International Standard 90/3

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Light gauge metal containers — Definitions and determination methods for dimensions and capacities — Part 3: Aerosol cans

Récipients métalliques légers — Définitions et méthodes de détermination des dimensions et des capacités — Partie 3: Boîtiers pour aérosols

First edition — 1986-12-01

UDC 621.798.144 **Ref. No. ISO 90/3-1986 (E)**

Descriptors : containers, metal packaging, spray cans, definitions, tests, dimensional measurements, determinations, dimensions, diameters, capacity, designation.

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 90/3 was prepared by Technical Committee ISO/TC 52, *Light gauge metal containers.*

This first edition together with the first editions of ISO 90/1 and ISO 90/2 cancel and replace ISO 90-1977, of which they constitute a technical revision.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Printed in Switzerland

Light gauge metal containers — Definitions and determination methods for dimensions and capacities — Part 3: Aerosol cans

0 Introduction

ISO 90 is a series of three parts which groups definitions, determination methods for dimensions and capacities, and tolerances and designations of light gauge metal containers.

This part of ISO 90 covers aerosol cans as defined in 2.1.

The two other parts are

Part 1: Open-top cans.

Part 2: General use containers.

NOTE — An "open-top can" is a can one end of which is double-seamed after filling. A "general use container" is a container which is sealed after filling with a closure that need not be double-seamed.

1 Scope and field of application

This part of ISO 90 defines cans and aerosol cans, diameters, aperture, constructions, shapes and capacities. It specifies methods for determining diameters, and package and brimful capacities. It also gives tolerances on capacity and recommends an international designation.

2 Definitions

For the purposes of ISO 90 and related International Standards, the following definitions apply.

2.1 Cans

2.1.1 can: Rigid container made of steel-based plate, with a maximum nominal material thickness of 0,49 mm, or of aluminium and its alloys.

2.1.2 aerosol can: Non-refillable can intended to contain a product which is dispensed by pre-stored pressure in a controlled manner through a valve.

2.2 Diameters

2.2.1 internal diameter (for steel-based plate cans): See figure 1a).

2.2.2 external diameter (for aluminium cans): See figure 1b).

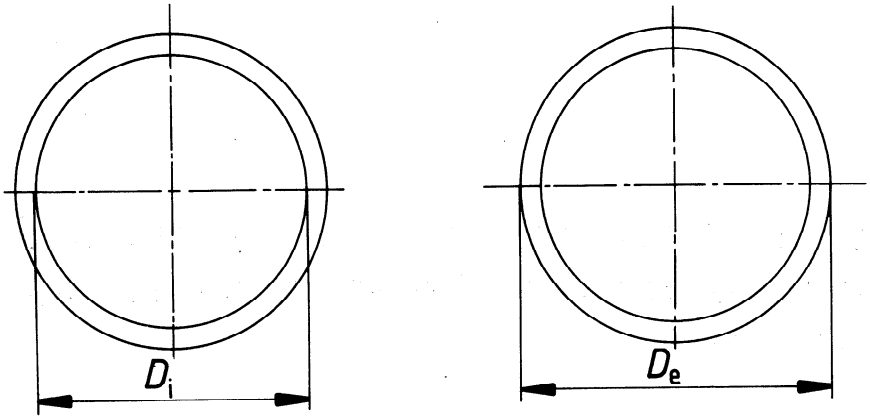

Figure 1

2.3 aperture: Circular opening designed to be sealed by a valve component. The valve is mounted either in an internally fitting cup or on an externally fitting ferrule.

2.4 Constructions

2.4.1 three-piece can (built-up can): Can made from three main components: body, top end and bottom end.

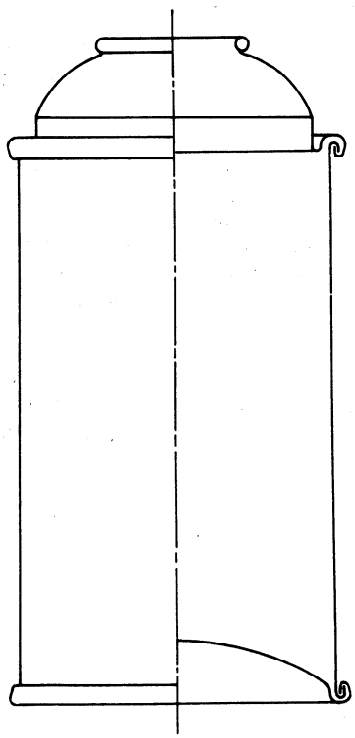

Figure 2

2.4.2 two-piece can (drawn or extruded) : Can made from two main components in which the body and one end are one piece and the other end may be the bottom or the top end.

