



नेपाल गुणस्तर
NEPAL STANDARD

**Rotational Moulded Polyethylene Water
Storage Tanks — Specification**



Government of Nepal
Ministry of Industry, Commerce and Supplies
Nepal Bureau of Standards and Metrology (NBSM)
Kathmandu, Nepal

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नेपाल गुणस्तर प्रस्तावना

१. नेपाल गुणस्तर (प्रमाण चिन्ह) ऐन २०३७ ले प्रदत्त अधिकार प्रयोग गरी नेपाल गुणस्तर निर्धारण गर्ने यस विभागलाई भएको निर्देशन र नीति अनुसार राष्ट्रियस्तरमा गुणस्तर प्रलेखहरू तयार पार्ने सिलसिलामा आवश्यक तरिका र ढाँचामा यो गुणस्तर प्रलेख तर्जुमा गरी प्रस्तुत गरिएको छ। यसले नेपाल गुणस्तरसँग सम्बन्धित सबै पक्षमा निमित्त आवश्यक निर्देशिकाको कार्य गर्नेछ।
२. प्रलेख तयार पार्दा खास ध्यानमा राखिएका बुँदाहरू:
 - २.१ गुणस्तर प्रलेखको तर्जुमा गर्दा अन्य प्रलेखको कुनै पनि परिच्छेदको उल्लंघन हुन नजाओस भनी यथाशक्य होशियारी राखिएको छ। असावधानीबाट केहि उल्लंघन हुन गएको ज्ञात हुन आएमा यसमा चाहिने संशोधनको लागि यथाशिघ्र कदम उठाइने छ।
 - २.२ देशको ऐन नियम अन्तरगत परेको सबै बुँदालाई यथोचित मान्यता दिई यसको कुनै दफा तथा परिच्छेदको उल्लंघन नहुने गरी यो गुणस्तर प्रलेख तयार पार्ने कोशिस गरिएको छ। कथंकदाचित गुणस्तर प्रलेखको कुनै भागमा उल्लेखित कुराहरू हाल प्रचलनमा भएका तथा भविष्यमा आउने ऐन नियमसँग बाझिन गएमा त्यस्ता (प्रलेखका) कुराहरू स्वतः निष्कृत हुनेछन्।
 - २.३ नापतौल इकाई तथा तिनीहरूको रूपान्तरण गर्दा स्ट्याण्डर्ड नापतौल ऐन अन्तर्गत जे जति नियमहरू छन् सबैलाई यथोचित मान्यता दिई यिनीहरूको प्रयोग गरिएको छ।
 - २.४ यो प्रलेख तयार पार्दा गुणस्तर निर्धारण सम्बन्धी अरु देशहरूले र अन्तर्राष्ट्रिय संगठनहरूले अपनाएका प्रणाली, चलन, तरिका र ढाँचालाई यथोचित ध्यानमा राखिएको छ।
 - २.५ यो गुणस्तर प्रलेखको अंगीकार गर्दा वातावरणीय लगायत स्वास्थ्य सम्बन्धी विविध पक्षहरूमा समेत यथोचित ध्यान पुर्याइएको छ।
 - २.६ यस गुणस्तर प्रलेखमा उल्लेखित विषयवस्तु राष्ट्रिय आवश्यकता अनुरूप छ वा छैन भन्ने निश्चित गर्न नेपाल गुणस्तर परिषद्को निर्णय नै अन्तिम मानिनेछ।

नेपाल गुणस्तर परिषद्

Nepal Council for Standardization (NCS)

NS: 353: 2052 Rotational Moulded polyethylene Water Storage
Tanks - Specification

अध्यक्ष:

उपाध्यक्ष:

आमन्त्रित:

सदस्यहरु

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सदस्य सचिव

**NS: 353: 2052 Rotational Moulded polyethylene Water Storage
Tanks - Specification**

विषयक प्राविधिक समितिका सदस्यहरु

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**NS: 353: 2052 Rotational Moulded polyethylene Water Storage
Tanks - Specification**

