semisynchronous fashion so that oscillations or fluctuations between the two species are established.

From the studies relating to population density, it is evident that high densities will be reached before development is depressed. It is difficult to expect control of insects in commercial storage as a result of population density. It also seems obvious that partial control of insects may lead to development of the pest over longer periods thereby rendering it more serious.

23.9 Heating in Grain:

Development of insects in the grain is invariably associated with development of hot spots as a result of the metabolic heat of the developing insect population not being dissipated as the grain is a bad conductor of heat. This is invariably termed as dry heating as this occurs in grain with moisture content below 14 per cent and is not brought by either mould or grain respiration. Dry grain heating brought about by insects gets limited to the lethal level of the insect as the insect then moves out to cooler areas. The stages that are not able to move get destroyed.

Heating spreads with the movement of insects and what initially appears a spot leads to entire grain mass getting heated. Insect activity then is limited to the periphery from where dissipation of heat allows the survival of the insect. Under certain conditions, a hot spot brings about moisture migration and this leads to spontaneous heating in the grain mass. Only a small number of insects can produce heat enough to bring about spontaneous heating.

In a grain bulk, where insect activity has produced heating, surface grain may become caked and damp from translocation of moisture under the influence of temperature gradient. This invariably happens in the winter when surface grain cools rapidly and water vapour moving from inside heated areas condenses and causes caking and sprouting.

In grain with moisture content in excess of 15 per cent, heating may occur without insect activity. The microflora aided by grain respiration bring about this heating. In such heating, the maximum temperature reached is much higher than observed in dry grain heating. It is also possible that insects initiate dry grain heating which by bringing about moisture migration, may lead to the latter type of heating or wet heating. Wet heating is capable of reaching the level of temperature when grain is rendered suitable for chemical reactions and the chemical reaction leads to combustion. For putting off lites so caused in stored grain, water is normally used which ultimately renders larger quantities of grain susceptible to destruction. Effective remedy for such situations is aeration.

23.10 Wheat has occasionally been found to be infected by moulds and black mould Helminthosporium is occasionally found on such wheats as Durum but it has been shown to be present on some winter hard wheats. The infection is generally at the germ end and is known as "black point".

A disease known as "wheat scab" is caused by a mould Fusarium culmorum and shows up as red patches on the grain. Reddish patches may also be caused by B. prodigiosus. The growth of Cladosporium type fungus just below the epidermis can severely increase grade colour figure of resulting flour. Many grains may have collection of black specks in the beard probably caused by Alternaria.
Smut:

Another group of fungi known as smut attacks wheat, of which the variety known as bunt or "stinking smut" because of the disagreeable odour emitted by the infected grains is important. The fungus grains enter the plant at the seedling stage, invades the ovaries and the infected grains show some swelling and discolouration. These malformed grains are not filled with the normal endosperm, but with a mass of black spores which have a pronounced fishy smell. Grains from bunted fields are blackened and are, therefore, poor for milling as well as feed purposes. The harvesting and threshing by mechanical means of such infected crops present some difficulty. The presence of spores in large quantity can cause explosions in separators and fires in machines. However, infected grains can be cleaned and dealt with satisfactorily by aspiration, pouring and thorough washing. In a bad case of "smutty" wheat, the wash water is often almost inky in appearance.

Loose or common smut (Ustalago triticci) is another variety which infects the plant at the flowering stages. Grain is produced and as far as the miller is concerned, there is little trouble. Infection in this case is within the grain but plants from infected seed fail to produce grain.

Smut diseases of economic importance and international significance are caused by Tilletia controversa (Kuh) and Neovossia indica (Mitra). Former is commonly known as Dwarf Bunt because affected plant remains dwarf in the growth stage and later Kamal bunt because it occurs in wheat grown under conditions as available at Kamal in Haryana (India). Dwarf Bunt is restricted to wheat grown in winter and to areas in U.S. Europe and Africa. Kamal bunt is prevalent in wheat grown in marshy areas and with many irrigations. Wheat grown in relatively dry areas of Rajasthan and Maharashtra is free of the disease. Its presence and degree of infection can be judged by assessing spore count by the method given in Chapter v. Under plant protection and Quarantine Laws entry of wheat affected by Dwarf bunt for sowing and planting is banned. Wheat imported for consumption may, however, contain Dwarf-Bunt to an extent of 0.005%. Wheat imported from the U.S. is, therefore, to be examined for this disease. Similarly, many countries ban entry of wheat affected by Kamal bunt from India. These diseases do not develop further in storage or cause any damage to grain in handling. They are significant mainly from the point of view of plant Quarantine. A badly affected wheat can cause troubles in mechanical handling. In such handling even fires are possible.

Take-all-disease.

This is caused by fungus (Ophiobolus graminis). It is found mainly in Australia. The fungi attacks the plant just before the grain forms and the whole plant takes on a pale, whitish appearance and fails to produce any grain.

Ergot in Cereals:

Ergot in cereals is caused by a fungus known as Claviceps purpurea. The sclerotia of this fungus replaces the seeds of cereals and other grasses which are botanically related to cereals. Ergot forms a hard, dark, purple mass, much larger than the grain and curved body in the ear in place of the kernel. The infection of this fungus depends largely on the environmental conditions. It occurs in rye, bajra and only
occasionally in wheat, and is toxic. The toxic effect is appeared as swelling and inflammation of a limb followed by a creeping sensation over the skin and violent burning pain in body. This symptom may appear when bread is contaminated with 6% or higher level of toxin. In the middle ages, this disease was known as the “Holy Fire”. In advanced stages mumification of the infected limbs may occur which may cause spontaneous separation later on. Abortion of animal and human foetus may also occur. The consumption of ergot causes giddiness, nausea, exhaustion and convulsions in more severe cases.

Toxins: Ergot alkaloids exist in six pairs and the members of each pair are inter convertible and closely related to each other.

1) Ergotoxine and ergotinine

2) Ergotamine and ergotaminine

3) Ergosine and ergotinin

On alkali hydrolysis all ergot alkaloids give lyseric acid known as ergine and amino acids. Ergotamine and ergotaminine (C, H, O, N,) on hydrolysis yield 1-hydroxyalanine (Pyruvic acid), 1-proline, 1-phenyle alanine and lyseric acid.

The ergot alkaloid is used in pure form in medicine. The first reference to its use as a drug appeared in a German publication in 1882. Tarett in 1875 isolated this alkaloid in crystalline form.

Effect on Milling:

A study conducted by Dr. W.C. Shuey, F.J. Connelly and R.D. Maneval (North Western Miller, March, 1973) revealed that there is a definite decrease in the flour extraction with increased contamination of ergot. Below 5% and definitely below 1% ergot contamination, there may not be appreciable effect on the milling properties. The per cent ergot recovered by these workers was proportional to the per cent flour extraction and independent of the initial ergot contamination. By use of finer scalping sieves at the head of the mill, it may be possible that less ergot gets entry in primary premium flour streams and at least 80% or 90% of the ergot could be directed to the feeds. The absolute amount of ergot in the flour would depend on the mill flow, flour extraction and initial ergot contamination of the mix. Because of the poor milling properties of ergot, the vast majority is scalped off into the feed streams of the mill.

23.12 Moisture: Free water in the grain constitutes its moisture content. Grain moisture changes with environment as grain tries to maintain equilibrium with atmospheric temperature and humidity (refer moisture equilibrium table in Chapter IV). As humidity and temperature are not stable in a conventional godown, grain in bags will keep changing moisture content and thereby weight. Grain freshly received from the market or from the mill, will have uniform moisture content in the stack. Thereafter, grain at the surface of the stack will react relatively fast with the surrounding environment and grain in inner layers at relatively slow rate. In about a month's time a stack of grain will start having different moisture content in different layers. In each bag also, grain will vary in moisture content in inner and outer portions. Moisture content determined being only moisture of the surface of the kernel, determined moisture will not be real moisture in the whole kernel. Grain loss/gain, related to moisture content then
will have to be worked out for different situations, taking into account various factors relating to moisture in the grain.

(a) In bagged grain, after a storage of one month there will be a range in moisture content in different layers. In an effort to maintain equilibrium, this moisture keeps on migrating and, therefore, in a stack of grain moisture migration is a continuous process.

