
प्याज की आपूर्ति श्रृंखला — दिशानिर्देश
Supply Chain of Onions —
Guidelines

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FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Supply Chain Management Sectional Committee had been approved by the Service Sector Division Council.

Onion is an important horticultural commodity which is grown worldwide for culinary purposes and its medicinal values. India is the second largest producer of onion in the world and a traditional exporter of fresh onion. An increase in production has little value unless there is a good marketing system and therefore a uniform approach towards supply chain of onion is necessary. This standard has therefore been formulated with a view to facilitate a uniform supply of onions in the domestic market. The standard would also be helpful to the stakeholders in regulating the supply of onions and minimizing the abnormal increase in price in different seasons.

This standard provides guidance to the stakeholders involved in the supply chain of onions to reduce the losses during post-harvest operations including curing, sorting, grading, packaging, procurement, handling, storage, transportation, and distribution of onions. This standard would help to ensure efficient and effective system of onion supply throughout the country.

While formulating this standard, assistance has been drawn from the documents published by National Agricultural Cooperative Marketing Federation of India Limited (NAFED) and the Agmark standard related to quality of onion, published by Department of Marketing and Inspection, Ministry of Agriculture and Farmers Welfare.

The composition of the committee, responsible for the formulation of this standard is given at Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2: 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SUPPLY CHAIN OF ONIONS — GUIDELINES

1 SCOPE

This Indian standard specifies the guidelines for supply chain of detopped onion bulb (*Allium Cepa* L) covering post harvesting operations including curing, sorting, grading, packaging, procurement, handling, storage, transportation, and distribution of onions.

2 REFERENCES

The following standard contains provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the edition indicated was valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
IS 9311 : 2021	Guide to storage of onions
IS 3790 : 1991	Textiles — Hessian bags — Specification

3 TERMS AND DEFINITIONS

3.1 Customer — Person or organization that could or does receive a product or a service that is intended for or required by the person or organization.

Example: Customer, client, end user, retailer, receiver of product or service from the internal process; a beneficiary; or a purchaser. A customer can be internal or external to the organization.

3.2 Conformity — Fulfillment of a requirement.

3.3 External Provider — External supplier or provider that is not part of the organization.

3.4 Infrastructure — System of facilities, equipment and services needed for the operation and management of supply chain of onions.

3.5 Monitoring — Observing and checking a system, a process, a product, a service or an activity over a period of time.

3.6 Nonconformity — Non-fulfillment of a requirement.

3.7 Onion — The de-topped cured onions.

3.8 Pack House — Combination of buildings and other installations such as machinery, gear, workers, and techniques which support the process of converting harvested farm-fresh onions into market-ready packages.

3.9 Practically Free — Without pests (or a specific pest) in numbers or quantities in excess of those that can be expected to result from, and be consistent with, good cultural and handling practices employed in the production and marketing of the onions.

3.10 Requirement — Need or expectation that is stated, or implied.

3.11 Service — Output of a group or society or an organization with at least one activity necessarily performed between the supplier and the customer.

3.12 Supply Chain — The physical, financial and information networks that involve the movement of onions, funds and related information through the full logistics process, from the acquisition of onions to delivery to the end user.

NOTE — The supply chain includes all vendors, service providers, customers and intermediaries.

3.13 Wholesaler — A person or whole set of a body or an organization that has processes, activities, means and resources necessary to provide services for procurement, handling, storage, transportation, distribution of onions in large quantity and resells.

4 GENERAL PROVISIONS

The onion producer/supplier/wholesaler should establish, implement, operate and maintain supply chain of onion and should ensure the following:

- a) The quality of onions at source/procurement centre to be monitored;
- b) Safe disposal of residues, adopting appropriate methods and/or processes;
- c) Compliance of IS 9311 for handling and storage of onions;
- d) Determine the resources needed for these processes and ensure their availability; and
- e) Assign the responsibilities to the concerned for the important processes appropriately.

5 LEGAL, STATUTORY AND OTHER REGULATORY REQUIREMENTS

The onion producer/supplier/wholesaler should ensure to implement all the legal requirements and other applicable requirements issued by the government from time to time. It should be ensured to communicate relevant information on legal and other applicable requirements to its employees and other relevant third parties including contractors.

6 COMMUNICATION

The onion producer/supplier/wholesaler should determine and ensure that an adequate internal and external communication system relevant to the onion supply chain is in place. It should also be ensured that the communication with farmers/local traders is done effectively as per 8.1.4.

7 RESOURCES

7.1 Infrastructure

The onion producer/supplier/wholesaler should determine, provide and maintain the infrastructure necessary for the operation of its processes and ensure that:

- a) onion establishment be located away from environmental pollution, industrial activities and other such activities,

- i) that produce disagreeable or obnoxious odour, fumes, excessive soot, dust, smoke, chemical or biological emissions and pollutants,
- ii) that pose a threat of contaminating onions,
- iii) that are prone to infestations of pests, and
- iv) where wastes, either solid or liquid, cannot be removed effectively;

- b) construction, design and layout of storage premises should be in the manner that neither permits the entry of pests nor provide harbourage for pests; and
- c) equipment, premises and containers are kept in good condition as to minimize any risk of contamination.