विषयक प्राविधिक उप-समितिका सदस्यहरु

सि.नं.	नाम	पद	संस्था
१.	श्री अनिल शाक्य	निर्देशक	नेपाल गुणस्तर तथा नापतौल विभाग
२.	श्री संजिव कुमार ठाकुर	निर्देशक	नेपाल गुणस्तर तथा नापतौल विभाग
३.	श्री संजिव महर्जन	उप-प्राध्यापक	पुल्चोक क्याम्पस
४.	श्री अजेय आचार्य	इन्जिनियर	श. पू. नि. अ. तथा ता. केन्द्र
५.	श्री सन्तोष दाहाल	QC Incharge	HillTake Industries (P) Ltd.
६.	श्री प्रमोद राज सुवाल	महा-प्रबन्धक	Nepatop Pvt. Ltd.
७.	श्री श्रावण कुमार साह	मेनेजर	Rijalco Polytank Industries Pvt. Ltd.
८.	श्री शंभू झा	ई.ई.	भौतिक प्रयोगशाला शाखा
९.	श्री प्रतिक जोशी	फु.टे.	रसायनिक तथा अन्य गु. नि. शाखा
१०.	श्री विजय दास	केमिष्ट	रसायनिक तथा अन्य गु. नि. शाखा
११.	श्री उत्तम विष्ट	के.ई.	भौतिक गुणस्तर निर्धारण शाखा
१२.	श्री निशेष महर्जन	मे.ई.	भौतिक गुणस्तर निर्धारण शाखा

Foreword

This Standard (First Revision) was adopted by the Nepal Bureau of Standard and Metrology after the draft finalized by Technical Committee had been approved by the Nepal Council for Standardization.

Looking to the widespread use of rotational moulded polyethylene tanks for the storage of potable water in Nepal, the committee felt the need to bring out a Standard in order to safeguard the user of such tanks against quality and performance requirements.

This Standard was first published in 2052 B.S. In this revision of the standard following major modifications have been made:

- Wall thickness and weight of the tanks have been modified based on the feedback from the manufacturers and users.
- Methods of installation and fittings have been made recommendatory and are separately given at Annex D.
- Method for carrying out Melt flow rate, density, and carbon black dispersion test, percentage of carbon black content, tensile strength test and flexural strength test has been included.

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 NS 17: 2037 “Rules for rounding off numerical values”. 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

1.1 This standard covers the requirements of materials, dimensions construction, shape, workmanship, performance requirements and inspection and testing of rotational moulded polyethylene water storage tanks with a nominal service temperature from +1 °C to +50 °C.

1.1.1 These tanks are not meant for underground applications.

1.2 This standard is applicable only to water storage tanks subjected to the following two conditions:

- a) Own hydrostatic head of water, and
- b) Tank with uniform flat base support.

1.3 This standard does not cover mobile water tanks and horizontal cylindrical water tanks.

2 REFERENCES

The following standards contain provisions, which through reference in this text constitute the provisions of the standards. At the time of publication, the editions indicated were valid. All the 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 standard indicated below.

<i>Standard</i>	<i>Title</i>
NS 145	Methods for random sampling
NS 383	Cast Iron Pipe Fittings
NS 553	Method of Test for Polyethylene Moulding Materials and Polyethylene Compounds
NS 554	Determination of Overall Migration of Constituents of Plastics Materials and Articles intended to come in Contact with Foodstuffs – Method of Analysis
ISO 7-1	Pipe threads where pressure-tight joints are made on the threads. Part 1: Dimensions, tolerances and designation
ISO 178	Plastics – Determination of Flexural Properties
ISO 527-2	Plastics — Determination of tensile properties Part 2: Test conditions for moulding and extrusion plastics
ISO 1133-1	Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics Part 1: Standard method
ISO 1183-1	Plastics — Methods for determining the density of non-cellular plastics Part 1: Immersion method, liquid pycnometer method and titration method
NS ***	Positive List of Constituents for Propylene, Polyethylene and their copolymers for its safe use in Contact with foodstuffs and Pharmaceuticals

① *Note: Latest editions of the referenced standards shall apply.*

3 TERMINOLOGY

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

3.1 Rotational Moulded Water Storage Tank

A tank moulded from polyethylene powder by the process of rotational moulding.

3.2 Net Capacity

Net capacity shall be net volume of water contained between the lowest level of the inlet and lowest specified level.

3.3 Gross Capacity

The total enclosed volume of the tank including any space which may not be capable of being filled with water.

3.4 Mould Parting Line

A circumferential line visible only on external surface of the tank corresponding to a parting joint of the mould required for rotational moulding. (See Fig. 1).

