

Inserted flange type closure systems for steel drums with a total capacity of 17 l to 230 l

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British Standard

ICS 55.140

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National foreword

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 38, an inside back cover and a back cover.

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EUROPÄISCHE NORM

May 2000

ICS 55.140

English version

Inserted flange type closure systems for steel drums with a total capacity of 17 l to 230 l

Système de fermeture à colerette (fileté) sertie pour fûts en acier d'une capacité totale de 17 l à 230 l

Verschlusssysteme mit eingesetztem Flansch für Stahlfässer mit einem Gesamtvolumen von 17 l bis 230 l

This European Standard was approved by CEN on 27 April 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared 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of an identical text or by endorsement, at the latest by November 2000, and conflicting national standards shall be withdrawn at the latest by November 2000.

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.

This standard is one of a series of standards on steel drums with a capacity of 17 l to 230 l and closures for steel drums.

Efficient packaging is of great importance for the distribution and the protection of goods. Insufficient or inappropriate packaging can lead to damage or wastage of the contents of the package.

1 Scope

This European Standard specifies the characteristics and dimensions of inserted flange type closure systems used for steel drums with a total capacity of 17 l - 230 l.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

ISO 228-1:1994	Pipe threads where pressure-tight joints are not made on the threads - Part 1:Dimensions, tolerances and designation.
ISO 3573:1999	Hot-rolled carbon steel sheet of commercial and drawing qualities.
ISO 3574:1999	Cold-reduced carbon steel sheet of commercial and drawing qualities.
ISO 5002:1999	Hot-rolled and cold-reduced electrolytic zinc-coated carbon steel sheet of commercial and drawing qualities.
ISO 11949:1995	Cold-reduced electrolytic tinplate
ISO 11950:1995	Cold-reduced electrolytic chromium/chromium oxide-coated steel

3 Terms and definitions

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

3.1

inserted flange type closure

mechanical fixed steel insert with threads, closable with plugs made of steel, other metals or synthetic materials such as plastics, ensuring a leaktight closing of an industrial packaging such as a tight head steel drum

NOTE The octagonal base closure (type C1) is described in annexes A to J. The serrated base closure (type C2) is described in annexes K to S.

4 Dimensions

The dimensions of the octagonal base closure (type C1) shall be as given in annexes B to H. The dimensions of the serrated base closure (type C2) shall be as given in annexes L, M, and N to S.

The nominal pitch diameter and the pitch of the thread of the closures G2 and G3/4 shall be in accordance with ISO 228-1:1994.

5 Materials

The materials of the various components of the closure shall be as given in annexes B to F and annexes L, M, N and O.

6 Design and construction

NOTE The nature of the internal and external surface finish should be agreed between the purchaser and the supplier. If not specified, the finish should be galvanized.

6.1 Flanges shall be of a mechanical inserted type and shall make a leak tight fit when inserted. The flange base shall have either an octagonal base (type C1) or a serrated base (type C2).

6.2 Plugs shall be designed so that they can be inserted and removed by means of a simple tool. The plugs shall have a wrenching insert projection welded to the bottom of the sump of the plug or have a wrenching device formed as part of the plug.

Dimensions of the wrenching insert shall be such that the plugs can be operated by a universal tool for steel and plastics plugs, e.g. as indicated in annexes I and R.

NOTE For recommended closing torques see annexes J and S.

6.3 Capsesals/overseals shall be of a crimping type which can be fitted with a gasket for sealing and shall have provisions for customs sealing and evidence of tampering.

Capsesals/overseals shall be designed so that they can be removed by means of a simple tool.

6.4 Label rings and/or protection rings shall be designed so that they can be mechanically inserted simultaneously with the flanges. Label rings shall have provisions for customs sealing.

NOTE Label rings and/or protection rings can provide adequate reinforcement for the flange insertion and can protect the drum stock neck against corrosion.

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7 Designation

Closure components manufactured in accordance with EN 12928 shall be designated:
Octagonal base inserted flange (type C1) closures for steel drums:

EN 12928 G2 and G3/4 flanges;
EN 12928 G2 and G3/4 plugs;
EN 12928 G2 and G3/4 capseals;
EN 12928 G2 and G3/4 label rings;
EN 12928 G2 and G3/4 protection rings;

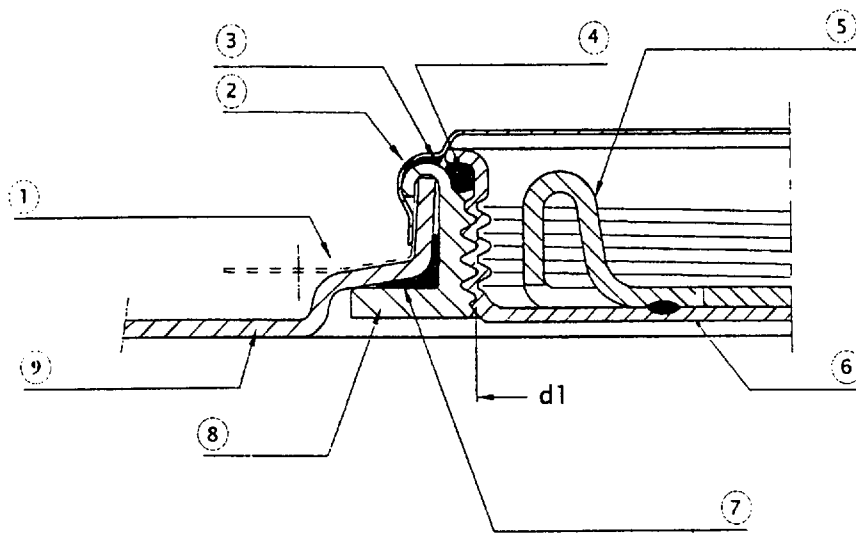
Serrated base inserted flange (type C2) closures for steel drums:

EN 12928 G2 and G3/4 flanges;
EN 12928 G2 and G3/4 plugs;
EN 12928 G2 and G3/4 overseals.

Annex A (normative)
Octagonal base (type C1) — Nomenclature for closure system

The nomenclature for the closure system shall be as shown in Figures A.1 and A.2.

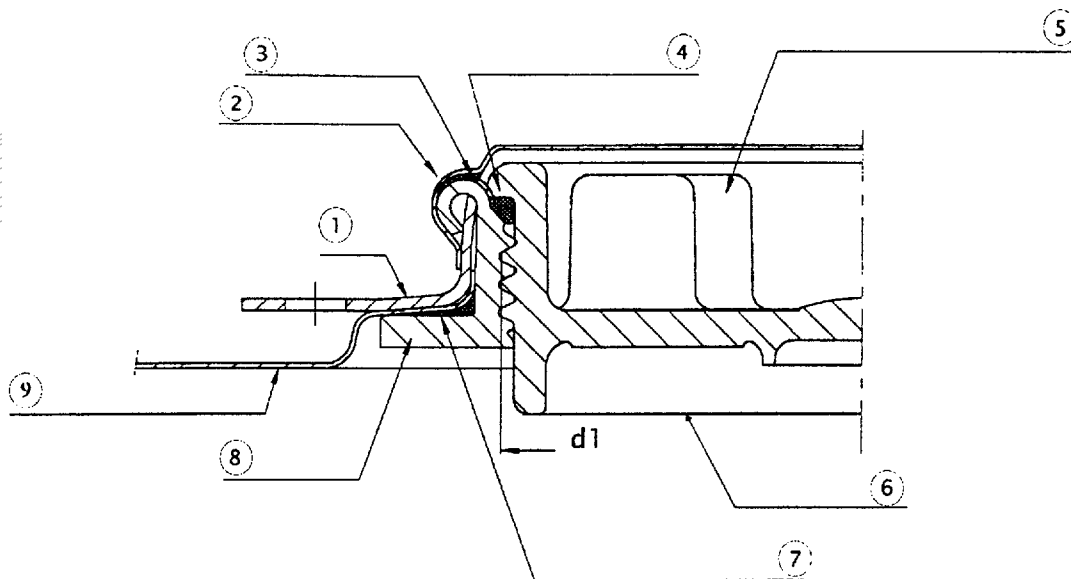
Where closure components of the octagonal base closure system deviate from those illustrated in the figures shown hereafter, the specified dimensions shall be maintained.



