STORAGE OF FOODGRAINS

STORAGE OF FOODGRAINS

(a) Matters related to Hiring/de-hiringof Pvt. godowns

- Proposals/requisitions for hiring/de-hiring or retention of Private godowns are received from DDPS, Food & Supplies Department in accordance with the requirements of the concerned DCF&S.
- As per **2713**/FS/P/Sectt./GE&EM/4M-46/2015 dt.29-08-2017, Tender(s) are floated online/offline for hiring of Private godowns with specific requirement by the WBSWC.
- The offered godowns are first inspected by the DCF&S and the team of DDPS+WBSWC,
- If found suitable, the **L1 Bidder** of that suitable private godown are hired by the WBSWC and offered to DCF&S for storage of CMR.
- Agreement with the concerned private owner of the hired godown is done on KMS basis.
- Rents are paid to the owner on the discovered L1 rate or the LA Collector assessed rate, whichever is lower, along with electricity bills.
- Handling Contractors of the near most WBSWC godowns are tagged with the private godowns.
- Staffs/ security guards are employed by the WBSWC from its pool or from the pool of DCF&S.
- WBSWC shall not store any hazardous/inflammable material in such godowns.
- Repairing, day to day maintenance is the responsibility of the godown owner, so the payment of taxes and maintenance of weighbridge.
- Foodgrains damaged due to rainwater due to constructional defects is the liability of the godown owner.
- De-hiring notices are served one month ago and at the same time the godown owner may also request to vacate the godown at least three months ago.
- Prior to de-hiring, stock must be exhausted and online records shall be updated.

(b) Engagement of Handling Contractors

DUTIES OF HANDLING CONTRACTORS:

- Engagement of competent and adequate staffs and labours in the godown having the job cards,
- Unloading/Loading of Food grains bags from/into the trucks/ vehicles/ carts etc.
- Stacking/ de-stacking, bagging, re-bagging, weighment, standardization, cleaning of rice wherever/whenever necessary,
- Preservation and Quality Control Management (Except PEG),
- Furnishing correct and upto date position/information/ progress of work statement and accounts,
- Contractor shall be responsible for the good conduct of their employees and shall compensate the corporation for losses arising from neglect, carelessness, want of skill or misconduct of themselves, their servants or agents or representatives,

- Contractor shall be solely responsible for compliance of all applicable laws and the statutory provisions enshrined therein and shall specifically ensure compliance of all such various Laws, acts etc., including but not limited to the following:
    1) Contract Labour (Regulation & Abolition) Act 1970 and Rules made there under.
    2) The Employees (Provident Fund & Miscellaneous Provisions) Act 1952.
    3) The Employees State Insurance Act 1948 wherever applicable (in case ESI Act is not applicable the Workmen Compensation Act 1923 and Maternity Benefit Act 1961 will be applicable).
    4) The Minimum Wages Act 1948.
    5) The Payment of Bonus Act 1965.
    6) The Payment of Gratuity Act 1972.
    7) The Payment of Wages Act 1936.
    8) The Motor Vehicle Act 1988.
- Liable for any loss which the Corporation/DCF&S may suffer on account of the bags not being properly handled,
- Ensure that their workers do not use large hooks for handling of foodgrains at any stage,
- Shall strictly abide by all rules and regulations of Police, Municipal authorities and other local bodies,
- Under no circumstances, the contractor or labourers engaged by him in any godown shall collect any money for the aforesaid works from any third party, like, MR Distributors/ Whole-sellers/ Rice Millers/ FPS Dealers etc. for unloading/ loading of the bags of foodgrains from/to the vehicle or any other activities.

PROCEDURES TO BE FOLLOWED FOR ENGAGEMENT OF HANDLING CONTRACTORS:

- Through e-Tender in the Govt. portal (https://wbtenders.gov.in).
- All necessary requirements/ qualifications/ dis-qualifications/ documents that are required to be uploaded shall be specified clearly in a standard format.
- Duties, responsibilities, liabilities, penalties etc. shall be clearly mentioned in the Tender.
- Evaluation and acceptance of bids shall also be mentioned in the bid document.

PAYMENT TO HANDLING CONTRACTORS:

- Following the terms and conditions of the Tender, SOP, Orders.
- Stock handled (in and out) in a month shall be tallied with online records as well as certificates given by the Godown In-charges.
- Stack heights following the standard norms and calculations shall be checked.
- Deductions shall be made as and where applicable.
- Bills shall be cleared within a month after receiving the same following the SOP.

