INTERNATIONAL STANDARD 90

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

Hermetically sealed metal cans for food and drinks — Specifications

Récipients métalliques étanches pour denrées alimentaires et boissons — Spécifications

First edition — 1977-06-15

UDC 621.798.144 : 672.46

Ref. No. ISO 90-1977 (E)

Descriptors : food industry, food packaging, cans, specifications, definitions, volumetric measurement, dimensional measurement, capacity, designations.

Price based on 6 pages

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

International Standard ISO 90 was developed by Technical Committee ISO/TC 52, *Metal containers*, and was circulated to the member bodies in July 1976.

It has been approved by the member bodies of the following countries :

Australia	India	Romania
Belgium	Israel	South Africa, Rep. of
Canada	Italy	Sweden
Czechoslovakia	Korea, Rep. of	Switzerland
Denmark	Netherlands	Turkey
Finland	New Zealand	United Kingdom
France	Poland	U.S.A.

No member body expressed disapproval of the document.

This International Standard cancels and replaces ISO Recommendation R 90-1959, of which it constitutes a technical revision.

Printed in Switzerland

Hermetically sealed metal cans for food and drinks — Specifications

1 SCOPE AND FIELD OF APPLICATION

This International Standard defines terms and specifies methods for the determination of nominal dimensions, for the determination of capacity and for the designation of hermetically sealed metal cans for food and drinks.

2 DEFINITIONS

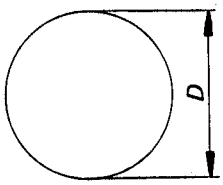
For the purposes of this International Standard, the following definitions apply :

2.1 can : A rigid metal container produced to contain foods and drinks and which is hermetically sealed. Cans are defined by the following characteristics : capacity, cross-section, construction, shape and special features.

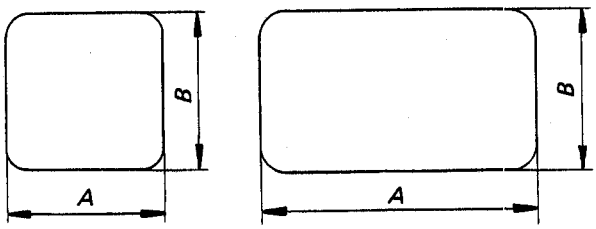
2.1.1 capacity : The internal volume of the closed can, measured in accordance with the standard method (see clause 4) and expressed in millilitres.

2.1.2 *Cross-section*

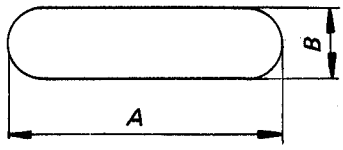
2.1.2.1 round can : A metal container having a circular cross-section.



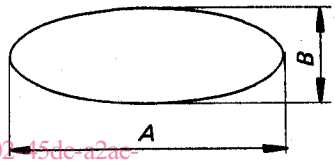
2.1.2.2 rectangular can (square and oblong) : A metal container having a square or oblong cross-section and rounded corners.



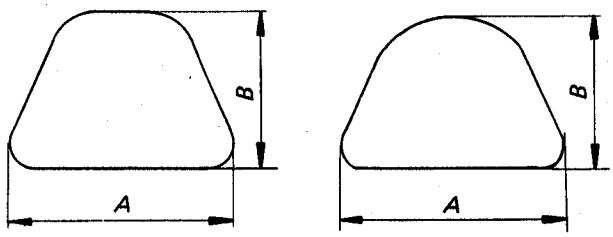
2.1.2.3 obround can : A metal container having a cross-section with parallel sides joined by two semi-circular ends.



2.1.2.4 oval can : A metal container having an oval cross-section.

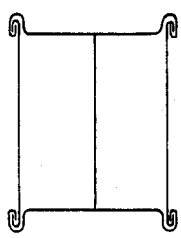


2.1.2.5 trapezoidal can : A metal container having an approximately trapezoidal cross-section, the corners being rounded. The shorter of the parallel sides may be rounded.

