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Draft Indian Standard

**POLYETHYLENE CONTAINERS FOR THE
TRANSPORT OF MATERIALS
SPECIFICATION**

(*Third Revision of IS 6312*)

(ICS 55.120)

Plastics Packaging Sectional Committee,
PCD 21

Last date for receipt of comment is
08 October 2023

FOREWORD

(Formal clause will be added later)

This Indian standard was first published in 1971 and covered polyethylene containers for transporting liquids only. The first revision of the standard in 1980 broadened the scope to cover requirements if the containers are used for the transportation of liquid, semisolid and solid materials. The polyethylene containers were classified according to their use than their construction. The second revision of the standard in 1994 taken cognizance of latest grades of HDPE (in line with ISO designations) which can be used in the manufacture of the containers. Further, the standard now permits use of snap-on type of closure in addition to screw type. The drop test requirements had also been modified.

This revision (*third*) has been undertaken to update the standard by incorporating amendments and by updating the cross referred standards.

The polyethylene containers may be used for transporting solid, semisolid or liquid materials. However, some containers may be unsuitable for use when containing certain materials and intending users of such containers are advised to refer the relevant transport authorities guidelines.

NOTE — Guidance on the requirements for polyethylene containers may be obtained by consulting the following regulations:

- a) Ministry of Transport and Shipping Regulations relating to road transport and sea transport including the IMCO code for the transport of dangerous goods by road and sea.
- b) The restricted article regulations of the International Air Transport Association (IATA).
- c) Ministry of Railways Regulations.

A scheme of labelling environment friendly products with the ECO logo has been introduced at the instance of the Ministry of Environment, Forests & Climate Change (MoEF&CC), Government of India. The ECO-Mark is being administered by the Bureau of Indian Standards (BIS) under the BIS Act, 1986 as per the Resolutions No. 71 dated 21 February 1991 and No. 425 dated 28 October 1992 published in the Gazette of the Government of India. For a product to be eligible for marking with the Eco logo, it shall also carry the ISI Mark of the BIS besides meeting additional environment friendly requirements. For this purpose the standard Mark would be a single mark being a combination of the ISI mark and the ECO logo.

In the preparation of this standard considerable assistance has been taken from AS 1936-1976 'Plastic containers for the transport of materials' published by Standards Association of Australia.

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 : 1960 'Rules for

rounding off numerical values (*revised*). The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1 SCOPE

This standard applies to polyethylene containers having nominal capacities in the range 5-220 litres for the transport of materials by sea, road, rail or air. It applies to both free-standing containers and composite parts incorporating protective outers, but does not include requirements for protective outers or their method of construction.

NOTE — Guidelines for purchasers in selecting containers are given in Annex A.

2 REFERENCES

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

<i>IS No.</i>	<i>Title</i>
IS 460: 1962	Specification for test sieves (<i>revised</i>)
IS 2530 : 1963	Methods of test for polyethylene moulding materials and polyethylene compounds
IS 2798: 1998	Methods of test for plastics containers (<i>first revision</i>)
IS 4905 : 1968	Methods for random sampling
IS 7328 : 1992	High density polyethylene materials for moulding and extrusion (<i>first revision</i>)
IS 10146: 1982	Polyethylene for its safe use in con tact with foodstuff. Pharmaceuticals and drinking water

3 DEFINITIONS

For the purpose of this standard, the following definitions shall apply.

3.1 Free-Standing Container

A polyethylene container which is used without an outer protective and/or supporting framework.

3.2 Composite Pack

A polyethylene container which is used with a protective outer.

4 CLASSIFICATION

4.1 General

Polyethylene containers shall be classified into types and classes according to the intended application and intended contents, as given in 4.2 and 4.3.

4.2 Types

Containers shall be of the following types, according to their applications:

Type 1 — Containers intended for the transport of hazardous goods by air.

NOTE — The IATA regulations specify additional requirements relating to capacity, closures dimensions including wall thickness and raw material properties.

Type 2 — Multi-trip free-standing containers, subdivided as follows:

- Type 2A* — Containers for the transport of hazardous goods; and
- Type 2B* — Containers for nonhazardous goods.

Type 3 — Single-trip free-standing containers.

Type 4 — Multi-trip containers with protective outers, sub-divided as follows:

- Type 4A* — Containers for the transport of hazardous goods; and
- Type 4B* — Containers for nonhazardous goods.