Key

- d_1 pitch diameter
- ① optional label ring/protection ring
- ② capseal
- ③ gasket
- ④ plug washer
- ⑤ wrenching insert
- ⑥ steel plug
- ⑦ flange washer
- ⑧ flange
- ⑨ drum stock

Figure A.1 — Assembly cross section in medium and heavy gauge drum stock



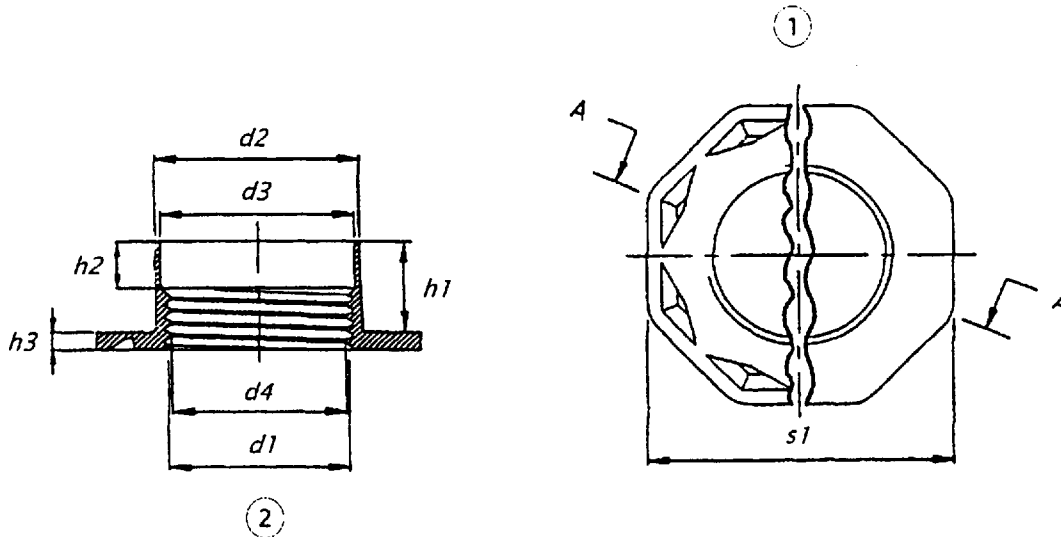
Key

- d_1 pitch diameter
- ① label ring/protection ring
- ② capseal
- ③ gasket
- ④ washer
- ⑤ wrenching part
- ⑥ plastics plug
- ⑦ washer
- ⑧ flange
- ⑨ drum stock

Figure A.2 — Assembly cross section in light gauge drum stock

Annex B (normative)
Octagonal base (type C1) — Flange and flange washer

The flange and flange washer shall be as shown in Figures B.1 and B.2 and as specified in Table B.1.



Key

- ① Bottom view
- ② Section A — A

Figure B.1 — Flange

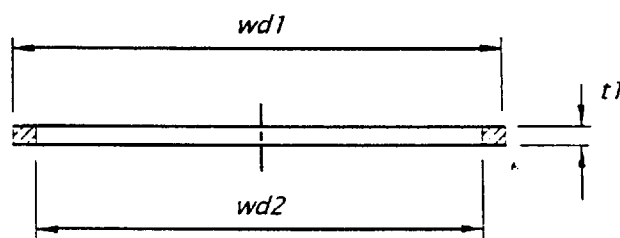


Figure B.2 — Flange washer

Table B.1 — Flange and flange washer

Dimensions in mm

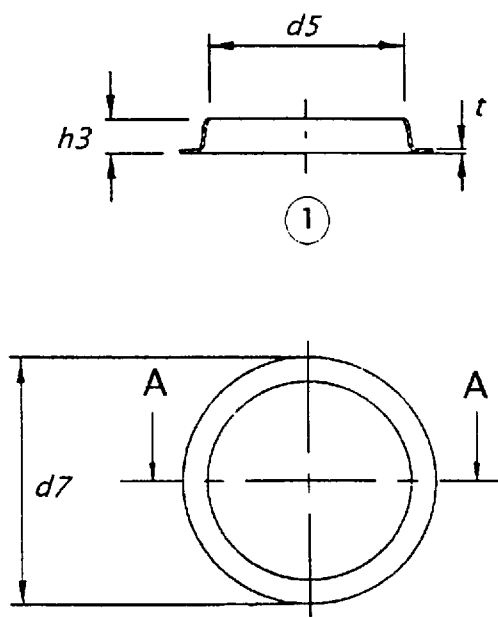
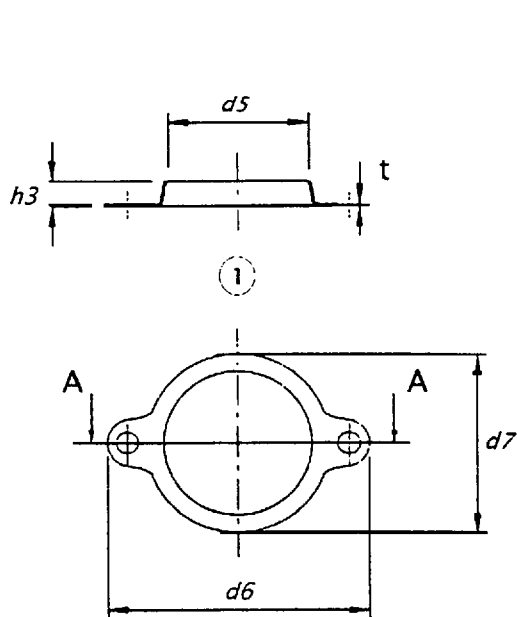
Pitch and pitch diameter (d_1) in accordance with ISO 228-1:1994	d_2	d_3	d_4	h_1	h_2	h_3	s_1	Flange washer dimensions $wd_1 \times wd_2 \times t_1$
Tolerances	$\pm 0,3$	$\pm 0,3$	$\pm 0,3$	$\pm 0,5$	$\pm 0,5$	$\pm 0,4$	$\pm 0,3$	$\pm 1 \times \pm 1 \times \pm 0,5$
G3/4	29,0	27,2	24,5	12,9	7,2	2,7	43,7	$32 \times 27,2 \times 2,6$
G2	62,4	60,4	57,1	15,8	7,9	2,8	77,9	$67 \times 60,5 \times 2,6$

Flanges shall either be made from steel in accordance with ISO 3573:1999 or ISO 3574:1999 or from another suitable material appropriate to the physical and chemical requirements. Flange washers shall be made from elastomer or thermoplastics.

NOTE The specific type of elastomer or thermoplastics and/or configuration may be agreed between the supplier and the purchaser.

Annex C (normative)
Octagonal base (type C1) — Label ring and protection ring

The label ring and the protection ring shall be as shown in Figures C.1 and C.2 and as specified in Table C.1.



Key

- ① Section A — A

Figure C.1 — Label ring

Figure C.2 — Protection ring

Table C.1 — Label ring and protection ring
Dimensions in mm

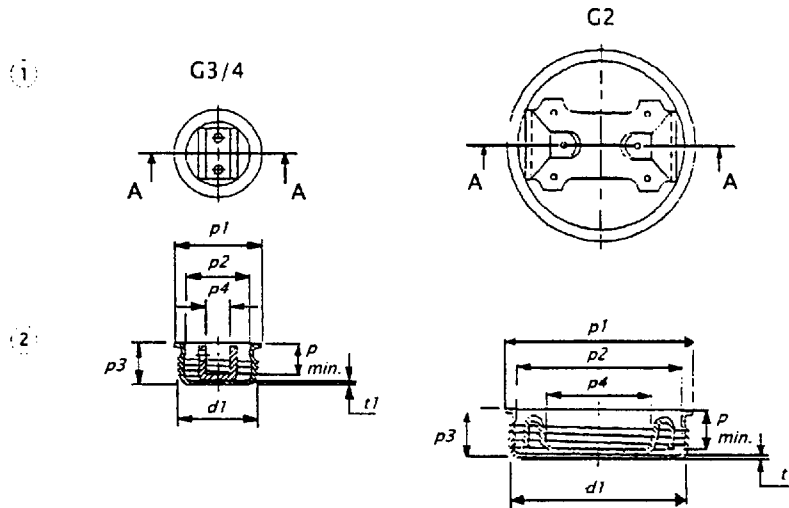
Thickness of end stock	Size	d_5	d_6	d_7	h_3	Thickness of label rings and protection rings (t)
Tolerances		$\pm 0,4$	$\pm 0,4$	$\pm 0,4$	$\pm 0,4$	
Light gauge 0,5 - 0,8	G3/4	29,7	54,0	41,0	6,4	0,8
	G2	62,3	98,5	74,5	8,4	
Medium gauge 0,8 - 1,25	G3/4	31,0	58,5	41,0	5,4	0,3
	G2	63,5	99,5	74,5	8,2	
Heavy gauge 1,5 - 2,0	G3/4	31,3	58,5	41,0	5,7	
	G2	65,7	99,5	74,5	7,3	

Label rings and protection rings shall be made from steel in accordance with ISO 5002:1999 or another suitable material.
NOTE The use of label rings and protection rings is optional for medium and heavy gauge drum stock. Other configurations may be agreed between the supplier and the purchaser.

