

**Terms of Reference (ToR)**  
**for**  
**Research Project**

<b>Title</b>	<b>Study of the warehouse operations and services parameters to frame guidelines and requirements for agriculture produce warehousing service providers</b>
<b>Sectional Committee</b>	<b>Supply Chain Management Sectional Committee, SSD 18</b>
<b>Duration</b>	<b>04 months</b>

### **1 BACKGROUND**

The warehouse industry plays a crucial role in facilitating smooth transitions of agri produce for individuals and businesses, ensuring the secure handling and storage of goods. However, in the absence of Indian Standard, majority of the stakeholders are following their own standard operating procedures/guidelines which is leading to inconsistent and non-uniform service quality, potential risks, and challenges for both service providers and consumers. So, it is essential to study the current warehouse operations practices to establish a comprehensive and cohesive set of standards that promote professionalism, reliability, and transparency throughout the Warehouse Service Operations.

To maintain uniformity/consistency in warehouse operations services, it is important to undertake a study of the current warehouse operations and services parameters for agriculture produce warehouses for framing guidelines and requirements for the warehouse service providers. As the demand for warehouse services continues to grow globally, it becomes imperative to establish a robust framework that sets the benchmark for service excellence and customer satisfaction. BIS has published a series of agriculture standards which focuses on the storage of fruits, vegetables and food grains commodities. The list of these standards is attached as **Annex A** for information, however, the study requires focus on services aspects of warehousing for agriculture produce.

### **2 OBJECTIVE**

To collect and analyse the data from primary and secondary sources in regard to the warehousing operations and services in the country with respect to the agriculture produce.

### **3 SCOPE**

**3.1** Undertake study of existing literature which includes published research papers, study conducted by any other organization, Standard Operating Procedures (SoPs), best practices, international standards/standards of NSBs of foreign country, if any.

**3.2** Comparative analysis of data collected on parameters given in para **3.1**.

**3.3** Identification of the warehouse service providers w.r.t large, medium and small scale as per the sampling plan given in **3.4** to study the following:

- a) Classification of Services
- b) Statutory and Regulatory Requirements
- c) Warehouse Requirements (Equipment, Infrastructure and Resources)
- d) Requirements for Deposit of Goods
- e) Requirements for Storage of Goods
- f) Requirements for Delivery of Goods
- g) Requirements for Safety and Security of Goods/Stock
- h) Grievance redressal Mechanism
- i) Roles and Responsibilities of Employees
- j) Safety and security protocols
- k) Training, Competence and qualification of Personnel
- l) Maintenance requirements (covering maintenance plan, checklist for critical requirements for maintenance, equipment required for maintenance)
- m) Traceability of Goods
- n) Documentation Requirements
- o) Use of IT tools for data processing and modeling
- p) Sustainable practices adopted by the service provider

**3.4** Conduct visits as per the sampling plan given below:

Type	Number of Agriproducts Warehouses to be visited	Data to be Collected
Large Scale Service Providers	2	As per para <b>3.3</b>
Medium Scale Service Providers	2	As per para <b>3.3</b>
Small Scale Service Providers	2	As per para <b>3.3</b>
Bulk Consumers/ Users	2	Feedback through structured questionnaire.

**3.5** Prepare an analytical report covering the details mentioned in para from **3.1** to **3.4**.

#### **4 RESEARCH METHODOLOGY**

The development of the standards should follow a structured methodology that includes, but not limited to, the followings:

- a) Review of the literature as mentioned in para **3.1**.
- b) Collection of feedback through circulation of questionnaire.
- c) Conduct visits as mentioned in para **3.4**. After identification of warehouses to be visited, take consent of BIS before proceeding further.
- d) Witness and observe the requirements given in para **3.3** during the visits.
- e) Focused group discussions after the visits to analyze and comparative analysis of the collected data.
- f) Prepare a report based on the findings and data collected as per para **3**.

## **5 DELIVERABLES**

An analytical report containing information/data as mentioned in **3** along with the covering evidence containing statements, questionnaire, details of interviews, outcome of consultation with experts and data collected during literature review and visits. Hard as well as soft copy of the report shall be submitted within the timeframe.

## **6 TIMELINE AND METHOD OF PROGRESS REVIEW**

The time frame of completing the study and submitting the final report is 4 months from the date of the award of the project.

### **Stage wise timelines:**

- a) Interim Report covering the review of the literatures, existing stipulations and visits plan for approval of BIS – within 1 months from the date of award of project from BIS.
- b) Report of site visits by end of 2 months from the date of award of project from BIS.
- c) Draft project report covering all the aspects of the ToR – By end of 3 months from the date of assignment received from BIS.
- d) The researcher taking up the project shall clear all doubts on provisions of research including ToR and BIS guidelines before acceptance.

## **7 BIS Support**

**7.1** BIS will provide access to latest editions of Indian and International Standards as identified by the researcher.