3.5 Overall Height

The height of the finished empty tank at its highest point including the top rim of the man-hole and lid of the tank (see Fig. 1).

3.6 Effective Height

The height of the finished empty tank from its base to the point where overflow connection is provided for the purpose of limiting water storage capacity (see Fig. 1).

3.7 Overall Diameter

The maximum diameter of finished empty tank measured at its base as the mean of two measurements of diameters including wall thickness of the tank and avoiding the mould parting line (see Fig. 1).

3.8 Rim Height

The perpendicular distance from the highest point of the top rim of the man-hole to the nearest point of the shoulder of the finished empty tank (see Fig. 1). Rim can be provided above the tank or within the tank.

3.9 Man-Hole/Hand-Hole

A hole of suitable internal diameter provided at the top of the tank, for the purpose of inspection of internal surface and entry into the tank.

3.10 Internal Diameter of Man-Hole/Hand-Hole

The internal diameter of the rim of the man-hole measured as the mean of two perpendicular diameters (see Fig. 1).

4 MATERIALS

4.1 The material of construction of tank, lid and fittings which come in contact with water shall be such that it does not impart any taste, colour or odour to water, nor have any toxic effect, and it shall not contaminate water thereby making it unpotable.

4.2 Polyethylene resin to be used for the manufacture of water tanks should be of rotational moulded grade and duly stabilized with anti-oxidants. The anti-oxidants used, not exceeding 0.3% by mass of finished resin, should be physiologically harmless and should be selected from the list given in NS ***. In addition, the material shall also meet the requirements given in **4.2.1 to 4.2.3**.

4.2.1 The density of resin (base material) at 23°C when tested in accordance with ISO: 1183-1 shall be within 932 to 943 kg/m³.

4.2.2 The melt flow rate (MFR) of the resin when tested under the test condition D (temperature 190°C and nominal load of 2.16 kg) and in accordance with ISO 1133-1 shall be within 2.0 to 6.0 g/10 minutes.

4.2.3 The water tanks meant for outdoor use shall be manufactured from carbon black compounded polyethylene. The carbon black content and carbon dispersion test shall be carried out in accordance with the procedure described in NS 553 and shall meet the following requirements:

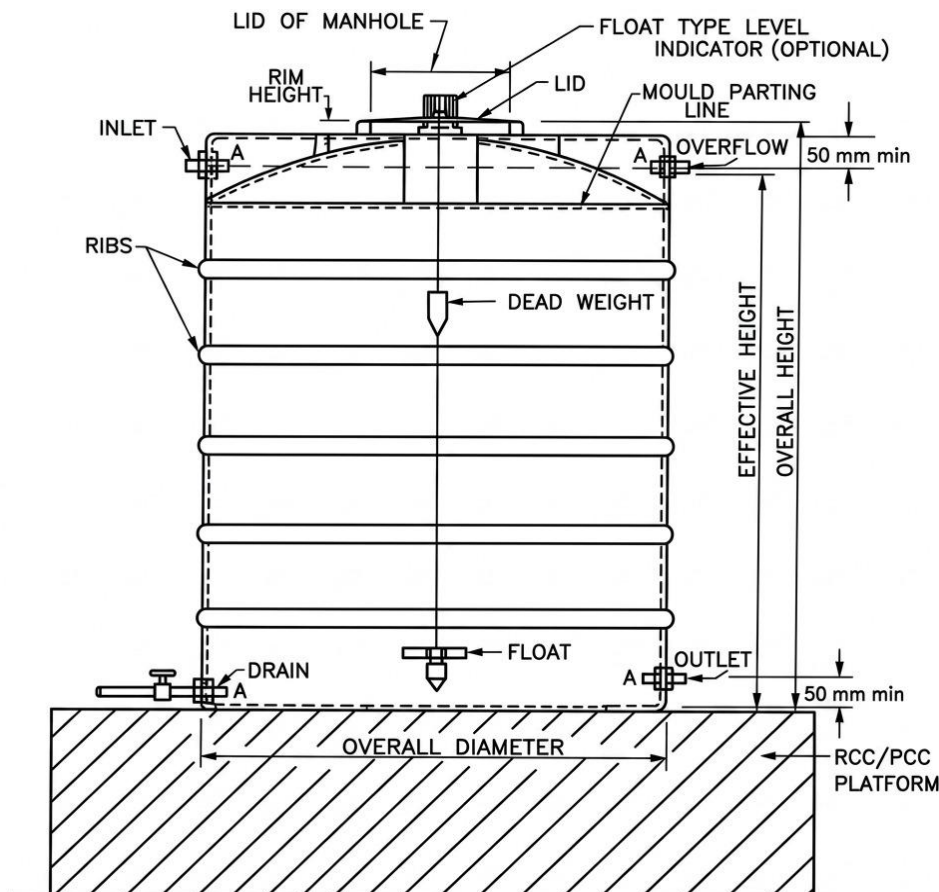
- The percentage of carbon black content in the material shall be within 2.0 and 3.0, and
- The dispersion of carbon black shall be satisfactory.