Type 5 — Single-trip containers with protective outers.

NOTE — No hazardous material should be allowed to be carried in Type 3 and 5 containers which are not considered safe for hazardous materials and are to be used only once.

4.3 Classes

Containers shall be of the following classes, according to contents:

- Class L — Containers suitable only for liquids; and
- Class S — Containers suitable for solids/semi-solids.

5 MATERIALS OF CONSTRUCTION

5.1 General

The materials used in the manufacture of the container and closure, and inserts, if applicable shall be high density polyethylene or low density polyethylene as specified by the purchaser. HDPE shall conform to grades PE BAW A40-T003 or BAW A45-T003 or BAW A50-T003 or BAW A40-T006 or BAW A45-T006 or BAW A50-T006 (*see* IS 7328). The carbon black content when determined by the method prescribed in **10** of IS 2530 shall not be less than 2.0 percent and not more than 3.0 percent. The dispersion of carbon black shall be satisfactory. When the container is made in natural or any other colour (with necessary pigments and other additives such as UV stabilizers as agreed by the purchaser and the supplier), the HDPE natural material shall conform to grades PE BAN A45-T003 or PE BAN A50-T003 or PE BAN A45-T006 or PE BAN A50-T006 (*see* IS 7328).

5.1.1 In case of packaging of food products, the material shall conform to IS 10146.

5.1.2 The closure material may be HDPE conforming to the above designation or any other designation as agreed to between the supplier and the purchaser. The selection of HDPE conforming to any designation other than the above (for closure only) shall depend upon the performance requirements and moulding characteristics of the material.

6 BRIMFUL CAPACITY

The total capacity of the container when checked in accordance with Annex B shall be at least 5 percent greater than the nominal capacity.

NOTES

1. Within an ullage greater than the design ullage of the container is required by regulations, the maximum filling capacity should be approximately adjusted.
2. Suitable modification to the method given in Annex B be made for larger containers.

7 WORKMANSHIP AND FINISH

7.1 The container and closure shall be manufactured in accordance with good trade practice and shall be free from any manufacturing defects, such as burnt, oxidized particles, which would affect the performance or appearance of the containers.

7.1.1 Closures

The closure shall be screw type or snap-on type with metal ring or other fastening devices or any other design as agreed between the purchaser and the supplier.

7.1.1.1 The closure shall be made from a material as inert to the intended contents as the container itself and adequate to prevent leakage. The closure for a secondary aperture shall be of material inert to the intended contents and adequate to prevent leakage. The design of the secondary aperture shall be as agreed to between the purchaser and the supplier.

7.1.2 Neck Size and Thread Form

The internal diameter of the neck of the principal closure shall be not less than 25.00 mm. The threads shall be not finer than 6 per 25 mm.

7.1.3 Handle

A handle, when provided, shall be either as an integral part of the unit or, if separate, it shall be reliably secured to the unit. It shall be located in such a position that it may be used for both carrying and pouring. The handle shall be designed for case of lifting and carrying when mittens are worn.

7.1.4 Spout

Containers may be provided with an integral spout, or alternatively the filling orifice may be designed to accept a separate spout to permit the contents to be dispensed without leakage or unless loss due to spillage.

7.1.4.1 Units having a nominal capacity greater than 10 litres for transport of inflammable liquids shall include a flame arrestor which shall be incorporated with the spout. It shall be a copper screen, not coarser than 1.00 mm aperture (*see* IS 460).

8 TEST REQUIREMENT

8.1 General

A container shall be tested by the test appropriate to its type as specified in Table 1, and shall meet the test criteria

Table 1 Test Requirements for Containers
(Clause 8.1)

Sl No.	Test	Clause	Type of Containers							Method of Testing (Ref to Annex)
			1	2A	2B	3	4A	4B	5	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
i)	Stacking test	8.2	×	×	×	×	×	×	×	C
ii)	Closure leakage test	8.3	×	×	×	×	×	×	×	D
iii)	Drop test: At ambient temperature	8.4.1	×		×	×		×	×	E
	At 0°C	8.4.2		×			×			E
	At -18°C	8.4.3	×							E

iv)	Pressure-tightness test	8.5	×	×	×	×	×	×	×	F
v)	Hydrostatic test : At 110 kPa At 110 kPa or Vapour Pressure At 55°C × 1.5, whichever is higher	8.6.1 8.6.2	×	×			×			G G
vi)	Handle strength test	8.7	×	×	×	×	×	×	×	H
vii)	Top load resistance test	8.8	×	×	×	×	×	×	×	J
viii)	Environmental stress crack resistant test	8.9	×	×	×		×			K

NOTE — × indicates test is required.

