INTERNATIONAL STANDARD

ISO 20848-2

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Packaging — Plastics drums —

Part 2: Non-removable head (tight head) drums with a nominal capacity of 208,2 l and 220 l

Emballages — Fûts en matière plastique —

Partie 2: Fûts à ouverture non amovible (ouverture partielle) d'une capacité nominale de 208,2 l et 220 l

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 20848-2 was prepared by Technical Committee ISO/TC 122, *Packaging*.

ISO 20848 consists of the following parts, under the general title *Packaging — Plastics drums*:

— *Part 1: Removable head (open head) drums with a nominal capacity of 113,6 l to 220 l*

— *Part 2: Non-removable head (tight head) drums with a nominal capacity of 208,2 l and 220 l*

— *Part 3: Plug/bung closure systems for plastics drums with a nominal capacity of 113,6 l to 220 l*

Introduction

Throughout the world, a large number of plastics drum types with different dimensions and characteristics are being used. The differences in location of the minimum filling opening and outer dimensions result in differences in filling, handling and transportation.

ISO 20848 specifies the characteristics and dimensions of plastics drums which are of importance for the worldwide safe handling and transport of substances and for the continued reuse of the drums during their life cycle. Detailed performance requirements and the related test methods are not included as they depend upon the specific application.

Where the drums are intended to be used for the transport of dangerous goods, attention is drawn to the regulatory requirements which govern the transport of those goods in the countries concerned, including capseals/overseals fitted in accordance with the certificate. Depending upon the mode of transport, this means meeting the requirements of:

— **UN** (United Nations) — *Recommendations on the Transport of Dangerous Goods*,

— **ICAO** (International Civil Aviation Organization) — *Technical Instructions for the Safe Transport of Dangerous Goods by Air*,

— **IMO** (International Maritime Organization) — *International Maritime Dangerous Goods (IMDG) Code*.

This involves the certification and marking of the drums according to the regulations.

Packaging — Plastics drums —

Part 2:
Non-removable head (tight head) drums with a nominal capacity of 208,2 l and 220 l

1 Scope

This part of ISO 20848 specifies the characteristics and dimensions of non-removable head (tight head) plastics drums with a nominal capacity of 208,2 l and 220 l.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 20848-3, *Packaging — Plastics drums — Part 3: Plug/bung closure systems for plastics drums with a nominal capacity of 113,6 l to 220 l*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
non-removable head (tight head) drum
TH
flat-ended or convex-ended circular cross-section packaging with openings for filling and emptying in the head not exceeding 70 mm in diameter

3.2
nominal capacity
NC
capacity in litres which, by convention, is used to represent a class of drums of similar brimful capacities

3.3
brimful capacity
BC
volume of water in litres held by the drum when filled through the filling orifice to the point of overflowing

NOTE Annex A specifies the method for measuring brimful capacity.

3.4
total capacity
TC
volume of water in litres held by the drum when filled completely, i.e. following the removal of any air trapped in the drum

NOTE Annex A specifies the method for measuring total capacity.

3.5
overall height, h_o
height of the finished drum from the base to the highest point

NOTE See Figure 1.

3.6
overall diameter, d_o
maximum diameter of the drum, where relevant

NOTE See Figure 1.

3.7
bung housing position, p_b
distance from the centre of the bung housing to the outside of the drum body 50 mm vertically below the top edge of the top handling ring

NOTE See Figure 1.

