BRITISH STANDARD

BS EN ISO
90-3:2001

Light gauge metal containers — Definitions and determination of dimensions and capacities —

Part 3: Aerosol cans

The European Standard EN ISO 90-3:2001 has the status of a British Standard

ICS 55.120; 55.130

National foreword

This British Standard is the official English language version of EN ISO 90-3:2001. It is identical with ISO 90-3:2000. It supersedes BS EN 20090-3:1993 which is withdrawn

The UK participation in its preparation was entrusted by Technical Committee PKW/5, Primary and transport packaging, to Subcommittee PKW/5/22, Metal packaging, which has the responsibility to:

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Summary of pages

This document comprises a front cover, an inside front cover, the EN ISO title page, the EN ISO foreword page, the ISO title page, pages ii to v, a blank page, pages 1 to 13 and a back cover.

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English version

Light gauge metal containers - Definitions and determination of dimensions and capacities - Part 3: Aerosol cans (ISO 90-3:2000)

Récipients métalliques légers - Définitions et détermination des dimensions et des capacités - Partie 3: Boîtiers pour aérosols (ISO 90-3:2000)

Verpackungen aus Feinstblech - Begriffe und Verfahren zur Bestimmung von Abmessungen und Volumen - Teil 3: Aerosoldosen (ISO 90-3:2000)

This European Standard was approved by CEN on 29 June 2001.

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Ref. No. EN ISO 90-3:2001 E

Foreword

The text of the International Standard from Technical Committee ISO/TC 52 "Light gauge metal containers" of the International Organization for Standardization (ISO) has been taken over as an European Standard by Technical Committee CEN/TC 261 "Packaging", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2002, and conflicting national standards shall be withdrawn at the latest by February 2002.

This European Standard replaces EN 20090-3:1992.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 90-3:2000 has been approved by CEN as a European Standard without any modification.

EN ISO 90-3:2001

INTERNATIONAL STANDARD

ISO 90-3

Second edition
2000-08-01

Light gauge metal containers — Definitions and determination of dimensions and capacities —

Part 3: Aerosol cans

Récipients métalliques légers — Définitions et détermination des dimensions et des capacités

Partie 3: Boîtiers pour aérosols

Reference number
ISO 90-3:2000(E)

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 part of ISO 90 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 90-3 was prepared by Technical Committee ISO/TC 52, *Light gauge metal containers*, Subcommittee SC 6, *Aerosol containers*.

This second edition cancels and replaces the first edition (ISO 90-3:1986) which has been technically revised.

ISO 90 consists of the following parts, under the general title *Light gauge metal containers — Definitions and determination of dimensions and capacities*:

— *Part 1: Open-top cans*

— *Part 2: General use containers*

— *Part 3: Aerosol cans*

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.

Annex A of this International Standard is for information only.

Introduction

ISO 90 consists of three parts which group definitions, methods of determination of dimensions and capacities, as well as tolerances and designations of rigid containers made of metal with a maximum nominal material thickness of 0,49 mm.

Light gauge metal containers — Definitions and determination of dimensions and capacities —

Part 3: Aerosol cans

1 Scope

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

NOTE A list of standards dealing with materials used for aerosol cans is given in the Bibliography.

2 Terms and definitions

For the purposes of this part of ISO 90, the following terms and definitions apply. The figures given in this clause illustrate the terminology.

2.1
aerosol can
rigid can made of light gauge metal with a maximum nominal material thickness of 0,49 mm; non-refillable can intended to contain a product which is dispensed by pre-stored pressure in a controlled manner through a valve