8.2 Stacking Test (Stackable Containers only)

When a stackable container is tested for stackability by the method described in Annex C, the container shall neither leak nor deform to such an extent that it would cause instability in a stack.

8.3 Closure Leakage Test

When a container is tested by the method described in Annex D, there shall be no evidence of leakage.

8.4 Drop Test

8.4.1 Drop Test at Ambient Temperature (Types 1, 2B, 3, 4B and 5)

When tested at ambient temperature by the method described in Annex E, Types 1, 2B, 3, 4B and 5 containers shall neither rupture nor shall there be any leakage from the container.

8.4.2 Drop Test at 0 °C

When tested at 0°C by the method described in Annex E, the containers shall not rupture nor shall there be any leakage from the container. The containers of Type 2A and 4A liable to be subjected to low temperature only shall be subjected to this test when specified by the purchaser.

8.4.3 Drop Test at -18 °C (Type 1 only)

When tested at -18°C by the method described in Annex E, Type 1 containers shall not rupture nor shall there be any leakage from the container.

8.5 Pressure-Tightness Test (Class L only)

When tested by either of the methods described in F-1.1 and F-1.2 as agreed to between the purchaser and the supplier, the containers shall neither rupture nor shall there be any leakage.

8.6 Hydrostatic Tests (Class L only)

8.6.1 At 110 kPa (Type 1 only)

When tested by the method described in Annex G at 110 kPa, a Type I container of Class L shall not rupture nor shall there be any leakage from a container.

8.6.2 At 1.5 Times Vapour Pressure at 55 °C (Type 2A and 4A only)

When tested by the method described in Annex G at 1.5 times the vapour pressure at 55 °C of the nominated material, but subject to a minimum of 110 kPa, Types 2A and 4A containers of Classes L shall not rupture nor shall there be any leakage from a container.

8.7 Handle Strength Test (All Containers with Handles)

When containers with handles are tested by the method described in Annex H, there shall be no damage to the handle (s) or container.

8.8 Top Lead Resistance

8.8.1 For Type 1 Containers

When a Type 1 container is tested by the method described in Annex J, there shall be no buckling of the side walls sufficient to cause damage, and in no case shall the top to bottom deflection exceed 25.4 mm.

8.8.2 For Containers Other Than Type 1

When a container of other than Type 1 is tested by the method described in Annex J, there shall be no leakage from the container nor any deformation likely to reduce its strength or tightness or to cause instability in stacks.

8.9 Environmental Stress Crack Resistance (When Specified by the Purchaser)

When the containers are tested by the method described in Annex K, there shall be no evidence of stress cracking.

9 ADDITIONAL REQUIREMENTS FOR ECO-MARK

9.1 General Requirement

9.1.1 The product shall conform to the requirements for quality, safety and performance prescribed.

9.1.2 The manufacturer shall produce to BIS the consent as per the provisions of Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 along with the authorization, if required under Environment (protection) Act, 1986 and the rules made thereunder while applying for the ECO-Mark. The manufacturers of plastic wares shall produce documentary evidence with respect to the compliance of regulation under Drugs and Cosmetic Act, 1940 and the rules made thereunder, wherever necessary.

9.1.3 The product must display a list of critical ingredient in descending order of quantity present expressed as percent of the total. The list of such ingredients shall be identified by Bureau of Indian Standards.

9.1.4 The Product packaging shall display in brief the criteria based on which the product has been labelled as 'Environment Friendly'.

9.1.5 The material used for product packaging shall be recyclable or biodegradable.

9.1.6 It shall also suitably mention that ECO-Mark label is applicable only to the packaging material/package, if content is not separately covered under Eco-Mark. It may be stated that ECO Mark is applicable to the product or packaging material or both.

9.2 Product Specific Requirements

The plastic products shall apart from fillers and reinforcing agents, be made from the minimum of 90 percent. By weight of compatible plastic wastes.

Note — The manufacturer shall provide documentary evidence by way of certificate or declaration to this effect.