4.3 The addition of not more than 10 percent of the manufactures own reworked material resulting from the manufacture of tanks only according to this standard is permissible. No other reworked or recycled waste material from any other source or filler shall be used in the manufacture of tanks.

5 TYPES AND FEATURES

5.1 Cylindrical Vertical Tank (Fig. 1)

The Dimensions, net and gross capacities and weight of the tank shall be as given in Table 1.



NOTE — A 25 mm wide band shall be painted around the tank at the inlet/overflow level and outlet level. Centre line of the band shall be 50 mm minimum from top/inner bottom of the tank.

A — Male threaded G.I. brass or PVC connections.

FIG. 1 TYPICAL DETAILS OF CYLINDRICAL VERTICAL TANK

Table 1: Dimensions of Cylindrical Vertical Tank
(Clause 5.1)

S.No	Min. Net Capacity Up to Effective Height (l)	Overall Diameter Range (mm)	Overall Height Range (mm)	Min. Internal Dia. of Man-Hole / Hand-Hole (mm)	Min. Wall & Bottom Thickness (mm)	Min. Weight of Tank (Without Lid) (kg)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i	200	650 – 850	490 – 690	265	3	7.8
ii	300	650 – 850	700 – 900	265	3	9
iii	400	700 – 980	700 – 950	265	3.5	15
iv	500	800 – 1140	625 – 1025	370	4	18
v	700	900 – 1140	800 – 1100	370	4.4	23
vi	1000	1000 – 1200	1050 – 1350	370	4.5	33
vii	1500	1080 – 1450	1150 – 1590	370	4.5	47
viii	1700	1300 – 1560	1260 – 1650	370	4.5	54
ix	2000	1365 – 1500	1400 – 1700	450	5.4	64
x	2500	1380 – 1610	1400 – 1810	450	7.7	81
xi	3000	1410 – 1800	1640 – 2150	450	8.1	96
xii	4000	1450 – 1920	1750 – 2400	450	10.4	147
xiii	5000	1800 – 2110	1800 – 2100	450	10.7	180
xiv	6000	1800 – 2200	2065 – 2800	450	10.7	205
xv	7500	1890 – 2250	2100 – 2930	450	10.7	239
xvi	10000	1900 – 2680	2400 – 3740	450	11.5	319
xvii	15000	2100 – 2680	3100 – 4000	450	11.5	408
xviii	20000	2100 – 3150	3190 – 5000	450	13.2	566

NOTE — The gross capacity of the tanks shall be at least 5 percent in excess of the minimum net capacity.

5.2 Rectangular Loft Tank (Fig. 2)

The dimensions, net and gross capacities and weight of the tank shall be as given in Table 2.

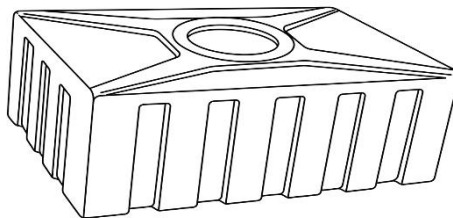


Fig. 2 Rectangular Loft Tank

Table 2: Dimensions of Rectangular Loft Tanks
(Clause 5.2)

S.No.	Min. Net Capacity (l)	Overall Length (mm)	Overall Width (mm)	Overall Height (mm)	Min. Internal Dia. of Hand	Min. Wall Thickness (Measured on) Rectangular Vertical	Min. Weight of Tank (Without Lid) (kg)
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					Hole (mm)	Port & Bottom Thickness (mm)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i	150	620 – 820	620 – 820	285 – 485	300	2.75	6.6
ii	200	930 – 1130	620 – 820	285 – 485	300	2.75	7.7
iii	300	995 – 1200	620 – 820	285 – 485	300	2.75	11
iv	400	1150 – 1350	855 – 1150	335 – 535	300	2.75	13
v	500	1150 – 1500	900 – 1250	335 – 535	300	2.75	17.5

NOTE — The gross capacity of the tanks shall be at least 5 percent in excess of the minimum net capacity.

