INTERNATIONAL STANDARD

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Packaging — Steel drums —

Part 3: Inserted flange-type closure systems

Emballages — Fûts en acier —

Partie 3: Systèmes de fermeture à collerette (filetée) sertie

Reference number
ISO 15750-3:2002(E)

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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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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

The main task of technical committees is to prepare International Standards. 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 15750 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15750-3 was prepared by Technical Committee ISO/TC 122, *Packaging*.

ISO 15750 consists of the following parts, under the general title *Packaging — Steel drums*:

— *Part 1: Removable head (open head) drums with a minimum total capacity of 208 l, 210 l and 216,5 l*

— *Part 2: Non-removable head (tight head) drums with a minimum total capacity of 212 l, 216,5 l and 230 l*

— *Part 3: Inserted flange-type closure systems*

Annexes A to C form a normative part of this part of ISO 15750. Annexes D and E are for information only.

Packaging — Steel drums —

Part 3: Inserted flange-type closure systems

1 Scope

This part of ISO 15750 specifies the characteristics, dimensions and finish of the inserted flange-type closure systems used for steel drums.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 15750. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 15750 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 228-2, *Pipe threads where pressure-tight joints are not made on the threads — Part 2: Verification by means of limit gauges*

ISO 301, *Zinc alloy ingots intended for casting*

ISO 3573, *Hot-rolled carbon steel sheet of commercial and drawing qualities*

ISO 3574, *Cold-reduced carbon steel sheet of commercial and drawing qualities*

ISO 5002, *Hot-rolled and cold-reduced electrolytic zinc-coated carbon steel sheet of commercial and drawing qualities*

ISO 11949, *Cold reduced electrolytic tinplate*

ISO 11950, *Cold reduced electrolytic chromium/chromium oxide-coated steel*

3 Terms and definitions

For the purposes of this part of ISO 15750, 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 in drums

3.2
elastomer
macromolecular material which returns rapidly to its initial dimensions and shape after substantial deformation by a weak stress and release of the stress

[ISO 472:1999]

3.3
thermoplastics
plastics that are capable of being repeatedly softened by heating and hardened by cooling through a temperature range characteristic of the plastics and, in the softened state, of being repeatedly shaped by flow into articles by moulding, extrusion or forming

4 Dimensions, materials and finish

4.1 The nominal pitch diameter and the pitch of the thread of the closures G 2 and G 3/4 shall conform to ISO 228-1.

These closures shall fit GO gauges conforming to ISO 228-2.

4.2 The dimensions and materials of the closure systems shall be in accordance with the relevant annexes for the closure type, i.e.:

— annex A: octagonal base closure system (type A closure);

— annex B: serrated base closure system (type B closure);

— annex C: octagonal (G 2)/hexagonal (G 3/4) base closure system (type C closure).

4.3 The finish of the flanges, steel plugs, label rings and protection rings shall be electrolytically zinc plated.

If for reasons of compatibility another finish of the closure system is required, the nature of the internal and external finish should be agreed upon between the purchaser and supplier.

5 Design and construction

5.1 Flanges

The flanges shall be the mechanical inserted type and shall make a leaktight fit when inserted.

5.2 Plugs

The plugs shall be designed so that they can be inserted or 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.

The dimensions of the wrenching insert shall be such that the plugs can be operated by a universal tool for steel and plastics plugs. Examples are shown in annex D.

NOTE For recommended closing torques, see annex E.

5.3 Capseals and overseals

Capseals or overseals, when fitted, shall be the manual or pneumatic crimping type and shall have provisions for customs sealing and evidence of tampering.

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

5.4 Label rings and protection rings

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

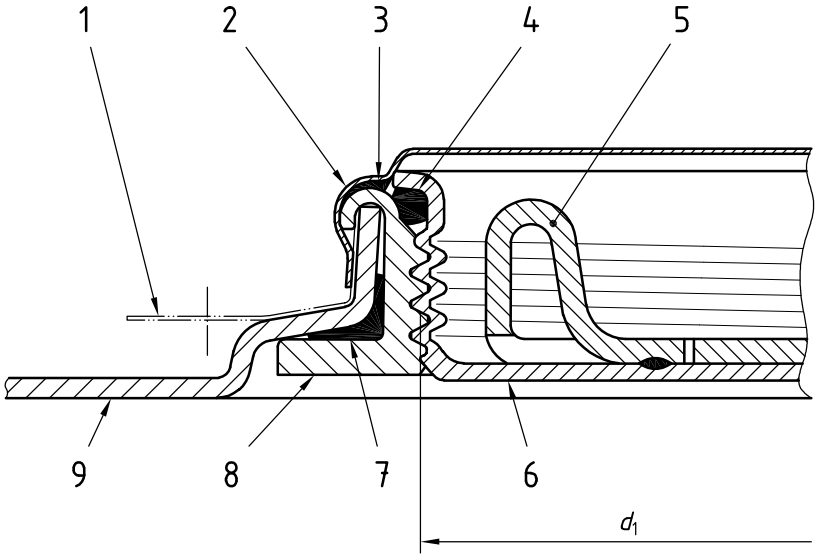
NOTE Label rings and/or protection rings can provide adequate reinforcement for the flange insertion and can protect the drum stock neck against corrosion.

Annex A
(normative)

Octagonal base closure system (type A closure)

A.1 Nomenclature for closure system

Closure components of the closure system may deviate from those shown in Figures A.1 and A.2. However the specified dimensions shall be followed.

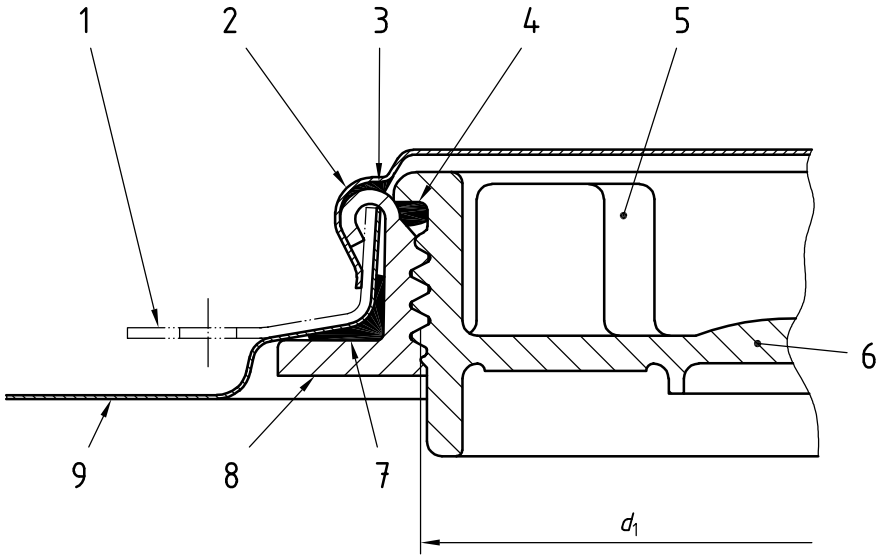


d_1 is the nominal pitch diameter.