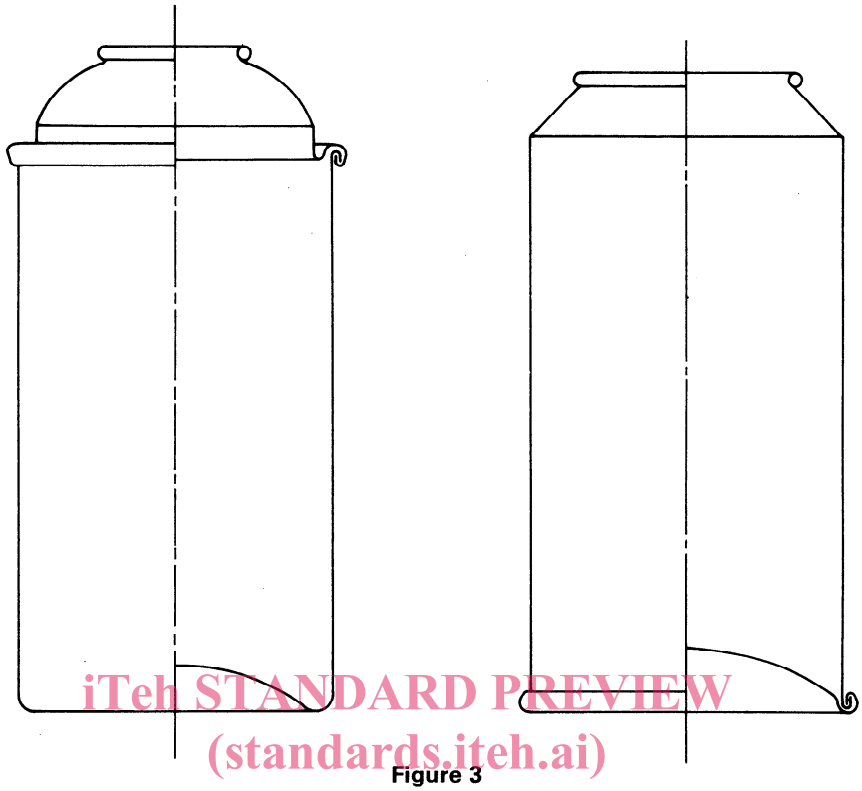

Figure 3

2.4.3 monobloc can : Cold extruded or drawn one-piece can, for which a variety of shoulders exists. Some shoulders are shown in figures 4 b) to 4 f).