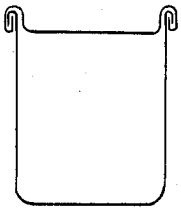


2.1.3 *Construction*

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

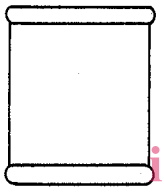


2.1.3.2 two-piece can : A can made from two main components : body with integral bottom, and top end.

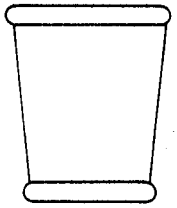


2.1.4 *Shape*

2.1.4.1 cylindrical can : A straight-walled, necked-in, step-sided or beaded can in which the cross-section remains constant in dimensions from top to bottom, ignoring local variations caused by beading.

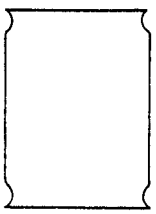


2.1.4.2 tapered can : A straight-walled, necked-in, step-sided or beaded can in which the cross-section changes continuously in dimension from top to bottom, ignoring local variations caused by beading.

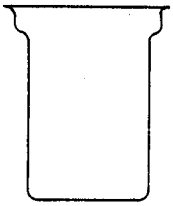


2.1.5 *Special features*

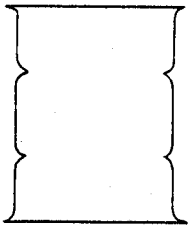
2.1.5.1 necked-in can : A can in which one or both extremities of the body are reduced in cross-section so that end components of smaller dimensions may be used.



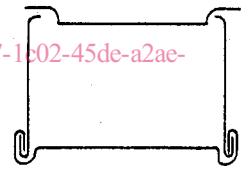
2.1.5.2 step-sided can : A can in which the top cross-section of the body has been increased so that an end component of larger dimensions may be used.



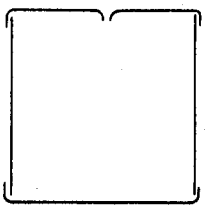
2.1.5.3 beaded can : A can whose straight-walled body has small peripheral changes in the internal cross-section in order to improve rigidity.



2.1.5.4 "à décollage" can : A three-piece can in which the fixed end is attached, by soldering, to a flange formed on the body component. The loose end is attached by double seaming after filling and the consumer opens the can by peeling back the "à décollage" end using the key provided.

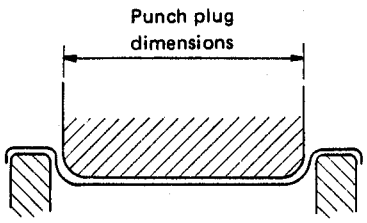


2.1.5.5 vent-hole can : A three-piece can with both top and bottom ends capped-on and soldered, one end being pierced with a "vent hole".

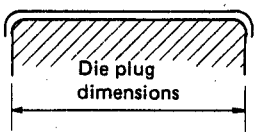


2.2 End tool parts

2.2.1 *Punch plug (for double-seamed ends)*



2.2.2 *Die plug (for capped-on ends)*



3 DETERMINATION OF NOMINAL DIMENSIONS

3.1 Nominal can cross-sections

The nominal can cross-section is the internal cross-section of the body determined to the nearest 0,1 mm, the resultant figure being rounded to the nearest whole millimetre. (If the first decimal is 0,5 mm or above, round up; in all other cases, round down.)

Where agreement has been reached on a range of standard nominal cross-sections, the permitted upper and lower limits of actual internal body dimensions for any nominal cross-section in the range will be published.

In all instances, internal body cross-sections are determined by using a plug gauge or by derivation from external body dimensions measured with a vernier caliper.

Internal cross-sections are characterized by the following data :

a) round can : *D*. See 2.1.2.1.

b) rectangular and obround : *A* and *B*. See 2.1.2.2 and 2.1.2.3.

c) oval can : *A* and *B*. See 2.1.2.4.

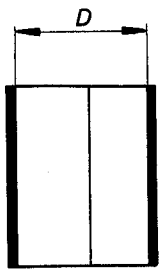
d) trapezoidal can : *A* and *B*. See 2.1.2.5.

The diagrams define the point of determination of nominal cross-section for cans with various characteristics.