Key

1 Optional label ring/protection ring
2 Capseal
3 Gasket
4 Plug washer
5 Wrenching insert
6 Example with steel plug
7 Elastomer flange washer
8 Flange
9 Drum stock

Figure A.1 — Assembly in medium- and heavy-gauge stock



d_1 is the nominal pitch diameter.

Key

1 Label ring/protection ring
2 Capseal
3 Gasket
4 Plug washer
5 Wrenching insert
6 Example with plastic plug
7 Elastomer flange washer
8 Flange
9 Drum stock

Figure A.2 — Assembly in light-gauge drum stock

A.2 Flanges and elastomer flange washer

A.2.1 Dimensions

Specific dimensions for flanges and elastomer flange washers shall be as shown in Figures A.3 and A.4 and specified in Table A.1.

Flanges and elastomer washers may deviate from those shown in the figures.

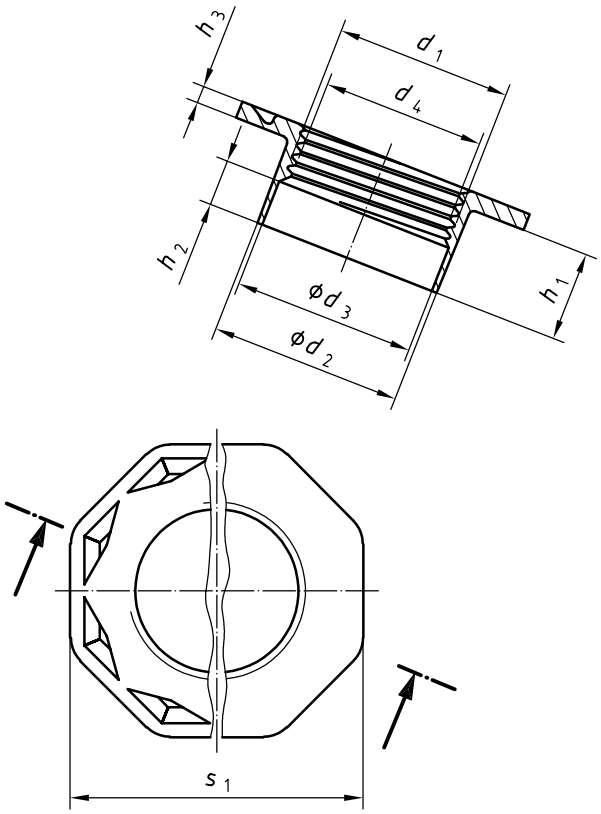


Figure A.3 — Flange

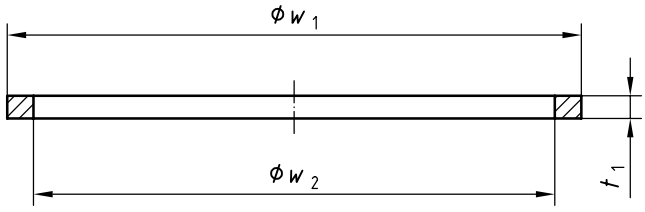


Figure A.4 — Elastomer flange washer

Table A.1 — Flanges and elastomer flange washers

Dimensions in millimetres

Thread	Nominal pitch diameter	Flange dimensions							Elastomer flange washer dimensions
	d_1	d_2	d_3	d_4	h_1	h_2	h_3	s_1	$w_1 \times w_2 \times t_1$
		± 0,3	± 0,3	± 0,3	± 0,5	± 0,5	± 0,4	± 0,3	± 1,0 × ± 1,0 × ± 0,5
G 3/4	a	29,0	27,2	24,5	12,9	7,2	2,7	43,7	32 × 27,2 × 2,6
G 2	a	62,4	60,4	57,1	15,8	7,9	2,8	77,9	67 × 60,5 × 2,6

[a] Conforming to ISO 228-1.

A.2.2 Materials and configuration

Flanges shall be made from either mild steel according to ISO 3573 or ISO 3574, or another material suitable for its intended use.

The specific type of elastomer shall be agreed between the purchaser and supplier.

Alternative configurations of the flange and flange washer(s) should be agreed between the purchaser and supplier.

A.3 Label rings and protection rings

A.3.1 Dimensions

Specific dimensions for label rings and protection rings shall be as shown in Figures A.5 and A.6 and specified in Table A.2.

Label rings and protection rings may deviate from those shown in the figures.

