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Plastics — Blow-moulded polypropylene containers for packaging of liquid foodstuffs

Plastiques — Récipients en polypropylène moulés par soufflage pour l'emballage de denrées alimentaires liquides

ICS 55.140; 83.140.99

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Foreword

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ISO 13106 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 11, *Products*.

Introduction

The packaging of liquid foods has traditionally used glass or metal containers. Plastics packaging, especially using blow-molded containers has proven to be an effective substitute offering many advantages including alternative manufacturing options, lower weights, design flexibility, and packaging aesthetics.

In addition to these benefits, polypropylene blow-molded containers offer the advantages of being able to be hot-filled and, in some cases autoclaved for sterilization of the contents. Polypropylene containers can also be manufactured as co-extruded structures allowing the inclusion of barrier layers to improve shelf-life or to incorporate layers composed of recycled polypropylene.

When properly specified and formulated, polypropylene is compliant to food contact requirements e.g., FDA, is highly resistant to many chemicals, exhibits very high stress crack resistance, and has the necessary balance of mechanical properties to meet the requirements for handling, storage, and transportation

Plastics — Blow-moulded polypropylene containers for packaging of liquid foodstuffs

1 Scope

This International standard prescribes the requirements for polypropylene resins intended to be used in the manufacture of blow-molded containers for use in liquid-food packaging. The standard also provides general guidance and recommendations regarding tolerances and sampling and information addressing environmental aspects and proper recovery and recycling practices.

Although applicable, this standard does not address other applications for blow-molded polypropylene containers. These must often meet specific requirements which will need to be addressed for these applications.

NOTE: It is not to be implied that polypropylene is the only polymer suitable for these applications as many other polymers i.e. PP-HD, PET, etc. are also suitable.

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 1873-1, *Plastics - Polypropylene (pp) molding and extrusion materials - part 1: designation system and basis for specifications*

ISO 1873-2, *Plastics - Polypropylene (PP) moulding and extrusion materials - Part 2: Preparation of test specimens and determination of properties*

3 Terms and definitions

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

3.1
extrusion blow molded container
a container formed from an extruded parison of heat softened thermoplastic, blow molded by the application of air pressure which forces it against the inside walls of a blow mould

3.2
injection blow molded container
a container formed from an injection-molded parison that is transferred, while hot, to a blow-mold to form the container

3.3
stretch blow molded container
a container formed from an injection-molded parison or reheated pre-form that is stretched prior to blow-molding to impart bi-axial orientation

3.4
neck face
the upper most surface of the container neck

3.5
container height to neck face
the height of the highest point of the neck face of the finished empty container

3.6
container overall height
the height of the finished empty container at its highest point with closure & fitment

3.7
container diameter
the external diameter of the finished empty container at a specified height, expressed as the mean of the two perpendicular diameters, or as the circumference multiplied by 0,318 at the same specified height

3.8
neck height (h)
the perpendicular distance from the highest point of the plane including the neck face to the nearest point of the finished container's shoulder. (Reference Annex "A")

3.9 neck finishes
3.9.1
neck diameter (E)
the external diameter of the neck, excluding thread and/or prominences, measured as the mean. (Reference Annex "B")

3.9.2
thread diameter (T)
the external diameter of the neck thread measured as the mean of two perpendicular diameters avoiding the part line. (Reference Annex "B")

3.9.3
neck bore (I)
the diameter of the inner periphery of the neck at a specified depth. (Reference Annex "B")

3.10
neck ovality
the difference between the maximum and the minimum neck diameters

3.11
nominal capacity
the volume of the liquid the container is intended to hold at ambient temperatures of 23 ± 1 °C or 27 ± 2 °C as specified

4 Capacity

The nominal capacities for stock containers as per retail trade for liquid food products, together with the corresponding minimum brimful capacities are given in Table 1.

Table 1 — The nominal capacities for stock containers

Sl No	Nominal Capacity (ml)	Minimum Brimful Capacity (ml)
1	50	67
2	60	92
3	100	108
4	125	129

5	150	157
6	180	187
7	200	212
8	250	260/285
9	500	525
10	750	836
11	1 000	1 035

5 Container mass – tare weight

The container mass or tare weight shall be as agreed between the purchaser and the vendor. The tolerance on the mass of the container shall be as specified in Table 2.

Table 2 — The tolerance on the mass of the container

Sl No	Mass of the container gms	Tolerance %
1	Up to & including 10	± 10
2	Over 10 upto & including 25	± 7,5
3	Over 25	± 5

The accuracy of weighing shall be to the nearest 0,1 g for containers with tare weight up to 50 gms and 0,5 gm for containers beyond 50 gms and up to 200 gms.

6 Raw material

The grade designation(s) described in ISO 1873-1, Plastics - Polypropylene (pp) molding and extrusion materials - part 1: designation system and basis for specifications shall be used to describe the polypropylene used. The testing of grades shall be carried out as per ISO 1873-2, Plastics - Polypropylene (PP) moulding and extrusion materials - Part 2: Preparation of test specimens and determination of properties.

Since all types of polypropylene are suitable for use in blow-molded containers, the specification of the polypropylene grade to be used will depend on many factors including the specific application, container design, and process method to be used. For these reasons, it is not possible to recommend specific grades. In all cases, the choice of a specific grade shall be determined by its suitability for the intended application and agreement between the interested parties.

7 Tolerance on dimensions

The tolerance on dimensions is valid for finished empty containers. The dimensions of filled containers may vary.

Reference Annexes “A” and “B” for specific tolerances

7.1 Wall thickness

The minimum wall thickness at any point on the container surface shall not be less that 0,2 mm unless agreed to between the interested parties. These are to be measured by any suitable means including micrometer, caliper, or electronic gauge.

7.2 Neck bore

This is to be measured at an agreed depth below the neck face using calipers, calibrated plugs etc. The tolerance shall be as agreed upon between the interested parties.