10 SAMPLING

The samples of the containers shall be drawn and the criteria for conformity determined as prescribed in Annex L.

11 MARKING

11.1 Each container shall be legibly and indelibly marked with the following information:

- a) Indication of the source of manufacture;
- b) Nominal capacity of the container in litres (*see 6*);
- c) Classification (*see 4*), that is, type and class;
- d) Batch No. or code No., if any; and
- e) Made from Food-grade plastics materials' in case of packaging of food stuffs.

11.2 BIS Certification Marking

Each container may also be marked with the Standard Mark.

11.2.1 The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

GUIDELINES FOR PURCHASERS

A-1 COMPATIBILITY

The packer should ensure that the material to be transported will not affect the container or its ancillaries that are in contact with the product during transport and storage. A suitable test method for compatibility is described in IS 2798. In addition, the product should not be affected to unacceptable extent by its storage.

A-2 CLOSURE

Details of closure requirements, for example the inclusion of closure locking devices, should be determined by agreement between the purchaser and the supplier, having regard to the fact that the principal requirement of the closure is the absence of leakage.

NOTE — Attention is drawn to the fact that the vented closures, which may be necessary when certain volatile liquids are transported, should be in agreement with the requirements of the relevant transport authority.

A-3 CERTIFICATE OF COMPLIANCE

When requested by the purchaser, the manufacturer should supply a certificate showing the results of tests carried out to determine compliance of the container with this specification.

ANNEX B (Clause 6)

METHOD OF MEASUREMENT OF BRIMFUL CAPACITY

B-1 APPARATUS

B-1.1 A rigid transparent plastic disc with a slot (*see* Fig. 1) big enough to completely cover the neck face of the container.

B-1.2 Weighing balance to determine the mass of the container to an accuracy of 1 g.

B-2 PROCEDURE

B-2.1 Weigh the empty container and the rigid transparent plastic disc to an accuracy of 1 g.

B-2.2 Fill the container with water to within approximately 3 mm of brim. The water used should be at ambient temperature or in case of dispute, at $27 \pm 2^\circ\text{C}$.

B-2.3 Place the rigid transparent plastic disc on the neck face and top-up by carefully pouring water through the slot until the water is seen just contacting the underside of the disc.

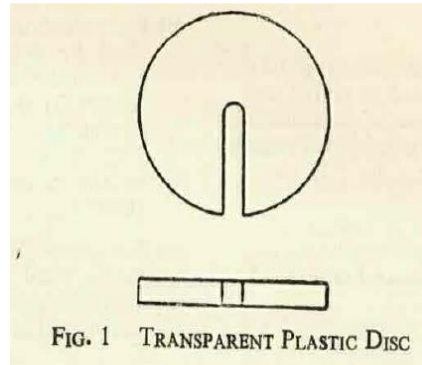
B-2.4 Weigh the filled container, together with the rigid transparent plastic disc.

B-2.5 The difference in weighings is the mass of the water recorded in grams. The results shall be expressed to the nearest 1 g.

B-2.6 Alternately the volume of water can be measured directly to the nearest millilitres.

B-3 RESULT

The mass of the water in grams or the volume of water measured is numerically equal to the brimful capacity of the container in millilitres.



ANNEX C
(Clause 8.2)

METHOD FOR STACKING TEST
(For Stackable Containers only)

C-1 Containers filled to their maximum gross mass as specified for the container shall be stacked to a height of 3 m for Type 1 containers, or 2 m for all other types.

After 21 days at $27 \pm 2^\circ\text{C}$ the container at the bottom of the stack shall not have leaked nor deformed to such an extent that it would cause instability in stacks.

ANNEX D
(Clause 8.3)

METHOD OF TEST FOR EFFECTIVENESS OF CLOSURES

D-1 TEST CONTAINERS

One container shall be used for the test. Unless otherwise specified, the test shall be conducted with the container in the manner in which it will be used (that is, free-standing or together with protective outers).

D-2 PROCEDURE

The container shall be filled to nominal capacity with the liquid to be packed or if this is not known or is impracticable, with water at ambient temperature or $27 \pm 2^\circ\text{C}$ for class L or with a granular solid for class S, and then closed in the manner specified by the manufacturer.

The container shall then be allowed to stand with its closures at the lowest point without any internal support at the closure for 1 hour.