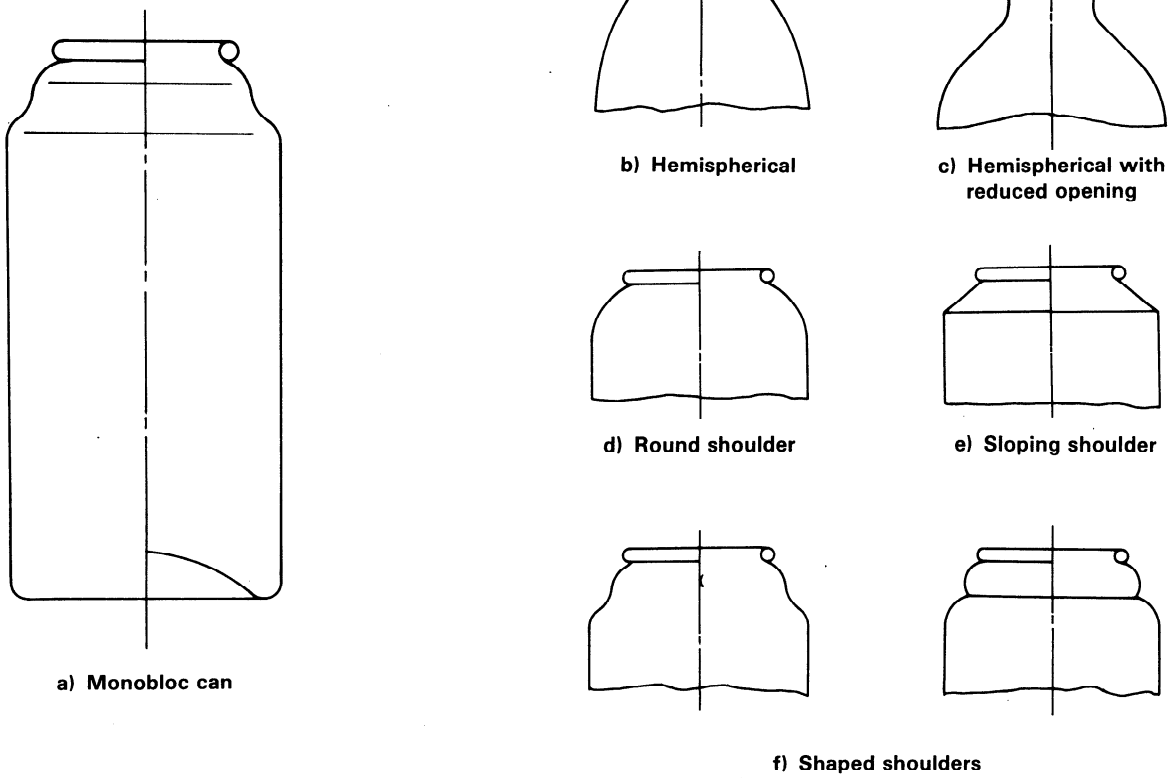

Figure 4

2.5 Shapes

2.5.1 cylindrical (straight-sided) can: Can the body diameter of which is constant from top to bottom.

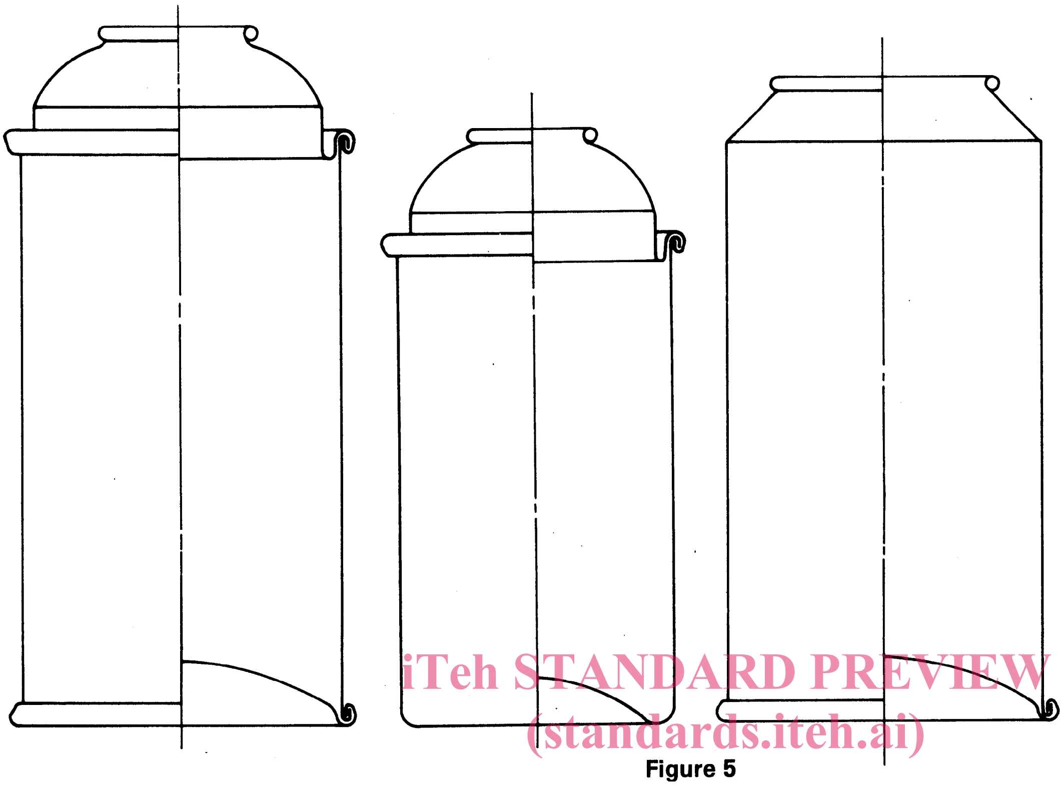

Figure 5

2.5.2 necked-in can: Can the body of which has been reduced in diameter at one [see figures 6 a) and 6 b)] or both [see figure 6 c)] ends.