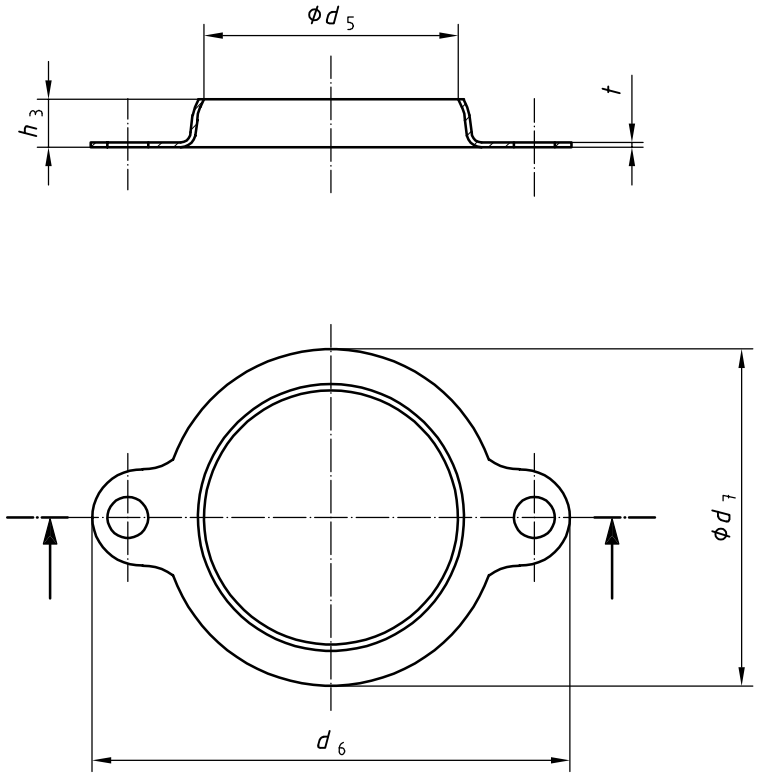


Figure A.5 — Label ring

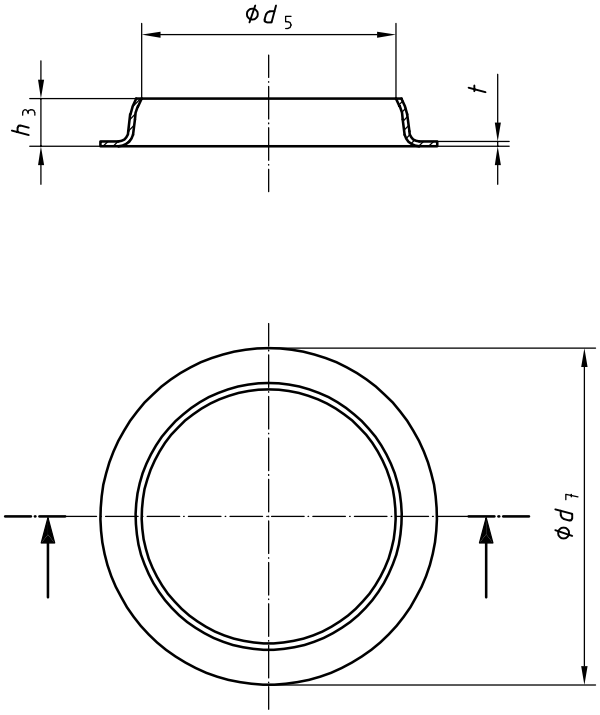


Figure A.6 — Protection ring

Table A.2 — Label rings and protection rings

Dimensions in millimetres

Thickness of end stock x	Thread	Dimensions				Thickness of label rings and protection rings t
		d_5 ± 0,4	d_6 ± 0,4	d_7 ± 0,4	h_3 ± 0,4	
Light gauge $0,5 \leqslant x < 0,8$	G 3/4	29,7	54,0	41,0	6,4	0,8
	G 2	62,3	98,5	74,5	8,4	
Medium gauge $0,8 \leqslant x < 1,5$	G 3/4	31,0	58,5	41,0	5,4	0,3 [a]
	G 2	63,5	99,5	74,5	8,2	
Heavy gauge $1,5 \leqslant x < 2,0$	G 3/4	31,3	58,5	41,0	5,7	0,3 [a]
	G 2	65,7	99,5	74,5	7,3	

[a] The use of label or protection rings is optional for medium- and heavy-gauge end stock.

A.3.2 Materials and configuration

Label and protection rings shall be made from mild steel according to ISO 5002 or another material appropriate to the requirements for its intended use.

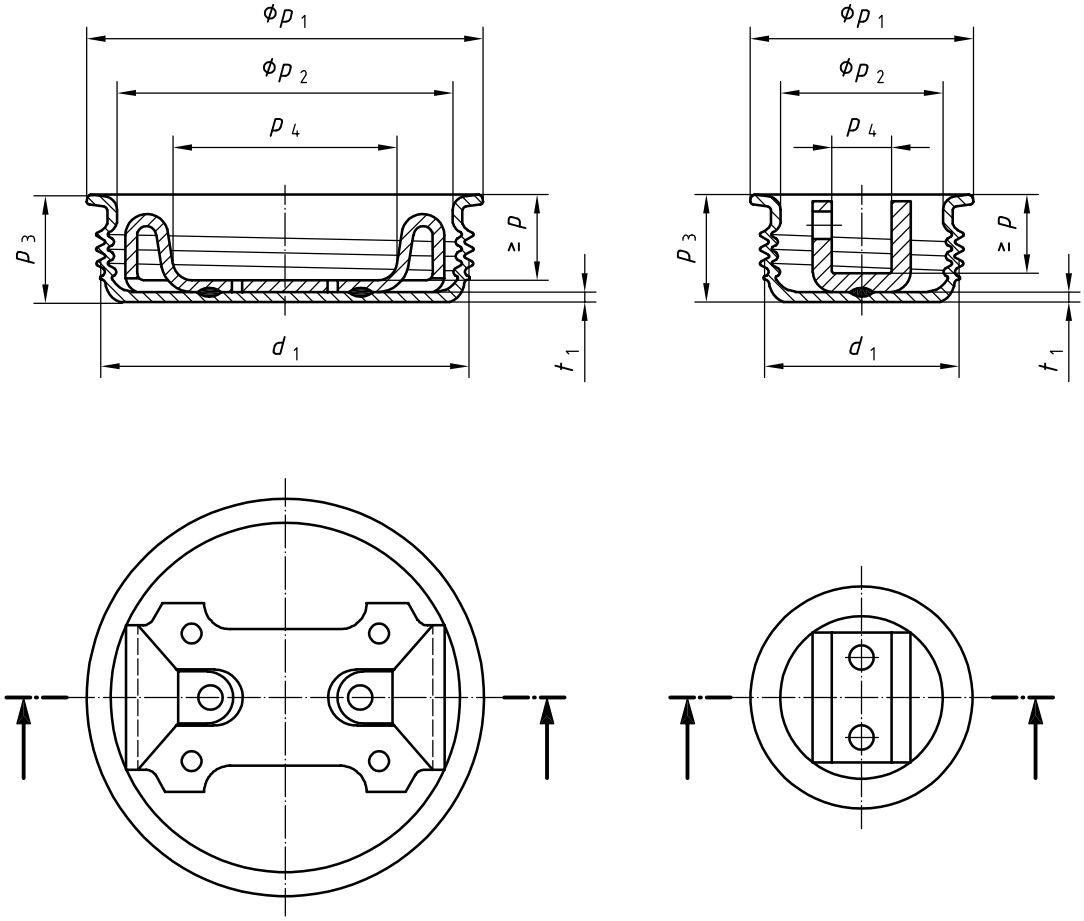
Alternative configurations of label and protection rings should be agreed between the purchaser and supplier.