(b) Thermal conductivity of grain is low. In case of wheat it ranges between 0.9 to 1.05 B.T.U./Sq.ft./hour for moisture content ranging between 13 to 20%. For cork thermal conductivity is 1/3rd that of wheat. For concrete it is 7 times and for steel 300 times that of wheat. A grain stack on bare concrete floor will cause condensation of migrating moisture due to wide difference between conductivity of grain and concrete. Bags in close contact with concrete floor, will absorb condensing moisture and this will result in damage to grain in bottom layers. Dunnage is, therefore, required to be used and to be effective, dunnage material should have thermal conductivity as low as or even lower than grain.

(c) For grain kept in bins, moisture problem will arise, due to leakage or due to difference in conductivity of walls of the bin and grain. Inside of the bulk grain being not subject to environmental changes as in case of a stack, moisture migration will not be of that magnitude in a bulk as in a stack. Further, if daily temperature variation is not large, moisture migration will not assume significance. In a silo where grain is cooled initially, changes in temperature and moisture content will be of a negligible magnitude. Grain under the controlled environment will not tend therefore, normally to loose weight and deteriorate. If loss occurs or deterioration takes place in a silo it means environment has been adversely disturbed.

(d) Above discussion will show that control on weight changes in grain will not be possible unless complete control on moisture changes is possible. In bagged grain, control of pests may be possible but not complete control of environment. Only choice left, then is to attempt possible control through regulation of aeration. This involves high technology since, aeration is related to pest control also.

23.13 Moisture content temperature relationship:

When air is made to flow through bulk grain, exchange of moisture and heat between grain and air takes place. These two exchanges have different velocities while moving with the air and, therefore, the result is occurrence of two distinct boundaries travelling through the bulk in the direction of air-flow.

The temperature exchange boundary or cooling front moves faster of the two. Cool air travelling into hot grain soon heats up causing its relative humidity to drop. This results in the grain being cooled and giving up some of its moisture. Amount of moisture removed in the process is very small being about 1 per cent for a drop in temperature to 20°C. But evaporation of moisture enhances cooling effect of the air.

The moisture exchange boundary or moisture front moves relatively slowly. This is caused by the differences in the moisture content of the grain and the air flowing through the grain. When air used for
aeration has a higher relative humidity than that of the air present in the intergranular spaces, moisture front develops slowly where air enters the grain. As the high moisture front moves into the bulk, moisture contents increase and temperatures get depressed up to 1.8 m. depth from the surface. The reduction in moisture content occurs at depths below 6 m and this is the effect of the evaporation accompanying cooling front. Moisture front occurs in the region between 1.8 and 6 mm depth, where grain moisture is influenced by both the factors.

In planning drying by aeration, these relations between grain, temperature and moisture have to be taken into account. When temperature builds up in a region, moisture content also changes and, therefore, air passing through this region carries some moisture with it. This moisture is absorbed by grain and there is an increase in the moisture content of grain. While passing through cooling front, moisture is taken from the grain, and there is reduction in the moisture content of grain. Air passing through moisture front looses moisture to the grain, thereby causing temperature changes in area.

23-14  Aeration of Grain :

In a conventional godown where grain is stored in bags, aeration would mean keeping doors and ventilators open to eliminate temperature and humidity gradients that might have arisen inside the godown. Where the godown has sloping roof, mechanical aeration does not become necessary. In flat roof godowns, natural movement of air is relatively slow and, therefore exhaust fans are required to be used to bring about required magnitude of aeration. In bulk grain as well as in grain stored in silos, forced aeration is necessary to cool or dry grain.
### CHARACTERISTICS OF FUMIGANTS

<table>
<thead>
<tr>
<th>Name of Chemical</th>
<th>Empirical formula</th>
<th>Physical state (at pressure 20°C)</th>
<th>Boiling point °C</th>
<th>Odour</th>
<th>Flash point (by vol.)</th>
<th>Flammability limit in air</th>
<th>Solubility in water</th>
<th>Sp. gr. liquid</th>
<th>Sp. gr. gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrylonitrile</td>
<td>CH\textsubscript{2}CHCN</td>
<td>Colourless volatile</td>
<td>77.0</td>
<td>Like mustard</td>
<td>---</td>
<td>3 to 17%</td>
<td>7.5 g/100 ml (at 25°C)</td>
<td>0.797</td>
<td>1.83</td>
</tr>
<tr>
<td>Carbon Disulphide</td>
<td>CS\textsubscript{2}</td>
<td>Volatile liquid</td>
<td>46.3</td>
<td>Unpleasant</td>
<td>20</td>
<td>1.25 to 44%</td>
<td>0.22 g/100 ml (at 22°C)</td>
<td>1.2628</td>
<td>2.64</td>
</tr>
<tr>
<td>Carbon Tetra-chloride</td>
<td>CCl\textsubscript{4}</td>
<td>Colourless liquid</td>
<td>76.8</td>
<td>Characteristic &amp; well known</td>
<td>Non-flammable</td>
<td></td>
<td>0.08 g/100 ml (at 20°C)</td>
<td>1.595</td>
<td>5.32</td>
</tr>
<tr>
<td>Chloropicrin</td>
<td>CCl\textsubscript{3}NO\textsubscript{2}</td>
<td>Colourless liquid</td>
<td>112.0</td>
<td>Irritating</td>
<td>Non-flammable</td>
<td></td>
<td>0.227 g/100 ml (at 0°C)</td>
<td>1.651</td>
<td>5.676</td>
</tr>
<tr>
<td>Ethylene Dibromide</td>
<td>CH\textsubscript{2}Br\textsubscript{2}</td>
<td>Colourless liquid</td>
<td>131.16</td>
<td>Chloroform like</td>
<td>Non-flammable</td>
<td></td>
<td>0.431 g/100 ml (at 30°C)</td>
<td>2.172</td>
<td>6.487</td>
</tr>
<tr>
<td>Ethylene Dichloride</td>
<td>CH\textsubscript{2}Cl\textsubscript{2}</td>
<td>Colourless liquid</td>
<td>83.5</td>
<td>-do-</td>
<td>6.2 to 15.9</td>
<td>0.869 g/100 ml (at 20°C)</td>
<td>1.267</td>
<td>3.42</td>
<td></td>
</tr>
<tr>
<td>Ethylene Oxide</td>
<td>(CH\textsubscript{2})\textsubscript{2}O</td>
<td>Gas</td>
<td>10.7</td>
<td>Irritating mustard like</td>
<td>3 to 80</td>
<td></td>
<td>Infinite at 0°C</td>
<td>0.887</td>
<td>1.521</td>
</tr>
<tr>
<td>Hydrocyanic Acid</td>
<td>HCN</td>
<td>Colourless liquid</td>
<td>26.0</td>
<td>Almond like</td>
<td>---</td>
<td>6 to 41</td>
<td>Infinite at all temp.</td>
<td>0.688</td>
<td>0.9</td>
</tr>
<tr>
<td>Methyl Bromide</td>
<td>CH\textsubscript{3}Br</td>
<td>Colourless gas</td>
<td>3.56</td>
<td>Sweet or Musty</td>
<td>Non-flammable</td>
<td></td>
<td>1.34 g/100 ml (at 20°C)</td>
<td>1.732</td>
<td>3.27</td>
</tr>
<tr>
<td>Phosphine</td>
<td>PH\textsubscript{3}</td>
<td>Gas</td>
<td>87.4</td>
<td>Like carbide</td>
<td>---</td>
<td>1.79% by vol. in air</td>
<td>Slightly soluble</td>
<td>0.746</td>
<td>1.214</td>
</tr>
</tbody>
</table>
MAJOR INSECTS PESTS OF STORED
WHEAT AND WHEAT PRODUCTS

INDIAN-MEAL MOTH
Red Flour Beetle
Confused Flour Beetle
Rice Weevil
Granary Weevil
Saw-Toothed Grain Beetle
Lesser Grain Borer
Drugstore Beetle
Cigarette Beetle
Flour or Grain Mite
Angoumois Grain Moth
Flat Grain Beetle
Khapra Beetle
Rusty Grain Beetle
PART-VII

ITEMS OTHER THAN FOODGRAINS
CHAPTER 24

SUGAR

24.1 On the directives of Government of India, FCI Procures Levy Sugar from various sugar mills for storage and distribution in different parts of the country. Quality Control in sugar comprises checking genuineness of grade and damage in storage.