Annex D (normative)

Octagon base (type C1) — Steel plug and elastomer or thermoplastics plug washer

The steel plug and elastomer or thermoplastics plug washer shall be as shown in Figures D.1 and D.2 and as specified in Table D.1.



Key

- ① Top view
- ② Section A — A

Figure D.1 — Steel plug

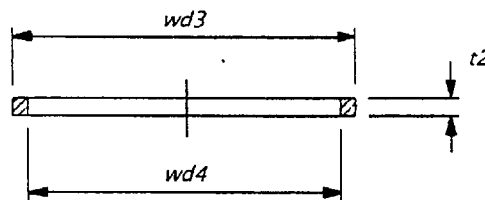


Figure D.2 — Plug Washer

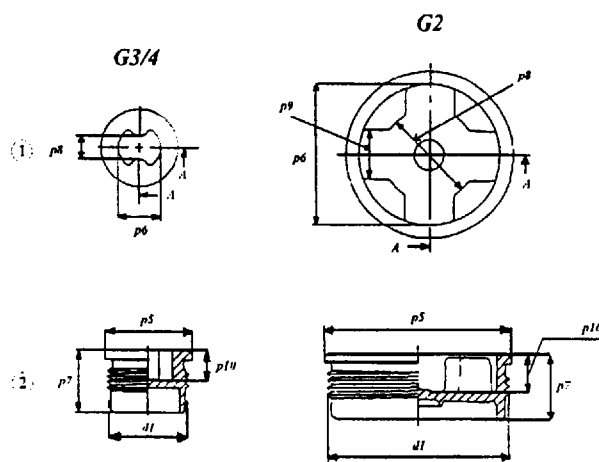
Table D.1 — Steel plug and elastomer or thermoplastics plug washer
Dimensions in mm

Pitch and pitch diameter (d_1) in accordance with ISO 228-1:1994	p_1	p_2	p_3	p_4	$p_{\min}^a)$	t_1	Plug washer dimensions $wd_3 \times wd_4 \times t_2$
Tolerances	$\pm 0,5$	$\pm 0,7$	$\pm 0,5$	$\pm 0,7$		$\pm 0,2$	$\pm 1 \times \pm 1 \times \pm 0,5$
G3/4	28,1	20,5	13,5	7,8	8,5	1,2	$25,5 \times 20,3 \times 2,4$
G2	61,3	53,6	15,3	$32,7^b)$	11,5	1,2	$56,0 \times 50,5 \times 2,7$
Plugs shall either be made from steel in accordance with ISO 3573:1999 or ISO 3574:1999 or from another suitable material appropriate to the physical and chemical requirements.							
Plug washers shall be made from elastomer or thermoplastics.							
NOTE Other materials and/or configuration may be agreed between the supplier and the purchaser.							
^{a)} Dimension p_{\min} is measured from the top of the plug to the top of the flat part of the wrenching insert.							
^{b)} Dimension p_4 for G2 is measured at a position 2 mm above the top of the flat part of the wrenching insert.							

Annex E (normative)

Octagonal base (type C1) — Plastics plug and elastomer or thermoplastics plug washer

The plastics plug and elastomer or thermoplastics plug washer shall be as shown in Figures E.1 and E.2 and as specified in Table E.1



Key

- ① Top view
- ② Section A-A

Figure E.1 — Plastics plug

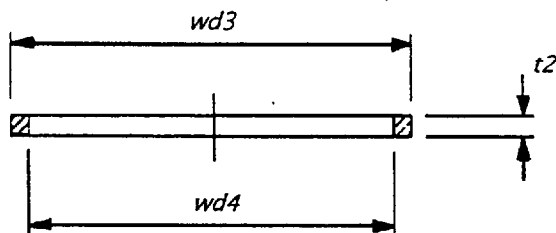


Figure E.2 — Plug washer

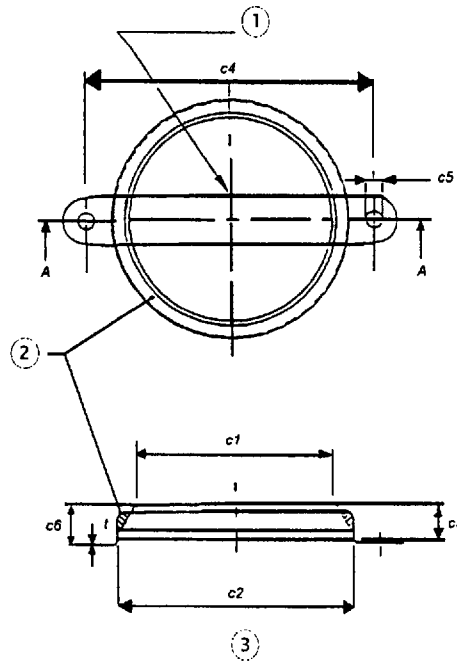
Table E.1 — Plastics plug and elastomer or thermoplastics plug washer

Dimensions in mm

Pitch and pitch diameter (d_1) according to ISO 228-1:1994	p_5	p_6	p_7	p_8	p_9	p_{10}	Plug washer dimensions $w_{d3} \times w_{d4} \times t_2$
Tolerances	$\pm 0,4$	$\pm 0,4$	$\pm 0,4$	$\pm 0,4$	$\pm 0,4$	$\pm 0,4$	$\pm 1 \times \pm 1 \times \pm 0,5$
G3/4	27,9	17,3	20,0	8,5	n.a.	9,5	25,5 \times 20,3 \times 2,4
G2	61,1	51,5	20,5	34,0	18,0	12,0	56,0 \times 50,5 \times 2,7
Plugs shall be made from a copolymer of polypropylene or another suitable material. Plug washers shall be made from elastomer or thermoplastics. NOTE Other materials and/or configurations may be agreed between the supplier and the purchaser.							

Annex F (normative)
Octagonal base (type C1) — Capseal

The capseal shall be as shown in Figure F.1 and as specified in Table F.1.



Key

- c_1 Outside diameter
- ① Scored lines
- ② Flowed-in Gasket
- ③ Section A — A

Figure F.1 — Capsel

Table F.1 — Capsel

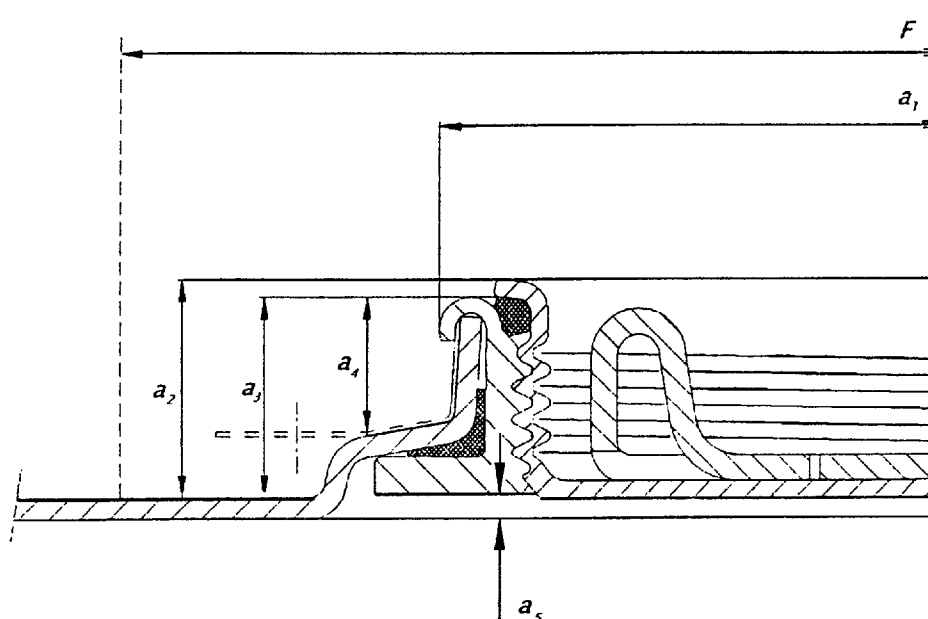
Dimensions in mm

Dimensions	c_1	c_2	c_3	c_4	c_5	c_6	Thickness of printed capseals (t)
Tolerances	$\pm 0,4$	$\pm 0,4$	$\pm 0,4$	$\pm 0,4$	$\pm 0,2$	$\pm 0,7$	$\pm 0,05$
G3/4	29,0	35,1	8,9	43,0	3,5	9,9	0,35
G2	62,4	69,8	11,2	85,0	4,8	12,2	0,35

Capseals shall be made from steel in accordance with ISO 11949:1995 or ISO 11950:1995.
NOTE Other materials and/or configurations or printing may be agreed between the supplier and the purchaser.