5.3 A flat area may be provided on the top of the cylindrical vertical tanks for workers to stand before entering the tank.

5.4 Wall Thickness

Owing to limitations of rotational moulding process, the wall thickness of the water storage tank at bottom, top and cylindrical sides at the bottom and top edges where the shape of tank changes is usually found to be much greater than the wall thickness at other surfaces. For cylindrical vertical tanks the wall thickness up to the effective height of the tank shall not be less than the values given in **Table 1** and the wall thickness above the effective height of the tank shall be not less than 75 per cent of the values given in **Table 1**. For rectangular loft tanks the wall thickness shall be in accordance with the values given in **Table 2**. The wall thickness shall be measured at least at 20 points well distributed on the sides, top and bottom. Thickness measurement on lid shall be made at least in four well distributed locations.

5.5 The dimensions as given in **5.1** and **5.2** refer to finished empty tanks. Measurement shall be made after 48 hours of moulding. The wall thickness may be measured with a dial gauge micrometer fitted with spherical anvils. The overall diameter, height and other dimensions may be measured with steel rule or steel tape of desired accuracy by placing the empty tank on a flat surface.

5.6 Rotational moulded polyethylene water storage tanks may be manufactured in single layer or double layers, inner layers shall be white in colour. The outer layer shall be black in colour and its thickness be minimum 50 percent of the total thickness of the wall.

6 FINISH

The internal and external surface of the water storage tank shall be smooth, clean and free from other hidden internal defects, such as air bubbles, pits and metallic or other foreign material inclusions. The mould parting line and excess material near the top rim of the tank shall be cut and finished to the required level. Defects like air bubbles and pits at mould parting line and at top rim of the main-man-hole shall be repaired by hot-air filler rod welding method.

7 PERFORMANCE REQUIREMENTS

7.1 Resistance to Deformation

7.1.1 When cylindrical vertical water storage tanks is tested in accordance with the **Method 1** described at **Annex A**, the difference between the circumferential measurement shall not be greater than 2 percent of the original measurements.

7.1.2 When rectangular loft tank is tested in accordance with the **Method 2** described at **Annex A** the difference between the longitudinal measurements shall not be greater than 3 percent of the original measurements.

NOTE – The tank shall not crack at the observed deflection.

7.2 Resistance to Impact

When polyethylene water tank is tested in accordance with the method as described in **Annex B** the impact shall neither result into cracking nor puncture of the tank.

7.3 Test for Top Load Resistance

The tank shall be filled to 98 percent of its net capacity and shall be subjected for not less than 4 hours at outdoor temperature to compression by means of 100 kg load applied on the horizontal surface provided for a man to stand before entering the tank. After removal of the load the test specimen shall be inspected for deformation or crack on the surface and after 4 hours of the removal of the load the flat surface shall return to normal position. This test shall be applied to tanks with capacity 1,500 litres and more.

7.4 Tensile Strength

7.4.1 Tensile strength at yield shall be determined in accordance with ISO 527- 2. The tensile strength of the wall of water tanks shall not be less than 12 N/mm².

7.4.2 The test specimens shall be cut from the flat portion of the top of the water tank at a temperature not exceeding 50 °C and then machined.

7.5 Flexural Modulus

The flexural modulus shall be determined in accordance with ISO 178. The flexural modulus of the wall of the water tank shall not be less than 300 N/mm². The sample shall be taken as given in **7.4.2**.

7.6 Overall Migration

Overall migration shall not exceed 60 mg/litre when tested according to NS 554.

8 SAMPLING AND TESTING

8.1 Routine Tests

The scale of sampling and criteria for conformity of a lot for routine tests specified in **Table 3** shall be as given in **Annex C**.