24.2 Crystalline sugar falls under three grain size groups L, M and S. Each grain size groups falls in two colour groupings namely, 40 and 29. There are thus six grades indicated as below. The appellation for grain size always precedes that for colour. The standard designation for sugar is “Crystal Sugar ISS grade M 29” and in abbreviation crystal sugar ISS need not be used and M-29 will do.

For inspection and determination of grade the specifications, method of sampling, grade determination sieve test etc. as laid down under ISI specification No. IS 498-1985 Indian Standard grading for vacuum pan sugar (Plantation white) is adopted. This is given below:-

APPENDIX - A

24.3 SAMPLING OF GRADER SUGAR

A.1 General Requirements of sampling

A.1.1 In drawing, preparing, storing and handling of samples, the following precautions and directions shall be observed.

A.1.2 Samples shall be taken from a protected place not exposed to damp air, dust or soot.

A.1.3 The sampling instruments shall be clean and dry when used.

A.1.4 Precautions shall be taken to protect the samples, the material being sampled, the sampling instruments and the containers for samples from adventitious contamination.

A.1.5 The samples shall be placed in clean, dry and moisture-proof containers.

A.1.6 The sample container shall be sealed air-tight after filling, and marked with full details of sampling, the date of sampling, grade of sugar, season of manufacture, name and place of factory and other important particulars of the consignment.

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Samples shall be protected from light as far as possible.

**Scale of Sampling:**

**A-2.1** Lot—All the bags in a single consignment declared to contain sugar of one grade shall constitute a lot. If a consignment is declared to consist of different grades, the bags belonging to the same grade shall be grouped together and each such group shall constitute separate lots.

**A-2.1.1** Samples shall be tested separately for each lot for ascertaining the conformity of the graded sugar.

**A-2.2** The number of bags to be selected from the lot shall depend on the size (N) of the lot and shall be in accordance with Col. 1 and 2, Table 2.

**A-2.2.1** These bags shall be selected at random from the lot to ensure the randomness of selection, a random number table (See IS: 498-1985) as agreed to between the purchaser and the supplier shall be used. In case such a table is not available the following procedure shall be used. Starting from any bag, count all the bags as 1, 2, 3, Upto…… and so on in one order, where r is equal to the integral part of N/n, N being the total number of bags in the lot and n the number of bags to be selected (see Table 4) Every r+1 bag thus counted shall be withdrawn.

**A-2.2.2** In case the bags are arranged in stacks in a godown, the bags may be taken for sampling purposes from all exposed sides of the stack.

**TABLE 4: NUMBER OF BAGS TO BE SELECTED FROM THE LOT FOR SAMPLING**

<table>
<thead>
<tr>
<th>Lot size</th>
<th>Number of bags to be sampled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 7</td>
<td>2</td>
</tr>
<tr>
<td>8 to 25</td>
<td>8</td>
</tr>
<tr>
<td>26 to 100</td>
<td>13</td>
</tr>
<tr>
<td>101 to 500</td>
<td>32</td>
</tr>
<tr>
<td>501 to 1000</td>
<td>50</td>
</tr>
<tr>
<td>1001 and above</td>
<td>80</td>
</tr>
</tbody>
</table>

**A-3** Number of Tests and Criteria for conformity:

**A-3.1** From each selected bag about 30 grams in all on the material from the top, middle and bottom bags shall be drawn. The material thus collected shall be mixed thoroughly to constitute a composite sample of the lot. Core and quarter this quantity repeatedly till about 600 g of the material is left. If the number of bags is too small to obtain about 600 g sample before sampling, more material
shall be drawn in such a manner that all the bags are equally represented. This composite sample shall be divided into three equal parts, one for the purchaser, one for the supplier and the third for the reference, and sealed air-tight with the particulars as given in A-1-5.

A-3-2 The composite sample prepared as under A-3-1 shall be tested for determination of its grade in the manner as prescribed in Appendix B. The lot shall be declared as conforming to that grade as arrived from B-2-2-1 or B-2-2-3.

APPENDIX—B

METHOD FOR DETERMINATION OF GRADE

B-1 General:

B-1-1 The tests for the determination of grade shall be carried out by visual comparison of the sample under examination with the sealed samples prepared and supplied by NSI (See 5). In case where visual comparison is inadequate, the grain-size group shall be determined by sieve test (See Appendix-C).

B-1-2 Visual comparison shall be made in diffused daylight, and not in direct sunlight. In the absence of natural illumination, white artificial light, produced by daylight bulbs and diffused by means of frosted glass may be used.

B-2 Procedure:

B-2-1 Place all the 10 bottles of the sealed samples for crystal sugar in separate grain-size groups on a large sheet of white paper. In each grain-size group arrange the three colour grade bottles in the descending order of colour.

B-2-2 Fill the empty bottles supplied with the sealed samples to the neck with the composite sample of sugar under examination (See A-3-1). Cork the bottle and by placing it alongside the sealed samples, determine by visual comparison to which grain-size group the majority of crystals in the sample under examination corresponds to. Then similarly find out, again by visual comparison, the sealed sample for colour in that particular grain-size group, to which the sample under examination corresponds.

B-2-2-1 The grade on this sealed sample shall be the grade of the sample under examination.

B-2-2-2 In case the grain-size of colour, or both, do not correspond with any one of the sealed samples, one of the following situations may arise:

(a) The matching may be obtained in respect of grain-size but not in respect of colour,

(b) The colour may match, but not the grain-size, and

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Neither the grain size nor the colour may match.

The sample under examination would, in such situations, fall either between two grain-size groups or two colours or both. In all these cases, the grade of the sample shall be that of the grade of the next lower scaled sample. The illustrate if the grain-size is bigger than groups S but smaller than M, and if the colour is better than 29 but inferior to 30, the grade for sugar under examination shall be S-29.

APPENDIX—C

SIEVE TEST FOR DETERMINING GRAIN-SIZE GROUP OF CRYSTAL SUGAR

C-1 General:

C-1-1 For reference purposes, and when visual comparison of grain-size group as given in Appendix B is considered inadequate, the grain-size group shall be determined by this method (See also 8.2).

C-2 Test Sieves:

C-2-1 Test sieves conforming to IS : 460 (Part 1) - 1985 and of diameter 200 shall be used.

C-3 Procedure:

C-3-1 Determine approximately, by visual comparison, the highest grain-size group in which the sample of sugar under examination is likely to fall. Select three test sieves corresponding to that grade (See Table 1) and nest them together in the descending order to the mesh size, with the coarsest sieve at the top and with a receptacle at the bottom. Weigh accurately 100 g of sugar out of the composite sample (See A-3-1) of sugar under examination and transfer this quantity on top sieve. Cover the top sieve, place the nest of sieves and the receptacle in a suitable mechanically driven sieve-shaker, and shake it continuously for five minutes. Brush the fractions of sugar from each sieve separately into weighing dishes and weigh the fractions accurately. The weight of each fraction in grams shall be the percentage of sugar retained on different sieves from which cumulative percentages may be calculated and compared with figures given in Col. 4 of Table 1 for the corresponding group. If the figure do not comply with the limits prescribed for the grade in Table 1, repeat the above process of sieving, by using a fresh quantity of 100 g of the composite sample and another set of three sieves of lower or higher grade as need be. The grain-size group thus determined shall be the grain-size group of the sample under examination.

C-3-1-1 If the sample under examination is found below grain-size Group S, the sugar shall be considered as "Below ISS Grade".

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<table>
<thead>
<tr>
<th>Grain size Group Designation</th>
<th>Retained on IS Sieve</th>
<th>Tyler Sieve</th>
<th>%age by weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘L’</td>
<td>1.70 mm</td>
<td>10</td>
<td>70 Min.</td>
</tr>
<tr>
<td></td>
<td>850 micron</td>
<td>20</td>
<td>95 Min.</td>
</tr>
<tr>
<td></td>
<td>600 micron</td>
<td>28</td>
<td>99 Min.</td>
</tr>
<tr>
<td>‘M’</td>
<td>1.18 mm</td>
<td>14</td>
<td>70 Min.</td>
</tr>
<tr>
<td></td>
<td>600 micron</td>
<td>28</td>
<td>95 Min.</td>
</tr>
<tr>
<td></td>
<td>425 micron</td>
<td>35</td>
<td>99 Min.</td>
</tr>
<tr>
<td>‘S’</td>
<td>600 micron</td>
<td>28</td>
<td>70 Min.</td>
</tr>
<tr>
<td></td>
<td>300 micron</td>
<td>48</td>
<td>95 Min.</td>
</tr>
<tr>
<td></td>
<td>212 micron</td>
<td>65</td>
<td>99 Min.</td>
</tr>
</tbody>
</table>

The above specifications were earlier made effective upto 1990-91 season but these have now been extended upto 1992-93.