3.8
drum mass
mass of the empty drum including all closures

4 Requirements

4.1 Dimensions

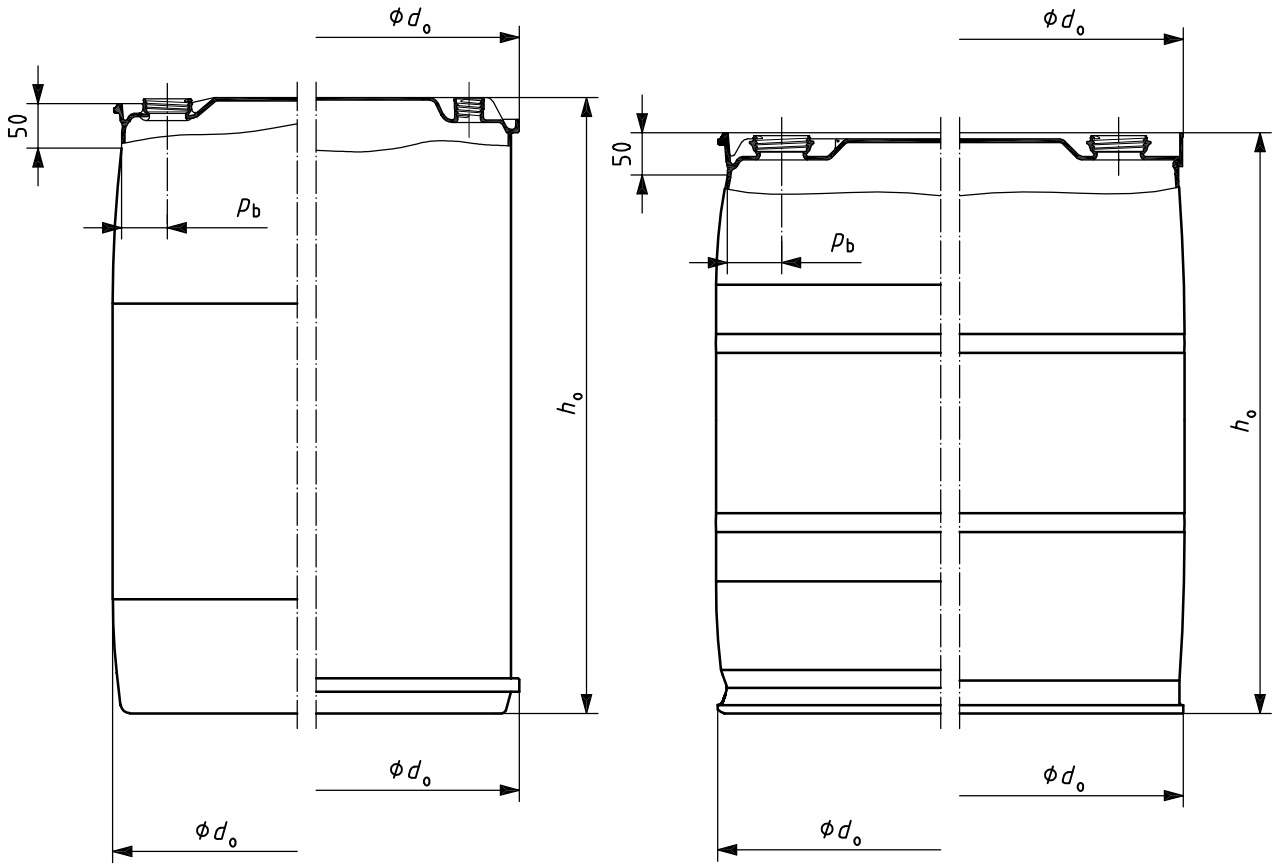
The dimensions and tolerances of the drum shall be as listed in Table 1 and as shown in Figure 1. The measurements shall be conducted at ambient conditions but shall not be made within 48 h of manufacture.

NOTE Apart from the dimensions specified, there are no restrictions on drum shape.

Table 1 — Dimensions of non-removable (tight head) drums with a nominal capacity of 208,2 l and 220 l (55 US gal and 58,1 US gal)

Nominal capacity, NC l (US gal)	**Brimful capacity**, BC l (US gal)	**Overall diameter**, d_o mm	**Bung housing position**, p_b mm	**Overall height**, h_o mm
208,2 (55)	$216{,}5\ ^{+5}_{0}$ $(57{,}2\ ^{+1{,}32}_{0})$	$595\ ^{+5}_{-7}$	84 ± 2	890 ± 7
220 (58,1)	$222\ ^{+3}_{-2}$ $(58{,}6\ ^{+0{,}8}_{-0{,}5})$	581 ± 5	72 ± 2	935 ± 5
NOTE 1 The bung housing position defined in this table only applies to that housing used for filling. NOTE 2 Dimensions d_o, p_b and h_o are applicable to empty drums. NOTE 3 1 US gal = 3,785 l.				

Dimensions in millimetres



Key

p_b bung housing position

d_o overall diameter

h_o overall height

The complete closure (plug and capseals/overseals) should not protrude above the overall height h_o.

NOTE Four possible designs are shown.

Figure 1 — Non-removable head (tight head) drum

4.2 Drum mass

The mass tolerance of the drum shall be ± 3 %.

NOTE The defined mass should be agreed between the purchaser and the supplier.

4.3 Material identification symbol

The drum shall be permanently marked with the relevant material identification symbol, i.e. the symbol identifying the material from which the drum is made, as shown in Annex C.

4.4 Closures

There shall be two closures in accordance with ISO 20848-3. When fitted, the closures shall not protrude above the overall height of the drum.

The preferred options are identified in Table 2.

The closure systems shall incorporate a facility for providing tamper evidence.

For the purpose of transport and storage, the filled drum should be closed, using the appropriate tooling, to the manufacturer's recommended closure torque for each type of gasket.

NOTE 1 For closures in drums intended for dangerous goods, the tolerance on the torque figures are specified in ISO 16104.