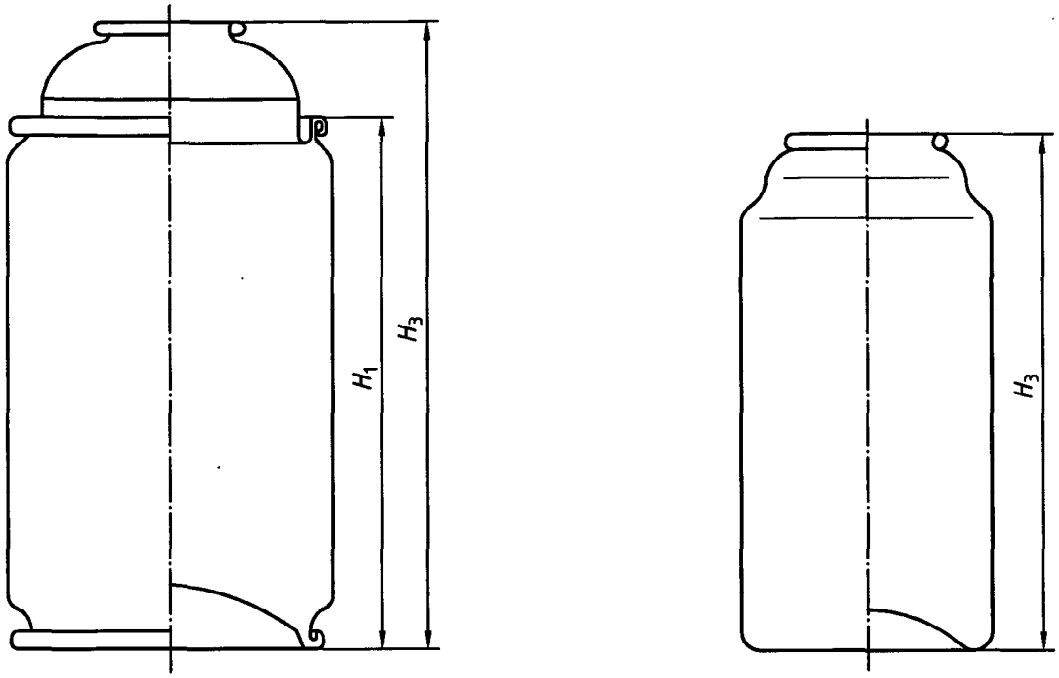
2.2 Heights

2.2.1
body height
H_1
height of the body over the double seams (three piece aerosol cans only)

See Figure 1 a).

2.2.2
overall height
H_3
height of the unclosed container

See Figures 1 a) and 1 b).



a) Body and overall heights

b) Overall height

Figure 1 — Heights

2.3
aperture
circular opening designed to be sealed by a valve component of which the valve is located in a valve cup

2.4 Constructions

2.4.1
three-piece can
can made from three main components: body, top end and bottom end

See Figure 2.

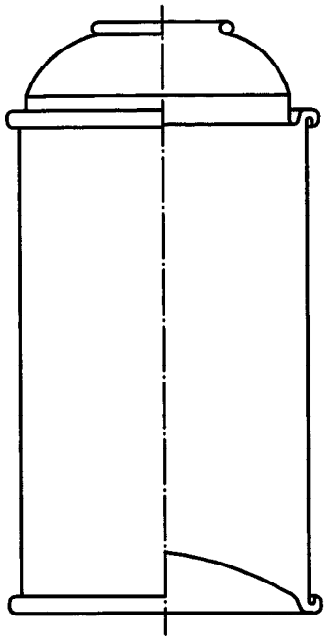
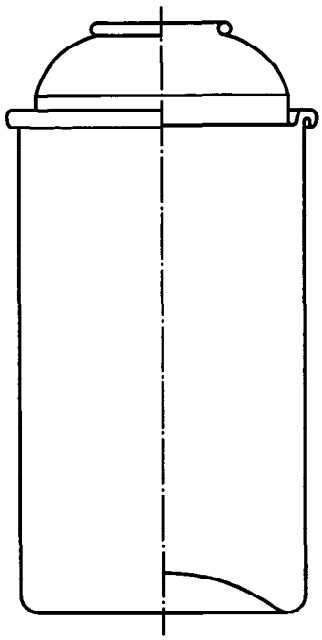