ANNEX E
(Clauses 8.4.1, 8.4.2 and 8.4.3)

METHODS OF TEST FOR DROP IMPACT STRENGTH

E-1 TEST CONTAINERS

Six containers shall be used for each test. Composite packs shall be tested as sealed and secured for transport. In case of containers with the handles projecting outside an extra container shall be taken for drop directly on to the handle.

E-2 PROCEDURE

E-2.1 Test at Ambient Conditions (For Types 1, 2B, 3, 4B and 5)

The six (or seven) containers shall be filled to maximum gross mass with water for classes L and with granular solid for class S. Each container shall be sealed and prepared as for transport.

NOTE — If the liquid to be packed is of specific gravity higher than one, the material itself or a suitable material of similar density should be used instead of water.

Each container shall be dropped as specified in (a) to (f) below on to a rigid, level dropping surface that absorbs negligible energy, from a height of 1.2 m measured from the bottom of the container.

An untested container shall be used for each drop, and the points of impact shall be as follows:

- a) Drop directly on to the closure. If there is more than one closure, additional drops shall be carried out on each closure.
- b) For cylindrical containers, one container shall be dropped on to a bottom edge and another on to a top edge. The containers for these tests shall be positioned so that on impact the angle between the vertical and a lined drawn from the edge to the centre of gravity does not exceed 10°.
- c) For non-cylindrical containers one container shall be dropped on to a bottom corner such that upon impact the angle between the vertical and a line drawn from the corner to the centre of gravity does not exceed 10°.
- d) Flat drop on the bottom of container.
- e) Flat drop on the top of container.
- f) Flat drop on the side of the container adjacent to closure. If there is more than one closure, additional drops shall be carried out on sides adjacent to each closure.
- g) For the container with handles projecting outside, drop directly on to the handles.

E-2.2 Test at 0 °C

The six (or seven) containers shall be filled to maximum gross mass with a solution compatible with the container and which remains liquid at the test temperature (for example 12 percent methylated spirits in water or an ethyleneglycol/water mixture) for class L or with a granular solid maximum gross mass for class S. The containers and contents shall then be chilled to a temperature in the range -4°C to 0°C and stored at that temperature for at least 4 hours.

The containers shall be subjected, while at the specified temperature, to the drops described in E-2.1.

E-2.3 Test at -18 °C

The six (or seven) containers shall be tested as follows:

- a) *Inside Containers* — The Containers shall be subjected to the following tests in the sequence given:

- 1) When empty and at -18 °C (or lower temperature), each container shall be dropped 1.8 m on to solid concrete in accordance with the procedure described in **E-2.1**.

2) When filled to 98 percent of its capacity with a liquid compatible with the material of the container (*see* Annex A) and remaining liquid at -18 °C and enclosed in the outside container prescribed for the liquid to be transported, and while at a temperature of -18 °C (or lower temperature), each container shall be dropped 1.2 m on to solid concrete in accordance with the procedure described in **E-2.1**.

b) *Reusable Moulded Containers for Use Without Overpack and not Having a Removable Head* — The containers shall be filled to 98 percent of capacity with a liquid compatible with the material of the container and remaining liquid at -18 °C, stored for not less than 4 hours at -18 °C (or lower temperature) prior to testing, and while at a temperature of -18 °C (or lower temperature), dropped 1.2 m on to solid concrete in accordance with the procedure described in **E-2.1**.

ANNEX F (*Clause 8.5*)

METHOD OF TEST FOR PRESSURE-TIGHTNESS OF CLASS L CONTAINERS

F-1 APPARATUS

F-1.1 For Testing with Air

- a) A compressed air supply connected to a tapered rubber plug which will seal the mouth of the container. A suitably modified screw cap may be used instead of the rubber plug.
- b) A means of regulating the air pressure at 35 kPa to an accuracy of ± 2 percent and a suitable pressure gauge.
- c) A water-bath at ambient temperature in which the container may be completely immersed.

F-1.2 For Testing with Water

- a) A water supply at ambient temperature connected to a tapered rubber plug which will seal the mouth of the container. A suitably modified screw cap may be used instead of the rubber plug.
- b) A means of regulating the water pressure and a pressure gauge of range 0 to 150 kPa and of accuracy ± 2 percent.

This apparatus may also be used for the hydrostatic test described in Annex D.

F-2 TEST CONTAINER

One container shall be tested. Composite containers shall be tested as composites.