NOTE — Infrastructure may include,

- a) warehouses;
- b) equipment, including hardware and software;
- c) transportation resources; and
- d) information and communication technology (ICT) tools and systems.

7.2 Persons/Workforce

The onion producer/supplier/wholesaler should determine and provide the persons necessary for the effective implementation of its supply chain of onion and for the operations and control of processes.

7.3 Competence

The onion producer/supplier/wholesaler should:

- a) determine the necessary competence of person(s) doing work under its control that affects the performance and effectiveness of the supply chain of onions;
- b) ensure that these persons are competent on the basis of appropriate education, training and experience;
- c) take actions to acquire the necessary competence, wherever applicable; and
- d) retain appropriate documented information as evidence of competence.

NOTE — Applicable actions can include, for example, the provision of training to, the mentoring of, or the reassignment of currently employed persons; or the hiring or contracting of competent persons.

7.4 Environment for the Operation

The onion producer/supplier/wholesaler should determine, provide and maintain the environment as well as hygienic conditions necessary for the operation of its processes and to ensure conformity of onions as per the acceptable limits. For guidance, refer Annex A for the quality requirements of onions.

The onion supplier/wholesaler should ensure the safety of its workforce and should periodically assess the safety measures including availability of first aid kits, arrangement for fire safety at the site of procurement. First aid kit should contain at least cotton, band-aid, sterilized cotton bandages, antiseptic liquid, ORS and other items as deem fit.

NOTE — A suitable environment can be a combination of human and physical factors, such as:

- a) social (non-discriminatory, calm, non-confrontational);
- b) psychological (stress-reducing, burnout prevention, emotionally protective); and
- c) physical (temperature, heat, humidity, lighting, ventilation, hygiene, noise control).

7.5 Monitoring and Measuring Resources

7.5.1 General

The onion producer/supplier/wholesaler should determine and provide the resources needed to ensure valid and reliable results when monitoring or measuring is used to verify the conformity of requirement of services given in the standard. Adequate measures for surveillance of onions quality during storage and distribution system should be instituted.

The onion producer/supplier/wholesaler should retain appropriate documented information as of fitness for purpose, of the monitoring and measurement resources.

7.5.2 Measurement Traceability

In order to provide confidence in the validity of measurement results, onion producer/supplier/wholesaler should arrange calibration of measuring equipment at specified intervals against measurement standards traceable to international or national measurement. The measuring equipment should be calibrated and a

list of such equipment along with their records of calibration should be maintained as documented information.

8 OPERATION

8.1 Identification of *Mandi*/Procurement Centre for Procurement of Onions

8.1.1 The farmers may use the electronic platform of national agriculture market (eNAM) or any mobile application approved by the government.

NOTE — For example, kisan rath which is an online trading platform for agricultural commodities in India and helping the farmers and traders for better price and providing better services and facilities for smooth marketing of their produce.

8.1.2 The onion supplier/wholesaler should identify *Mandi*/procurement centre. The purchaser should specify and communicate to the farmers about the tentative quantity to be procured through each procurement centre based on their requirements and infrastructure. Agencies may also be appointed by onion supplier/wholesaler for procurement of onions at *Mandi*/procurement centre. The onion supplier/wholesaler should verify the infrastructure and related support for procurement of onions available with such agencies. The legal document in the form of agreement should be signed by the onion supplier/wholesaler with the appointed agency to ensure that all activities are performed to meet all the requirements of this standard.

8.1.3 Infrastructure at the Procurement Centre

8.1.3.1 The onion supplier/wholesaler or appointed agency engaged in procurement of onions should organize all the required infrastructure at the procurement centre, which may include adequate working space having sufficient sheds, weighing scales, stationery and computers for keeping records of the procurement and temporary storage, if required, or any other equipment required.

8.1.3.2 If loose onions are being received, the onion supplier/wholesaler/appointed agency should organize for gunny bags, *Sutli*, etc in adequate quantity for packing of onions.

8.1.3.3 Infrastructure at the procurement centre should be created as per the rules and regulations defined under respective state *APMC Act*.

8.1.3.4 The onion procurement centre should have modern amenities and facilities. Refer Fig. 1 for the preferable system for modernization of onion procurement centre.

8.1.4 *Communication with Farmers/Local Traders*

The onion supplier/wholesaler or appointed agency should inform the farmers/traders about nearby area of procurement centre and share the procurement process in advance including the period of procurement and quantity to be procured by the centre. The farmers/traders should be communicated through *Gram Panchayat*/posters or announcements regarding the location and in-charge of procurement centre.