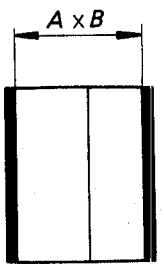
3.1.1 *Three-piece can*

The nominal cross-section is determined avoiding the flanged, necked-in, step-sided or beaded portion of the body, and the side seam.

3.1.1.1 CYLINDRICAL CAN

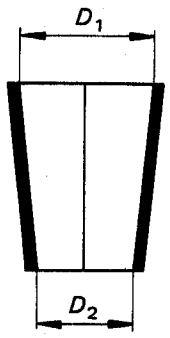


Round cans

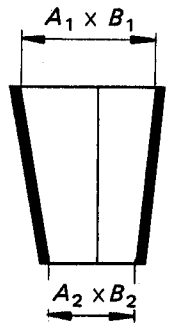


Non-round cans

3.1.1.2 TAPERED CAN



Round cans

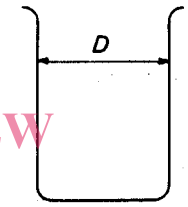


Non-round cans

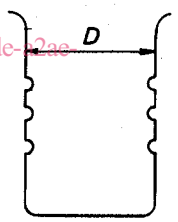
3.1.2 *Two-piece can*

The nominal cross-section is determined avoiding the flanged, necked-in, step-sided or beaded portion of the body.