(c) Up-keeping of godowns

UPKEEPING OF GODOWNS:

- Maintenance of cleanliness of godown inside & surroundings.
- Arrangement of proper security.
- Arrangement of proper lighting, drainage, washroom etc.
- Arrangement of Firefighting systems.

- Arrangement of other necessary infrastructures like weighbridge, computer with internet, QC equipment and chemicals, chair, table, required registers etc.
- Receiving, maintenance and delivery of stocks maintaining quality, quantity etc.
- Regular inspection, Physical Verification (P.V.) etc.

MAINTENANCE OF CLEANLINESS AND HYGIENIC CONDITIONS:

- Cleaning of entire godown premises, removal of all waste materials from the complex and cleaning of Alleyways & Gangways inside the godown chambers by sweeping on regular basis to avoid cross-infestation,
- Arrangement of lighting, ventilation etc. inside the chamber,
- Bagging of spillage rice on daily basis in Empty Gunny Bags (Palla bags),
- Filling of rat holes with stones, muds and cements with prescribed pest-control medicines,
- Informing the District Authority or WBSWC on any minor or major structural defects of roof, floors, ventilators and walls of the godown for undertaking repairing/renovations works as soon as possible to keep it storage worthy,

RECEIVING OF STOCKS:

- Disinfestation of godowns following the latest G.O./ SOP,
- Programme for receiving CMR should be given as per RRO validity dates issued to concerned Rice Millers.
- CMR should be received from authorized representatives of the Rice Mill on production of valid RRO and necessary entries in the portal.
- Sample should be drawn from each truck by the concerned Quality Control Trained Inspectorate staff for quality analysis so that only FAQ rice is received and the same should be recorded in relevant physical Registers and WQSC and Stack Cards.
- Stacks should be built according to stack plans. In case of deviations, necessary permission should be taken from District Authority.
- All necessary entries shall be done with utmost care in the godown management portal and shall be verified on regular interval.

MAINTENANCE OF STOCK:

- All chambers of godown should be opened on all days,
- Surface of the bags and the floor of the godown should be cleaned regularly,
- Purchase of all required medicines/ chemicals,
- QC treatment of the stock on a regular interval, as per prescribed G.O./ SOP,
- Categorization of the stock following the G.O.,
- Fumigation of stock as and when required,

DELIVERY OF STOCK:

- Delivery of CMR should be scheduled in accordance with DO dates,
- Stocks of rice should only be delivered to the authorized representatives of MR Distributors accordingly on production of valid DO,
- Sampling of delivered rice should be done in presence of authorized representatives of concerned MR Distributors or lifting agents by the QC Inspector during delivery operation,
- All necessary entries shall be done with utmost care in the godown management portal and shall be verified on regular interval,

- Requisition for Empty gunny Bags to be used as Palla Bags for at other godown which are not managed by WBSWC should be given in advance before starting of new KMS.

REGULAR INSPECTION:

- Inspections shall be done in regular interval following the SOP,
- DCF&S in at least one godown in each week, ADCF&S/SCF&Ss in at least two godowns in a week or following the SOP/G.O. in this respect,
- Noting shall be done through mobile App/ written report/ in registers lying in the godowns,
- Minor corrective measures shall be taken at the time of inspection itself

PHYSICAL VERIFICATION:

- PV is mandatorily to be done twice in a year, if not more,
- All other operations like receipt/ delivery of stocks shall be stopped at the time of PV,
- Presence of all staffs/ officials in connection with PV/ godown officials/ Handling Contractor/ Labourers shall be ensured,
- Opening/Closing balance as well as all stocks that has been received and delivered from the godown shall be verified from the date of last PV and talied with that PV report,
- PV report of all godowns shall be verified and finalized and updated with online records,
- In case of any mismatch, in online and physical stock, the DCFS shall immediately intervene and bring it to the notice of ITR Cell, if there is any technical glitch

(d) Inspection of Godowns

Checking stacks:

Stacking and space utilization:

- Only Block system of stacking should be resorted to,
- An internal layout (stack plan) for the storage of foodgrains shall be followed,
- Better circulation of air, condition of stocks and incidence of infestation shall be taken care of