Annex G (normative)
Octagonal base (type C1) — Closure assembly without capseal

The assembly without capseal shall be as shown in Figure G.1 and as specified in Table G.1.



The closure assembly shall not protrude above the drum chimb.

Figure G.1 — Assembly without capseal

Table G.1 — Closure assembly without capseal

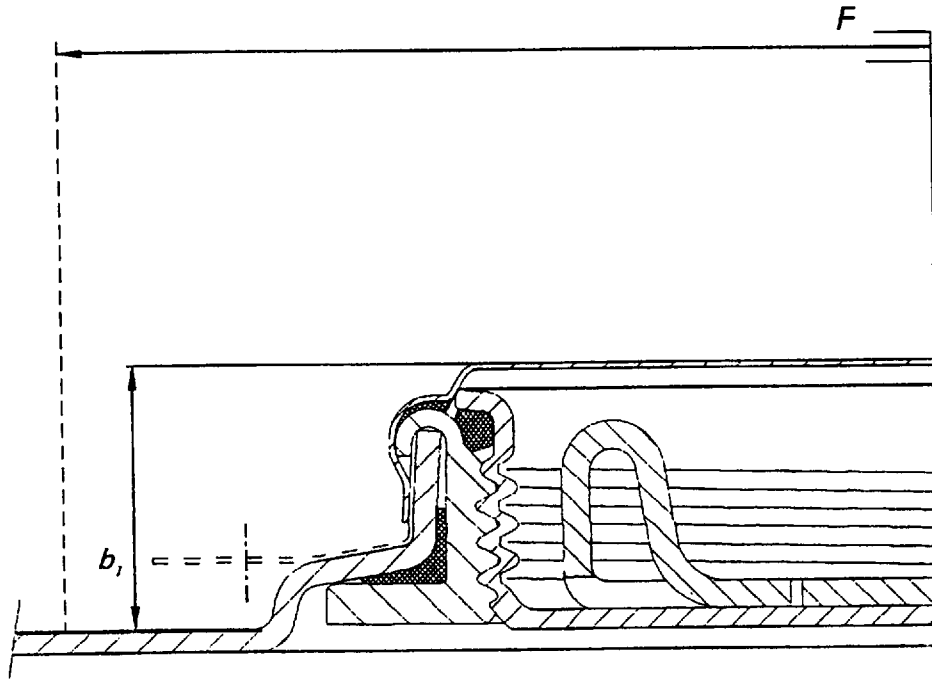
Dimensions in mm

Dimensions	a_1 (dia.)	a_2	a_3	a_4	a_5	Minimum free space required around closure for capseal application tools (F) (diameter)
Tolerances	$\pm 0,4$	$\pm 0,3$	$\pm 0,2$	$\pm 0,4$	n.a.	
G3/4	33,9	11,7	11,2	6,6	> 0	90
G2	68,4	14,5	13,6	9,4	> 0	110

Annex H (normative)

Octagonal base (type C1) — Closure assembly with capseal

The assembly with capseal shall be as shown in Figure H.1 and as specified in Table H.1.



The closure assembly shall not protrude above the drum chimb.

Figure H.1 — Assembly with capseal

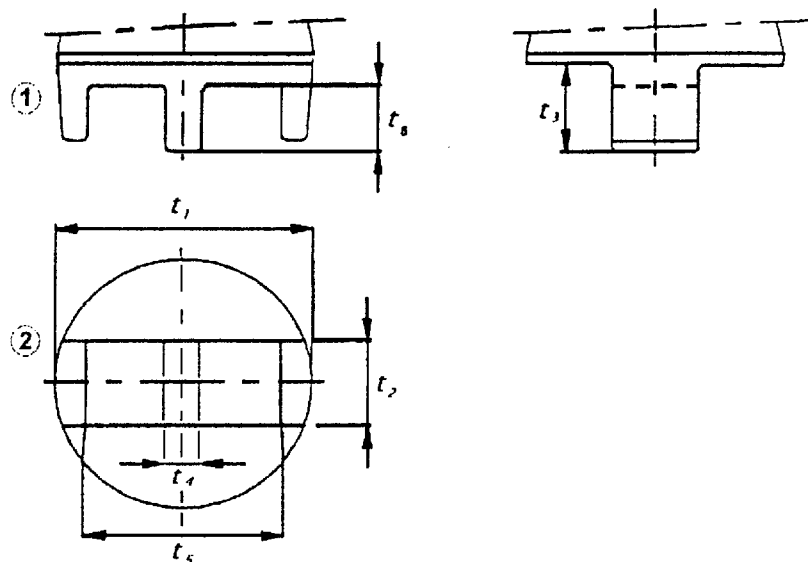
Table H.1 — Closure assembly with capseal

Dimensions in mm

Dimensions	b_1	Minimum free space required around closure for capseal application tools (F) (diameter)
Tolerances	$\pm 0,3$	
G3/4	14,1	90
G2	17,3	110

Annex I (normative)
Octagonal base (type C1) — Plug wrench adaptor

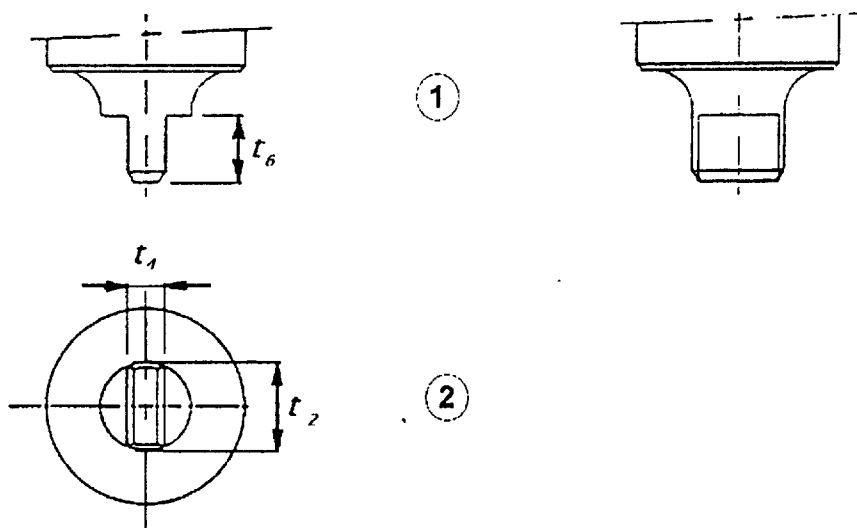
The plug wrench adaptor shall be as shown in Figures I.1 and I.2 and as specified in Table I.1.



Key

- ① Side view
- ② Bottom view

Figure I.1 — Plug wrench adaptor for G2 and G3/4



Key

- ① Side view
- ② Bottom view

Figure I.2 — Plug wrench adaptor for G3/4

Table I.1 — Plug wrench adaptor
Dimensions in mm

Dimensions	t_1	t_2	t_3	t_4	t_5	t_6
Tolerances	±0,3	±0,2	±0,3	±0,2	±0,3	±0,3
G3/4	n.a.	15,8	n.a.	6,4	n.a.	12,0
G2 and G3/4	50,7	15,8	16,0	6,4	36,0	12,0

Annex J (normative)
Octagonal base (type C1) — Closing torques

Closing torques shall be as specified in Tables J.1 and J.2.

NOTE 1 After the tightening of plugs, torques will reduce over time. In particular, plastics components are subject to stress relaxation resulting in a reduced torque.

NOTE 2 It should be noted that the torques given in Tables J.1 and J.2 are valid for the tightening of plugs, i.e. in a clockwise direction.

NOTE 3 Measured torques on releasing plugs, i.e. in an anti-clockwise direction are different from those given in Tables J.1 and J.2.