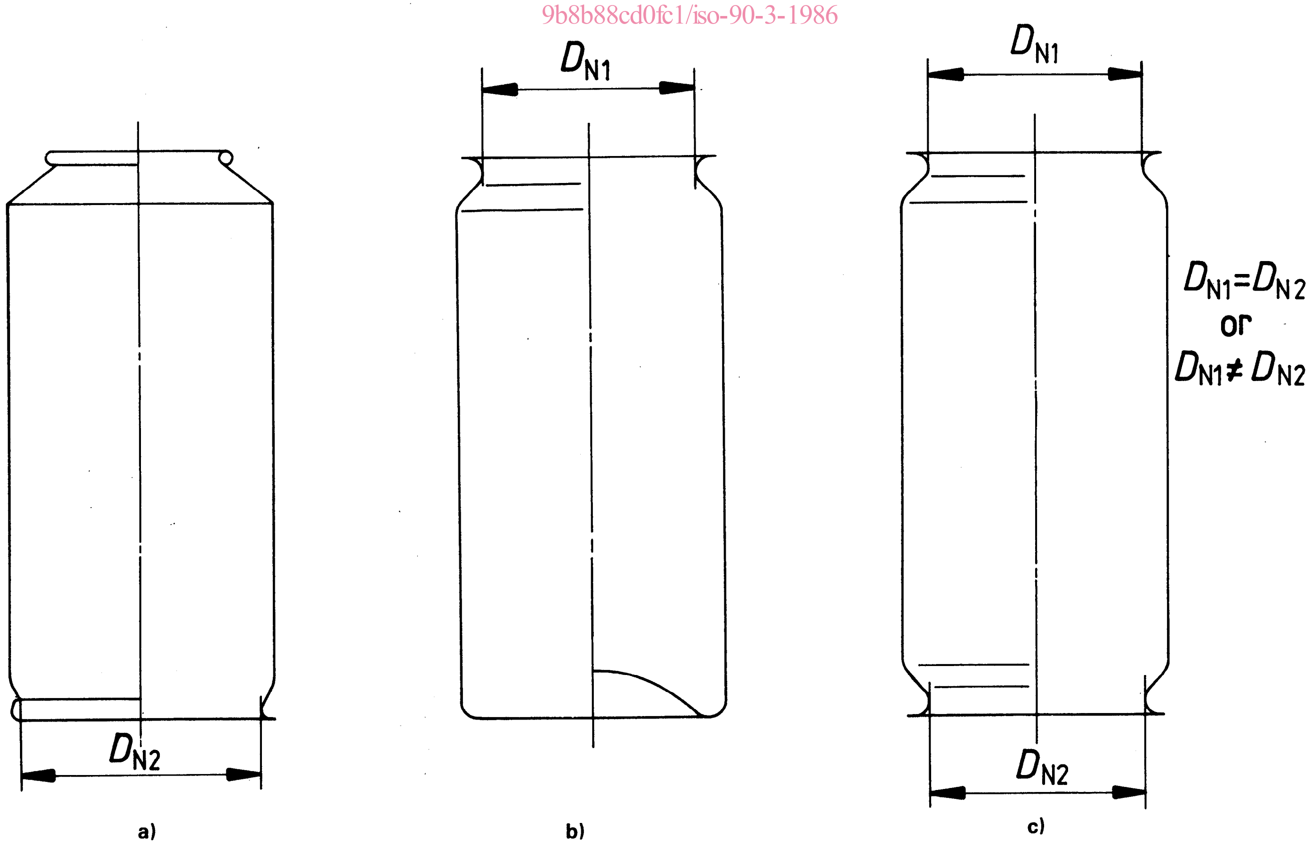

Figure 6

2.6 Capacities

2.6.1 package capacity, C_1 (in millilitres): The total capacity of a can, fitted with the valve, valve cup and dip tube, determined in accordance with 4.2.

2.6.2 brimful capacity, C_2 (in millilitres): The total capacity of a can without a closure, determined in accordance with 4.3.