24.4 The Sr. Regional Managers/Regional Managers should purchase one box of Material standard sealed samples directly from the National Sugar Institute, Kanpur on payment for colour comparison every season. For verification of crystal size of sugar, a set of the following sieves with the base collection pan may also be purchased through the National Sugar Institute, Kanpur, or through some authorised manufacturers recommended by them.

<table>
<thead>
<tr>
<th>IS1 Sieve</th>
<th>Tyler Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00 mm</td>
<td>9</td>
</tr>
<tr>
<td>1.18 mm</td>
<td>14</td>
</tr>
<tr>
<td>1.70 mm</td>
<td>16</td>
</tr>
<tr>
<td>850 microns</td>
<td>20</td>
</tr>
<tr>
<td>600 microns</td>
<td>28</td>
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<tr>
<td>425 microns</td>
<td>35</td>
</tr>
<tr>
<td>300 microns</td>
<td>48</td>
</tr>
<tr>
<td>212 microns</td>
<td>65</td>
</tr>
</tbody>
</table>
Sugar falling within any one of the ISS grade only should be purchased. In case of any dispute with regard to grade, quality at the time of procuring in the Mill, a representative sample of the lot should be jointly drawn and sealed by the FCI staff and miller and referred to the Director, National Sugar Institute, Kanpur, together with the prescribed fee (Rs. 301) within ten days. The decision of this institute shall be binding on both the parties.

24.5 As in the case of foodgrains the procedure of drawing representative samples at the time of supply of sugar to FPS and the Agencies should be followed as detailed below:

A combined total quantity of 300 grams of sugar may be drawn from all the sugar bags under delivery. This may be divided into two identical parts after proper and thorough mixing the samples should be packed in polythene bags and sealed with FCI seal.

The sample slip should contain all relevant details such as (i) Bill NO. (ii) Date of drawal (iii) NO. of bags (iv) No. and Name of Fair price shop (v) Grade marked on bags (vi) Season of production (vii) Name of mill etc. One of these would be handed over to the F.P.S. dealer with advise to display in his shop prominently mentioning the date of receipt for comparison by anybody. The other samples shall be retained in the depot for three months from the date of drawal and in case of no complaints, should be handed to the FPS owner. As in wheat stocks coloured sample slips (i.e.) Green, yellow, blue and pink for different fortights of the calender months should be used.

Sugar Inspectors of Government of India shall also be paying periodical visits to FCI depots and draw representative samples.

The procedure for disposal of sugar samples received in Dist. Labs, is the same as for foodgrains.

In the light of PFA Act (Amended), great care has to be taken with regard to quality and prompt detection of admixture of impurities.

24.6 Storage of Sugar:

Sugar being costly commodity and liable to deteriorate easily under adverse conditions of temperature and humidity, calls for meticulous care during its handling.

Normally, sugar of either grade No. 5-29 or 30 : M-29 or 30, or L-29 or 30 packed in A-T will ginnies having 22 to 24 stitches at their mouths and weighing @ 1 qtl. per bag, is likely to be received for storage.

24.7 Godowns requirements:

The conventional high plinth godowns of the FCI being damp, rodent and bird proof or their like, are considered adequate for storage of sugar. Shutter doors and ventilators help make the godowns reasonably air tight, at a short notice and hence the same should be preferred.

Ordinary godowns with low plinth and Kutch or brick floor and walls should not be patronised for storing sugar even for short periods.
**24.8 Dunnage:**

The following dunnage is suggested in order of preference:

(i) Cement flowing lined with bitumin, duly covered with black tarfelt cloth available from M/s Shalimar. This besides being ideal would also help easy detection sugar spillings and their collection without spoilage and admixture.

(ii) Wooden crates, covered with pataramats or double layer of pataramats with polythene sandwiched in between them as used in grain godowns.

(iii) In absence of either of the above suggested dunnage a layer of paddy husk spread on the floor and covered with 2 layers of pataramats finally topped with a layer of polythene would sufficient.

(iv) While loading wagons a gunny wrapper, preferably at the cost of the Miller, may be spread on the cleaned wagons floor and pataramats along with the sides to avoid damage by condensation in the bottom/side layers, particularly, over long distances during winter season.

**24.9 Storage:**

(1) The sugar accepted under levy for storage and distribution would be packed in new A-twill sound gunnies duly stencilled indicating the name of the mill, place and time of production as also the grade of the sugar clearly.

(2) Weak, cut or torn gunnies must be rejected in the mills and if received in the godowns these must be got replaced before stacking. The torn and bleeding bags should be got stitched then and there by keeping the stitcher handy at the point of receipt in the stores. Any sugar bags showing signs of sweating should be segregated and stored separately and also any repaired or old bags and issued on priority at the earliest opportunity.

(3) As far as possible, sugar should not be stored with other commodities but by itself in a shed.

**24.10 Handling:**

Use of hooks by the labour for handling sugar bags should be disallowed to prevent spillage and spillage by water absorption and consequent deterioration by sweating. Instead these bags should be lifted with the help of long ears specifically provided at the sides of the bags for the said purpose.

**24.11 Godown Hygiene and disposal of sweepings/damaged sugar:**

Godowns hygiene should be maintained scrupulously and during operations spillage should be avoided. However, spilt/damaged sugar, if any, should be collected/cleaned/seavaged everyday and not allowed to accumulate. Prompt disposal of all such stocks by auction to registered confectioners should be arranged at the earliest according to the procedure laid down for the purpose.
24.12 Sampling:

For sampling the procedure as prescribed at para 13.3 may be adopted but sampling by ‘Parkhies’ at the time of receipt or during storage should be avoided to prevent spillage; however when absolutely necessary samples be drawn in the presence of an officer not below the rank of Assst. Manager (QC) by cutting open the mouths of the bags at random according to the aforementioned prescribed procedure and sampled bags should then be properly stitched and marked ‘S’.

The samples thus drawn should be kept in air-tight containers and the condition of sugar as also the description stencilled on the gunny bags be furnished in the sample slips before forwarding to a laboratory for analysis.

24.13 Stacking:

To facilitate part deliveries of sugar without disturbing the main lot, block system of stacking rather than ens cross may be adopted. Since stored sugar would not be fumigated, utilization of space be maximised by building bigger stacks and reducing the size of the alleyways which should be sacrificed completely.

The stack height may be restricted to 20 bags in coastal areas but in the central and northern areas it may be conveniently raised up to 22 to 24 bags. The stitched mouths of the bags should always be inwards. Also, the sugar be stacked gradewise.

24.14 Preservation:

(a) Because of internal heat, insects are not likely to pose any problem in sugar godowns. Therefore, no disinfection measures would generally be required except for control of wasps, ants, bees, house flies etc. Wasps and bees will be troublesome only when the sugar is going out of condition. For control of these pests spraying the floor of alleyways with pyrethrum once a month is suggested ensuring, however that the sugar bags are not directly treated with any chemical.

(b) To avoid contamination of sugar stocks with droppings of rats/birds, control of these pests in accordance with the instructions already given in the Manual is advocated.

24.15 Aeration:

(i) All openings of the godowns should be kept open on clear, dry and cold day but closed during the rainy season or when it is too hot outside. Selective and controlled aeration would help to keep the sugar stocks in good condition.

(ii) The stocks may be covered with polythene or tarpaulins to avoid the adverse effects of atmospheric humidity but not continuously as otherwise heating and moisture translocation is likely to occur.

(iii) Godowns where sugar is stored shall be provided with hygrometers to record the daily humidity to facilitate selective aeration.
(iv) The inspecting officers should endeavour to guard against the possibility of Millers pushing out sugar of inferior quality, short weight or partially/fully damaged stocks by carrying out proper quality checks/test weighment and adequate supervision at loading time to segregate torn/damaged sugar bags.