Drawing up of stack plan:

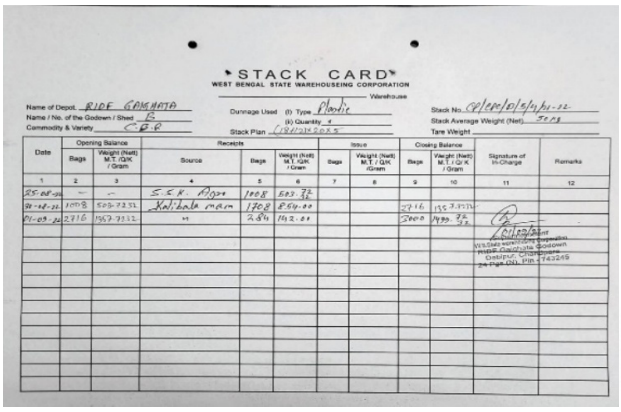
- Floor space should be divided into convenient blocks of rectangles or squares,
- Standard size recommended for a stack is 9.144 m x 6.090 m (30ft x 20 ft),
- Stack line should be drawn with white or yellow paint,
- Minimum of 75 cm (2 & 1/2 ft) wide space between stacks to serve as alleyways to facilitate inspections, aeration and disinfestation,
- In addition, gangways, 150 cm (5 ft) wide shall be provided for operation purpose,
- Total space left for alleyways, gangways, etc. may not, however, normally exceed 27% of the total floor area of the godown,
- Stack height shall be kept within 20 layers, i.e. 10 ft 3 inch,
- Standard sizes of the gas proof fumigation cover should also be kept in mind,

  Some of the standard sizes of stacks are as under:

  a) 9.144 m x 6.090 m (30 ft x 20 ft)
  b) 6.400 m x 6.486 m (21 ft x 18 ft)
  c) 5.486 m x 4.486 m (18 ft x 18 ft)
  d) 3.577 m x 5.486 m (12 ft x 18 ft)

Stack Card and Stack-wise Register:

- Each stack should have a separate stack card kept in a polythene jacket,
- Account of receipt and delivery of stocks is given on one side of the card while on the other side the condition of the grain and the disinfestation treatments given to the stocks from time to time are recorded.
- Corresponding entries shall also be made in the Stack-wise Register.



STACK CARD

WEST BENGAL STATE WAREHOUSEING CORPORATION

Warehouse

Name of Depot RIDF GAMHATA
Name / No. of the Godown / Shed B
Commodity & Variety C.B.R

Dunnage Used (i) Type Plastic
(ii) Quantity 4
Stack Plan

Stack No. 08/09/10/11/12
Stack Average Weight (Net) 50 KG
Tare Weight

Date	Opening Balance Bags	Opening Balance Weight (Nett) M.T. /Q/K / Gram	Receipts Source	Receipts Bags	Receipts Weight (Nett) M.T. /Q/K / Gram	Issue Bags	Issue Weight (Nett) M.T. /Q/K /Gram	Closing Balance Bags	Closing Balance Weight (Nett) M.T. /Q/K / Gram	Signature of In-Charge	Remarks
1	2	3	4	5	6	7	8	9	10	11	12
25.08.09	—	—	S.F.C. Agpt	1008	503.72						
31.08.09	1008	503.72	Kalitala main	1208	650.00			2216	1153.72		
01.09.09	2216	1153.72	"	284	142.00			2000	1295.72		

Front Side

DISINFESTATION RECORD

WEST BENGAL STATE WAREHOUSING CORPORATION

RIDF Gamhata Warehouse

Date of Inspection	Condition of Grains: Extent of Infestation (Whether Clear, Few or Heavy)	Condition of Grains: Nature of Infestation with pests per 500 gm Sample	Condition of Grains: Percentage of Weevilled, Discoloured and Damaged Grains	Category	Recommendations	Treatment Given: Extent & Nature of Infestation before Treatment	Treatment Given: Date of Treatment	Treatment Given: Nature of Treatment (Dusting / Fumigation / Spraying)	Treatment Given: Result of Treatments	Signature of Q.C.	Remarks
1	2 (a)	2 (b)	2 (c)	3	4	5 (a)	5 (b)	5 (c)	5 (d)	6	7
31.8.09	Few	2		B	Treatment with Deltamethrin.		31.8.09	Spraying	clear		
24.9.09	clear			B	Malathion		24.9.09	Spraying	clear		
15.10.09	clear			B	Treatment with Malathion		15.10.09	Spraying	clean		

Back Side

Some convenient stack plans:

- **Cross stacking (Criss-Cross Method):** 1st layer bags are lengthwise and the 2nd layer will be breadthwise. This contributes strength and stability. But the bottom most bags or lower layer bags cannot be lifted till all the bags above these are issued.