F-3 PROCEDURE

F-3.1 Testing with Air

The air supply shall be connected to the container and the container immersed in the water bath at ambient temperature. A pressure of 35 kPa shall be applied for a period of 1 minute.

Any steady evolution of bubbles, other than around the mouth, shall be deemed to indicate failure to meet the test requirements.

NOTE — Particular attention should be paid to the provisions of adequate protective devices.

F-3.2 Testing with Water

The container shall be filled with water to exclude all air and then connected to the water supply. The pressure shall be increased to 35 kPa and held for 1 minute.

Any leakage from the container, other than from the mouth, or localized bulging of the container shall be deemed to indicate failure to meet the test requirements.

ANNEX G
(Clauses 8.6.1 and 8.6.2)

METHOD FOR HYDROSTATIC TEST OF CLASS L CONTAINERS

G-1 APPARATUS

As described in **F-1.2**.

G-2 TEST CONTAINERS

One container shall be tested. Composite containers shall be tested as composites.

G-3 PROCEDURE

The container shall be filled with water to exclude all air and then connected to the water supply. The pressure shall be increased to that specified in **8.6.1** or **8.6.2** as applicable, and held for a period of 5 minutes.

Any leakage from the container, other than from around the mouth, or localized bulging of the container shall be deemed to indicate failure to meet the test requirements.

ANNEX H
(Clause 8.7)

METHOD OF TEST FOR HANDLE STRENGTH

H-1 APPARATUS

A typical test rig is illustrated in Fig. 2 which is suitable for testing grippable handles. Suitably padded gripping devices approximately 75 mm in length and 12 mm in thickness may be provided to enable test of moulded-in-wall handles.

H-2 TEST CONTAINER

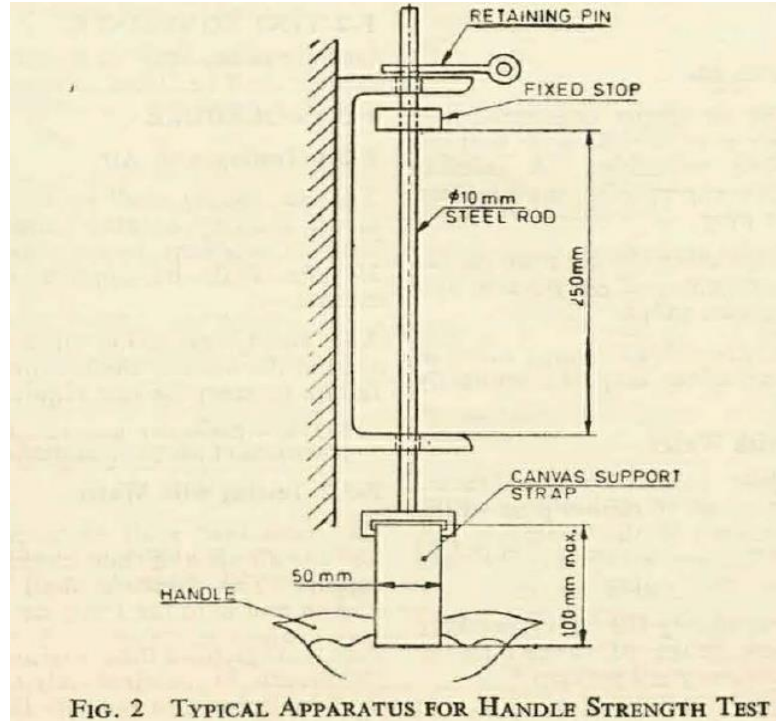
One container shall be tested.

H-3 PROCEDURE

The container shall be filled to maximum gross mass with water for classes L or with a granular solid for class S, at ambient temperature, and shall then be placed in the test rig.

The container shall be held by its handle (s) and then allowed to fall freely for 250 mm in the test rig.

The container shall be subjected to three drops.



ANNEX J
(Clauses 8.8.1 and 8.8.2)

METHOD OF TEST FOR THE TOP LOAD RESISTANCE

J-1 TYPE 1 CONTAINER

The container shall be filled to 98 percent capacity with water and shall be subjected to static compression by means of a 275 kg load applied for not less than 48 hours.

J-2 CONTAINERS OTHER THAN TYPE 1

J-2.1 Apparatus

- a) A cabinet or room controlled at 27 ± 2 °C.
- b) A means of applying a superimposed force to the container. The applied force should be similar to that imposed by a stack of such containers.