A.4 Steel plugs and elastomer or thermoplastics plug washers

A.4.1 Dimensions

Specific dimensions for steel plugs and elastomer or thermoplastics plug washers shall be as shown in Figures A.7 and A.8 specified in Table A.3.

Steel plugs and elastomer or thermoplastics plug washers may deviate from those shown in the figures.



a) G 2 thread **b) G 3/4 thread**

Figure A.7 — Steel plug

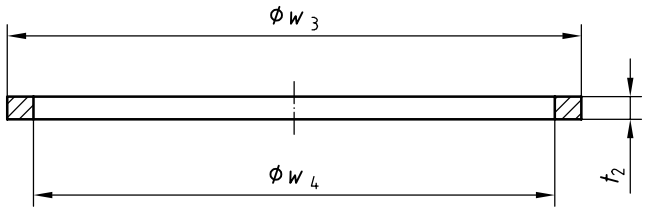


Figure A.8 — Elastomer plug washer

Table A.3 — Steel plugs and elastomer plug washers

Dimensions in millimetres

Thread	Nominal pitch diameter	Plug dimensions						Elastomer plug washer dimensions
	d_1	p_1 ± 0,5	p_2 ± 0,7	p_3 ± 0,7	p_4[b] ± 1,5	p[c] min.	t_1 ± 0,2	$w_3 \times w_4 \times t_2$ ± 1,0 × ± 1,0 × ± 0,5
G 3/4	[a]	28,1	20,5	13,7	8,5	8,5	1,2	25,5 × 20,3 × 2,4
G 2	[a]	61,2	53,6	15,5	33,5	11,5	1,2	56,0 × 50,5 × 2,7

[a] Conforming to ISO 228-1.

[b] Dimension p_4 for G 2 is measured at a position 2 mm above the top of the flat part of the wrenching insert.

[c] Dimension p (min.) is measured from the top of the plug to the top of the flat part of the wrenching insert.

A.4.2 Materials and configuration

Plugs shall be made from either mild steel according to ISO 3573 or ISO 3574, or another material suitable for their intended use.

The position of the wrenching inserts shall be not more than 0,5 mm out of centre.

Plug washers should be made from elastomer; however thermoplastics materials are also acceptable. The specific type of elastomer or thermoplastics shall be agreed between the purchaser and supplier.

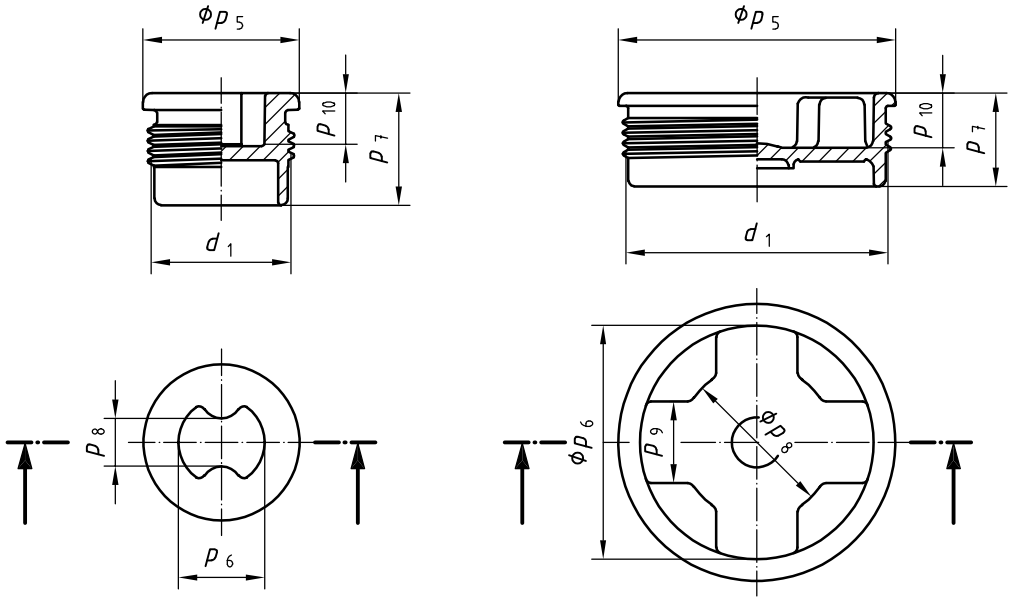
Alternative configurations of the plug and plug washer should be agreed between the purchaser and supplier.

A.5 Plastic plugs and elastomer plug washers

A.5.1 Dimensions

Specific dimensions for plastics plug and elastomer plug washers shall be as shown in Figures A.9 and A.10 and specified in Table A.4.

Plastics plugs and elastomer plug washers may deviate from those shown in the figures.



a) G 3/4 thread **b) G 2 thread**

Figure A.9 — Plastics plug

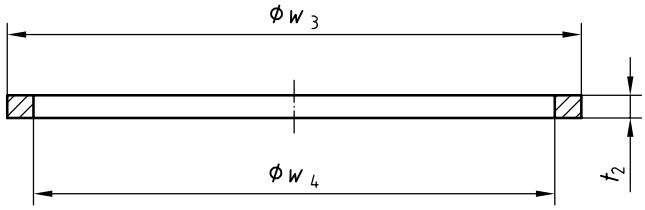


Figure A.10 — Elastomer plug washer

Table A.4 — Plastics plugs and elastomer plug washers

Dimensions in millimetres

Thread	Nominal pitch diameter	Plug dimensions						Elastomer plug washer dimensions
	d_1	p_5	p_6	p_7	p_8	p_9	p_{10}	$w_3 \times w_4 \times t_2$
		± 0,4	± 0,4	± 0,4	± 0,4	± 0,4	± 0,4	± 1,0 × ± 1,0 × ± 0,5
G 3/4	a	27,9	17,3	20,0	8,5	N.A.	9,5	25,5 × 20,3 × 2,4
G 2	a	61,1	51,5	20,5	34,0	18,0	12,0	56,0 × 50,5 × 2,7

[a] Conforming to ISO 228-1.

N.A. Not applicable.