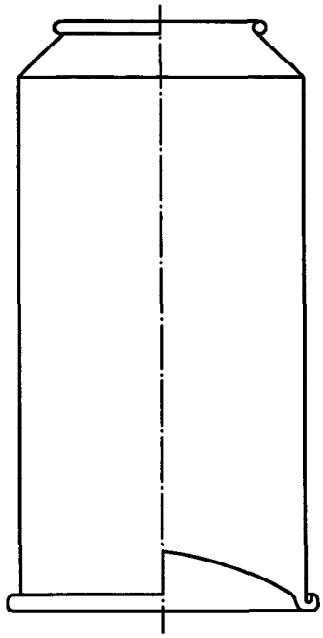
Figure 2 — Three-piece can

2.4.2
two-piece can
⟨extruded or drawn and wall-ironed⟩ can made from two main components: the body and top end or the body with bottom end

See Figure 3.



a) Extruded body with bottom (one piece) and top end

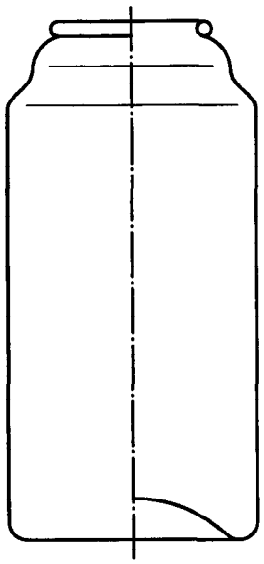


b) Drawn and wall-ironed body with shoulder on top (one piece) and bottom end

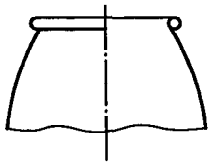
Figure 3 — Two-piece can

2.4.3
monobloc can
extruded or drawn and wall ironed one-piece can for which a variety of shoulders exists

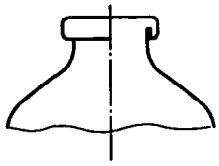
See Figure 4. Typical shoulders are shown in Figures 4 b) to 4 f).



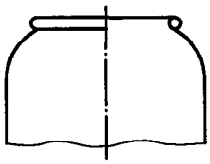
a) Monobloc can



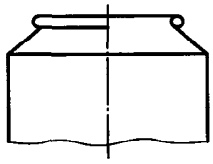
b) Ogival shoulder



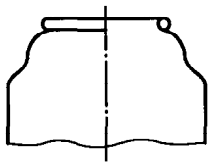
c) Ogival shoulder with reduced opening



d) Spherical shoulder



e) Flat shoulder



f) Shaped shoulder

Figure 4 — Monobloc can

2.5 Shapes

2.5.1
straight-sided can
can which has a constant diameter from top to bottom, local variations caused by special features being disregarded

See Figure 5.