24.16 To arrest such practices it would be desirable to ensure that the quality and quantity is checked properly at least by an Asst. Manager (QC) both at the loading and receiving ends.

24.17 Super surprise checks during processing/packing purchase at Mills as also enroute at the State borders/Octroi posts by Senior Quality Control Officers should be enforced. Further, the loaded trucks should move in convoy formation duly escorted by FCI staff as far as possible.

24.18 During storage, losses due to pilferage, spillage, adulteration due to rodent/bird infestation, and damage due to exposure to water either during transit or due to leakage/seepages in the godowns and/or consequent discoloration on account of heating are most likely to occur and all these would have to be avoided.

Gradewise stocks position of sugar may please be incorporated in the Monthly Regional Technical Review giving (a) Opening balance, (b) Receipts, (c) Issues, (d) Closing balance and break-up of stocks—covered under allocation and the free stocks in hand. Quantity of sweepings and damaged bag collected may also be incorporated in the review.

24.19 (a) All possible efforts be made to store sugar stocks in separate godowns apart from other foodgrains which are liable to chemical treatment. Secondly it may also be ensured that the sugar stocks are loaded in clean and sound wagons in order to avoid any likely contamination/loss during transit.

(b) The importance of godown hygiene has also been emphasised from time to time. It is imperative that during the handling operations the spillage is avoided as far as possible. However, spilled/damaged sugar, if any, must be collected, cleaned and/or salvaged daily and under no circumstances it should be allowed to accumulate.

(c) Sugar stocks, except those which can be rendered fit for human consumption by any available means of reconditioning/processing economically, would be declared as sweepings/substandard/damaged contaminated, based upon the following :-

(i) Presence of excessive inseparable foreign matter (Sweepings)

(ii) Excessive discoloration of sugar and/or unbreakable cake formation within (Sub-standard)

(iii) Liquification and/or carbonised sugar (Damaged)

(iv) Suspected contamination with chemicals or any other deleterious material (Contaminated) respectively.

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Further the sugar stocks as group above would be categorised as:—

(a) Unfit for human consumption, or as
(b) Fit for industrial use or, as
(c) Fit for manure and/or as,
(d) Fit for dumping.

Depending upon the degree of visible/moderate extensive/extreme extent of damage, respectively.

24.20 The disposal of such sugar sweepings which cannot be rendered fit for consumption in the godowns would have to be arranged promptly as per the following procedure.

(a) Sugar sweepings both from godowns and the wagons or from other loading/unloading points should be collected, cleaned and bagged, and stacked separately away from the main stocks with tally cards giving full details.

(b) While forwarding proposal for disposal of sugar sweepings it would be the responsibility of the District Managers— to satisfy himself about the condition of the stocks and he should furnish the certificate prescribed in the Quality Control Manual Appendix 20-A-5 to the Regional Manager.

(c) Depot office would forward two representative samples (at least 500 grams each) drawn by the Quality control staff from each lot of sugar sweepings to the Regional/District laboratories, in duplicate for analysis duly accompanied by the samples slip as prescribed in the quality control Manual Appendix 20-A-1 duly completed.

(d) Distt./Regional Managers after categorisation of the lots on the basis of analysis results, will arrange disposal of the sugar sweepings as per recommendation of the categorisation committee.

(e) Complete details in respect of the quantities and values of the sugar sweepings obtained and sold should be maintained and these details should be sent to the District/Regional offices on a monthly basis.

(f) Generally, sugar sweepings will be sold to the registered candy manufacturers or confectioners either by tender or by auction as per the procedure laid down for the disposal of damaged food grains.

(g) The list of such registered parties will be drawn up by RM/ZM as is being done in the case of damaged food grains with the help of local authorities wherever necessary.

(h) As far as small to medium sized collections are concerned these be disposed by tender/auction amongst registered bulk consumers who are prepared to give undertaking that they would utilise such sugar only after cleaning/purification.
During auction of damaged/sweeping stocks of sugar by the District/Regional Manager, an Accounts Officer would also be associated besides the Asstt. Manager (QC) as is being done in the case of damaged food grains.

However, in case of huge accumulations of sweepings sufficient enough to attract sugar millers, the Regional/District Managers are advised to contact the nearest sugar mills in their area either in the beginning or at the close of the milling season, and get the stocks reconditioned, provided it is found economical to do so vis-a-vis sale by tender/auction amongst registered parties as specified in para 8 above. It is understood that the sugar mills charge about Rs. 15/- (Fifteen) per quintal for reconditioning sound sugar sweepings. In case it is found uneconomical, disposal be arranged as laid down in para-8.

In case of sugar lots suspected to be contaminated, the representative sample will be drawn and referred to the public analyst. A copy of the results/recommendation of the public analyst should be forwarded to the Head Quarters for seeking disposal/dumping instructions as is being practised in the case of contaminated food grains.

If no offer is received for a lot of damaged sugar even in two successive auctions then the Regional Manager may use his discretion to dispose of such lots by way of dumping after obtaining concurrence of the Zonal Manager/Head Quarters.

The stocks declared fit for dumping shall in the first instance be offered to the local Municipal Corporations or panchayats free of cost ex-godowns without the containers, giving ten days time for lifting.

In case of delivery of damaged/contaminated stocks of sugar by the Corporation for dumping to Municipality/Panchayat, a certificate will be obtained from them to the effect that the stocks of damaged/contaminated sugar handed over to them by the Corporation have been actually dumped by them.

In case there is no response, the lots in question shall be dumped in the presence of the officers one of whom should be Asstt. Manager (QC) and the other not below the rank of Asstt. Manager nominated by the Regional Manager.

After dumping of the stocks the nominated officers will record the prescribed certificate on the same lines as is being done in the case of damaged foodgrains.

In case the stocks requiring dumping are not allowed to be dumped in the depot premises/city/municipal limits by certain Corporations/Municipalities/Panchayats then such stocks at times may have to be transported to dumping ground in which case the incidentals such as handling and transportation, if any may have to be borne by the Food Corporation of India.

In disposing of sugar sweepings as per the procedure outlined above prior approval will be obtained from the competent authority in case the value of damaged/substandard/contaminated sugar exceeds the financial power delegated to them.
CHAPTER 25
FERTILIZER

25.1 STORAGE:
The main problem in storage of fertilizer is its hygroscopic nature. In India the extremes of temperature and varying climates render the storage more difficult. Safe storage of fertilizers depends on the following factors:

(a) Nature of fertilizer.
(b) Climatic Factors.
(c) Kind of packing material.
(d) Type of storage structure.
(e) Dunnage and stacking.

(a) Nature of Fertilizer:
The chemical composition and the physical condition of a fertilizer and its hygroscopicity determine its keeping quality. Bigger the size of granule the lesser the tendency for cake formation. Some of the common fertilizers are classified as under:

<table>
<thead>
<tr>
<th>Hygroscopic acid treatment or Explosive fertilizers</th>
<th>Non-hygroscopic fertilizers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Calcium Ammonium Nitrate (Neutral)</td>
<td>1. Potassium (Neutral)</td>
</tr>
<tr>
<td>2. Ammonium Sulphate Nitrate (Acidic)</td>
<td>2. Potassium (Neutral)</td>
</tr>
<tr>
<td>3. Nitro phosphate (Liable to cause damage to gunnies)</td>
<td>3. Ammonium (Acidic)</td>
</tr>
<tr>
<td>4. Urea (Acidic) super phosphate (liable to cause damage to gunnies)</td>
<td>4. Ammonium (Acidic)</td>
</tr>
</tbody>
</table>

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5. Rock phosphate (liable to cause damage to gunnies)
6. Triple phosphate (liable to cause damage to gunnies)
7. Di-Ammonium phosphate (liable to cause damage to gunnies)
8. Potassium Nitrate.

(b) Climatic Factors:

The effect of temperature and relative humidity is markedly pronounced in hygroscopic fertilizer. Generally an increase in the mean temperature of atmosphere improves the keeping quality of the fertilizer by lowering the moisture content whereas, the increase in the relative humidity of the atmosphere gives rise to rapid deterioration of its keeping quality. Relative humidity level of over 60 per cent is harmful. Such atmospheric changes induce lump or cake formation. In areas of high humidity the whole bag may become a pasty mass though in semi-dry area the fertilizer retains its solid condition.