Table J.1 — Closing torques for drum makers

Plug type	Washer type	G3/4 Closure N·m	G2 closure N·m
Steel plugs	Elastomer	10 to 20	10 to 20
	Thermoplastics	15 to 25	15 to 25
Plastics plugs	Elastomer	10 to 15	10 to 20
	Thermoplastics	10 to 15	10 to 20

Table J.2 — Closing torques for drum fillers

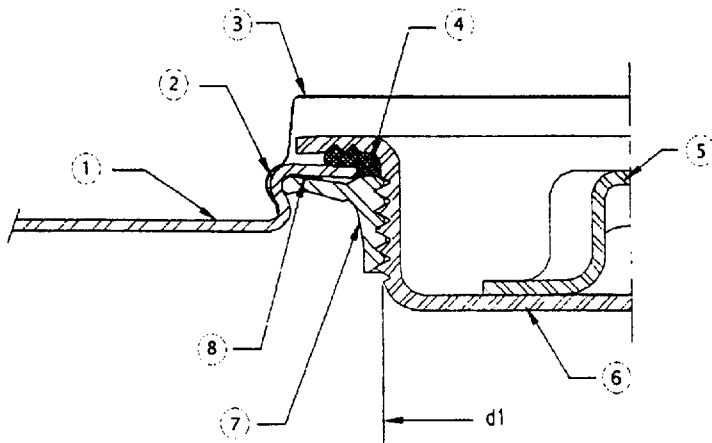
Plug type	Washer type	G3/4 Closure N·m	G2 closure N·m
Steel plugs	Elastomer	10 to 20	20 to 30
	Thermoplastics	15 to 25	20 to 30
Plastics plugs	Elastomer	10 to 15	20 to 30
	Thermoplastics	10 to 15	20 to 30

Annex K (normative)

Serrated base (type C2) — Nomenclature for closure system

The nomenclature for the closure system shall be as shown in Figures K.1 and K.2.

Where closure components of the serrated base closure system deviate from those illustrated in the figures shown hereafter, the specified dimensions shall be maintained.



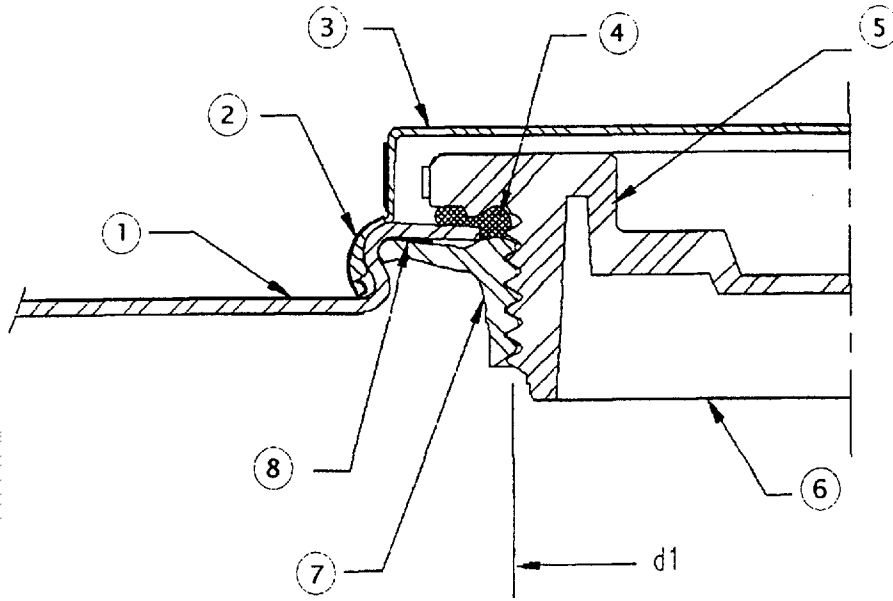
Key

d_1 Pitch diameter

- ① drum stock
- ② compound
- ③ overseal
- ④ washer

- ⑤ wrenching insert
- ⑥ steel plug
- ⑦ flange
- ⑧ compound

Figure K.1— Assembly cross-section showing steel G2 plug



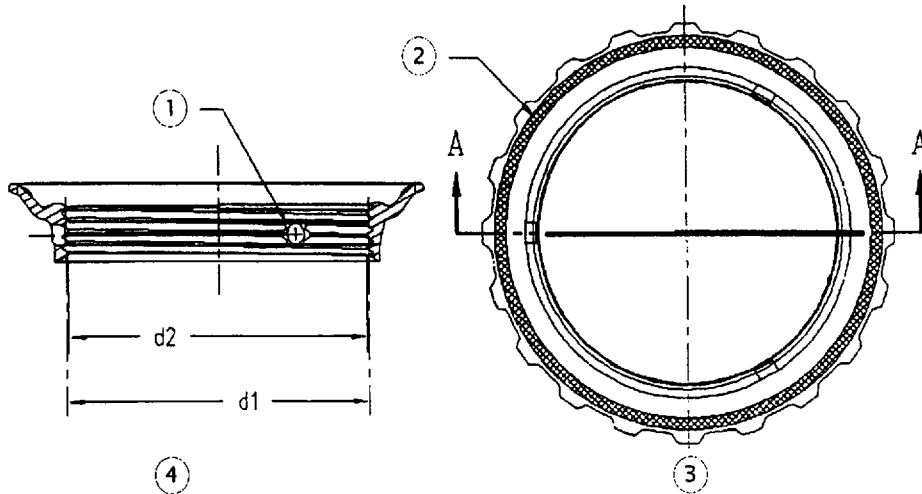
Key

- | | | | |
|-------|---------------------|---|----------------|
| d_1 | Pitch diameter | | |
| ① | drum stock | ⑤ | wrenching part |
| ② | metallic ring | ⑥ | plastics plug |
| ③ | overseal (plastics) | ⑦ | flange |
| ④ | washer | ⑧ | compound |

Figure K.2— Assembly cross-section showing plastics G2 plug

Annex L (normative)
Serrated base (type C2) — Flange and sealing feature

The flange and sealing feature shall be as shown in Figure L.1 and as specified in Table L.1.



Key

- ① drain hole
- ② compound
- ③ Top view
- ④ Section A — A

Figure L.1— Flange

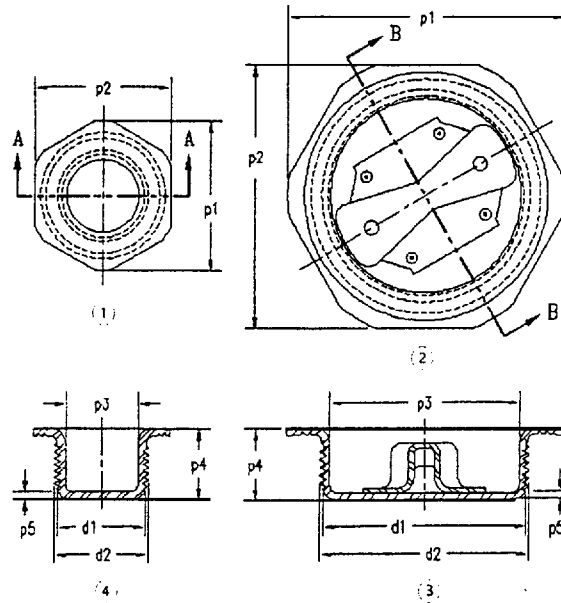
Table L.1 — Flange
Dimensions in mm

Pitch and pitch diameter (d_1) conforming to ISO 228-1:1994 as installed	d_2
Tolerances	$\pm 0,3$
G3/4	24,5
G2	57,1
Flanges shall either be made from steel according to ISO 3573:1999 and ISO 3574:1999 or from another suitable material appropriate for its intended use. NOTE Compounds, elastomers or thermoplastics and/or configurations may be agreed between the supplier and the purchaser.	

Annex M (normative)

Serrated base (type C2) — Steel plug and elastomer or thermoplastics plug washer

The steel plug, elastomer or thermoplastics plug washer shall be as shown in Figures M.1 and M.2 and as specified in Table M.1.