A.5.2 Materials and configuration

Plugs shall be made from a copolymer of polypropylene. Other materials may be agreed between the purchaser and supplier.

Plug washers should be made from elastomer; however thermoplastics materials are also acceptable. The specific type of elastomer or thermoplastics shall be agreed by the purchaser and supplier.

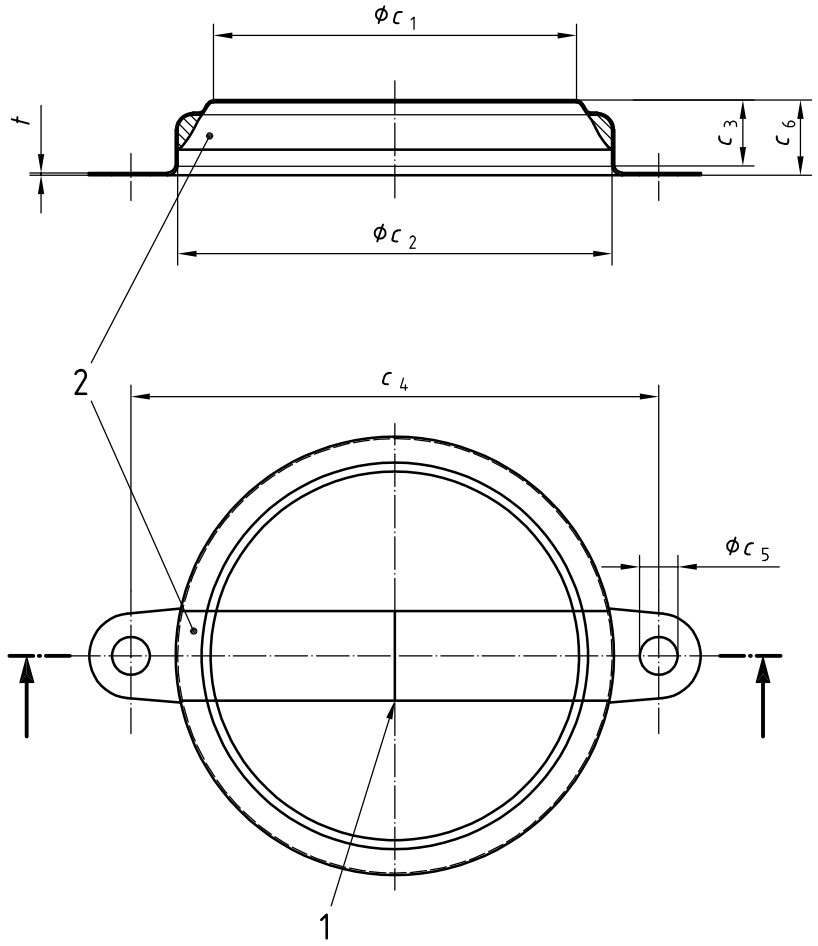
Alternative configurations of the plug and plug washer should be agreed between the purchaser and supplier.

A.6 Capseals

A.6.1 Dimensions

Specific dimensions for capseals shall be as shown in Figure A.11 and specified in Table A.5.

Capseals may deviate from that shown in the figure.



Key

1 Scored lines
2 Flowed-in gasket

Figure A.11 — Capseal

Table A.5 — Capseal

Dimensions in millimetres

Thread	Capseal dimensions						Thickness of printed capseals
	c_1 ± 0,4	c_2 ± 0,4	c_3 ± 0,4	c_4 ± 0,4	c_5 ± 0,2	c_6 ± 0,7	t ± 0,05
G 3/4	29,0	35,1	8,9	43,0	3,5	9,9	0,35
G 2	62,4	69,8	11,2	85,0	4,8	12,2	0,35
NOTE Printing of the capseal (if required) should be agreed between the purchaser and supplier.							

A.6.2 Materials and configuration

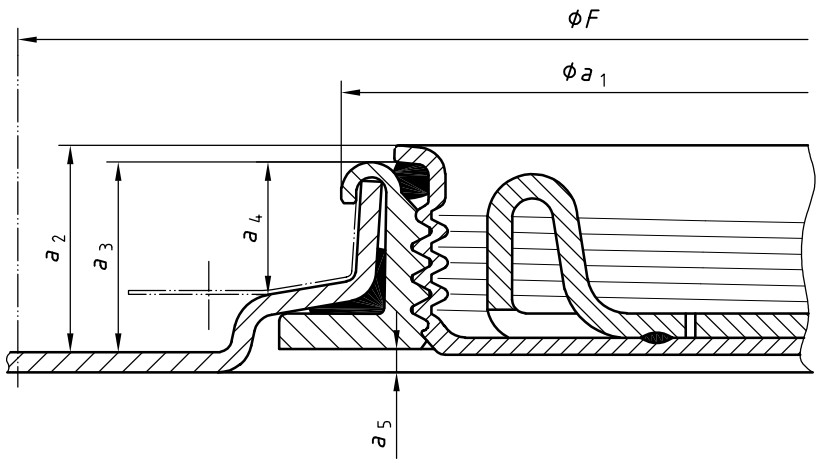
Capseals shall be made from low-carbon sheet steel according to ISO 11949 or ISO 11950, or another material suitable for its intended use.

Alternative configurations should be agreed between the purchaser and supplier.

A.7 Assembly without capseal

Specific dimensions for an assembly without capseal shall be as shown in Figure A.12 and specified in Table A.6.

An assembly without capseal may deviate from that shown in the figure.



NOTE Parts 1 and 2 of ISO 15750 require that the closure assembly does not protrude above the drum chime.