(c) Kind of packing material:

The type of packing material exerts considerable influence on the absorption of moisture by the fertilizers. Polythene lined-bitumenised jute bags are more suitable than any other packing material. In the case of ammonium phosphate and ammonium sulphate and other non-hygroscopic fertilizers ordinary jute bags can be used as packing material. Fertilizer packed in crepe paper bags and jute bags absorbs considerable moisture. The use of five-ply paper bags with two moisture proof plies and jute bags with two moisture proof plies bag is quite satisfactory packing material provided the fertilizer is dry at the time of packing. However, polythene lined-bitumenised jute bags are ideal. The mouth of the bag may be hand or machine stitched. In the case of hand stitching the mouth of the bags is rolled over and then stitched in two rows with at least 14 stitches in each row.

(d) Type of storage Structure:

In view of the extensive damage and loss that results from storing fertilizers in unsuitable godowns, selection of a godown is of prime importance. It is necessary to use only such godowns as are structurally suited for this purpose. In ordinary godowns with low plinths, mud walls or galvanized iron sheet roofing, the effect of slight variations in temperature and relative humidity of atmosphere are pronounced. The godown for storage of fertilizers should be SUCH THAT IT SHOULD GUARD the material from atmospheric high humidity and high temperature. It should, therefore, be well-ventilated and away from places of fire-hazards, as enclosed space under conditions of high temperature and pressure gives rise to explosion and fire in the presence of combustible material. The godown floor should be good and free from ammonical smell and
should be properly decolourised before arranging storage. The godowns used for fertilizers should not be used for foodgrains unless they are thoroughly cleaned, washed and aerated, so that strong ammonical smell may not have any deleterious effect on the storage of foodgrains. Whenever the godown is vacant after issue of fertilizer, the floor should be thoroughly washed with washing soda so as to remove the traces of chemical odour left behind.

Sometimes, due to paucity of storage accommodation or for a temporary, short period, fertilizers may have to be stored in the open. Tarpaulin, polythene sheets and other water proof materials are used for protecting the stocks. Since tarpaulins are costlier and in spite of best protection are likely to result in exposure to rain, provision of polythene is considered to be a better alternative.

Polythene sheets/covers provide protection from rains as well as from weathering effects. With the new device of providing a window in a polythene cover at the top they are also able to stand high wind velocity at port areas. Further, the likely damage to polythene covers is very easily and economically repairable.

(e) Dunnage and Stacking:

Proper dunnage is essential to protect the fertilizer bags from moisture damage as well as damage to floors from fertilizer itself. In fertilizer storage damage occurs to the bottom layers of the bags due to seepage from floor, and also due to diurnal variations in the temperature resulting in condensation of water on the floor. Wooden crates with a layer of matting over them are ideal as dunnage, they enable free circulation of air under the stack, and also the mats over them prevent spillings of the stacks from coming in direct contact with the floor. In addition, any incidental leakage or overflow of gutters will not damage the stocks.

In the absence of wooden crate a layer of polythene sheets sandwiched between two layers of mats can be used as dunnage. In no case fertilizer bags should be stacked without dunnage. Even for a short period of storage at least two layers of mats must be used. The mats once used for fertilizers should not be reused for foodgrains milled product or any other edible material. The wooden dunnage once used for fertilizer and being reused for storage of foodgrains must be properly cleaned and, if necessary aerated to get rid of the smell.

Proper stacking of fertilizer bags is very necessary for the safe storage of fertilizers. Before the stocks are received, a stack plan in the godown, should be prepared dividing the floor area into uniformly sized and serially numbered rectangular or square stack base to build stacks. Ordinarily the maximum base area of a stack should not exceed 30’ x 20’. Of the three types of stacking in vogue for foodgrains viz (i) simple (ii) block and (iii) cross wise, the block system is considered to be convenient for fertilizers. All the bags in the stack should be of uniform size and weight. The height of the stack is important for storage of fertilizers and could be divided into two broad categories. The fertilizers that are highly hygroscopic, acid treated or explosive in nature, could be stacked generally to maximum height of 12 ft. while non-hygroscopic fertilizers could be stacked to a maximum height of 15 ft. During storage, it is observed that in bigger stacks the percentage of damage is less. Smaller stacks should, therefore, be avoided and bigger stacks built.
The spillings and droppings of the fertilizer should be daily collected, cleaned and kept separately in empty bags attached to the respective stack cards indicating the name of the fertilizer, date of receipt and issue, number of bags, weight of the stack and other relevant information should be tagged to each stack at a convenient height. The stocks of different fertilizers should not be stacked together. No other agricultural commodity should be stored in the same godown where fertilizers are stored.

25.2 HANDLING AND TRANSPORTATION:

Since bulk transport is not very popular outside the manufacturing plants in India, fertilizers are transported in bags by rail/road, or water. In the case of transport by rail only clean and water-tight wagons should be selected and proper dunnage spread on the wagon floor. The bags should be stacked neatly on either side within the wagons, and a small stack built in between the two stacks so that the bags are tightly kept and do not collapse during transit. The fertilizer bags should be kept at least one foot away from the doors. Dummy bags should be kept near the wagon doors. Loading and unloading of fertilizers bags should be done on a concrete platform with covered roof, especially during rains. Hooks need to be avoided at any stage of handling.
CHAPTER 26

DEFINITIONS OF TERMS

26.1 In the assessment of quality of foodgrains a large number of terms are used. Before undertaking assessment it is necessary that definitions of these terms relating to quality of foodgrains are known. It also needs to be remembered that definition for the same term is not identical in different countries. In respect of imported grain, therefore, definitions adopted in the country of origin of the grain need to be studied before undertaking quality assessment of that grain. Definitions given below thus, apply mainly to grain of India origin. Terms frequently encountered in food grain handling and foodgrain analysis are defined below. In definitions, wherever possible definition given in Indian Standards or International Standards and accepted for Indian conditions are adopted.

26.2 Aeration—Enabling movement of air through grain. This could be forced or free/natural aeration.

26.3 Aluminium phosphide—one of the chemicals used as fumigant of grain. On contact with moisture of the air it give out a toxic gas hydrogen phosphide which acts as a fumigant. Residue is aluminium oxide an inert dust.

26.4 Bajra—Pennisetum typhoides L.—Pearl millet or Blush millet. A millet produced in some parts of the country during kharif season. Yearly production in the country is around a million tonnes.

26.5 Barley—Hordeum Vulgare L. Also known as Jau.---It is a rabi crop and is mainly used as cattle feed (horse feed).

26.6 Beetle—A group of insects of Coleoptera order with first pair of wings forming a hard coat over the body.

26.7 Bran—Outer coat of the grain. It generally constitutes 7 to 8% of the grain. In case of rice, extent of removal of bran indicates degree of milling. Rice bran is a source of oil and with or without oil constitutes a good poultry and cattle feed.

26.8 Brokens—Grain pieces of sound kernels that are less than three fourth of the size of the full kernels. In case of Dals pieces that are less than the size of three-fourth of the split pulses shall be considered as brokens. In case of rice brokens, the following definitions shall apply:

1. Big Brokens—Those pieces of rice kernels which are equal to or smaller than three-fourths but bigger than one-half of the average length of the unbroken kernels of principle class.
2. **Medium brokens** — Those pieces of rice kernels which are equal to or smaller than one half but bigger kernels of principle class.

3. **Small brokens** — Those pieces of rice kernels which do not exceed one quarter of the average length of the unbroken kernels of principle class retained on 1-40 mm IS Sieve.

Brokens less than 1/8th of the size of full kernels will be treated as organic foreign matter.

26.09 **Brown rice** — Rice that has not been polished. It is also known as husked rice.

26.10 **Bulk storage** — Storage of grain in naked form without using container like jute/cloth bags.

26.11 **Cap storage** — Cover and plinth storage in the open. This form of storage is adopted when accommodation falls short of requirements.

26.12 **Categorisation** — Food grain in storage is placed in different categories depending upon the condition of the grain to facilitate priority for issue. Procedure followed is known as categorisation. For details of the procedure refer to chapter—XI of the Manual.