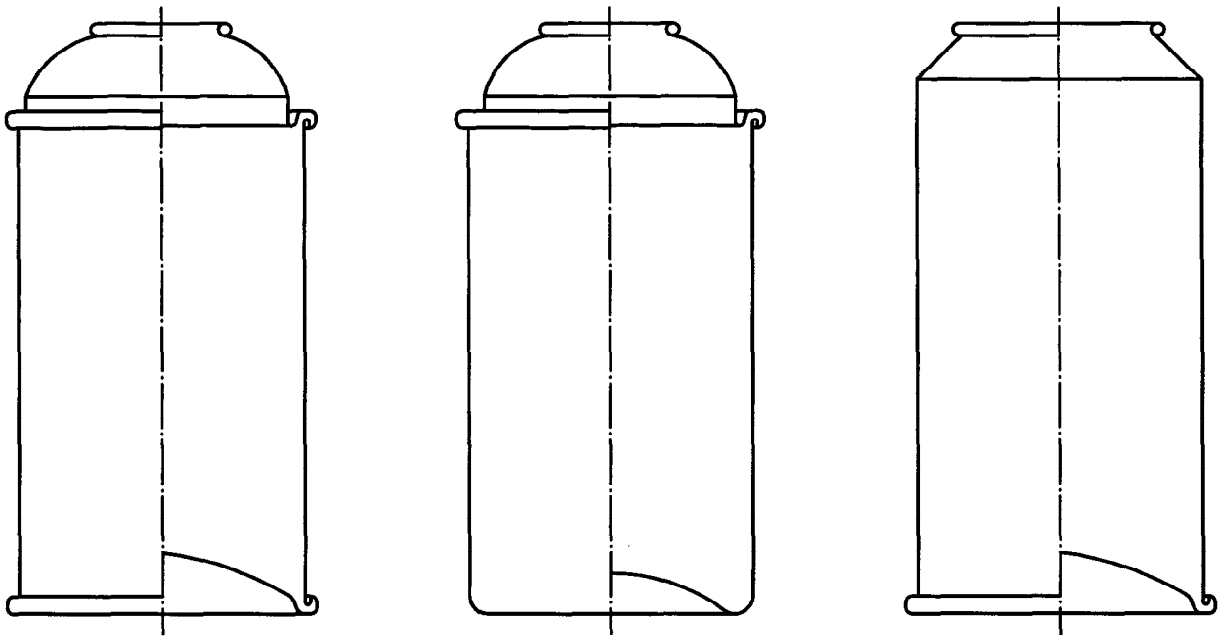


Figure 5 — Straight-sided can

2.5.2
necked-in can
can which has a body reduced diameter at one [see Figures 6 a) and 6 b)] or both [see Figure 6 c)] ends

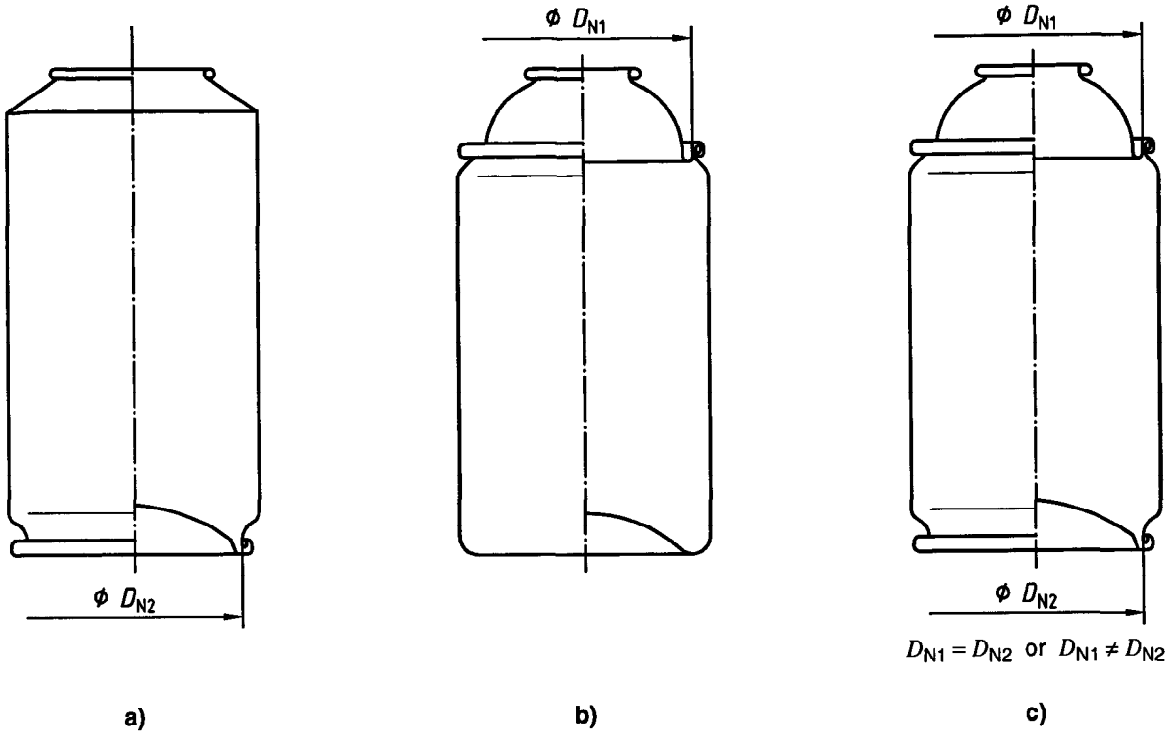


Figure 6 — Necked-in can

2.6 Capacities

2.6.1
gross lidded capacity
C_1
total capacity of a can, fitted with a valve, valve cup and dip tube

NOTE Gross lidded capacity is expressed in millilitres.