Figure A.12 — Assembly without capseal

Table A.6 — Closure assembly without capseal

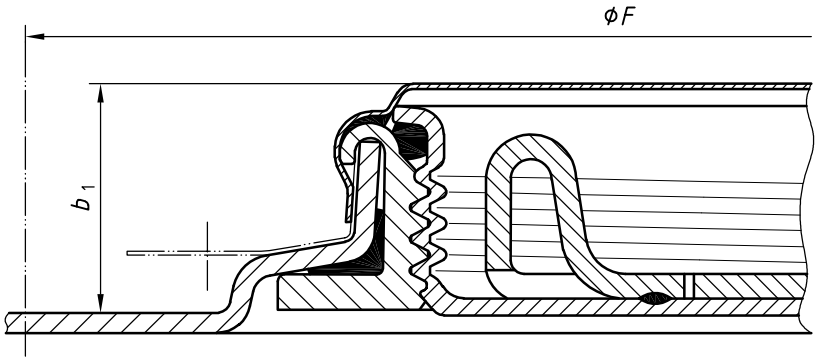
Dimensions in millimetres

Thread	Closure assembly					Minimum free space required around closure for capseal application tools
	a_1 ± 0,5	a_2 ± 0,5	a_3 ± 0,5	a_4 ± 0,5	a_5 N.A.	F
G 3/4	33,9	11,7	11,2	6,6	> 0	90
G 2	68,4	14,5	13,6	9,4	> 0	110
NOTE The recommendation of the supplier of the closures on insertion of the flanges should be followed if it deviates from the above.						
N.A. Not applicable.						

A.8 Assembly with capseal

Specific dimensions for an assembly with capseal shall be as shown in Figure A.13 and specified in Table A.7.

An assembly with capseal may deviate from that shown in the figure.



NOTE Parts 1 and 2 of ISO 15750 require that the closure assembly does not protrude above the drum chime.

Figure A.13 — Assembly with capseal

Table A.7 — Closure assembly with capseal

Dimensions in millimetres

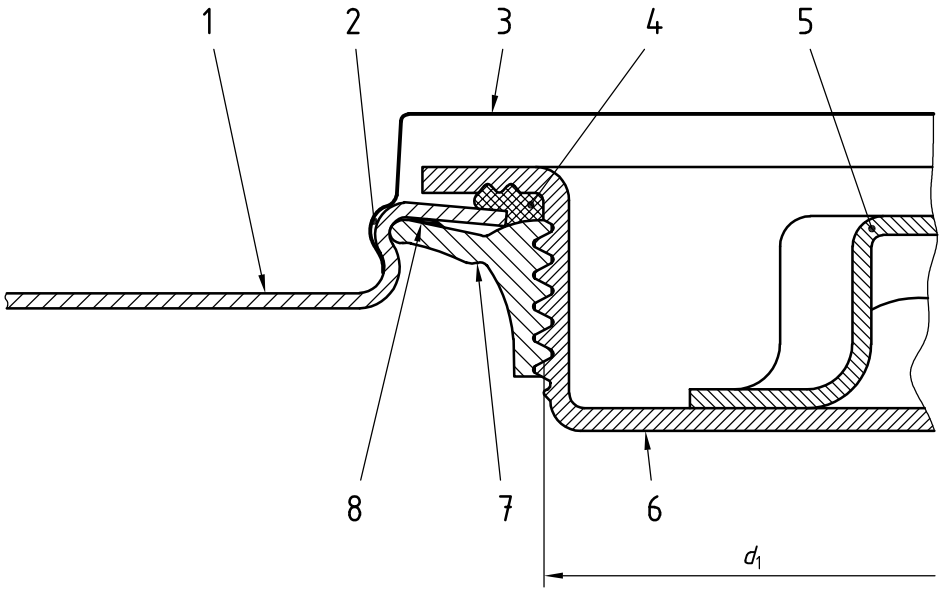
Thread	Dimension b_1 ± 0,5	Minimum free space required around closure for capseal application tools F
G 3/4	14,1	90
G 2	17,3	110
NOTE The recommendations of the supplier of the closures on insertion of the flanges should be followed if they deviate from the above.		

Annex B
(normative)

Serrated base closure system (type B closure)

B.1 Nomenclature for closure system

Closure components of the closure system may deviate from those shown in Figures B.1 and B.2, however the specified dimensions shall be followed.

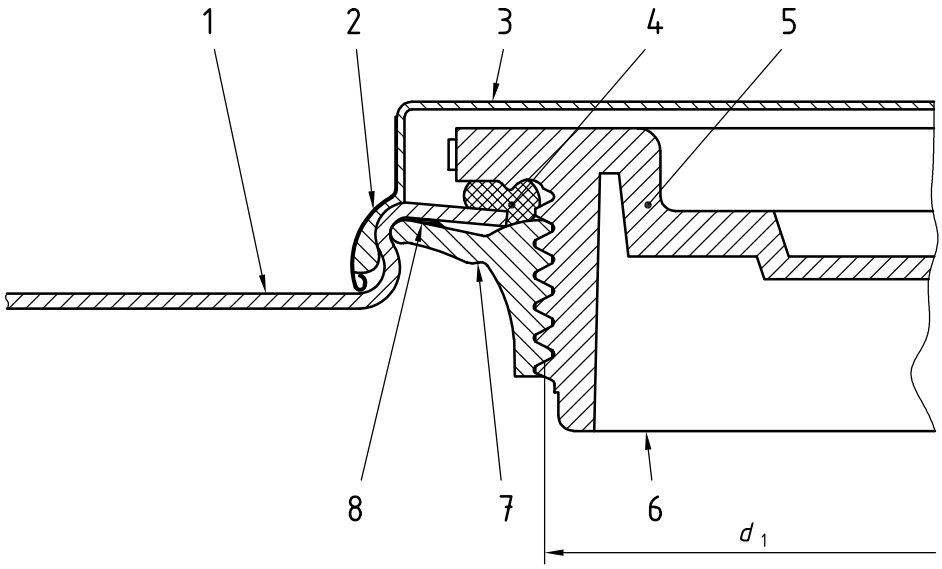


d_1 is the nominal pitch diameter.

Key

1	Drum stock	5	Wrenching insert
2	Compound	6	Steel plug
3	Overseal	7	Flange
4	Washer	8	Compound

Figure B.1 — Assembly cross section showing steel G 2 plug



d_1 is the nominal pitch diameter.