Key

- ① Top view G3/4
- ② Top view G2
- ③ Section view B — B
- ④ Section view A — A

Figure M.1 — Steel plug

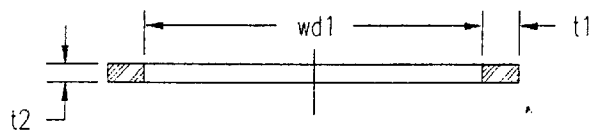


Figure M.2 — Plug washer

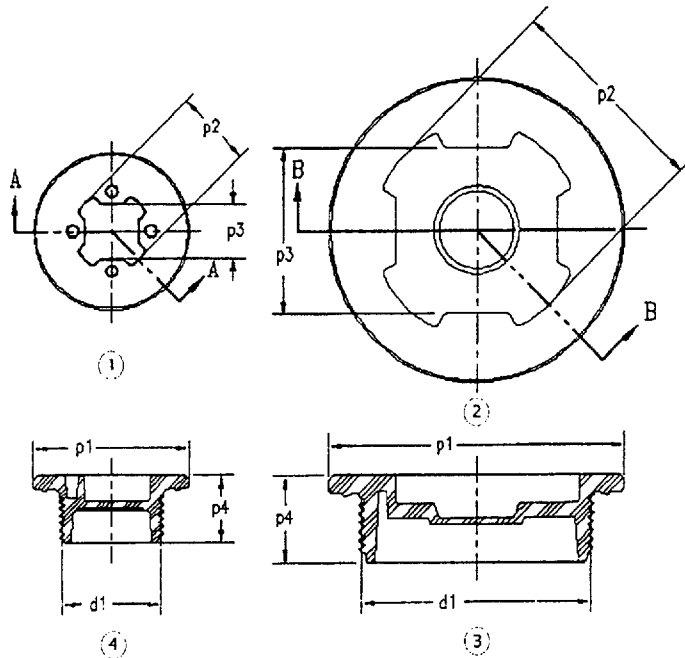
Table M.1— Steel plug and elastomer or thermoplastics plug washer
Dimensions in mm

Pitch and diameter (d_1) according to ISO 228-1:1994	d_2	p_1	p_2	p_3	p_4	p_5	Plug washer dimensions $w d_1 \times t_1 \times t_2$
Tolerances	$\pm 0,4$	$\pm 0,4$	$\pm 0,4$	Min.	$\pm 0,8$	Min.	$\pm 0,5 \times \pm 0,8 \times \pm 0,3$
G3/4	26,3	41,7	38,0	20,1	19,8	1,0	$25,4 \times 5,4 \times 3,0$
G2	59,0	79,0	73,4	54,0	20,2	1,0	$58,0 \times 6,4 \times 3,0$

Plug materials shall either be made from steel according to ISO 3573:1999 or ISO 3574:1999 or from another suitable material appropriate to the physical and chemical requirements.
 Plug washers shall be made from elastomers or thermoplastics.
 NOTE Other materials and /or configurations may be agreed between the supplier and the purchaser.

Annex N (normative)
Serrated base (type C2) — Plastics plug and elastomer or thermoplastics plug washer

The plastics plug and elastomer or thermoplastics plug washer shall be as shown in Figures N.1, N.2, N.3 and N.4 and as specified in Tables N.1 and N.2.



Key

- ① Top view G3/4
- ② Top view G2
- ③ Section view B — B
- ④ Section view A — A

Figure N.1 — Plastics plug (type A)

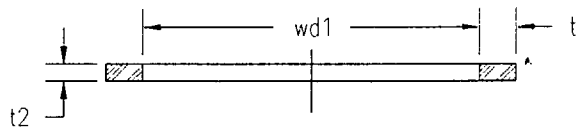
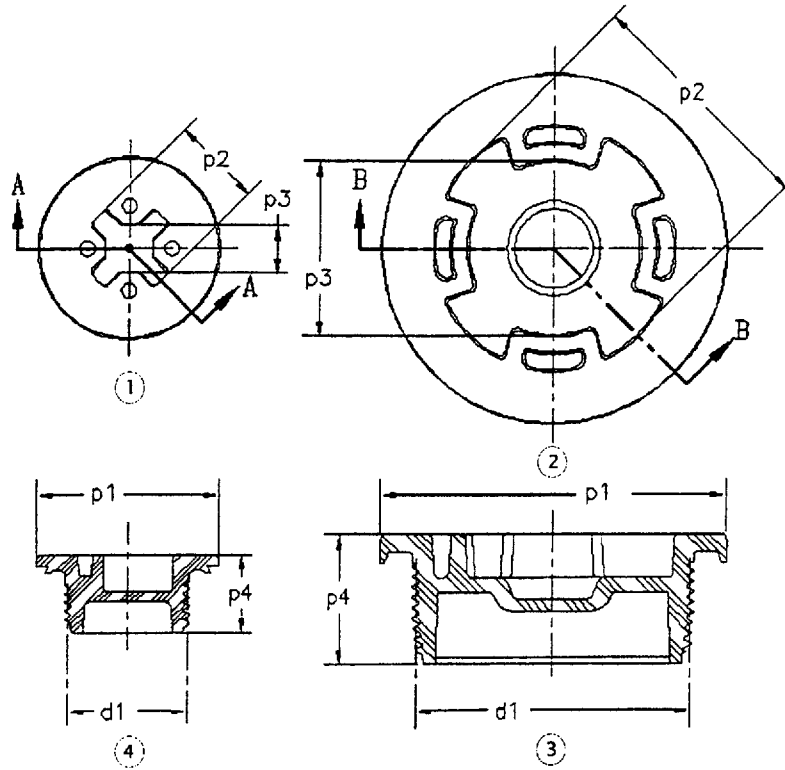


Figure N.2 — Plug washer (type A)

Table N.1 — Plastics plug and elastomer or thermoplastics plug washer (type A)
Dimensions in mm

Pitch and diameter (d_1) according to ISO 228-1:1994	p_1	p_2	p_3	p_4	Plug washer dimensions $w d_1 \times t_1 \times t_2$
Tolerances	$\pm 0,9$	Min.	Min.	$\pm 0,8$	$\pm 0,5 \times \pm 0,8 \times \pm 0,3$
G3/4	38,7	18,2	6,4	16,1	25,4 \times 5,4 \times 3,0
Tolerances	$\pm 0,8$	Min.	Min.	$\pm 0,8$	$\pm 0,5 \times \pm 0,8 \times \pm 0,3$
G2	73,5	51,2	39,9	21,1	58,0 \times 6,4 \times 3,0
<p>Plugs shall be made from polyethylene or another suitable material. Plug washers shall be made from elastomer or thermoplastics. NOTE Other materials and/or configurations may be agreed between the supplier and the purchaser.</p>					



Key

- ① Top view G3/4
- ② Top view G2
- ③ Section view B — B
- ④ Section view A — A

Figure N.3 — Plastics plug (type B)

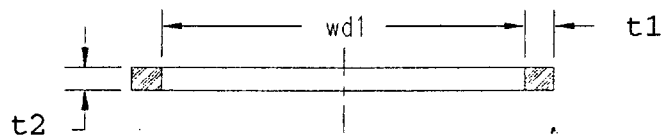


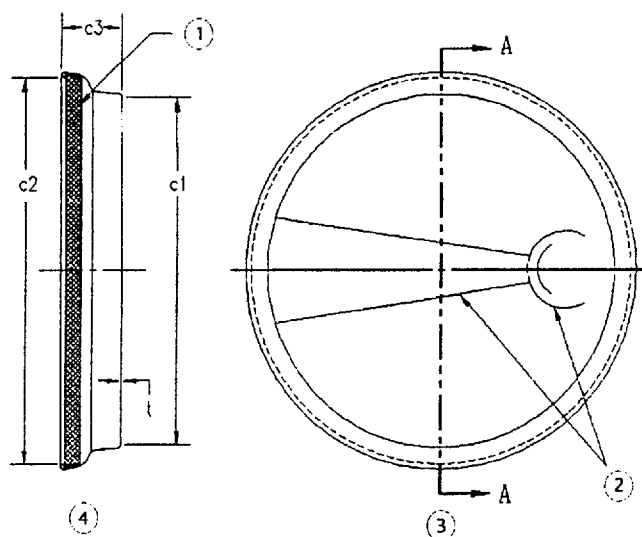
Figure N.4 — Plug washer (type B)

Table N.2 — Plastics plug and elastomer or thermoplastics plug washer (type B)
Dimensions in mm

Pitch and diameter (d_1) according to ISO 228-1:1994	p_1	p_2	p_3	p_4	Plug washer dimensions $w d_1 \times t_1 \times t_2$
Tolerances	$\pm 0,9$	Min.	Min.	$\pm 0,8$	$\pm 0,5 \times \pm 0,8 \times \pm 0,3$
G3/4	38,7	18,2	6,4	16,1	$25,4 \times 5,4 \times 3,0$
Tolerances	$\pm 0,8$	Min.	Min.	$\pm 0,6$	$\pm 0,5 \times \pm 0,6 \times \pm 0,3$
G2	73,5	51,2	35,8	27,2	$58,0 \times 4,8 \times 3,9$
<p>Plugs shall be made from polyethylene or another suitable material. Plug washers shall be made from elastomer or thermoplastics. NOTE Other materials and/or configurations may be agreed between the supplier and the purchaser.</p>					

Annex O (normative)
Serrated base (type C2) — Overseal

The overseals shall be as shown in Figures O.1 and O.2 and as specified in Table O.1 (metal overseal) and in Table O.2 (plastics overseal).