26.13 **Classification** — For convenience of purchase and sale grain is grouped in classes depending on physical characters. Thus prior to classification there were 1536 varieties of rice produced in India. It was impossible to handle such a large number of varieties of paddy and rice. These are now placed in a few classes so that there is no confusion in understanding the variety in relation to its price. Wheat is classified in International market on the basis of its colour, growing season and protein content. In India all wheat is placed in one class though in International market it is placed in 6 different classes. For details of rice classification refer to Chapter-IV. For classification of wheat refer to handbook of U.S. Grain Standards and Canadian Grain Standards when necessity arises. During storage the term classification indicates grouping of foodgrain stack into clear, tear and heavy classes depending upon the degree of living infestation. This facilitates in chalking out disinfestation programme.

26.14 **Chalky kernels** — Kernels or pieces of kernels of which at least half the portion is either opaque or milky white in colour and brittle in nature.

26.15 **Damaged grain** — Kernels or pieces of kernels which are sprouted or internally damaged as a result of heat, microbes, moisture or weather.

26.16 **Conventional Storage** — Storage of bagged grain in stacks in godowns/warehouses.

26.17 **Curative treatment** — Insecticidal treatment that is used to control developing infestation.

26.18 **D.D.V.P.** — Dichlorovos-Di-methyl-2,2 Dichlorovinyl phosphate. D.D.V.P. insecticide is used in empty/full grain stores.

26.19 **Dehusked grain** — Kernels from which husk is removed. In case of rice kernels that is not polished is called dehusked or brown rice. In analysis, rice kernels, whole or Broken, which have more than 1/4th surface covered with bran will be considered as 'dehusked kernels'.

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26.20 Discoloured—Kernels or pieces of kernels that have changed in their normal colour as a result of deteriorative changes.

26.21 Dockage—This term is used in specifications of Western countries according to which Dockage shall be weed seeds, Weed stems, chaff, straw, grain other than wheat, sand, dirt and any other material other than wheat which can be removed readily from the wheat by the use of appropriate sieves and cleaning devices, also under-developed, shrivelled and small pieces of wheat kernels removed improperly separating the material other than wheat which can not be recovered by properly rescreening or re-cleaning. This term is not used in Indian specifications for foodgrains.

26.22 Dunnage—Any material placed between the grain bag and the floor of the godown is called dunnage. It is used to prevent condensation of moisture because of grain coming in contact of floor, that is a better conductor of heat, in comparison to grain. Material that is a bad conductor of heat in comparison to grain and floor serves as an effective dunnage.

26.23 Dwarf bunt—A fungus disease caused by Tilletia Sp. Affected plants lose height. Wheat grain in winter season is susceptible. It is commonly present in American and European Wheats.

26.24 Ergot—A disease caused by fungus Claviceps purpurea. It attacks cereals and millets. In the affected grain sclerotia which are hard, compact, black bodies of the size bigger than grain or of the same size as affected grain are noticed. These have a toxic effect on the consumers and therefore, there is a limit for their tolerance in food grain. In India Bajra is the grain commonly affected. Indian wheat is free of the disease but American wheat is likely to show presence of these.

26.25 Flat storage—Storage where height is less than length and breadth or diameter. Conventional godowns of the Corporation and bins at Borivali, Mannad and Kanpur all fall under this category of storage.

26.26 Foodgrain—Edible cereals, millets and pulses constitute foodgrains. (Ref. IS: 2813: 1964) Grain that is used as poultry and cattle feed is termed ‘food grain’.

26.27 Foreign matter—Everything foreign to grain present in grain is ‘foreign matter’. In India, this is placed in two categories as ‘organic’ and ‘inorganic’ foreign matter. Inorganic foreign matter shall include sand, gravel, dirt, pebbles, stones, lumps of earth clay and mud. Organic matter shall include chaff, straw, weed seeds and other inedible grains. In case of rice, brokens less than the size of 1/8th of the kernel is considered as foreign matter (organic).

26.28 Fumigant—A chemical that vaporises and disperses through stored grain to have a killing effect on insects developing in the grain.

26.29 Fumigation—Process in which grain is subject to fumes of toxic gases for the purpose of disinfection.

26.30 Fungus—Plant material that grows a parasite. When it retards growth of plants it assumes position of a disease. Some of the fungal growths are toxic to man whereas some constitute food of man.

26.31 Grade—Category in which grain is placed based on impurities present in the lot. These are numerical and in descending order/quality.
26.32 Germ eaten—Kernel where only the germ is eaten by insects. Some insects eat only germ and leave rest of the kernel unaffected. Such kernels are considered germ eaten kernels.

26.33 Gram—Also known as Bengal gram or Chana. *Cicer arietinum* L. It is a major rabi pulse grown in the country. Other pulses are Red gram—Arhar (tur) *Cajanus cajan,* L., Green gram—Mung, *Phaseolus aureus* Roxb., Urad—Black gram—*Phaseolus Mungo* L., Masur—Lentil—*Lens culinaris* Medic and Moth—dew gram—*Phaseolus aconitifolius* Jacq.

26.34 Glutinous rice—Also known as waxy rice. This type of rice cooks into sticky mass. Kernels of this type contain only amylopectin starch in the endosperm as against amylase and amylopectin starch in the endosperm of non-glutinous rice.

26.35 Heating—Temperature rise in grain on account of insect or moisture activity. This is indicative of deterioration and needs to be checked immediately. For further details refer to Chapter VII.

26.36 Hectolitre weight—Weight of 100 litres of grain. This shows weight volume ratio of grain and indicates quality. In Western countries similar term used is bushel weight. Bushel is a definite measure and a top grade of wheat weighs 60 or more pounds per bushel. In metric system Hectolitre weight is used as a guide for quality in place of bushel weight.

26.37 Husk—Outer shell of grain. Only grain marketed without husk is rice and with husk it is known as paddy. Paddy is required to be milled to get rice.

26.38 Impurities—Items which are not desirable in the grain but at the same time their presence to some extent is unavoidable. Grain quality is stated to be lowered to the extent these are present in the grain. Grain analysis aims at finding out the extent to which impurities are present.

26.39 Insect—An animal belonging to group Hexapoda which means having six legs.

26.40 Insect damaged—Kernels that are partially or wholly bored.

26.41 Jowar—*Sorghum vulgare* pers. It is grown as a Kharif and Rabi crop in many parts of the country. Yearly production is around two million tonnes. Indian sorghums are white to yellow in colour. American and African sorghums are red in colour and are known by the term milo.

26.42 Jute bag—A standard sized and textured jute container for storage of food grains.

26.43 Kamal bunt—A disease caused by fungus in wheat. It originated around Kamal in Haryana and hence the name. Wheat grown in drier areas are observed to be free of this disease so far. The disease is known to be affecting wheats in India so far.

26.44 Kernel—Three-fourths and more than three-fourths of the whole grain is whole kernel otherwise it is broken kernel.
Khatti—An underground pit used for grain storage is known as Khatti. Food Corporation of India is not using Khatties for grain storage any more. In India Khatties are used mainly for turmeric storage to some extent in some parts of the country.

Kernels with husk—Kernels or pieces of kernels carrying husk on 1/16th or more portion.

Maize—Zea mays L. A cereal crop capable of growing in all seasons but is mainly grown in Kharif season. Grain is used as food to a limited extent but is used as a cattle feed and for purposes of processing into a large number of food items. It is an important item of poultry feed. In storage, the grain is highly susceptible to insect and microbial damage.

Malathion—$C_{19}H_{19}O_{6}S_{3}P$—A chemical used for control of insects in storage.

Mites—Animals belonging to group Arthropoda. These have four pairs of legs as compared to three pairs to insects.

Moisture—Amount of water present in the grain and which can be removed without alteration of chemical structure is termed moisture. The Indian grain standard defines this as 'loss in weight brought about by heating for two hours at 130°-133°C.' Apart from free water, some closely held water exists in combination with grain components. This is known a 'bound' water. It is present in varying quantities in all grains. Moisture may be gained or lost depending on environmental conditions. Moisture is an important factor contributing to storability of grain. When low, grain storability is better and when high, grain is rendered susceptible to insect and mould attacks and can get heated easily.

Moths—A group of flying insects belonging to family Lepidoptera and which generally are nocturnal.

Mouldy—Grain which is attacked by moulds and is damaged. In extreme cases such grain gives out off odours. Mould, a fungus, growth can prevail under highly humid conditions and through activity can change colour and taste of grain. In extreme cases such grain can be toxic.