Key

1	Drum stock	5	Wrenching part
2	Metallic ring	6	Plastics plug
3	Overseal (plastics)	7	Flange
4	Washer	8	Compound

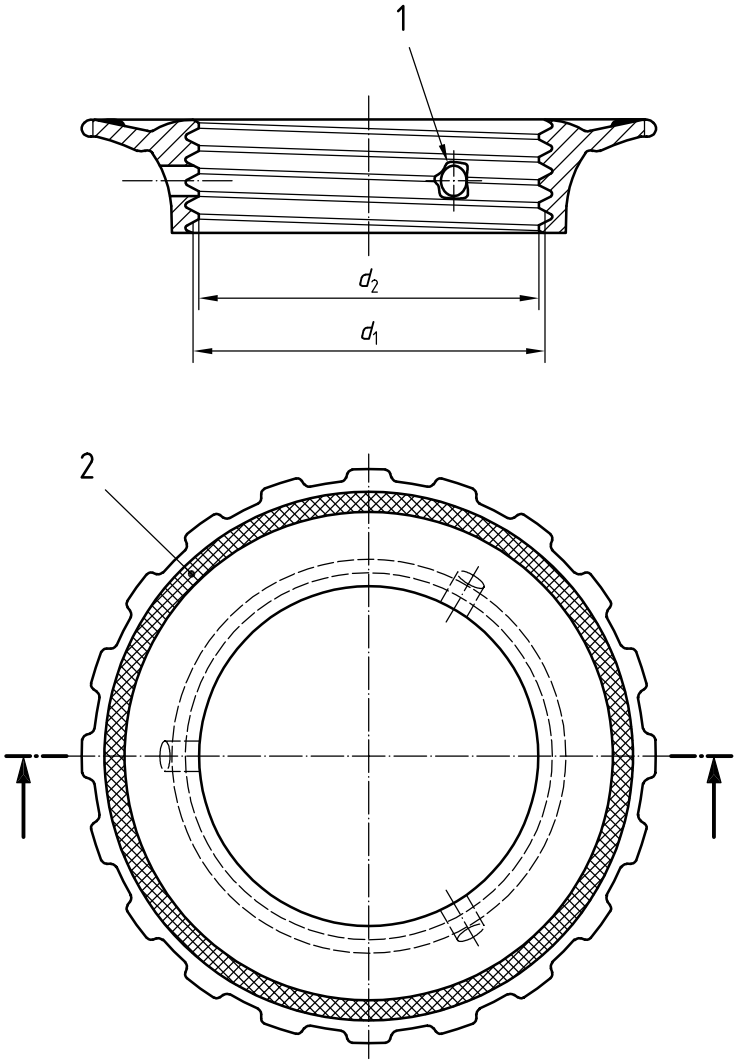
Figure B.2 — Assembly cross section showing plastics G 2 plug

B.2 Flanges and sealing features

B.2.1 Dimensions

Specific dimensions for the flange shall be as shown in Figure B.3 and specified in Table B.1.

The flange may deviate from that shown in the figure.



Key

1 Drain hole
2 Compound

Figure B.3 — Flange

Table B.1 — Flange

Dimensions in millimetres

Thread	Nominal pitch diameter d_1	Flange dimension d_2 ± 0,3
G 3/4	a	24,5
G 2	a	57,1

a Conforming to ISO 228-1 as inserted.

B.2.2 Materials and configuration

Flanges shall be made from either mild steel according to ISO 3573 or ISO 3574, or another material suitable for its intended use.

The specific type of compound shall be agreed between the purchaser and supplier.

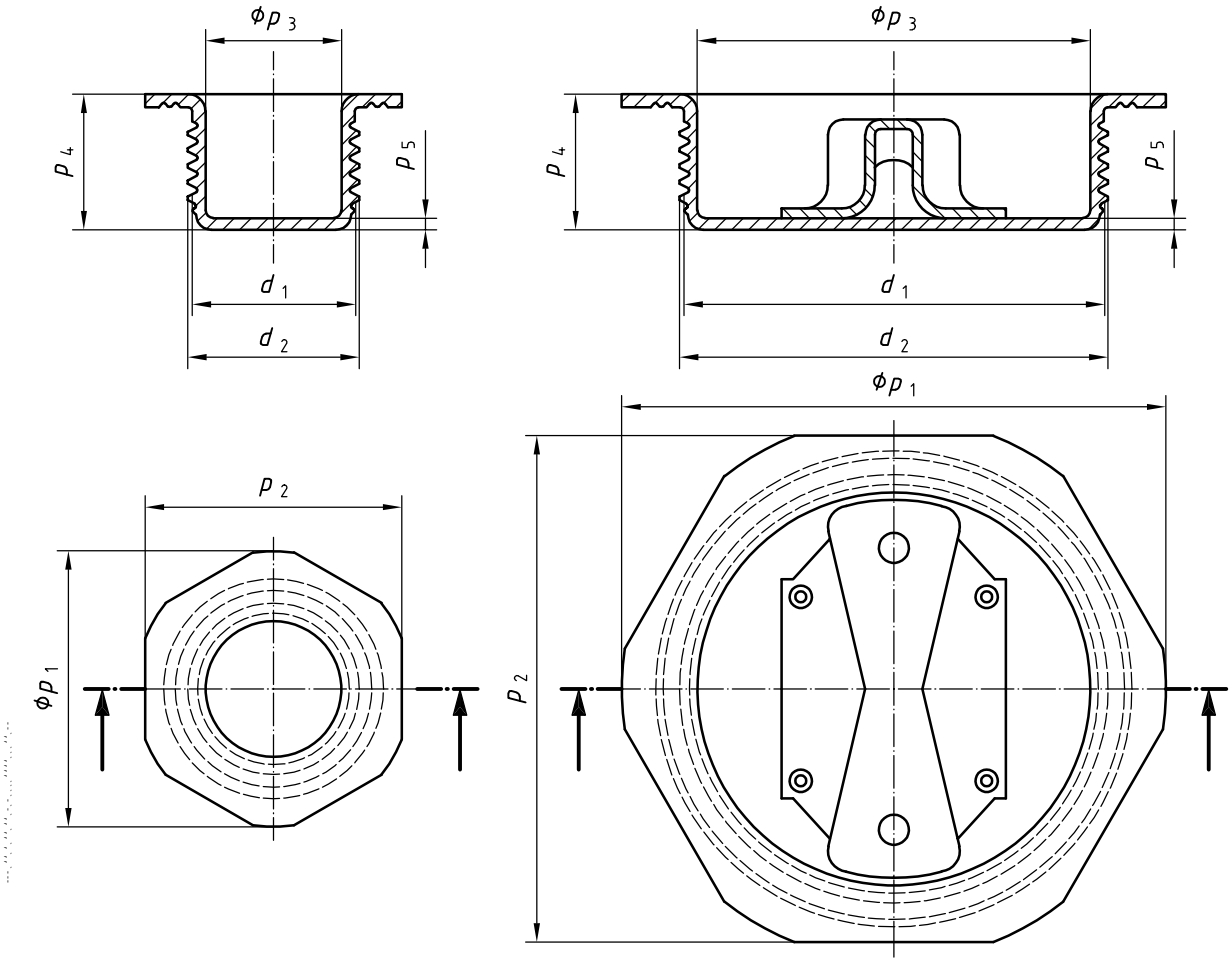
Alternative configurations of the flange should be agreed between the purchaser and supplier.