- **Block stacking**: Rows of length-wise and breadth-wise bags alternating each other side by side to form a block is made in this case. In two adjacent layers this system of length-wise and breadth-wise stacking of bags is reversed in each row. But in the 2nd layer above length-wise and breadth-wise bags are placed with opposite position, making a brick like bonding and strength. The advantage of this stacking is that the bags from the stack can be issued out in part by breaking one block without disturbing the adjacent block in the same stack.

Sampling

- Sample shall be representative,
- BIS method for sampling of Cereals and Pulses IS: 14818-2000 shall be followed,

Godown Inspection Checklist

A. BASIC INFORMATION OF THE ENQUIRY OFFICER AND ENQUIRY DATE – TIME ETC.

B. LOCATION: SITE & SURROUNDINGS

1) Name, type, capacity, area.
2) Details of surroundings with construction, boundary, drainage, infrastructure.
3) Hygiene issues.

C. STRUCTURE, DESIGN & MAINTENANCE

1. Walls, ceilings, floor, doors conditions,
2. Plinth height, platform etc.,
3. Ventilation issues
4. Lighting, cleanliness,
5. Weighbridge issues,

D. STORAGE FACILITIES & PRACTICES

1. Dunnage,
2. Alleyways/ gangways,
3. FIFO maintenance,
4. Palla bags,
5. Weighing facilities

E. PEST CONTROL

1. Signs of pest infestation,
2. Techniques of pest control (Prophylactic/Curative) and rodent control followed,
3. Stock and record keeping

F. FOODGRAINS IDENTIFICATION & TRACEABILITY

1. Use of Stack Cards, WQSC Stickers,
2. Effective traceability system and recall capability (for concerned Rice Mills)

G. **DOCUMENTATION AND RECORDS**

H. **VERIFICATION OF STOCKS ON THE DATE OF INSPECTION**

1. Stock details as per register,
2. Stock details as per online records,
3. PV reports and its evaluation as per stock (both offline and online),
4. Physical verification of each and every stock by the inspecting officer,
5. Final assessment.

(e) QC related issues & Usage of relevant modules

Introduction

Standard Operating Procedures (SOP) issued vide Memo no. 01-FS/Sectt./Food/4P-12/2021 (Pt. I) dated 03/01/2022 are to be followed correctly and without any exception in each and every godown that is under their supervision.

Personal hygiene in godown operation

- General and specific knowledge for any workplace in areas of hygiene and food safety,
- Personal hygiene: body hygiene, hand washing, clean dress code, periodical medical examination and health certification,
- Hygienic Habits and Conducts (Example respect of no-smoking zones, no spitting, etc.)
- Hygienic work practice,
- Knowledge on the sanitary requirements and conditions,

Pest Control

Factors and conditions that attract pests:

1. Physical and structural conditions of the warehouse
2. Hideouts
3. Accessibility
4. Environmental conditions
5. Temperature and humidity
6. Availability of food and water for the pest

Pest control programme should include information being imparted on:

1. Types of pests
2. Control areas and techniques
3. Indication of the positions of the equipment (traps, etc.) being used for pest control

Examples:

1. Hygienic measures: always maintain the doors of the warehouse closed, disposing off waste daily.
2. Physical measures: meshing and/or sealing of all the openings in the walls of the warehouse.
3. Mechanical means: traps, adhesives, etc.
4. Biological measures: traps with baits

Lot Traceability Plan: Maintenance of FIFO

Some Important guidelines related to Quality Control measures from the Standard Operating Procedures (SOP) vide Memo no. 01-FS/Sectt./Food/4P-12/2021 (Pt. I) dated 03/01/2022 of the Secretary to the Government of West Bengal, Food & Supplies Department.