NOTE 2 After tightening of plugs, torques will reduce over time. In particular, plastics components are subject to stress relaxation resulting in a reduced torque.

NOTE 3 Torque figures supplied by the manufacturer are valid for the tightening of plugs in a clockwise direction. The measurement of torques on releasing plugs, i.e. in an anticlockwise direction, are different.

Table 2 — Preferred closure system combinations

Draining side	Second side
BCS G2 × 11,5	BCS 70 × 6
BCS G2 × 11,5	BCS 56 × 4
BCS G2 × 11,5	BCS G2 × 5

4.5 Materials

The drum shall be manufactured from high-density polyethylene or another suitable plastics material, or a combination thereof. Suitable non-plastics material may be used in conjunction with the plastics material.

NOTE Suitable additives may be included provided the specifications are identified.

4.6 Handling

Provision shall be made to enable the drum to be mechanically handled using one or two permanently fixed handling rings. The construction of the handling rings shall be adequate for normal static and dynamic handling of filled drums.

4.7 Stacking

The drum shall be capable of being stacked with or without pallets, according to the manufacturer's recommendations.

4.8 Draining

4.8.1 The drum shall be designed so as to minimize the residual volume of liquid left in the drum after drainage. The residue shall be not more than 100 ml when tested according to B.3.

4.8.2 The residue obtained when the drum is tested according to B.4 is more dependent on the area and condition of the internal surface of the drum than when the drum is tested according to B.3 and, therefore, may be in excess of that obtained according to B.3.

NOTE The maximum permitted figure should be agreed between the purchaser and the supplier.

4.9 Finish

The external surface finish shall be suitable for the attachment of labels.

NOTE 1 The nature of the internal and external finish should be agreed between the purchaser and the supplier.

The drum body should be blue in colour. The use of any other colour and any durable marking should be agreed between the purchaser and the supplier.

5 Designation

A non-removable head (tight head) drum (TH) manufactured in accordance with this part of ISO 20848 with a nominal capacity of 220 l shall be so designated, e.g.

Plastics drum TH ISO 20848-2 NC - 220 l

Annex A
(normative)

Capacity measurement method for non-removable head (tight head) plastics drums

A.1 Principle

The capacity is determined by a gravimetric method, i.e. by the measurement of the mass of water in the filled drum and its conversion to a capacity. A correction factor can be applied according to Table A.1, but only if the weighing scale used is of a higher precision than the correction.

Table A.1 — Correction factors

Water temperature °C	**Correction factor**, F
12	1,000 5
14	1,000 8
16	1,001 1
18	1,001 4
20	1,001 8
22	1,002 2
24	1,002 7
27	1,003 6

A.2 Apparatus

Weighing scale, with an accuracy of at least 0,1 % of the weight being measured.

A.3 Procedure for determination of total capacity

A.3.1 Drill a hole of diameter 5 mm to 10 mm for venting at the highest point of the closed drum.

NOTE The position of the hole depends on the profile of the top.

A.3.2 Weigh the empty drum and record its mass, m_1, in grams.

A.3.3 Measure the temperature of the tap water to be used to fill the drum.

A.3.4 Fill the drum 100 % with water through the normal filling closure with all other closures fitted and make sure that the air is vented through the drilled hole.

NOTE For certain drums, the drum needs to be inclined or tilted, so that the filling hole is at the highest position.

A.3.5 Fit and secure the drum closure and remove any surplus water from the outside.

A.3.6 Weigh the filled drum and record its mass, m_2, in grams.

A.4 Procedure for determination of brimful capacity

Follow the same procedure as for the determination of total capacity (see A.3) with the exception that no hole is drilled to vent entrapped air. Fill the drum, with the drum in the normal position for filling, until water overflows at the closure.

A.5 Expression of results

The difference between the mass of the filled drum, m_2, and the mass of the empty drum, m_1, $(m_2 - m_1)$, if necessary multiplied by the correction factor F, represents the capacity of the drum as determined by the procedure used.

Annex B
(normative)

Draining test method for non-removable head (tight head) plastics drums

B.1 Principle

The absolute drainability and the relative drainability are obtained by determining the mass of water left as a residue in the drum after drainage under gravity.

B.2 Apparatus

B.2.1 Weighing scale, with an accuracy of at least ± 2 g.

B.3 Determination of drainability using the top section of the drum

B.3.1 Cut the top off the drum.

B.3.2 Retain the top section and fit the appropriate closure(s).

B.3.3 Weigh the top section with closure(s) fitted, and record its mass, m_1, in grams.

B.3.4 Position the top section, top down, on a test rig so that it is held at the angle specified by the manufacturer (preferably 0° to 20°) with the designated closure opening at its lowest position.