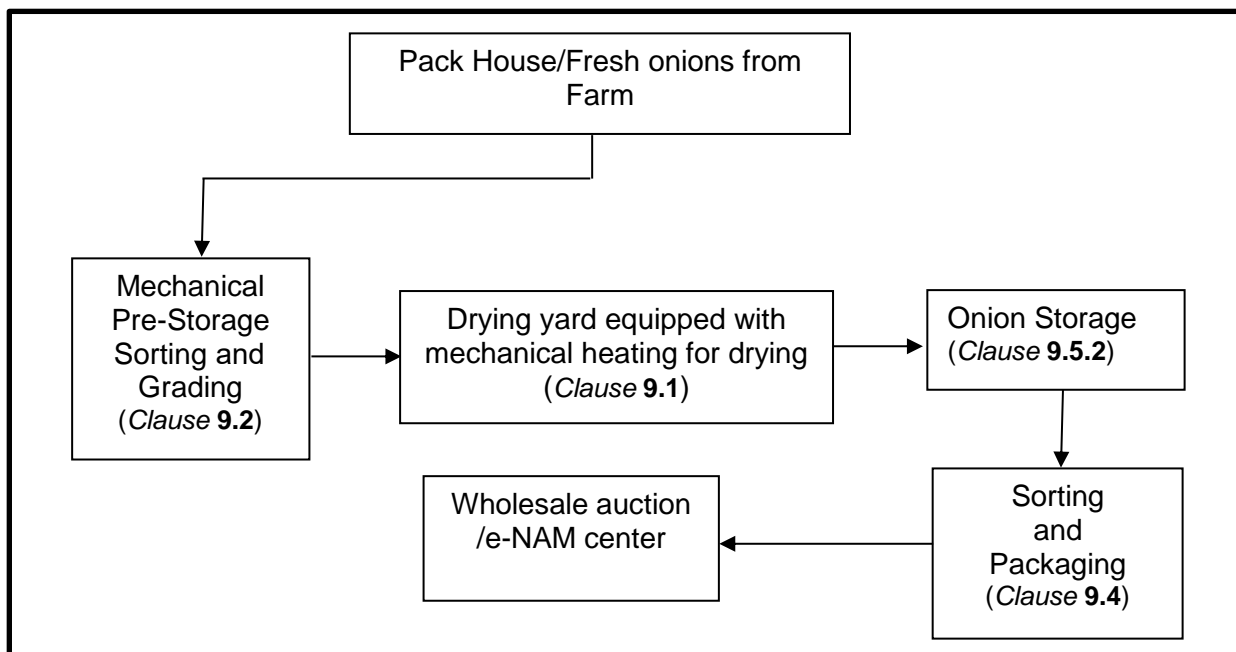


FIG. 1 SCHEMATIC DIAGRAM DEPICTING TYPICAL PROCESS FLOWCHART IN A MODERN PROCUREMENT CENTRE

8.1.5 *Determination of Requirements for Onions and Related Services*

The onion supplier/wholesaler or appointed agency should ensure that relevant documented information regarding requirements for procurement, handling, transportation, storage and distribution are determined including any applicable statutory and regulatory requirements and communicated to all concerned. The relevant persons should be made aware of the changed requirements, if any.

8.2 *Control of Externally Provided Processes and Services*

8.2.1 *General*

The onion supplier/wholesaler should determine

and apply criteria for the evaluation, selection, monitoring of performance, and re-evaluation of external providers including agency appointed for procurement of onions, based on their ability to effectively handle the onions, processes involved and services in accordance with the requirements of this standard. The onion supplier/wholesaler should retain documented information of these activities including list of selected external providers and any necessary actions arising from the evaluation.

8.2.2 *Type and Extent of Control*

The onion supplier/wholesaler should ensure that due to externally provided processes, supply chain related services do not adversely affect the onion supplier/wholesaler’s ability to consistently deliver services for supply of onions

to its customers.

The onion supplier/wholesaler should:

- a) take into consideration,
 - i) the potential impact of the externally provided processes related services and their ability to consistently meet customer and applicable legal requirements; and
 - ii) the effectiveness of the controls applied by the external provider.
- b) ensure that externally provided processes remain within the control of the supply chain services; and
- c) determine the criteria for evaluation of activities necessary and verification at regular interval to ensure that the externally provided processes, and related services meet the requirements of this standard.

8.2.3 Information to External Providers

The onion supplier/wholesaler should communicate to external providers about its requirements for:

- a) the processes, onion quantity and quality, and related services to be provided;
- b) the approval of,
 - i) onion quality and associated services,
 - ii) methods, processes and equipment, and
 - iii) the procurement of onions and related services;
- c) competence, including any required qualification of persons involved in the processes;
- d) interactions with the farmers/traders;
- e) method and criteria for evaluation of performance of external provider; and
- f) verification or validation activities that the onion supplier/wholesaler, or its customer, intends to perform at the external providers' premises.