REGARDING MAINTENANCE OF GODOWN:

1. Ensure cleanliness of the surrounding areas,
2. Prevention of water logging around the godown,
3. Removal of unwanted and broken furniture, old bags etc.
4. Proper lighting arrangement,
5. Checking of floor and walls for cracks/crevices and necessary repairing
6. Filling of Rat burrows should be closed with stones, mud and cement after fumigation with Aluminum Phosphide tablets,

REGARDING MAINTENANCE OF NECESSARY EQUIPMENTS:

1. Fire-fighting arrangements in workable condition
2. All equipment like Moisture meter, weighing devices, weighbridges etc. in working and calibrated condition, and within AMC.

REGARDING PREPARATION OF GODOWN BEFORE RECEIVING OF STOCKS:

1. Thorough cleaning of the godown,
2. Before receiving of stock, chemical treatment with pesticides as prescribed, (***combination of Malathion 50% EC + Deltamethrin 2.5 % WP (1:1)***,
3. Use of proper dunnage material [Polythene sheets (100 micron / 300 gauge in two layers)],

STIPULATIONS PERTAINING TO RECEIVING OF STOCKS: As mentioned in the above stated order

REGARDING GENERAL PRESERVATION PROCEDURE, QUALITY CONTROL TREATMENT PROCEDURES AND RODENT CONTROL MEASURES:

It is extremely important to keep the foodgrains clean, dry and free from insects for long storage. In order to do so regular maintenance and monitoring activity is needed. The stored food grains must be clean dry and CLEAR, i.e. completely free from insects.

("CLEAR" foodgrains means the lot is free from any living insects in a 500 g representative sample. "FEW" foodgrains means the lot has not more than two living insects in a 500 g representative sample. "HEAVY" foodgrains means the lot has more than two living insects in a 500 g representative sample.)

GENERAL PRESERVATION PROCEDURES:

1. Godowns are to be opened on regular basis for aeration and all stocks to be brushed properly, preferably on every alternate day *except on rainy and highly moist days*.
2. If the moisture content of the stored stocks is found to be higher than the normal / acceptable moisture content, the stock should be preferably aerated so that the moisture may be reduced *except on rainy and highly moist days*. This is to be done by keeping doors and ventilators open and also using exhaust fans.
3. The surface of bags in stacks should be brushed gently to remove dust, powders of foodgrains formed as a result of infestation, dead and living insects and webs. Dead insects and uric acid content should not exceed FSSAI limits (i.e., not more than 100 ppm).

4. Brushing of bags after fumigation is a must.
5. The QC Treatment / Pesticides Registers are to be maintained and updated on regular basis.
6. The insect-affected (Few or Heavy) stock should be separated from the Clear stock to check cross infestation.
7. The stacks should be cleared properly after disinfestations.
8. Quality Control Inspectors must ensure that the godown is equipped with necessary quality control treatment chemicals, fumigation cover and rodent control chemicals. In case of unavailability of quality control treatment chemicals / fumigation cover / rodent control chemicals, s/he must take up the matter with the higher authority on urgent basis.
9. Schedule of chemical treatment should be chalked out for prophylactic treatment as preventive measure for each godown in order to safeguard the quality of stock in the godowns. At the same time, godown Inspectors have to check the quality of received stock after 15 days of receiving and decide its quality in proper sampling and checking of a given stack. Accordingly, Categorization Registers are to be prepared.
10. The physical condition of the godown along with moisture content, degree of infestation is to be measured.
11. Based on category of stock, Priority Registers are to be maintained and updated on regular basis.

(Categorization of stocks as per GO No. 8697-FS dated 28/11/1996 is detailed below:)

Commodity (Rice)	Category	Percentage of Damaged grains	Percentage of Discoloured grains	Remarks
Parboiled/Raw	A	Up to 3%	Up to 3%	Issuable stock for delivery
Parboiled/Raw	B	Above 3% up to 4%	Above 3% up to 5%	Issuable stock for delivery
Parboiled/Raw	C	Above 4% up to 5%	Above 5% up to 7%	Issuable stock for delivery
Parboiled/ Raw	D	Appreciable quantity of loose bran (more than 5%) or giving obnoxious smell		Non-Issuable for delivery

QUALITY CONTROL TREATMENT PROCEDURES:

1. **During storing period:**

   Prophylactic Treatment: This is periodical, preventive and regular in nature.