Other food Grain—Food grain other than the grain concerned.

Pests—Living creatures other than man, feeding on grain meant for human consumption are pests viz. insects, rats, birds, etc.

PFA—Prevention of Food Adulteration Act. It is applicable to grain handling by the Corporation.

PPM—Parts per million (1 in 1000000).

Prophylactic—An insecticidal treatment that is used more as a preventive and so as to have preventive action to last for some time.

Pulse—Dicotyledonous grain like gram, arhar, etc.

Pyrethrum—An insecticide of plant origin. It is obtained from chrysanthemum like flowers of the plant. It is grown in Kashmir in India and Kenya, Tanzania in Africa.
26.60 Ragi—Finger millet—Eleusine Coracana Guerin. It is a millet grown during Kharif season in some parts of the country.

26.61 Refractions—All components in food grain which differ from sound grain.

26.62 Rice—Oryza Sativa L. It is a cereal crop grown in largest quantity in the country in a season. Rice with husk is paddy. Paddy is also known as rough rice. Rice where bran is not removed is known as brown rice. Storability of brown rice is very poor. Parboiled rice is produced by steaming paddy before milling. Breakage is less in parboiled rice in milling. Varieties subject to breakage in milling are necessarily parboiled. Parboiled rice is liked by consumers in some parts of the country. Parboiled rice is generally consumed as soon as produced. It is normally not stored for more than a year. Raw rice, on the other hand is consumed after some storage and old rice stored for more than one year is liked by consumers. Rice (raw only) could be glutinous and non-glutinous. Glutinous varieties cook into sticky mass and are not liked by Indian consumers. These varieties are also not grown in India. After parboiling all varieties cook like non-glutinous varieties.

26.63 Red grain—Kernels or pieces of kernels having more than 1/4th of the surface covered with red cuticle.

26.64 Rejection limit—Limit up to which particular refraction is acceptable in the food grain. Refraction when present beyond this limit in the grain, such lot of grain is to be rejected. Hence the name rejection limit.

26.65 Sample divider—An equipment that divides a sample of grain in uniform and identical parts.

26.66 Silo—A bin for bulk storage of grain and other plant material. This could be a vertical silo when height is larger than diameter and flat silo when height is less. When equipped with an elevator silo storage is also known as elevator storage.

26.67 Slightly damaged—Kernels or pieces of Kernel that are damaged or discoloured superficially so as not to affect the quality of the material.

26.68 Shrivelled or immature—Kernels or pieces of kernels that are not well developed.

26.69 Sound grain—Kernels of grain that are not damaged internally or externally and also not discoloured. Pieces of kernels when not damaged and discoloured will be called sound broken but not sound grain.

26.70 Specification—Standard of quality wherein limits for various refrations are specified, along with discount in price to be effected whenever discounts are applicable. Where grain is marketed on grade basis quality standard of each grade will constitute the grade specification.

26.71 Sweepings—Spilled grain collected in conventional store at the time of sweeping it clean.

26.72 Tolerance limit—Limit for refraction in the grain, up to which it could be tolerated without any price deduction.

26.73 Touched grain—Kernels or pieces of kernels that are damaged or discoloured superficially so as not to affect the quality of the lot.
26.74 Tube sampler—A hollow steel tube shaped to obtain samples from bags and bulk.

26.75 Uric Acid—It is an important constituent of insect excreta.

26.76 Varietal admixture—Presence of a variety of the same grain other than the variety under consideration (Acceptance)

26.77 Wheat— *Triticum Vulgare* L. This is the common bread wheat. Apart from this, other varieties grown in India in insignificant quantities are amber wheat—*T. dicoccum* and durum wheat—*T. durum*. In international market bread wheat is marketed in different varieties such as spring and winter wheat according to season in which it is grown, also as dark red, white, etc. according to its colour. Depending on the protein content, it is soft, hard, semi-hard etc. In Indian wheat, it is all grown in one season but has colour and protein variations. It is not, however, grouped into different categories as in the international market. Trade tries to put it in different groups, gives different local names, depending purely on consumer preference but not on technical grounds as colour, protein, and season of cultivation. In India, yearly production of wheat is on an increase each year and presently amounts to about 40 million tonnes.

26.78 Weevil—This is a beetle with a snout. It belongs to the same group of insects as beetles namely, Coleoptera.

26.79 Weeviled grain—Kernels that are partially or wholly bored.

26.80 Wooden crates—A wooden structure fabricated to a standard type to be used as dunnage in grain stores.
## APPENDIX-I

### LIST OF PUBLICATIONS FOR REFERENCE

1. **Food Grains**, (1969), Published by the Grain and Oil Seeds Merchants Association of India.
2. **Rice Economy**, (1961), Published by the Dept. of Econ. and Stat. Min. of Food and Agric. India.
8. **Safe storage of Grain and other Products from Insect Pests and Rats**, (1968), Khushwaha, K.S. & Sharma, J.C. University of Udaipur No. 59.
10. **Hermetic Storage**, (1948), Vayssiere, P., F.A.O. study No. 2

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A Study of Weed seeds found in Food grains. (1973), A Wheat Association of U.S. in India Publication.


Handbook of Quality Standards. (1974) Published by Food Corporation of India.

Following are important journals that carry technical research papers on the subject.

A) Bulletin of Grain Technology. Pub. by Food Grain Tech. Res. Association of India from Hapur (It is a Quarterly Publication in 26th year.)

B) Journal of Food Science and Technology. Published by Assoc. of Food Scientists, Mysore. (It is a bimonthly publication in 40th year).

C) Cereal Chemistry Publi. by Assoc. of cereal Chemists U.S.A. (It is a bimonthly publication in 60th year).
APPENDIX-II

STANDARDS RELATED TO FOODGRAIN STORAGE

(PUBLISHED BY BUREAU OF INDIAN STANDARDS, NEW DELHI

Title IS No.

1. Aluminium foodgrain storage bins 631-1979

2. Code of practice for construction of bagged foodgrains storage structures suitable for trade and government purposes (revised) 607-1971


4. Code of Practice for Handling of foodgrains in transit 611-1955

5. Code for Practice for improvement of existing structures used for intended to be used for foodgrains storage 609-1955

6. KOTHAR type rural foodgrains storage structure 601-1955

7. MORAII type rural foodgrains storage structure 602-1955

8. Storage of foodgrains and its protection during storage 610-1955

9. Underground rural foodgrain storage structures 603-1960

10. Dust applicator for burrows 3634-1977

11. Foot-sprayer 3652-1982


13. Hand rotary duster, shoulder mounted type 2477-1970

14. Rocker sprayer 3062-1982


N.B. IS 611-1955 at S.No. 4 and 610-1955 at S.No. 8 have been clubbed and superseded by IS-615 (part I and II) 1971 under the caption “Storage management code”
16. Sprayer, atomizer type, hand-operated
   3897-1978

17. BHC emulsifiable concentrates (second revision)
   632-1972

18. BHC smoke generators
   1505-1968

19. BHC water dispersible powder concentrates (second revision)
   562-1978

20. Malathion dusting powders
   2568-1978

21. Malathion emulsifiable concentrates
   2567-1978

22. Ethylene dibromide (first revision)
   1311-1966

23. Malathion water dispersible powder concentrates
   2569-1978

24. Ethylene dichloride-carbon tetrachloride mixture
   634-1965

25. Methyl bromide (first revision)
   1312-1980

26. Pyrethrum extracts
   1051-1973

27. Zinc phosphide, technical
   1251-1988

   3594-1967

29. Guidelines for handling cases of pesticides poisoning:
    Part I First-Aid measures
    4015 (Part I)-1967

30. Test Sieves
    460
    Part I & Part II

31. Sample divider
    4940-1968

32. Common names for pesticides (eight list)
    ISO/R785-1968

33. Guide for handling cases of pesticide poisoning:
    Part II Symptoms, diagnosis and treatment
    4015
    (Part I-1967)

34. Maida
    1009-1979
35. Suji Rawa 1010-1968
36. Wheat Atta 1155-1968
37. Terminology for foodgrains 2813-1970
38. Methods of analysis of foodgrains Part I to IV 4333-1967
40. Standard method for sampling of Cereals and pulses 2814-1978

In case of all standards, the latest amendments should be kept track of.