9 ONION AND RELATED SERVICES

9.1 Curing and Drying

9.1.1 In order to achieve long storage, it should be ensured that the onion bulbs are cured appropriately. The process of curing should ensure that the necks and outer scale leaves of the bulb are dried off adequately to prevent the loss of moisture and the attack by decay during storage.

9.1.2 The curing should be in appropriate heat and good ventilation and preferably with low humidity. Onions should be considered cured when neck is tight and the outer scales are dried until they rustle. This condition is generally considered as reached when bulbs have lost about 5 percent of their weight. In case bulbs cannot be dried in the field, the bulbs should be collected in trays and then stacked in a warm, covered area with good ventilation.

9.1.3 In cool, damp climates, onions in bulk-ventilated stores should be dried with artificial heat blown through the bulk at a duct temperature of 30°C. Onions may also be cured by tying the tops of the bulbs in bunches and hanging them on a horizontal pole in well-ventilated shades as curing in shade improves bulb colour and reduces losses significantly during storage.

9.2 Sorting and Grading

Before transportation for marketing or storage, manual or automatic grading and sorting of onions should be done to reduce losses during storage as injured and decayed bulbs may harm the healthy onions of the lot. Based on the demand of customer/local market, onions should be graded based on their size, colour, etc and it is ensured that the bulb is:

- a) reasonably uniform in shape, size colour and pungency of the variety/type;
- b) mature, solid in feel, reasonably firm with tough clinging skins;
- c) throughout cured and dried;
- d) free from dust and other foreign material;
- e) free from defective, diseased, decayed and damaged bulbs;
- f) free from dry sun scald burn, sprouting, mechanical or other injuries and staining; and
- g) free from moulds, soft rot and insect attack.

NOTE — The sorting and grading of onions should be done based on requirements of variety, size, colour given in the guidelines issued by the supplier/wholesaler.

9.3 Onion Procurement

Farmers/traders may bring stock in loose/packed form in tractor trolley/other vehicle at the procurement centre. Alternatively, the onion supplier/wholesaler may also procure onion from the field of the farmers.

The onion supplier/wholesaler or appointed agency should verify the quality of onions as per the guidelines set for procurement and accept the material after weighment.

The quality requirements for onions may be decided by the Onion supplier/wholesaler and should be communicated to the farmer/local trader in advance. For guidance, refer Annex A for the quality requirements of onions.

9.3.1 Procurement Centre

The procurement centre should ensure that:

- a) constant monitoring mechanism of procured onion should be put in place as to minimize the by-product losses;
- b) weighing arrangements along with certified standard weights are available and receipts are issued to the farmer/trader;
- c) system is in place for daily reporting to management of onion supplier/wholesaler indicating quantity purchased and financial details relevant to procurement;
- d) control room is set up which should remain functional throughout the operation of procurement for monitoring and supervision as well as for receiving complaints/grievances and their redressal with proper recording of receipt of such complaints;
- e) name and contact number of centre in-charge, is prominently displayed at procurement centre;
- f) by-product obtained during sorting/grading of onions are disposed as per 9.3.3; and
- g) prior to storage, bulbs are cleaned and graded, and all damaged or diseased bulbs are removed.

9.3.2 Cleaning

The impurities, soil or other foreign materials, which may materially alter the appearance or quality of bulbs should be removed and badly affected produce should be discarded. Cleaning may be carried out using air or by manually removing unwanted materials on the bulb surface. Care should be taken to avoid physical harm to the bulb during these operations.

9.3.3 Disposal of By-product Obtained During Sorting/Grading of Onions

The onion supplier/wholesaler should arrange disposal of by-product through open auction at spot of sorting/grading itself and in case of waste/damaged products, the same should be disposed by adopting standard procedures stipulated for sustainable organic waste disposal.

9.4 Packaging

9.4.1 The packing should be small for easy handling during transit, however may vary according to market demand and customer requirements. Onions should be packed in such a way as to protect the produce properly and are free from all foreign matter. The bags used for packaging of onions should be cleaned adequately from inside and should be of a quality such as to avoid causing any external or internal damage to the onions.

9.4.2 The packing of procured onion should generally be made in environment friendly wide meshed hessian cloth new bag conforming to IS 3790 and preferably 45 kg of the capacity or as decided by the onion supplier/wholesaler. Being helpful to reduce storage losses, polypropylene net woven bags (leno bags), suitable for packing weights from 5 kg to 50 kg may also be used for packaging of onions. The bags used for packing of onions should meet the following criteria:

- a) The bag should be strong enough to retain the required weight of onions during transport and storage; and
- b) The bags should allow sufficient ventilation for the air around the bulbs to maintain temperature and relative humidity in the required range.