   I) Malathion 50% EC (dilution 1:100) - to be treated once in every fortnight.

   Dosage - 3 litre solution per 100 square metre.

   II) Deltamethrin 2.5% w.p. (dilution 40 gram per litre) - once in 90 days.

   Dosage - 3 litre solution per 100 square metre.

2. **CURATIVE CONTROL MEASURES:**

   i) In case of heavy infestation like *khapra*, fumigation by using Aluminum Phosphide is to be used by covering the stacks with polythene covers. After polythene covering, the stacks are to be made air tight by mud plastering and the cover should be kept for at least 5-7 days.

   Dosage - 9 g (3 tablets each of 3 g) per MT and for chamber fumigation the dosage is 63 g / 28 c mt.

ii) In case of infestation, the insect affected (Heavy/Few) stock should be separated from clear stock to prevent cross infestation and immediate fumigation is to be undertaken.

iii) The entire fumigation should be done properly and entire stocks should become CLEAR as per classification after the fumigation.

iv) After chemical treatment, the bags of rice should be brushed properly. In case of treatment with Deltamethrin 2.5% w.p. the stock should be brushed only before delivery.

3. Rodent Control Measures should be taken, as and when required, by using rodenticides like Zinc Phosphide, Barium Carbonate, Redsquill, ANTU, etc.

REGARDING DELIVERY OF RICE:

1. FIFO (First In, First Out) has to be maintained strictly. All mandatory registers are to be maintained accordingly.
2. After killing the stack, all spillages should be collected and cleaned up to FAQ level before issuing them to PDS. These cleaned spillages are then to be kept in *palla* bags. These *palla* bags should be accounted for in the weight of the stocks in the stack.
3. Additional gunny bags are to be requisitioned in advance which are to be used as p*alla* bags.
4. Stocks are to be delivered only to the authorised representatives of Distributors and as per the terms of Delivery Order (DO), joint sampling by the authorised representative of the Distributor and the Godown Inspector is to be done when the stocks are issued.
5. Delivery Registers must be maintained properly.

CHEMICAL ANALYSIS:

1. **STIPULATIONS PERTAINING TO QUALITY CHECKING OF FORTIFIED RICE STOCKS:**

   A. Fortified rice consignments are to be checked by the Godown Inspectors i.e. Godown-in-Charge and Quality Control Inspector as per the existing procedure for analysis of food grains (BlS methods, read with updated amendments & FSSAI validated and approved methods). The Godown Inspectors must ensure that all bags of fortified rice received at their godowns bear blue coloured +F logo stenciled on it, as well as on rexin slips and the stocks are in compliance with other regulatory instructions suggested by FSSAI from time to time.

   B. For Qualitative and Quantitative tests of fortified rice, the provisions mentioned under the Standard Operating Procedure (SOP) for Quality Management Protocols for Fortified Rice Kernels (FRK) and Fortified Rice (FR) issued by the Govt. of India, Ministry of Consumer Affairs, Food & Public Distribution, Deptt. of Food & Public Distribution (Quality Control Cell) shall be applicable.

   Additionally, all the provisions of the Standard Operating Procedure (SoP) for monitoring the quality of food grain stocks procured under the Decentralized Procurement (DCP) Scheme dated 16/07/2021, shall also be applicable.

   C. The Godown Inspectors i.e. Godown-in-Charge and Quality Control Inspector should check the blending ratio of each consignment at the time of acceptance to ensure that the prescribed quantity of FRK is blended with the conventional rice to make it fortified. In case there is problem in physical separation, a chemical test (iron spot test) may also be done to identify the number of FRKs in a test sample of fortified rice.

BLENDING EFFICIENCY TEST (BET):

- Draw composite sample from the stocks of fortified rice received at the godown.

- From this composite sample, prepare a smaller 100 g sample.
- Identify the FRKs in this 100 g sample by visual examination or iron spot test.
- Segregate the FRKs from the sample.
- Weigh the FRKs segregated from the sample.

The offered lot of fortified CMR should be uniformly blended with FRK (1:100). The Tolerance Limit of Blending Ratio, as specified by FSSAI, ranges from -10% to +20%, i.e. 0.9 to 1.2 The Godown Inspectors may use this range for blending efficiency test for their operational ease.