J-2.2 Test Containers

The container shall be filled to maximum specified gross mass with water at 27 ± 2 °C for classes L or with a granular solid for class S. The container shall be sealed and prepared as for transport.

NOTE — If the liquid to be packed is of high density, it should be used as the test medium:

J-2.3 Procedure

The container shall be placed in the cabinet at $27 \pm 2^\circ\text{C}$ on a rigid, level, flat surface and the superimposed force calculated by the following formula shall be applied separately for a period of 21 days:

$$F = \frac{9.8 (H-h) G}{h}$$

Where

F = calculated superimposed force in Newtons,
 H = stack height of 2 m,
 h = height of the container in metres, and
 G = maximum specified gross mass in kilograms

The containers shall then be inspected for signs of leakage or deformation likely to affect strength or tightness or to cause instability in stacks.

ANNEX K (Clause 8.9)

METHOD OF TEST FOR RESISTANCE TO ENVIRONMENTAL STRESS CRACKING

K-1 APPARATUS

K-1.1 For Method 1 (for containers up to and including 25 litres nominal capacity) - an air oven controlled at $60 \pm 2^\circ\text{C}$.

K-1.2 For Method 2 (for containers over 25 litres nominal capacity) - test liquid tank controlled at $80 \pm 2^\circ\text{C}$.

K-2 TEST LIQUID

A 0.5 percent aqueous solution of Polyoxyethylated nonylphenol.

NOTE — Teepol B 300 has been found suitable.

K-3 TEST CONTAINERS

One container shall be tested.

K-4 PROCEDURE

K-4.1 Method 1

The container shall be filled to nominal capacity with the test liquid at $27 \pm 2^\circ\text{C}$. The container shall be secured as for transport and then placed upright in the oven at $60 \pm 2^\circ\text{C}$ for 48 hours.

The container shall then be inspected for cracks, the container being sectioned where necessary.

K-4.2 Method 2

The container shall be secured as for transport and the sectioned circumferentially at midpoint into two halves.

All sections shall then be placed in the test liquid at $80 \pm 2^\circ\text{C}$ for 48 hours.

The sections shall then be examined for cracks.

ANNEX L
(Clause 9)

SAMPLING OF POLYETHYLENE CONTAINERS

L-1 SCALE OF SAMPLING

L-1.1 Lot

In any consignment all the containers of the same material and drawn from a single batch of manufacture shall be grouped together to constitute a lot.

L-1.2 For ascertaining the conformity to the requirements of this specification, tests shall be carried out separately for each lot. The number of containers to be sampled from a lot for ascertaining conformity to the requirements of this specification shall be in accordance with Table 2.

**Table 2 Scale of Sampling and Permissible
Number of Defectives**

Sl.No.	Lot Size N	For Non-Destructive Tests		For Destructive Tests Number of Containers to be Selected
		No. of Containers to be Selected	Permissible Number of Defectives	
(1)	(2)	(3)	(4)	(5)
i)	Up to 100	5	0	2
ii)	101 to 300	13	1	2
iii)	301 to 500	32	3	2
iv)	501 to 1000	50	5	3
v)	1000 and above	80	7	5

L-1.3 The containers shall be selected at random from the lot. To ensure the randomness of selection, method given in IS 490 may be followed.

L-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

L-2.1 For Non-destructive Tests

The containers selected at random according to **L-1.2** shall be tested for dimensions and capacity, closure leakage test (**8.3**), and pressure-tightness test (**8.5**). A container failing to satisfy any one or more of these tests requirement shall be regarded as defective. The lot shall be considered as conforming to the requirements for these characteristics, if the number of defectives in the sample does not exceed the number given in col 3 of Table 2.

L-2.2 For Destructive Tests

If the lot conforms to the requirements for non-destructive tests, then the number of containers given in col 4 of Table 2 shall be taken from the containers selected in **L-1.3** for destructive tests. Each of the containers shall be tested for stacking (**8.2**), drop test (**8.4.1, 8.4.2 and 8.4.3**), hydrostatic test (**8.6**), handle strength test (**8.7**), top load resistance (**8.8**), and environmental stress crack resistance (**8.9**). A container not satisfying any one or more of these requirements shall be regarded as defective. The lot shall be considered as conforming to these requirements if none of the containers fail.