2.6.2
brimful capacity
C_2
total capacity of a can without a closure, determined according to 4.2

NOTE Brimful capacity is expressed in millilitres.

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 calliper.

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 Measurement of height

Measure the body height and/or the overall height using a vernier calliper or a height gauge.

3.3 Nominal dimensions

NOTE Annex A gives information on the dimensions of the top end of three-piece necked-in tinplate cans.

3.3.1 Nominal diameters

3.3.1.1 Determination

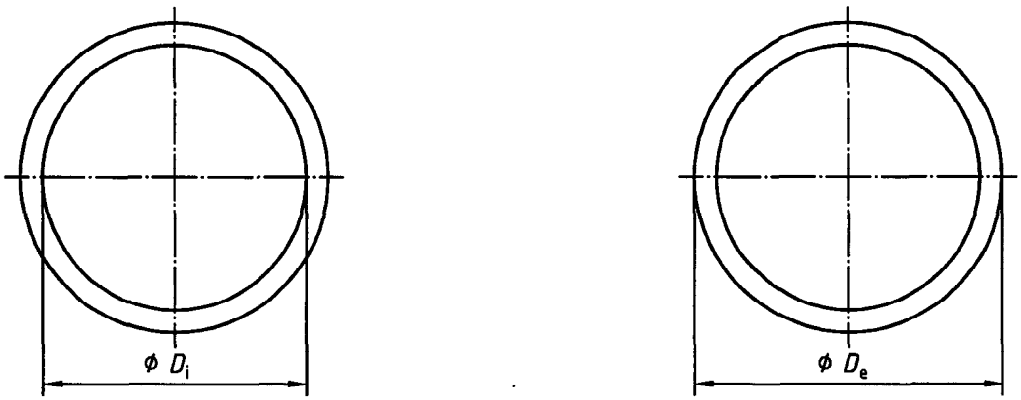
The nominal diameter is determined by rounding the body or necked-in diameter to the nearest whole millimetre (if the first decimal is 5 or above, round up; in all other cases, round down).

3.3.1.2 Characteristic dimensions

3.3.1.2.1 Aerosol cans

Internal diameter D_i [see Figure 7 a)].

External diameter D_e [see Figure 7 b)].



a) Internal diameter

b) External diameter

Figure 7 — Diameters

3.3.1.2.2 Necked-in cans

Diameter(s) D_{N1} and/or D_{N2} (see 2.5.2 and Figure 6).

3.3.2 Nominal height

The nominal heights H_1 or H_3 shall be expressed by rounding the height to the nearest whole millimetre (if the first decimal is 5 or above round up; in all other cases, round down).

4 Determination of capacities

4.1 General

The methods for determining capacities 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) may be applied, but only if a very precise determination of capacity is necessary.

4.1.1 Temperature-dependent correction factor

Table 1 gives the values of correction factors for the determination of capacity with respect to the temperature of water.

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 balances

The scales used for weighing the cans shall not exceed the values of accuracy 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 brimful capacity, C_2

4.2.1 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.

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

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

4.2.4 Fill the can with water, avoiding air bubbles.

4.2.5 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.

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

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

4.2.8 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, in millilitres, of the can.

5 Tolerances on capacities

5.1 General

For standardized capacities, tolerances are as given in Table 3.

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

5.2 Tolerances

Tolerances for gross lidded or brimful capacities are given in Table 3.