Standard Operating procedure for Qualitative spot test of Iron in Fortified Rice:

This is a Qualitative test only. It detects whether iron is present or not. Quantitative details, including iron level and mixture homogeneity are beyond the scope of this procedure. Time required for this test is less than five minutes.

Equipment: Weighing Machine/Balance

Glassware:

1) 100 ml measuring cylinder (2 pcs)
2) 50 ml measuring cylinder (2 pcs)
3) 25 ml measuring cylinder (2 pcs)
4) 100 ml volumetric flask (4 pcs)
5) 100 ml glass beaker (4 pcs)
6) 250 ml conical flask (4 pcs)
7) 250 ml Amber colour glass bottle (for reagent storing) (2 pcs)
8) Plastic tray (round shape)/petri-dish (80×70)
9) Plastic dropper (1 packet) (4 pcs)
10) Distilled water-keeping bottle 250 ml (2 pcs)

Reagents or Chemical required:

1) Hydrogen peroxide (H_2O_2) (6.0% solution)
2) Potassium thiocyanate (KSCN)
3) Hydrochloric Acid (HCl)
4) Distilled water (laboratory grade)

Preparation of reagents/solutions:

Preparation of 10% Potassium thiocyanate (KSCN) solution:

- Take 10 g Potassium thiocyanate in a 100 ml volumetric flask. Add 100 ml distilled water in it. Shake vigorously until the total salt dissolves.

Preparation of 2N HCl (Hydrochloric Acid) solution:

- Take 83.0 ml distilled water in a 100 ml measuring cylinder. Add remaining 17.0 ml HCl to make the solution 100 ml. Keep this solution in a 100 ml volumetric flask with cap after gentle shaking.

Solution-1:

- Mixing of 10% KSCN solution and 2N HCl solution in 1:1 ratio.
- Take 20 ml 10% KSCN solution in a 50 ml measuring cylinder and add 20 ml 2N HCl solution in it. Keep this solution in a 100 ml beaker.

Solution-2:

Preparation of 3.0% Hydrogen peroxide (H_2O_2) solution

- Take 50 ml 6.0% Hydrogen peroxide solution in a 100 ml measuring cylinder. Add remaining 50 ml distilled water to make 100 ml. Keep the solution in a 100 ml volumetric flask with cap.

Procedure of testing:

- Take 50 g of fortified rice in a petri-dish/plastic tray.
- Pour the Solution-1 with the help of dropper on the fortified rice sample drop by drop. Make the fortified rice sample wet at several points, particularly where the FRKs are seen.
- Wait for 1-2 minutes.
- If needed, add Solution-2 drop by drop with the help of dropper.

Result observation:

- Fortified rice kernels will turn red to dark red indicating the presence of Iron fortification. Fortified rice kernels will turn black upon drying.
- If Solution-1 does not give satisfactory results, Solution-2 will indicate the presence of FRKs by coloration. Otherwise, fortification by iron has not been done.

2. Standard Operating Procedure of Mixed Indicator Method for determining the age of Raw Rice (CMR):

The Standard Operating Procedure (SOP) of Mixed Indicator Method (MIM) that should be followed for determining the age of milled rice stocks during acceptance of CMR Mill Raw Rice for procurement is detailed hereunder.

This method is helpful for the procuring agencies to put a check on possibility of acceptance of old rice, along with the various parameters of the Uniform Specifications. SOP of Mixed Indicator Method should also be implemented for determining the age of milled rice stocks during acceptance of CMR Milled Raw Rice for procurement.

Implementation:

Henceforth, all the raw rice consignments shall be subjected to another test i.e. Mixed Indicator Method for determination of age of milled raw rice stocks. As per instructions in vogue, a sample shall be drawn from the offered consignment and analysed in terms of FAQ specifications of GOI. If it is found conforming to the prescribed specifications, the samples would be tested through Mixed Indicator Method. In case the colour of the reagent comes out to be green/avocado green, the consignment would be accepted and any other colour like yellow, yellow orange & orange would be rejected terming the stocks as "Not freshly Milled".