Table 3 Routine Tests

S. No. (1)	Test (2)	Ref to Clause and Annex (3)
i.	Band width/location	Fig. 1
ii.	Outer dimensions and Weight	Table 1 and Table 2
iii.	Net Capacity	Table 1 and Table 2
iv.	Gross Capacity	Table 1 and Table 2
v.	Thickness	Table 1 and Table 2
vi.	Resistance to deformation	7.1 and Annex A
vii.	Resistance to impact	7.2 and Annex B
viii.	Test for top load resistance	7.3
ix.	Tensile strength	7.4
x.	Flexural modulus	7.5

8.2 Type Tests

Type tests are intended to prove the suitability and performance of water tank of a new composition, a new technique, new shape or modified wall thickness. Such tests need necessarily be done, before undertaking mass production when a change is made in polymer composition or method of manufacture or when a new size and shape of water tank is introduced. However, if no change is envisaged, at least on sample of any size shall be put to 'Type Tests' once in a year. Tests for suitability of tank material as specified in 4 and overall migration as specified in 7.6 shall be taken as type tests.

9 MAN-HOLE HAND-HOLE LIDS

9.1 Materials

Man-hole hand-hole lids shall be moulded from polyolefin of minimum thickness 3 mm and shall have sufficient ribs to provide adequate stiffness. It shall be stabilized with 2 to 3 percent of carbon black having satisfactory dispersions. The carbon black content and carbon dispersion test shall be carried out in accordance with NS 553.

9.2 The lid shall fit securely over the top rim of the tank and it shall rest evenly on it in order to prevent the ingress of foreign matter such as insects, mosquitoes or dust through the top of the tank. The lid shall also be provided with suitable locking arrangement.

9.2.1 To test the lid being fit security to the manhole, no clearance in it should permit a 1.6 mm diameter wire to pass through.

10 MARKING

10.1 All the water storage tanks shall be marked with the following information:

- a. Manufacturer's name, initials or recognized trade mark;
- b. Net capacity in litres; and
- c. Lot or Batch number, and year of manufacture;

10.2 In additions to the marking by painting, the manufacturers name or trade mark and net capacity of the tank shall be moulded on the external surface of the tank during manufacture.

10.3 NS Certifications Marking

The product conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the Nepal Standards (Certification Mark) Act, 2037 and the rules and regulations framed thereunder. The product may be marked with the Standard Mark.

ANNEX A*[Clauses 7.1.1 and 7.1.2]***METHOD OF DEFORMATION TEST****A-1 METHOD 1, FOR CYLINDRICAL VERTICAL TANKS**

A-1.1 The water tank shall be placed on a flat level base. A circumferential measurement shall be made parallel to the base at a distance of one third the effective height. The tank shall be filled up to the effective height at a minimum rate of 23 l/min with water at temperature of not less than 15°C.

A-1.2 A continuous film of polyethylene shall be floated over the whole of the surface of the water in the tank to prevent evaporation.

A-1.3 The tank and water shall be maintained at temperature not less than 15°C and after 3 days a circumferential measurement shall be made at the previously determined level.

The difference between the two circumferential measurements shall be expressed as a percentage of the original circumferential measurements.

A-2 METHOD 2, FOR RECTANGULAR LOFT TANKS

A-2.1 The rectangular tanks shall be placed on a flat level base. The internal length and width of the tank shall be measured on the centre lines, as shown in Fig. 3 at the centre of effective height.

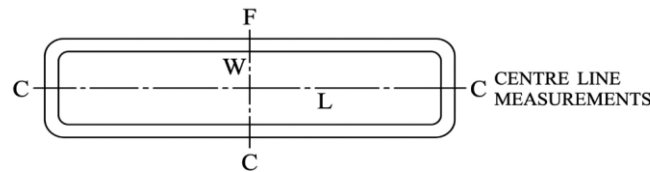


FIG. 3

A-2.2 The tank shall be filled up to the effective height at a minimum rate of 23 litres/min with water at a temperature not less than 15°C. The lid shall be closed after filling the loft tank.

A-2.3 The tank and water shall be maintained at a temperature of not less than 15°C and after 7 days measurements of length and width shall be made at a previously determined centre lines.

A-2.4 The deformation in each direction shall be calculated as follows:

$$D_L = \frac{W_2 - W_1}{2L_1} \times 100$$

$$D_W = \frac{L_2 - L_1}{2W_1} \times 100$$

Where

 D_L = deformation of the longer side, D_W = deformation of the shorter side, W_1 = width at the start of test, W_2 = width at the end of the test, L_1 = length at the start of test, and L_2 = length at the end of test.