Key

- ① compound
- ② Scored lines
- ③ Top view
- ④ Section view A — A

NOTE Compound is optional and its function may be provided by optional construction materials

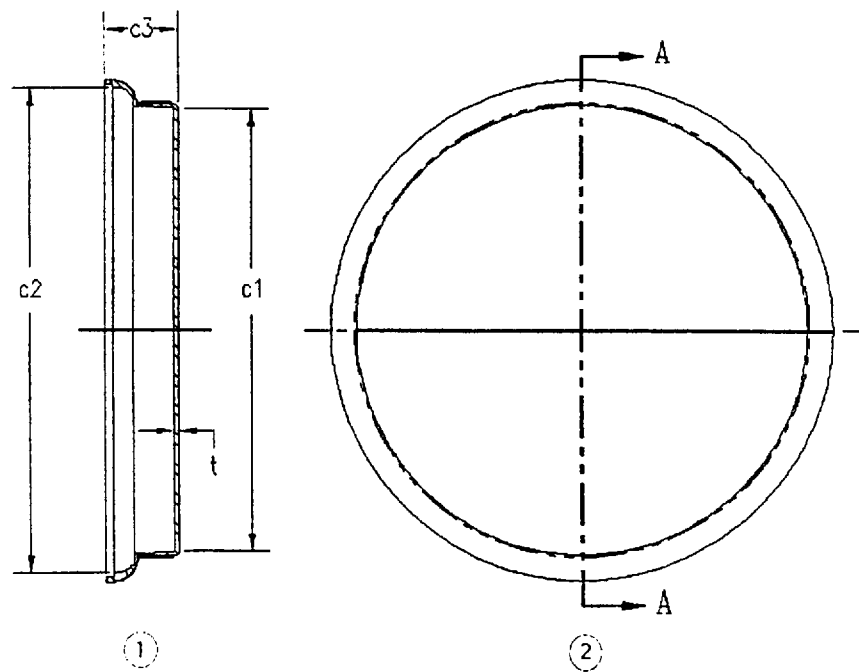
Figure O.1 — Metal overseal

Table O.1 — Metal overseal

Dimensions in mm

Dimensions	c ₁	c ₂	c ₃	Thickness of printed overseal (t)
Tolerances	Max.	Min.	Max.	±0,05
G3/4	41,5	48,1	13,8	0,23
G2	78,7	85,6	14,7	0,23

Overseals shall be made from steel according to ISO 11949:1995 or ISO 11950:1995.
NOTE Other materials and /or another configuration and printing may be agreed between the supplier and the purchaser.



Key

- ① Section A — A
- ② Top view

Figure O.2 — Plastics overseal

Table O.2 — Plastics overseal

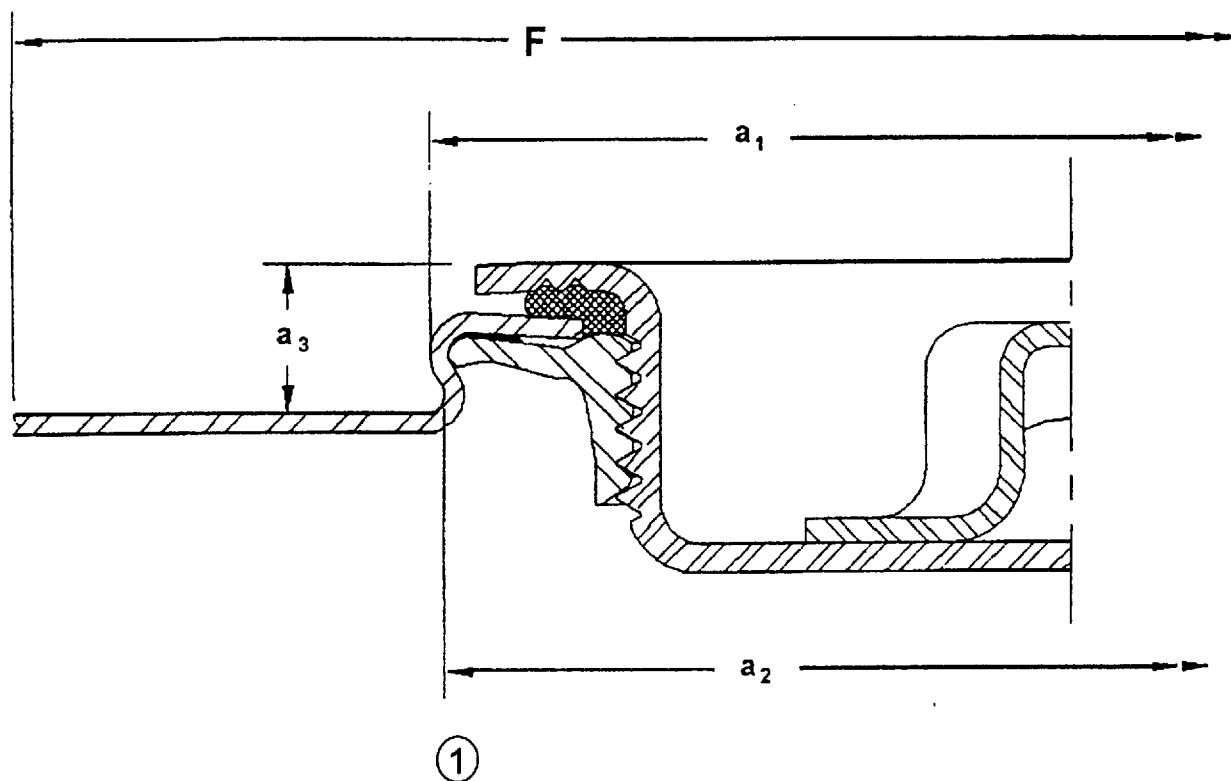
Dimensions in mm

Dimensions	c ₁	c ₂	c ₃	Thickness of printed overseal (t)
Tolerances	Max.	Min.	Max.	±0,11
G3/4	41,5	48,5	14,7	0,80
G2	78,7	86,2	15,1	0,80

Overseals shall be made from plastics with a steel or aluminium ring.
NOTE Other materials and /or another configuration and printing may be agreed between the supplier and the purchaser.

Annex P (normative)
Serrated base (type C2) — Closure assembly without overseal

The closure assembly without overseal shall be as shown in Figure P.1 and as specified in Table P.1.



Key

- a_1 Spline Major diameter
- a_2 Spline Minor diameter
- ① Section view

The closure assembly shall not protrude above the drum chimb.

Figure P.1 — Assembly without overseal

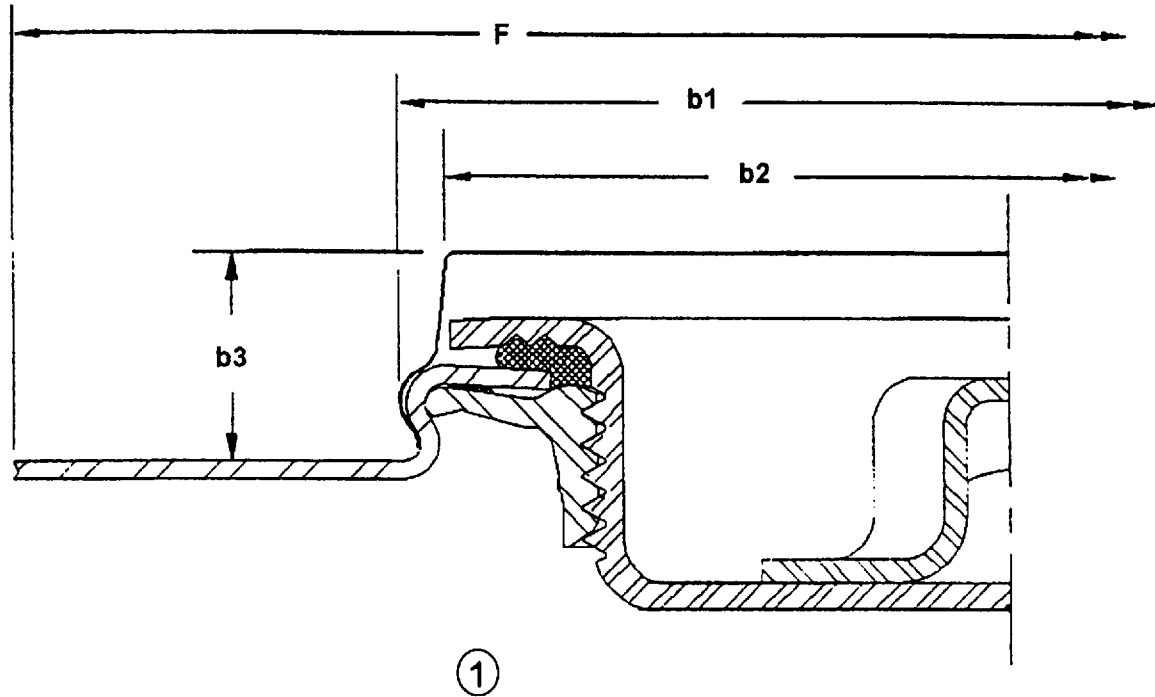
Table P.1 — Closure assembly without overseal
Dimensions in mm