Table 3 — Tolerances on capacities

Gross lidded, C_1 or brimful capacity, C_2 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

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

6 Designation

It is recommended that aerosol cans be designated internationally in the following manner:

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

b) their nominal diameters, expressed in millimetres, in accordance with 3.3.1;

c) their height, expressed in millimetres, in accordance with 2.2 and 3.3.2.

EXAMPLES

Tinplate aerosol cans:

Cylindrical (straight-sided) cans	C_2 - D_i - H_1
Necked-in cans (only top end)	C_2 - D_i/D_{N1} - H_1
Necked-in cans (only bottom end)	C_2 - D_i/D_{N2} - H_1
Necked-in cans (both ends)	C_2 - $D_i/D_{N1}/D_{N2}$ - H_1

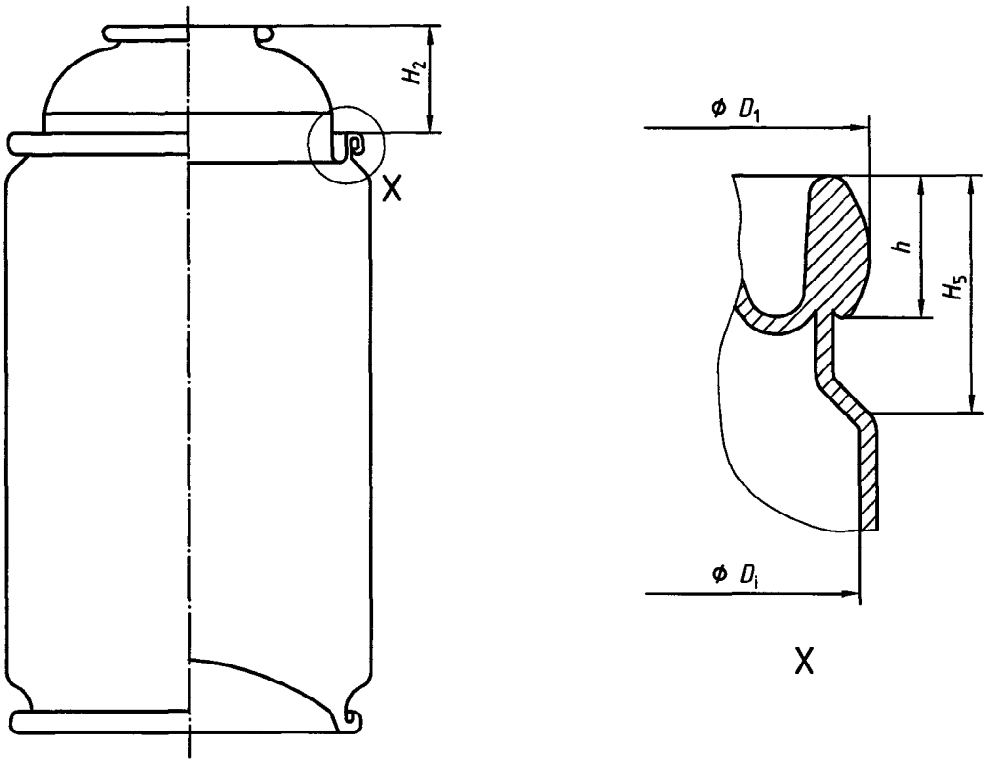
Aluminium aerosol cans:

Monobloc cans	C_2 - D_e - H_3

Annex A
(informative)

Dimensions of the top end of three-piece necked-in tinplate cans

See Figure A.1 for dimensions of the top end of three-piece necked-in tinplate cans.



Key

h Height of the seam
D_1 External diameter of the seam
H_2 Height of the top end
H_5 Height of the neck
D_i Internal diameter of the body

Figure A.1 — Top end of three-piece necked-in tinplate can

Bibliography

Related standards dealing with materials used for aerosol cans

[1] ISO 11949:1995, *Cold-reduced electrolytic tinplate.*

[2] ISO 11950:1995, *Cold-reduced electrolytic chromium/chromium oxide-coated steel.*

[3] EN 541:1995, *Aluminium and aluminium alloys — Rolled products for cans, closures and lids — Specifications.*

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