ANNEX B

[Clause 7.2]

B-1 METHOD FOR IMPACT RESISTANCE TEST FOR WATER TANK

B-1.1 The water tank shall be inverted and the base of tank shall be struck with a 25 mm diameter hemispherically ended striker of mass 2.5 kg falling freely from a height of 3.0 metre.

B-1.2 The striker shall be so arranged as to hit the base at its mid-point. Three other impacts shall be made, which shall be as close to the edge or corners of the base as is practical. The shape of the striker shall be such that only the surface of the specified hemisphere comes into contact with the tank under the initial blow.

ANNEX C

[Clause 8.1]

SCALE OF SAMPLING AND CRITERIA FOR CONFORMITY FOR ROUTINE TESTS

C-1 SCALE OF SAMPLING

C-1.1 Lot

In any consignment, all the tanks of same size and type made from same raw materials and manufactured under similar conditions shall be grouped together to constitute a lot.

C-1.2 For ascertaining the conformity of the tanks to the requirements of the specification, samples shall be tested from each lot separately.

C-1.3 The number of water storage tanks to be selected from a lot shall depend on the size of the lot and shall be according to Table 4 for tanks with capacity up to 1,000 litres and Table 5 for tanks with capacity above 1,000 litres.

C-1.4 The tanks shall be selected at random from the lot. In order to ensure the randomness of selection procedures given in NS 145 may be followed.

C-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

C-2.1 Visual, Dimensional Requirements and Capacity

C-2.1.1 Tanks of Capacity up to 1 000 litres

Each of the tanks selected according to col 1 and 2 of the **Table 4** shall be examined for the tests at S. No. 1, 2, 3 and 4 of **Table 3**. A tank failing to satisfy one or more of these requirements shall be considered as defective. The lot shall be deemed to have satisfied these requirements if the number of defectives found in the sample is less than or equal to the corresponding acceptance number given in col 3 of **Table 4**.

C-2.1.2 Tanks of capacity above 1 000 litres

Each of the tanks selected according to col 1 and 2 of **Table 5** shall be examined for the tests given at S. No. 1, 2, 3 and 4 of the **Table 3**. A tank failing to satisfy one or more of these requirements shall be considered as defective. The lot shall be deemed to have satisfied these requirements if there is no defective in the sample.

C-2.2 The lot having been found satisfactory according to C-2.1 shall be further tested for tests at SI No. 5, 6, 7, 8, 9 and 10 of **Table 3**. For this purpose a sub-sample of the size given in col 4 of **Table 4** or col 3 of **Table 5**, as the case may be, shall be selected from those already examined and found satisfactory according to C-2.1 and shall be tested for requirements, as specified. The lot shall be declared to have satisfied the requirements if no defective is found in the sub-sample.

Table 4 Scale of Sampling and Criteria for Conformity
(For Tanks with Capacity up to 1,000 l)
(Clause C-1.3)

S. No.	Lot Size	Sample Size	Acceptance Number	Sub-sample Size for Tests at S.No. (v), (vi), (vii), (viii), (ix) and (x) of Table 3
(1)	(2)	(3)	(4)	(5)
i.	Up to 50	2	0	1
ii.	51 to 100	3	0	1
iii.	101 to 300	5	0	2
iv.	301 to 500	8	0	3
v.	501 to above	13	1	5

Table 5 Scale of Sampling
(For Tanks with Capacity Above 1,000 l)
(Clause C-1.3)

S. No.	Lot Size	Sample Size	Sub-sample Size for Tests at S.No. (v), (vi), (vii), (viii), (ix) and (x) of Table 3
(1)	(2)	(3)	(4)
i.	Up to 25	2	1
ii.	26 to 50	3	1
iii.	51 to 100	4	1
iv.	101 to above	5	2

ANNEX D

RECOMMENDATIONS FOR INSTALLATION AND FITTING OF TANKS

D-1 Vent pipe/overflow pipe is provided near the top with mosquito and insect proof cap.

D-2 The flat base of cylindrical vertical or rectangular water storage tanks should be fully supported over its whole bottom area by a durable, rigid, flat and level platform sufficiently strong to withstand without deflection the weight of the tank when filled fully with the water. In case, the tank is placed on a suitable M. S. platform then it is essential that the latter is free from sharp edges, corners or surface projections and shall be corrosion resistant.

D-3 Where required the tanks shall be suitably anchored. The tanks may also be provided with clamping devices.