Dimensions	a_1	a_2	a_3	Minimum free space required around closure for overseal application tools (F) (diameter)
Tolerances	Max.	Max.	Max.	Min.
G3/4	48,1	47,2	12,7	76,0
G2	85,6	84,0	14,0	128,0

Annex Q (normative)

Serrated base (type C2) — Closure assembly with overseal

The closure assembly with overseal shall be shown in Figure Q.1 and as specified in Table Q.1.



Key

① Section view

The closure assembly shall not protrude above the drum chime.

Figure Q.1 — Closure assembly with overseal

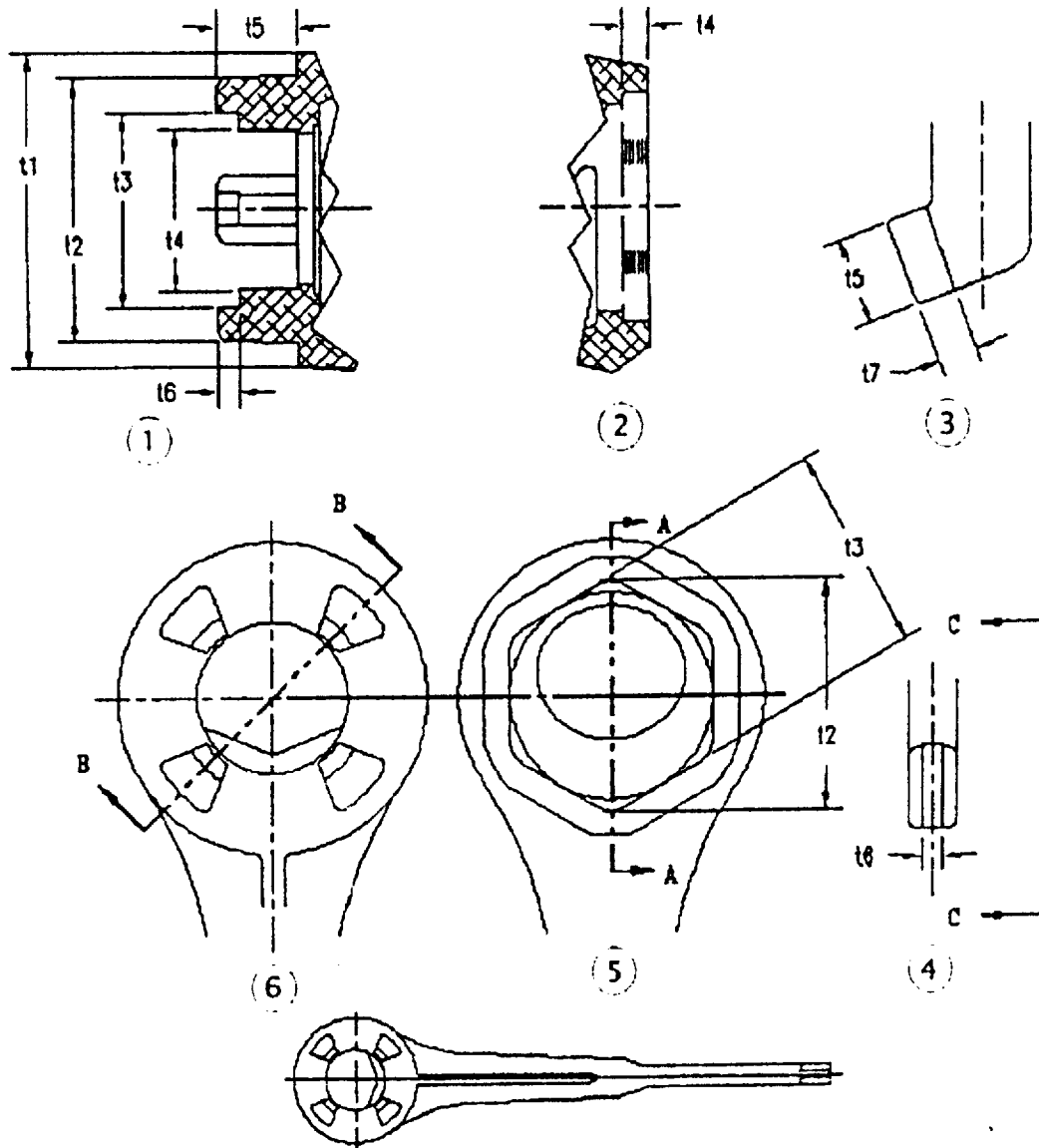
Table Q.1 — Closure assembly with overseal

Dimensions in mm

Dimensions	b_1	b_2	b_3	Minimum free space required around closure for overseal application tools (F) (diameter)
Tolerances	$\pm 1,2$	$\pm 1,0$	Max.	Min.
G3/4	50,1	43,8	15,0	76,0
Tolerances	$\pm 2,0$	$\pm 1,0$	Max.	Min.
G2	86,3	80,6	15,0	128,0

Annex R (normative)
Serrated base (type C2) — Plug wrench adapter

The plug wrench adapter shall be as shown in Figure R.1 and as specified in Table R.1.



Key

- | | | | |
|---|----------------------|---|----------------------|
| ① | Section B — B — G2 | ④ | G3/4 — Tang top view |
| ② | Section A — A — G3/4 | ⑤ | G3/4 — Top view |
| ③ | View C — C — G3/4 | ⑥ | G2 — Top view |

Figure R.1 — Plug wrench adapter

Table R.1 — Plug wrench adapter

Dimensions in mm

Dimensions	t_1	t_2	t_3	t_4	t_5	t_6	t_7
Tolerances	n.a.	±1,0	±0,8	±1,2	±1,2	±0,8	±0,8
G3/4	n.a.	42,4	38,9	4,8	16,2	4,4	7,1
Tolerances	±2,0	±0,8	±0,8	±1,0	±0,8	±0,8	n.a.
G2	57,7	49,5	36,4	29,7	14,9	4,1	n.a.

Annex S (normative)
Serrated base (type C2) — Closing torques

The closing torques shall be as specified in Table S.1 and Table S.2.

NOTE 1 After the tightening of plugs, torques will reduce over time. In particular, plastics components are subject to stress relaxation resulting in reduced torque.

NOTE 2 It should be noted that the torque recommendations below are valid for tightening plugs, i.e. in a clockwise direction.

NOTE 3 Measured torques on releasing plugs, i.e. in an anti-clockwise direction are different from those below.

NOTE 4 For plastics plugs elastomer washers are recommended.

Table S.1 — Closing torques for drum makers

Plug type	Washer type	G3/4 closure N·m	G2 closure N·m
Steel plugs	Elastomer	18 to 22	18 to 23
	Thermoplastics	25 to 30	24 to 30
Plastics plugs	Elastomer	10 to 14	11 to 16
	Thermoplastics	(See note 4)	(See note 4)

Table S.2 — Closing torques for drum fillers

Plug type	Washer type	G3/4 closure N·m	G2 closure N·m
Steel plugs	Elastomer	18 to 22	38 to 42
	Thermoplastics	25 to 30	50 to 54
Plastics plugs	Elastomer	10 to 14	25 to 30
	Thermoplastics	(See note 4)	(See note 4)

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