Method of analysis:

Materials & Equipment:

(A) Glassware:

1. Volumetric flasks, amber coloured, 2 nos. of 250 ml each & 100 ml.
2. Graduated measuring cylinder (100 ml), Glass Made A-Grade,
3. Beaker (100 ml & 250 ml)
4. Test tube with stopper (5 no. of 25 ml),
5. Glass stirrer
6. Measuring pipette (2ml)

(B) Equipment's:

1. Balance (with 0.01-gram accuracy)

(C) Consumables:

1. Test tube racks (plastic made)
2. Distilled Water Bottle plastic (500ml)
3. Pipette Sucker (made of rubber)
4. Amber coloured Glass reagent Bottles (250 ml)

(D) Chemical Reagents:

1. Methyl red, analytic reagent (0.05 gram/depot)
2. Bromothymol blue, analytic reagent (0.15 gram/depot)
3. Ethyl alcohol, Absolute Grade (75ml/ depot)
4. Distilled water (10.00 litres)

Preparation of stock solution:

1. Weigh 0.05 gram of methyl red and 0.15 gram of bromothymol blue.
2. Dissolve the above indicators in 75 ml ethyl alcohol and add distilled water to make 100 ml.
3. Store in a cool and dark place and in an amber-coloured flask.

Preparation of working solution

Take an aliquot of stock solution and dilute with distilled water in the volume ratio 2:98. The prepared solution preferably be consumed in same or next day. Accordingly, working solution is to be prepared keeping in view the number of raw rice samples to be tested.

Procedure for staining method using pH indicators (working solution)

1. Weigh 5 grams of the raw rice samples
2. Place the sample in the test tube.
3. Add 10 ml of pH indicator (working solution) and shake well for one minute.
4. Note the resulting colour of solution (whether green/ avocado green/ yellow/ yellow orange /orange).

Interpretation of Test Results:

<table>
<tr><th rowspan="6">Samples subjected to Mixed Indicator Method</th><th>Colour change</th><th>As per standards</th><th>Results</th></tr>
<tr><td>Green</td><td rowspan="2">Freshly milled stock</td><td rowspan="2">Accepted</td></tr>
<tr><td>Avocado green</td></tr>
<tr><td>Yellow</td><td rowspan="3">Old stock</td><td rowspan="3">Not to be accepted</td></tr>
<tr><td>Yellow Orange</td></tr>
<tr><td>Orange</td></tr>
</table>

Precaution:

1. Keep away the chemicals from the face due to volatile nature of alcohol.
2. Avoid contact of the chemicals from eye, nose and skin.

Appeal Procedure:

Normal appeal procedure would be followed in case of rejection of consignment through this method.

Colour Coding for different age groups of rice:

Age of Rice in Months	Resulting colour of solution
0 month	GREEN
1 month	AVOCADO GREEN
2 months	AVOCADO GREEN
3 months	YELLOW
4 months	YELLOW ORANGE
5 months	ORANGE
6 months	ORANGE

3. DE-HUSKED GRAINS:

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

ANALYSIS PROCEDURE: - Take 5 grams of rice (sound head rice and brokens) in a petri dish (80x70 mm) Dip the grains in about 20 ml. of Methylene Blue solution (0.05% by weight in distilled water) and allow to stand for about one minute. Decant the Methylene Blue solution. Give a swirl wash with about 20 ml. of dilute hydrochloric acid (5% solution by volume in distilled water). Give a swirl wash with water and pour about 20 ml. of Metanil Yellow solution (0.05% by weight in distilled water) on the blue stained grains and allow to stand for about one minute. Decant the effluent and wash with fresh water twice. Keep the stained grains under fresh water and count the dehusked grains. Count the total number of grains in 5 g of sample under analysis. Three brokens are counted as one whole grain.

CALCULATIONS:

Percentage of Dehusked grains: $\frac{N \times 100}{W}$

Where, N = Number of dehusked grains in 5 g of sample

W = Total grains in 5 g of sample

i. The Method of sampling is to be followed as given in Bureau of Indian Standard "Method of sampling of Cereals and Pulses" No IS: 14818-2000 as amended from time to time.

ii. Brokens less than 1/8th of the size of full kernels will be treated as organic foreign matter.

For determination of the size of the broken average, length of the principal class of rice should be taken into account.

iii. Inorganic foreign matter shall not exceed 0.20% in any lot, if it is more, the stocks should be cleaned and brought within the limit. Kernels or pieces of kernels having mud sticking on the surface of rice shall be treated as Inorganic foreign matter.

In case of 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 encrustation of the grains.