D-4 The pipelines, valves and other fittings should be supported in such a manner that it is aligned properly so as not to produce any distortion in the water tank where the fitting is fixed.

D-5 The checkouts of the threaded connection should be placed after placing rubber gaskets and should not be over tightened. Under no circumstances should jointing compounds or putty be employed in contact with the polyethylene water tanks. PTFE (poly-tetra-fluoroethylene) unsintered tape may be wrapped around the threaded portion of the valves and connections to act as a sealant.

D-6 Circular holes drilled for fixing threaded connections should have a clean edge free from notches. Holes can be drilled with a high speed steel hole saw cutter. Scratching or scoring the wall should not be done for setting out holes.

D-7 Where the section of water tank has a change in profile which is accomplished with a radius, it is essential that the outer extremities of the threaded connections are clear of this radius.

D-8 The water storage tank should not be installed in close proximity to heaters or other direct sources of heat.

D-9 FITTINGS

D-9.1 For providing inlet, outlet and other connections, usually full threaded G.I. brass connections are used which shall not produce any kind of harmful effect on potable water. A typical threaded connections is illustrated in **Fig 4**. Flat surface may preferably be provided to fix outlet pipes at appropriate locations. The design of threaded connections fixed with the water storage tank may be similar to that shown in **Fig 4**. The different sizes of threaded connections required to be fixed for different capacities of water storage tanks may be according to **Table 6**.

D-9.1.1 The overflow pipes should be provided with non-corrodible mosquito-proof device of maximum clearance not more than 1.6 mm.

Table 6 Sizes of Threaded Connections
(Clause D-9.1)

S. No.	Capacity of Water Storage Tank	Nominal Bore Size of Threaded Connection (mm)
i.	Up to 750	12.5
ii.	Above 750 and up to 2,000	25
iii.	Above 2,000 and up to 4,000	40
iv.	Above 4,000 and up to 10,000	50
v.	Above 10,000	75

D-9.2 The dimensions of male and female threads of G.I. PVC/brass full threaded connections and other fittings like elbow, tee, bend, coupling, nipple, etc. shall be conforming to ISO 7-1. The sizes and other dimensions of the fittings, such as centre-to-face, face-to-face and centre-to-centre shall conform to NS 383. Manufacturers shall provide instructions for fittings.

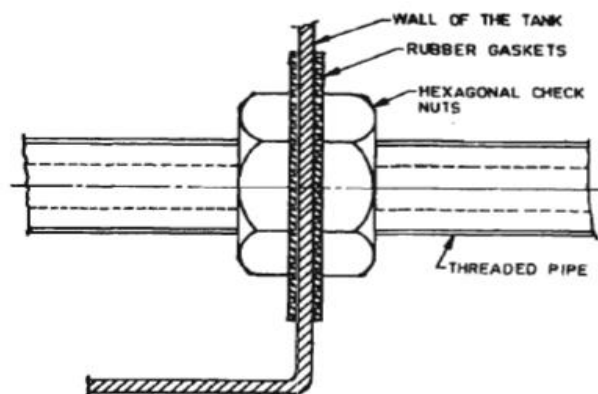


FIG. 4 THREADED CONNECTION

- ❖ नेपाल गुणस्तर तथा नापतौल विभाग राष्ट्रिय गुणस्तर निर्धारना गर्ने विभाग हो।
- ❖ नेपाल सरकारले यस विभागलाई निम्न जिम्मेवारीहरू सुम्पेको छः
 - नेपाल गुणस्तर कायम गर्नु, संशोधन गर्नु वा रद्ध गर्नु।
 - गुणस्तर प्रमाणचिन्ह प्रयोग गर्न इजाजत दिने वा प्रमाण पत्र दिने प्रयोजनको निम्मित सरकारी प्रयोगशालाहरूलाई मान्यता दिनु वा दिइएको मान्यतालाई निलम्बन वा रद्ध गर्नु।
 - गुणस्तर प्रयोग गर्न वा इजाजत वा प्रमाण पत्र दिनु।
 - परीक्षण उपकरणहरूको मापांकन गर्नुतथा कानूनी नापतौल कार्यान्वयन गराउनु।

नेपाल गुणस्तर तथा नापतौल विभाग

बालाजु, काठमाडौं, नेपाल

फोन नं. ०१-४९५०८१८, ४९५६६७२, ४३५०७२९

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