The standard specifications of wide meshed jute (hessian) bags used for packing of onion may be as under:

- a) Type of jute bag: New jute hessian bag;
- b) Capacity: 45 kg;
- c) Dimensions: 0.6 x 1 m;
- d) Weight: 220 g;
- e) Stitching: Herakle, sewn by jute twine/jute yarn; and
- f) Packing: Iron bound bale 500/1 000 bags in a bale.

incorporate suitable IT tools and should devise a suitable coding system to be marked on packaging for identification/traceability of onions preferably containing the location of farmer/*Mandi*/procurement centre, date of procurement, quality (grade, size, colour), weight, logo of procurement agency, etc. A low-cost real-time system as given in Fig. 2 may be preferred.

9.4.3 The onion supplier/wholesaler should

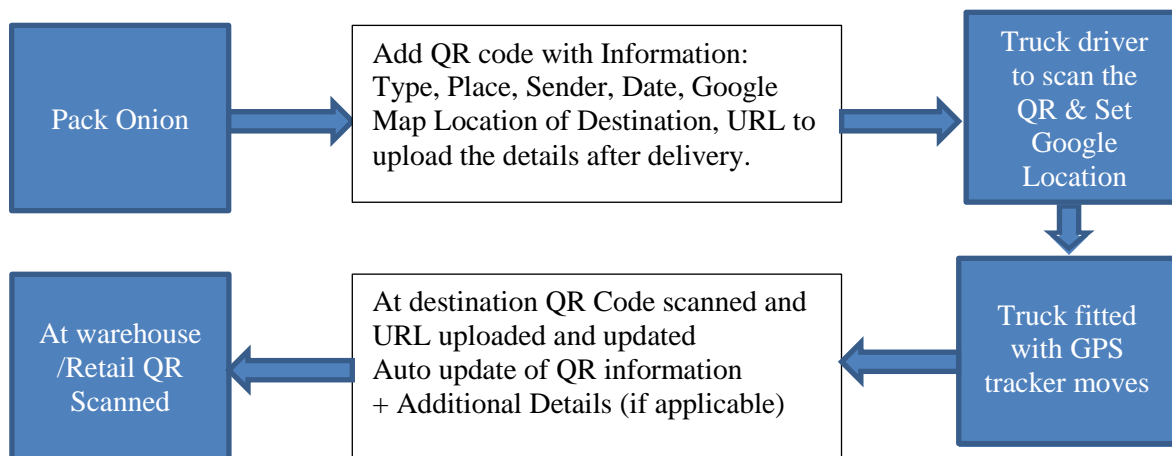


FIG. 2 TYPICAL ILLUSTRATION OF USE OF TECHNOLOGY TO TRACK AND TRACE ONIONS IN STORE AND TRANSIT

9.5 Weighment and Storage

9.5.1 Weighment of the Onions

The warehouse person should adopt the practices to ensure that the negotiable warehouse receipts preferably in electronic form are issued accurately stating the quantity and quality of the deposited onions.

The following procedure should be adopted:

- a) The entire lot of the onions to be stored should be weighed before being stored inside a registered warehouse;
- b) The warehouse person should ensure that the record of the weighment of the goods to be stored cannot be tampered with or altered;
- c) In case where the warehouse does not have its own lorry weighbridge, it should have platform scales of requisite capacity and in sufficient numbers;
- d) If the warehouse does not have its own lorry weighbridge, and the weighment is

taken at an external weighbridge, the warehouse person or authorized official should supervise the weighment of the onions at such external locations as well as during transportation to the warehouse;

- e) The recorded weight of the onions during storage should be communicated to and got authenticated by the depositor or its authorized representative; and
- f) The standard weights, weighing scales or weighbridge used for weighment of goods should be available in the warehouse. In case weighing facilities are not available in the warehouse or out of order, the facilities available externally should be used. These standard weights, weighing scales or weighbridge should be periodically verified and stamped by Department of Weights and Measures. Same mode of weighment should be resorted both during deposit and delivery of goods in a warehouse.

9.5.2 Storage of Onions

The storage of onions should be in accordance with IS 9311 and operated in such a manner to minimize losses from physical, physiological, and pathological agents. In addition to the guidelines mentioned in IS 9311, the following precautions should be taken during storage of onions:

- a) Turning of onion is required at 3 month interval in ventilated storage structures. In case storage structure starts emitting foul smell, turning of onion should be carried out earlier to remove rotten, damaged and sprouting bulbs;
- b) During rains, structures may be protected with plastic sheet to prevent splashing;
- c) Avoid spraying or dusting of hazardous pesticide on the stored onions;
- d) General maintenance of storage premises should be done before storage and no structural maintenance should be allowed during the storage of onions;
- e) Trash and onion waste disposal system should be in place;
- f) The warehouse person should check the godowns regularly for any leakage in the roof, gaps in the walls/window/ventilator pans allowing entry of rain water or entry of birds;
- g) Vegetative growth in the warehouse's premises should be removed at periodical intervals and the premises kept free from reptiles, bird nests, rat burrows, etc;
- h) Adequate arrangements should be available to deal with any emergency situation including outbreak of fire in the premises of storage;
- j) The adequate lighting arrangements should be available in warehouse premises; and
- k) Before storage of onion, storage structure should be cleaned and disinfected. It is recommended to disinfect with spray of 2 percent carbendazim or fumigation of sulphur.