B.3.5 Fill the top section with approximately 10 l of tap water.

B.3.6 Wait until the water surface has settled and then open the closure.

B.3.7 Allow the water to drain for 5 min without moving or shaking the top section and refit the closure.

B.3.8 Reweigh the top section, still in the top-down position, and record its mass, m_2, in grams.

B.4 Determination of drainability using a complete drum

B.4.1 Weigh the empty drum including its closure(s), and record its mass, m_1, in grams.

B.4.2 Fill the drum with a limited quantity of tap water, approximately 10 l. Close the drum.

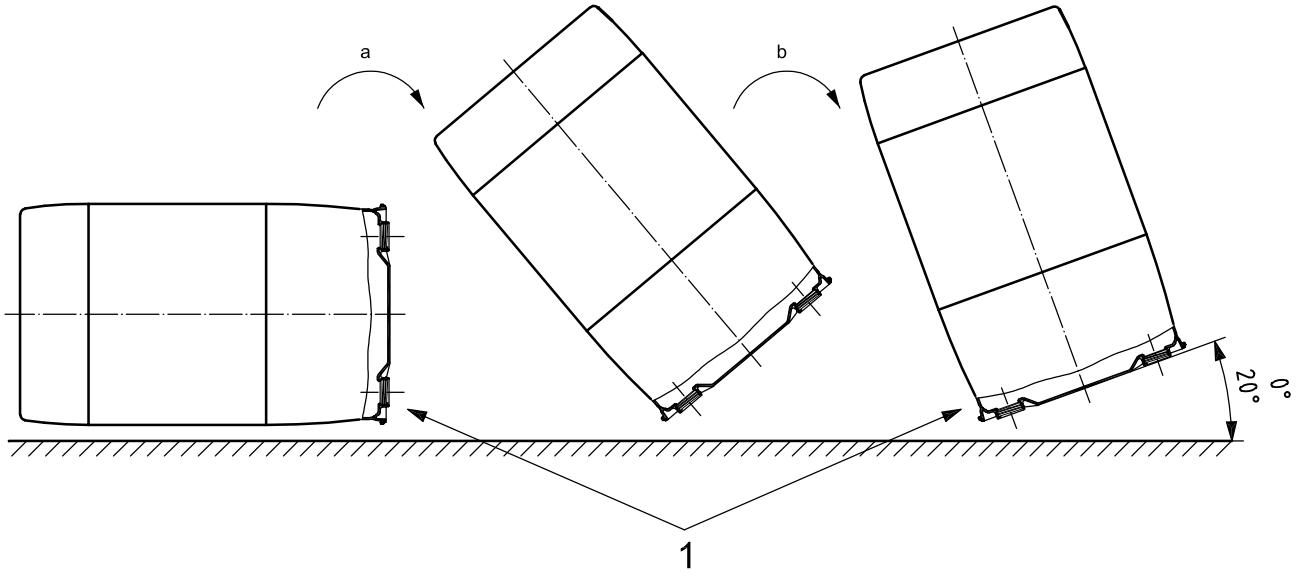
B.4.3 Rotate the drum to ensure a wetting of all inner surfaces.

B.4.4 Open the drum and place it in a horizontal position with the designated closure (as shown in Figure B.1).

B.4.5 Slowly incline the drum up to the manufacturer's recommended angle that ensures optimal draining (preferably 0° to 20°) and leave the drum in this position for 5 min (position 2 in Figure B.1) without moving or shaking the drum.

B.4.6 Fit and secure the designated closure and remove any surplus water from the outside.

B.4.7 Weigh the emptied drum and record its mass, m_2, in grams.



Key

1 designated closure

[a] Position 1.

[b] Position 2.

Figure B.1 — Determination of drainability

B.5 Expression of results

The difference between the mass of the emptied drum, m_2, and the mass of the empty drum, m_1, $(m_2 - m_1)$, represents the residue in the drum and is termed the absolute drainability of the drum.

The relative drainabillty of a drum is obtained by expressing the absolute drainability as a percentage of the total capacity.

Annex C
(normative)

International material code symbols

Figure C.1 — Polyethylene terephthalate (PET)

Figure C.2 — Polyethylene, high density (PE-HD)

Figure C.3 — Vinyl (polyvinyl chloride or PVC)

Figure C.4 — Polyethylene, low density (PE-LD)

Figure C.5 — Polypropylene (PP)

Figure C.6 — Polystyrene (PS)

Figure C.7 — Other

Bibliography

[1] ISO 16104, *Packaging — Transport packaging for dangerous goods — Test methods*

ICS 55.140

Price based on 12 pages