**7.2** BIS will facilitate assistance and introduce the research project to research organizations, government departments, and Industries/Service Providers.

## **8. NODAL PERSON**

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Services Sector Department

Bureau of Indian Standards

## Annex-1

(Para 1, Informative)

### Published Indian Standards on Agriculture Commodities

Sl No.	IS No.	Title
1	IS 7192 : 2022	Citrus Fruits - Guide for Storage
2	IS 7730 : 2022	Guide for storage of pears
3	IS 7731 : 2021	Guide for Storage of Peaches
4	IS 9304 : 2022	Guide for Storage and Ripening of Mangoes
5	IS 9311 : 2021	Guide to Storage of Onions
6	IS 16119 : 2013 / ISO 7562 : 1990	Potatoes - Guidelines for storage in artificially ventilated stores
7	IS 16120 : 2013 / ISO 5525 : 1986	Potatoes - Storage in the open (In Clamps)
8	IS 6028 : 2002 / ISO 931:1980	Green bananas - Guide to storage and transport
9	IS 6669 : 2001 / ISO 1212:1995	Apples - Guide to cold storage
10	IS 6670 : 2018	Storage of potatoes - Guidelines
11	IS 7191 : 2001 / ISO 5524:1991	Tomatoes - Guide to cold storage and refrigerated transport
12	IS 7252 : 2013 / ISO 2169 : 1981	Fruits and vegetables - Physical conditions in cold stores - Definitions and measurement
13	IS 9303 : 2021	Guide for cold storage of Table Grapes
14	IS 11966 : 1997 / ISO 6663:1995	Garlic - Cold storage
15	IS 15691 : 2006	Guidelines for storage and transportation of bamboo shoot
16	IS 16118 : 2013 / ISO 6665 : 1983	Strawberries - Guide to cold storage
17	IS 609 : 2020	Improvement of Existing Structures Used or Intended to be Used for Food Grain Storage — Code of Practice
18	IS 631 : 1979	Specification for outdoor aluminium food grain storage bins
19	IS 5503 : Part 1 : 1969	General requirements for silos for grain storage: Part 1 constructional requirements
20	IS 5503 : Part 2 : 2020	General Requirements for Silos for Grain Storage Part 2 Grain Handling Equipment and Accessories
21	IS 5606 : 1970	Specification for steel bins for grain storage
22	IS 6151 : Part 1 : 2020	Storage Management Code Part 1 Terminology
23	IS 6151 :Part 2 : 1971	Storage management code: Part 2 general care in handling and storage of agricultural produce and inputs

24	IS 6151 :Part 3 : 1976	Storage management code: Part 3 specific care in handling and storage of agricultural produce and inputs
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Sl No.	IS No.	Title
25	IS 7147 : Part 1 : 1973	Specification for steel bins for domestic storage: Part 1 gharelu kothl
26	IS 7715 : 1975	Method for testing suitability of bins for safe storage of food grains
27	IS 8453 : 1977	Code of practice for construction of polyethylene embedded earthen bins for bulk storage of foodgrains
28	IS 9215 : 1979	Specification for outdoor steel bins for foodgrain storage
29	IS 11396 : 1985	Test methods for determination of storability (Safe Storage Life) of foodgrains
30	IS 11816 (Part 1) : 2010/ ISO 6322 Part 1:1996	Storage of cereals and pulses: Part 1 general recommendations for the keeping of cereals
31	IS 11816 (Part 2) : 2009/ ISO 6322 Part 2:2000	Storage of cereals and pulses: Part 2 practical recommendations
32	IS 11816 : Part 3 : 2018 ISO 6322-3:1989	Storage of cereals and pulses: Part 3 control of attack by pests
33	IS 12529 : 1988	Storage of foodgrains - Storage losses by insects - Methods for estimation
34	IS 16144 : 2014	Foodgrain storage godowns - Code of practice
35	IS 7247 : Part 1 : 1974	Code of practice for fumigation of agricultural produce: Part 1 methyl bromide
36	IS 7247 (Part 3) : 2023	Code of practice for fumigation of agricultural produce: Part 3 aluminium phosphide
37	IS 7247 : Part 4 : 1975	Code of practice for fumigation of agricultural produce: Part 4 ethylene dichloride and carbon tetrachloride mixture
38	IS 7247 (Part 5) : 2023	Code of practice for fumigation of agricultural produce: Part 5 general requirements
39	IS 10017 : 1981	Code of practice for construction of cocoa beans storage structures
40	IS 16891 : 2018	Green coffee - Guidelines for storage and transport
41	IS 6399 : 2023	Code of practice for construction of coffee seed storage structures
42	IS 5686 : 1970	Code of practice for handling and storage of oilseeds
43	IS 6558 : 1972	Code of practice for cold storage of shell eggs