NOTE — The storage reservoirs may be located at key points to take advantage of natural physical topography, or for reasons of balancing supply and demand or for emergency situations.

9.6 Transportation

9.6.1 As the onions are generally transported by

means of ship, road and rail, the conveyances and/or containers used for transporting should be kept ventilated, clean and maintained in good condition to protect from contamination and should be designed and constructed such as to permit adequate cleaning and/or disinfection. Not more than 12 bags should be stowed on top of one another, as too great a stack height leads to bruising and excessive heating which may lead to more losses than usual limits. It should also be ensured that the bags stacking should fill not more than three-fourth of the volume of the vehicle.

9.6.2 Non-Refrigerated Transportation

9.6.2.1 In case where transportation time is less than five days, the onions should be transported by road/rail at ambient temperature and humidity, however, the vehicle should be covered suitably to protect the consignment from rain/thunderstorm/contaminations, etc during transportation; and

9.6.2.2 In case of transportation time is more than five days, adequate ventilation (60 to 90 circulations per hour, and at least one complete air change per 12 h) at ambient temperature is essential to prevent a buildup of excessive humidity in the load, which may lead to initiation of rooting. It should be ensured that there is at least 150 mm of clear space between the top of the load and the roof of the container, to allow air movement.

9.6.3 Refrigerated Transportation

In case, transportation time of the consignment is more than 10 days, onions should be transported at low temperatures in conventional vessels, or in containers. Optimum conditions during such transportation should be a temperature of (0 to 2)°C and relative humidity of 65 to 70 percent, with a high air circulation rate of 60 to 90 complete circulations per hour, and one complete air change per 12 h. Modern integral reefer containers with in-built dehumidifying capacity may also be used to maintain a relative humidity of 65 percent to 70 percent.

9.7 Distribution

The following steps should be taken for efficient distribution of onions:

- a) The onion stock stored in ventilated stores and controlled atmosphere stores

- should be labeled as per date of storage, date of harvesting, farmers details and other traceability features. The suitable coding system as per 9.4.3 may also be adopted.
- b) Retrieval of stock for distribution should be on first in first out (FIFO) basis.
 - c) Mapping should be done in advance for deficient markets and consumption centers.
 - d) The onion producer/supplier/wholesaler should maintain proper action plan for distribution of onions and ensure efficient transport distribution channel of onions.
 - e) Requirement of each consumption centers from April till December should be worked out in the action plan.
 - f) Action plan should indicate the dates on which supply is to be made and quantity to be supplied to each center.
 - g) Advance booking of transport should be done for each date and destination.
 - h) The duration of transportation time to the destination should be factored in the distribution.
 - j) The action plan should also factor the holidays and festivals on which mandis are not working at the destination
 - k) Before transportation, grading of stock should be done to remove diseased and sprouted bulbs.
 - m) Reheating of onion should be done in case of controlled atmosphere storage before dispatch to market/consumption centre.
 - n) Transportation should be done in well ventilated trucks for long distance beyond 500 km.
 - p) The Good Receipt Note (GRN) should be filled in prescribed format with appropriate verification at the time of dispatch.
 - q) At the time of dispatch, Quality Inspection Report (QIR) should be prepared and dispatched along with the consignment.
 - r) In case of pre-dispatch inspection of the stock by the representative of buyer, state government/any other agency, their signature certifying the quality of stock may be obtained on the QIR.

9.8 Documentation

To the extent necessary, the onion producer/supplier/wholesaler should:

- a) maintain documented information to support the operation of its processes;
- b) retain documented information to have confidence that the processes are being carried out as per planned scheduled;
- c) maintain the records of the workforce employed and needed, as per schedule;
- d) maintain records to establish traceability of onions causing major/minor non-conformity; and
- e) maintain documented information of quantity of onions purchased along with their source of origin for inspection and traceability.

ANNEX A
(Clause 9.3)
(For guidance)

**GUIDELINES FOR CLASSIFICATION AND QUALITY CHECK OF ONIONS AT THE
PROCUREMENT CENTRE**

A-1 MINIMUM REQUIREMENTS

Onion should be:

- a) intact;
- b) sound, produce affected by rotting or deterioration such as to make it unfit for consumption is excluded;
- c) clean, free from any visible foreign matter;
- d) free from damage caused by frost;
- e) sufficiently dry for the intended use (in the case of storage of onions, at least the two first outer skins and the stem should be fully dried);
- f) without hollow or tough stems;
- g) practically free from pests;
- h) practically free from damage caused by pests;
- j) free of all abnormal external moisture; and
- k) free of any foreign smell and/or taste.