3.1.2.1 CYLINDRICAL CAN

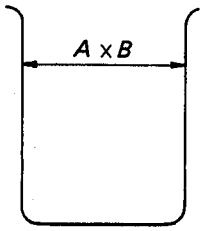


Straight-walled

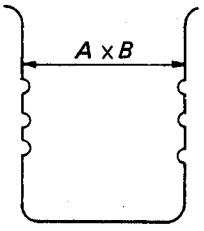


Beaded

Round cans

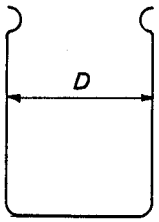


Straight-walled



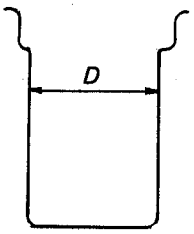
Beaded

Non-round cans



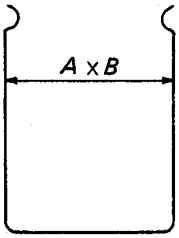
Necked-in

Round cans



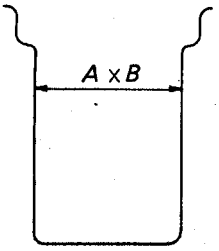
Step-sided

Round cans



Necked-in

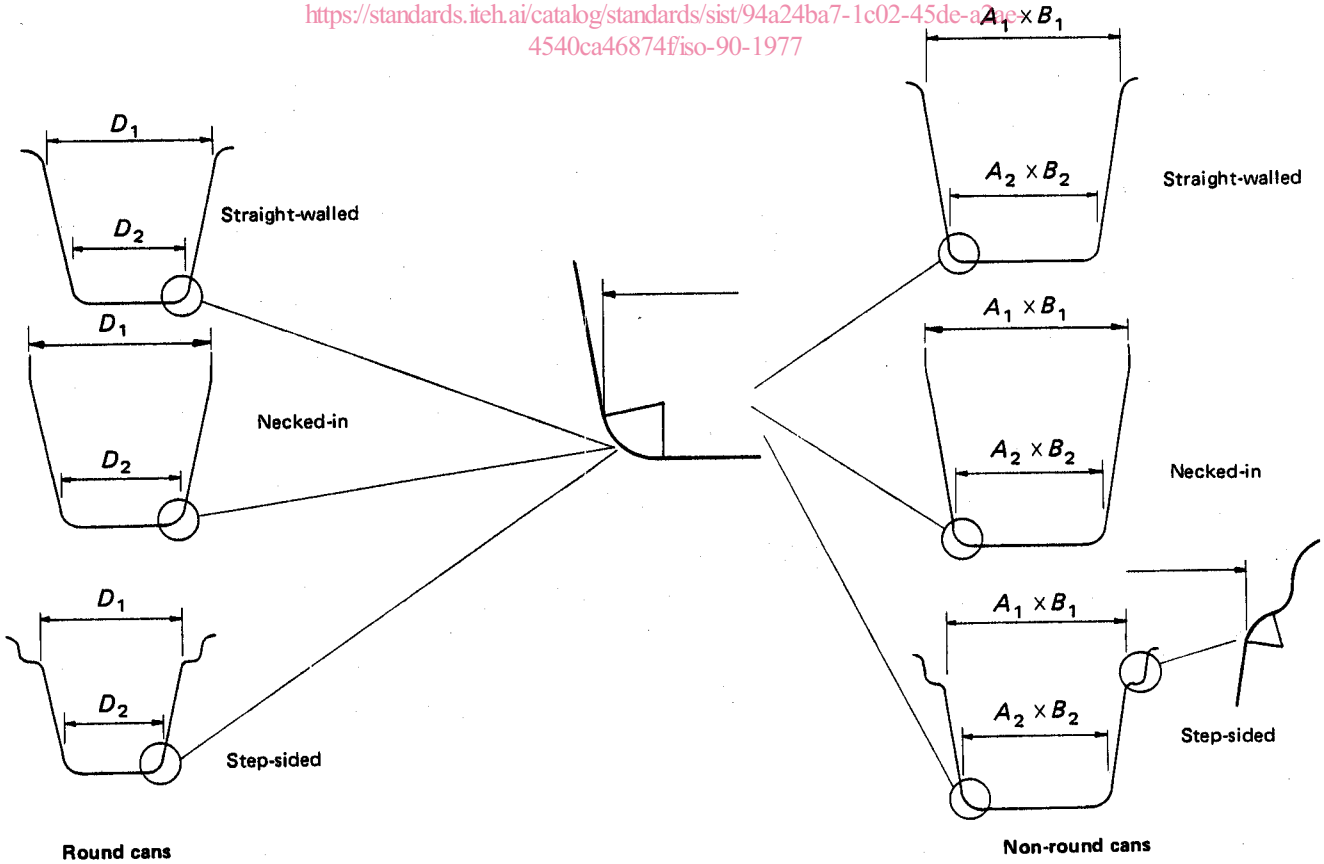
Non-round cans



Step-sided

Non-round cans

3.1.2.2 TAPERED OR OTHER SHAPES OF CAN



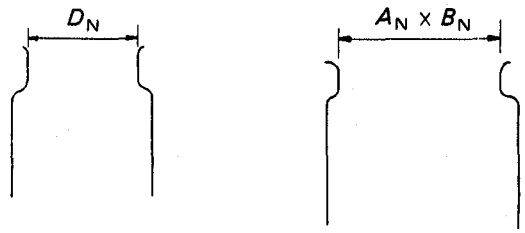
Round cans

Non-round cans

3.2 Nominal end dimensions for necked-in and step-sided cans

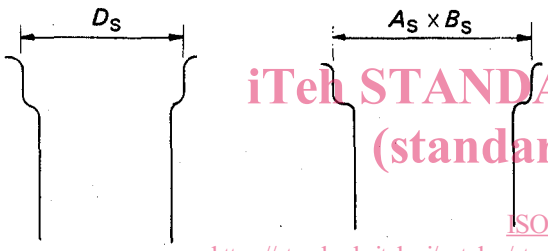
As in 3.1, the nominal cross-section of the end for a necked-in or step-sided can is the internal cross-section of the can aperture to which the end is to be fixed; this internal cross-section is determined in the same way as the internal cross-section of the body.

3.2.1 *Necked-in can*



Round cans — Non-round cans

3.2.2 *Step-sided can*



Round cans — Non-round cans

4 DETERMINATION OF CAPACITY

It is recommended that one of the following methods be used internationally for determining the capacities of hermetically sealed metal cans.

4.1 Method to be used for two- and three-piece cans with non-flexing sides and/or ends

4.1.1 Apply one end to the body by the usual method (three-piece cans only).

4.1.2 Drill two holes 3 to 4 mm in diameter and about 5 mm apart in the loose end of the can and as close as possible to the countersink, from the inside surface outwards.

For non-round cans, drill the holes as close as possible to a corner radius.