3 Determination of dimensions

3.1 Measurement of diameters

3.1.1 Measure the internal body diameter using a plug gauge or derive it from the external diameter.

3.1.2 Measure the external body diameter using a vernier caliper.

3.1.3 Measure the necked-in diameter using a plug gauge applied to the internal diameter of the extremity to which the end is to be fixed.

3.2 Nominal diameters

When a series of standard body diameters (or necked-in diameters) has been agreed, the tolerances define the limits of acceptable deviation resulting from variations in can design and manufacture.

Determine the nominal diameters by rounding the standard body or necked-in diameters to the nearest whole millimetre (if the first decimal is 5 or above, round up; in all other cases, round down).

3.3 Measurement of height

See the annex.

3.4 Characteristic dimensions

Nominal diameters are characterized by the following data:

— for all aerosol cans: diameter D_i or D_e (see 2.2)

— in addition, for necked-in cans: diameter(s) D_{N1} and/or D_{N2} (see 2.5.2)

4 Determination of capacities

4.1 General

The methods for determining capacity all rely on obtaining the mass of water in the can. For cans with a capacity equal to or greater than 400 ml, a correction factor (see 4.1.1) can be applied, but only if a very precise determination of capacity is necessary.

4.1.1 Temperature-dependent correction factor

Table 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
26	1,003 3
28	1,003 8
30	1,004 4

4.1.2 Accuracy of the balances

The scales used for weighing the cans shall be at least as accurate as specified in table 2.

Table 2 — Balance accuracy

Mass of can m g	Accuracy g
$m \leqslant 50$	± 0,2
$50 < m \leqslant 500$	± 0,5
$500 < m$	± 1,0

4.2 Determination of package capacity, C_1

4.2.1 Determine the mass of the empty can, together with the valve, valve cup and dip tube, m_{v1}, in grams, as accurately as possible (see 4.1.2).

4.2.2 If necessary, measure the temperature of the water to be used (see 4.1.1).

4.2.3 Fill the can completely with water.

4.2.4 Insert the separated dip tube loosely (the length should correspond to the can height).

4.2.5 Press the valve cup with fully assembled valve into the aperture of the can.

4.2.6 Remove any surplus water from the outside of the can.

4.2.7 Determine the mass of the filled can, m_{v2}, in grams, as accurately as possible (see 4.1.2).

4.2.8 The difference between the weighings ($m_{v2} - m_{v1}$), if necessary multiplied by the relevant correction factor (see 4.1.1), represents the package capacity, C_1, of the can, in millilitres.

4.3 Determination of brimful capacity, C_2

4.3.1 Close the can with a rigid disc of transparent plastic with two holes, 3 mm in diameter and about 7 mm apart, or one hole, 6 mm in diameter.

4.3.2 Determine the mass of the empty can together with the disc, m_{d1}, in grams, as accurately as possible (see 4.1.2).

4.3.3 If necessary, measure the temperature of the water to be used (see 4.1.1).

4.3.4 Fill the can with water, avoiding air bubbles.

4.3.5 Close the can with the disc, the hole(s) in the disc being as close as possible to the edge of the aperture, and complete filling through the holes. The can should be shaken, if necessary, during the filling process to ensure the release of any trapped air.

4.3.6 Remove any surplus water from the outside of the can.

4.3.7 Determine the mass of the filled can together with the disc, m_{d2}, in grams, as accurately as possible (see 4.1.2).

4.3.8 The difference between the weighings, ($m_{d2} - m_{d1}$), if necessary multiplied by the relevant correction factor (see 4.1.1), represents the brimful capacity, C_2, of the can, in millilitres.

5 Tolerances on capacities

5.1 General

When a series of standard nominal capacities has been agreed, tolerances are as given in table 3.

These tolerances define the limits of acceptable deviation resulting from variations in can design and manufacture.

At least 99,7 % of the individual cans shall lie within these limits. [1)]

5.2 Tolerances

Table 3 — Tolerances on capacities

Package or brimful capacity ml	Tolerances	
	%	ml
< 80	± 5	
80 to 100		± 4
101 to 150	± 4	
151 to 200		± 6
201 to 430	± 3	
431 to 650		± 13
651 to 1 000	± 2	
1 001 to 1 400		± 20

6 Designation

It is recommended that aerosol cans be designated internationally

a) by their nominal brimful capacity, C_2, expressed in millilitres,

b) by the nominal diameters, expressed in millimetres, in accordance with 3.2 and 3.4.