A-2 CLASSIFICATION

The onions are classified in two classes, based on the quality as given below:

- a) *Class I*
 - 1) Onions in this class should be of good quality and the bulbs should be:
 - i) firm and compact; and
 - ii) practically free of root tufts; however, for onions harvested before complete maturity, root tufts are allowed.
 - 2) *Defects* – The following slight defects, however, may be allowed, provided these do not affect the general appearance of the produce, and the quality:
 - i) a slight defect in shape;
 - ii) slight defects in colouring;
 - iii) light staining covering not more than one fifth of the bulb's surface;
 - iv) superficial cracks in and partial absence of the outer skins, provided the flesh is protected;

and

- v) slight glassiness not exceeding the outer fleshy ring.

b) *Class II*

- 1) This class includes onions that do not qualify for inclusion in Class I but satisfy the minimum requirements specified in **A-1**. The bulbs should be reasonably firm.
- 2) *Defects* – The following defects may be allowed, provided the onions retain their essential characteristics as regards the quality, the keeping quality and presentation:
 - i) defects in shape;
 - ii) defects in colouring;
 - iii) staining covering not more than one half of the bulb's surface;
 - iv) cracks in the outer skins and partial absence of the skins on a maximum of one third of the bulb's surface, provided the flesh is not damaged;
 - v) slight marking caused by parasites or disease;
 - vi) slight bruising;
 - vii) root tufts; and
 - viii) glassiness not exceeding the two outer fleshy rings.

A-3 QUALITY CHECK

The quality of onions at source/procurement centre should be monitored by the onion producer/supplier/wholesaler for the long-term storage and to minimize losses from physical, physiological and pathological agents.

In addition to **A-1**, the quality of the stock of onion should also meet the following specifications:

- a) The bulbs should be reasonably uniform in shape, size colour and pungency of the variety/type;

- b) The bulb should be mature, solid in feel, reasonably firm with tough clinging skins, be free from dust and other foreign material;
- c) Bulb should be free from defective, diseased, decayed and damaged bulbs caused by seed stems, tops, roots, moisture, dry sun scald burn, sprouting, mechanical or other injuries, staining and be free from moulds, soft rot and insect attack;
- d) Bulbs selected for storage should be firmed and the neck dry and thin. The bulbs should be intact (flesh not exposed);
- e) Thick-necked bulbs should be discarded because they are most likely to have high moisture content than optimum for storage, and therefore would have short storage life;
- f) Skin colour should be typical of the cultivar;
- g) The stem should be twisted and clean-cut and should not be more than 40 mm long (except for twisted); and
- h) Size code of onions should be as follows:

<i>Size Code</i>	<i>Diameter mm</i>	<i>Difference Between the Diameter of the Smallest and the Largest Onion in the Same Package mm</i>
A	10 to 20	5
B	21 to 40	15
C	41 to 70	20
D	More than 70	30

A-4 RELAXATION

At all marketing stages, tolerances in respect of quality and size should be allowed in each lot for produce not satisfying the requirements of the class indicated, as follows:

a) *Quality Tolerances*

1) *Class I*

A total tolerance of 10 percent, by number or weight, of onions not satisfying the requirements of the class but meeting those of Class II should be allowed. Within this tolerance not more than 1 percent in total may consist of produce satisfying neither the requirements of Class II quality nor the minimum requirements, or of produce affected by decay. Within the 1 percent tolerance, the externally visible shoot growth may not exceed 10 mm in length.

2) *Class II*

A total tolerance of 10 percent, by number or weight, of onions satisfying neither the requirements of the class nor the minimum requirements are allowed. Within this tolerance not more than 2 percent in total may consist of soft onions or produce affected by decay. In addition, a tolerance of 10 percent by number or weight of firm onions with externally visible shoot growth is allowed.

b) *Size Tolerance for All Classes*

A total tolerance of 10 percent, by number or weight, of onions not satisfying the requirements as regards sizing may be allowed.

ANNEX B*(Foreword)***COMMITTEE COMPOSITION**
Supply Chain Management Sectional Committee, SSD 18