4.1.3 Apply this end to the body by the usual method.

4.1.4 Weigh the empty can to the nearest gram.

4.1.5 Fill the can with water at a temperature of 20 °C from a narrow water jet through one of the holes, with the can inclined at an angle to the vertical so that the holes are as high as possible.

4.1.6 When water runs out of the second hole, ensure complete filling by closing the holes with the fingers, gently shaking the can, and then completing the filling.

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

4.1.8 Weigh the filled can to the nearest gram.

4.1.9 The difference between the weighings plus 0,28 % represents the capacity of the can in millilitres.

4.2 Method to be used for two- and three-piece cans when the use of method 4.1 would result in distortion

4.2.1 Apply one end to the body by the usual method (three-piece cans only).

4.2.2 Drill two holes 3 to 4 mm in diameter and about 5 mm apart in the loose end of the can and as close as possible to the countersink, from the inside surface outwards.

For non-round cans, drill the holes as close as possible to a corner radius.

4.2.3 Apply this end to the body by the usual method.

4.2.4 Weigh the empty can to the nearest gram.

4.2.5 Fill the can with water at a temperature of 20 °C from a narrow water jet through one of the holes, with the can inclined at an angle to the vertical so that the holes are as high as possible.

4.2.6 Place the can in a container, filled with water, the holes being at the highest point of the can.

The water in the container should be not more than 10 mm below the highest point of the can.

4.2.7 Fill the can completely using a pipette.

4.2.8 Close the holes with small pieces of adhesive tape.

4.2.9 Remove the can from the container.

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

4.2.11 Weigh the filled can to the nearest gram.

4.2.12 The difference between the weighings plus 0,28 % represents the capacity of the can in millilitres.

NOTE — The density correction of 0,28 ml for each 100 ml of capacity is based essentially on the temperature of the water which is weighed in the can, but also allows for the buoyancy of the can and of the weights in air. It has been assumed that the specific gravity of the water-filled can is unity and that brass weights are used, but some departure from these conditions may be allowed without serious loss of accuracy.

5 MAXIMUM PERMISSIBLE ERROR ON NOMINAL CAPACITY

The maximum permissible error is the sum of the deviations of the mean capacities and the manufacturing tolerances.

99,7 % of the individual cans shall lie within these limits. They result from the statistical distribution between ± 3 σ (standard deviation) limits based on declared capacity of the cans to which the variations apply.

5.1 Maximum permissible error applicable to round cans

Can capacity	Maximum permissible error	
ml	%	ml
⩽ 80	± 5	
81 to 100		± 4
101 to 150	± 4	
151 to 200		± 6
201 to 250	± 3	
251 to 300		± 7,5
301 to 500	± 2,5	
501 to 625		± 12,5
626 to 1 000	± 2	
1 001 to 1 333		± 20
1 334 to 2 000	± 1,5	
2 001 to 3 000		± 30
> 3 000	± 1	

5.2 Maximum permissible error applicable to non-round cans

Can capacity	Maximum permissible error	
ml	%	ml
⩽ 80	± 5	
81 to 100		± 4
101 to 150	± 4	
151 to 200		± 6
201 to 250	± 3	
251 to 300		± 7,5
301 to 500	± 2,5	
501 to 625		± 12,5
> 625	± 2	

6 DESIGNATION

It is recommended that hermetically sealed metal food cans be designated internationally

a) by their capacity, expressed in millilitres, and

b) by their characteristic dimensions, expressed in millimetres, according to 3.1.

Tapered, step-sided or necked-in cans shall be denoted by adding the letters "T", "S" or "N".

In addition, the nominal dimensions of the ends for necked-in or step-sided cans shall be included in the designation according to 3.2 immediately after the body dimensions.

Examples (C = capacity of can) :

	Round can	Non-round can
Cylindrical can	$C.D$	$C.A \times B$
Tapered can — straight walled	$T.C.D_1/D_2$	$T.C.A_1 \times B_1/A_2 \times B_2$
Cylindrical can — necked in	$N.C.D/D_N$	$N.C.A \times B/A_N \times B_N$
Tapered can — step-sided	$T.S.C.D_1/D_2/D_S$	$T.S.C.A_1 \times B_1/A_2 \times B_2/A_S \times B_S$