Examples

— **Steel-based aerosol cans**

Cylindrical (straight-sided) cans	C_2-$D_i/D_i/D_i$
Necked-in cans (only top end)	C_2-$D_i/D_{N1}/D_i$
Necked-in cans (only bottom end)	C_2-$D_i/D_i/D_{N2}$
Necked-in cans (both ends)	C_2-$D_i/D_{N1}/D_{N2}$

— **Aluminium aerosol cans**

Monobloc cans	C_2-D_e

1) This percentage is derived from statistical theory: when a variable, X, is distributed according to a normal distribution of parameters m and σ (where m is the arithmetical mean and σ is the standard deviation), 99,7 % of its values are between ($m - 3\sigma$) and ($m + 3\sigma$).

Annex

Measurement of height

(This annex does not form an integral part of the standard.)

In clause 6, it is recommended that containers be designated internationally by

a) their nominal brimful capacity;

b) their nominal diameters.

However, it may be necessary to refer to container heights; this should be done as follows:

— **Body height** (for three-piece aerosol cans): The height of the body over the double seams.

This dimension is shown as H_1 on the types of can illustrated in figure 7.

— **Overall height** (for all types): The height of the unclosed container.

This dimension is shown as H_3 on the types of can illustrated in figure 7.

These dimensions shall be measured using a vernier caliper or a height gauge.

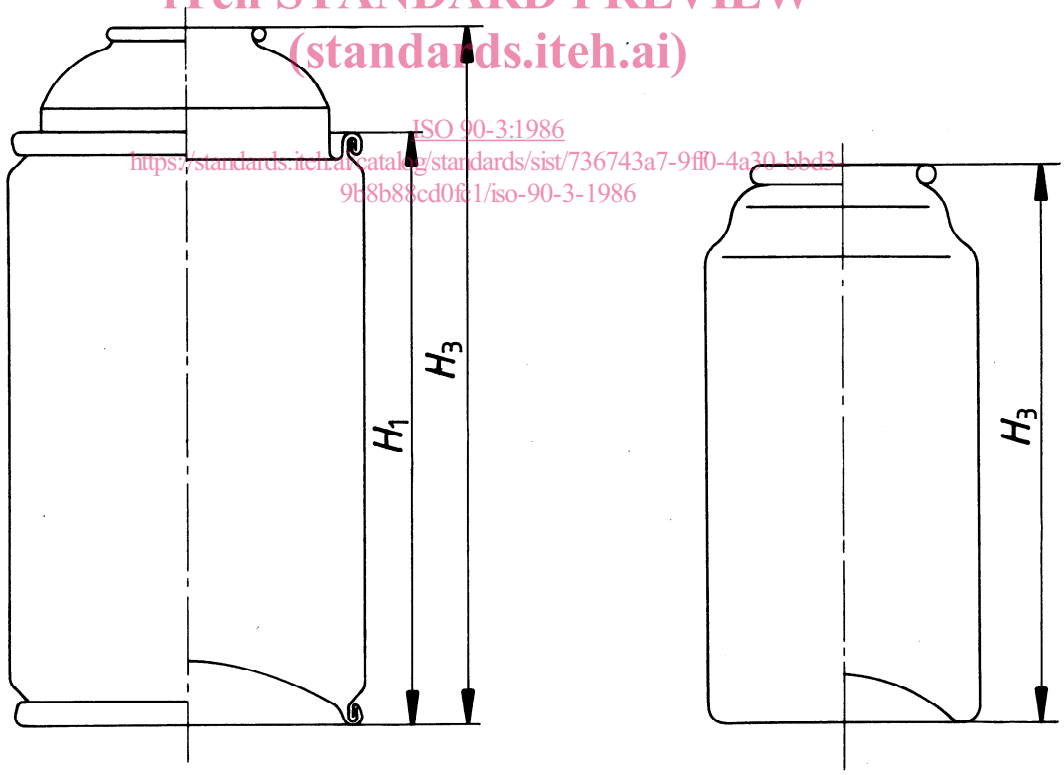

Figure 7

Solely for reference purposes, the body height, H_1, for three-piece aerosol cans and H_3 for all types of aerosol cans should be quoted and shall be expressed by rounding to the nearest whole millimetre (if the first decimal is 5 or above, round up; in all other cases, round down).