<i>Organization</i>	<i>Representative(s)</i>
Ministry of Commerce and Industry, New Delhi	DR SURENDRA KUMAR AHIRWAR (Chairman)
Amazon India, Bengaluru	REPRESENTATIVE
Associated Chambers of Commerce and Industry of India, New Delhi	REPRESENTATIVE
Association of State Road Transport Undertakings, New Delhi	REPRESENTATIVE
Directorate General of Shipping, Mumbai	SHRI VIKRANT RAI CAPT P. C. MEENA (<i>Alternate</i>)
Directorate of Marketing and Inspection, Faridabad	SHRI B. K. PRUSTY
Domestic Air Cargo Agents Association, Navi Mumbai	SHRI DINESH KUMAR SHRI AMIT BAJAJ (<i>Alternate</i>)
Dredging Corporation of India Ltd, Vizag	REPRESENTATIVE
DTDC Express Ltd, Bengaluru	REPRESENTATIVE
Federation of Freight Forwarders' Associations in India, Mumbai	SHRI SHANKAR SHINDE
Federation of Indian Chambers of Commerce and Industry, New Delhi	SHRI ABHIK SAHA
ICAR-Directorate of Onion and Garlic Research, Pune	DR RAJIV KALE
ICAR-Indian Institute of Horticultural Research, Bengaluru	DR T. M. GAJANANA DR R. RAGHU (<i>Alternate</i>)
Indian Institute of Foreign Trade, New Delhi	PROF NITIN SETH PROF DEEPANKAR SINHA (<i>Alternate</i>)
Indian Institute of Management Ahmedabad, Ahmedabad	REPRESENTATIVE
Indian Institute of Management Bangalore, Bengaluru	DR ADITYA GUPTA
Indian Institute of Materials Management, Navi Mumbai	REPRESENTATIVE
Indian Ports Association, New Delhi	DR R. D. TRIPATHI
Infrastructure Industry and Logistics Federation of India, New Delhi	REPRESENTATIVE
Institute of Logistics and Aviation Management, New Delhi	REPRESENTATIVE
Logistics Sector Skill Council, Chennai	CAPT T. S. RAMANUJAM SHRI RAMESH VENKAT (<i>Alternate I</i>) SHRI R. SIVAKUMAR (<i>Alternate II</i>)
Mahindra Logistics Ltd, Mumbai	REPRESENTATIVE
Ministry of Civil Aviation, New Delhi	REPRESENTATIVE
Ministry of Ports, Shipping and Waterways, New Delhi	REPRESENTATIVE
Ministry of Skill Development and Entrepreneurship, New Delhi	REPRESENTATIVE
National Agricultural Cooperative Marketing Federation of India Ltd, New Delhi	SHRI S. K. KAUL
National Center for Cold Chain Development, New Delhi	SHRI BRAJENDRA SINGH SHRI ANGSHUMAN SIDDHANTA (<i>Alternate</i>)
National Horticultural Research and Development Foundation, New Delhi	DR P. K. GUPTA
National Institute of Agricultural Extension Management, Hyderabad	DR SHALENDRA DR K. C. GUMMAGOLMATH (<i>Alternate</i>)

<i>Organization</i>	<i>Representative(s)</i>
National Institute of Industrial Engineering, Mumbai	DR VIVEK KHANZODE PROF RAVINDRA GOKHALE (<i>Alternate I</i>) PROF RAKESH RAUT (<i>Alternate II</i>)
Packaging Industry Association of India, Mumbai	REPRESENTATIVE
Pricewaterhouse Coopers Private Ltd, Gurugram	REPRESENTATIVE
Research Designs and Standards Organization (RDSO), Lucknow	REPRESENTATIVE
Rhenus Logistics India Private Ltd, Mumbai	SHRI VIVEK ARYA
Services Export Promotion Council, New Delhi	MS TARVINDER KAUR
The Chartered Institute of Logistics and Transport India, New Delhi	SHRI RAJIV KUMAR KOCHHAR
TRAX - Road Safety NGO of India, New Delhi	REPRESENTATIVE
TVS Supply Chain Solutions Ltd, Chennai	SHRI NAGENDRA PRASAD V. SHRI S. RAMCHANDRAN (<i>Alternate</i>)
Warehousing Development and Regulatory Authority, New Delhi	DR RACHANA SHALINI
XLRI - Xavier School of Management, Jamshedpur	DR T. A. S. VIJAYA RAGHVAN DR ABHISHEK CHAKRABORTY (<i>Alternate</i>)
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Member Secretary

SHRI SHIVAM SONI

SCIENTIST B (SERVICE SECTOR DEPARTMENT-II), BIS

Panel for drafting standard on Supply Chain of Onions – Guidelines - SSD 18/P01

<i>Organization</i>	<i>Representative(s)</i>
Logistics Sector Skill Council, Chennai	SHRI RAMESH VENKAT (<i>Convener</i>) SHRI R. SIVAKUMAR (<i>Alternate I</i>) CAPT T. S. RAMANUJAM (<i>Alternate II</i>)
Directorate of Marketing and Inspection, Faridabad	SHRI B. K. PRUSTY
Domestic Air Cargo Agents Association, Navi Mumbai	SHRI DINESH KUMAR SHRI AMIT BAJAJ (<i>Alternate</i>)
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National Institute of Agricultural Extension Management, Hyderabad	DR SHALENDRA DR K. C. GUMMAGOLMATH (<i>Alternate</i>)
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