B.3 Steel plugs and plug washers

B.3.1 Dimensions

Specific dimensions for steel plugs and elastomer plug washers shall be as shown in Figures B.4 and B.5 and specified in Table B.2.

The steel plugs and elastomer plug washers may deviate from those shown in the figures.



a) G 3/4 thread **b) G 2 thread**

Figure B.4 — Steel plug

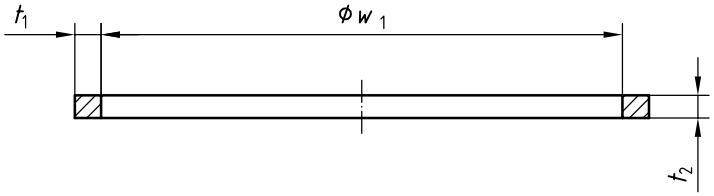


Figure B.5 — Elastomer plug washer

Table B.2 — Steel plugs and elastomer washers

Dimensions in millimetres

Thread	Nominal pitch diameter	Plug dimensions						Elastomer plug washer dimensions
	d_1	d_2	p_1	p_2	p_3	p_4	p_5	$w_1 \times t_1 \times t_2$
		± 0,4	± 0,4	± 0,4	min.	± 0,8	min.	± 0,5 × ± 0,8 × ± 0,5
G 3/4	a	26,3	41,7	38,0	20,1	19,8	1,0	25,4 × 5,4 × 3,0
G 2	a	59,0	79,0	73,4	54,0	20,2	1,0	58,0 × 6,4 × 3,0

[a] Conforming to ISO 228-1.

B.3.2 Materials and configuration

Plugs shall be made from either mild steel according to ISO 3573 or ISO 3574, or another material suitable for its intended use.

Plug washers should be made of elastomer; however thermoplastics materials are also acceptable. The specific type of elastomer or thermoplastics shall be agreed between the purchaser and supplier.

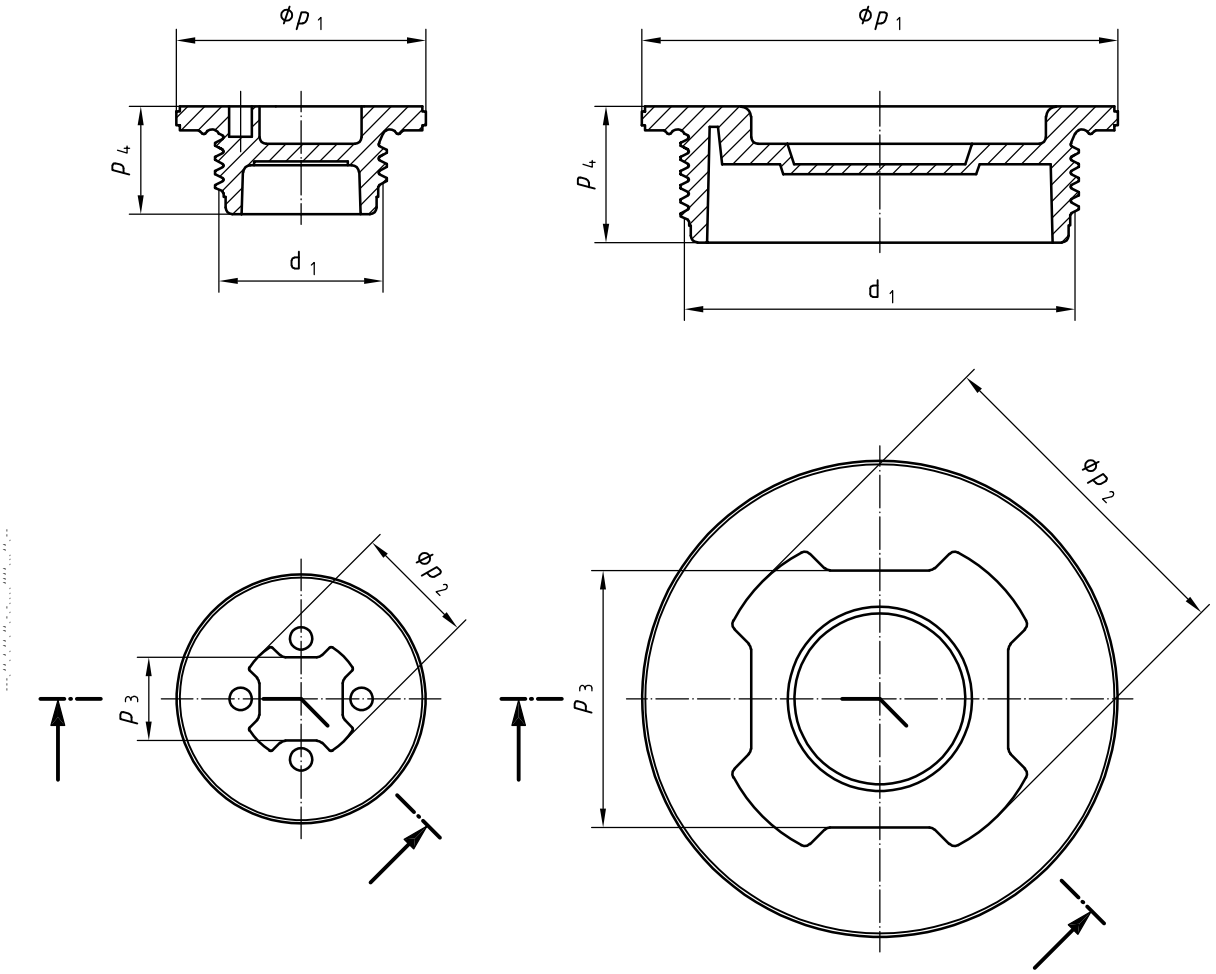
Alternative configurations of the plug and plug washer should be agreed between the purchaser and supplier.

B.4 Plastics plugs and elastomer plug washers

B.4.1 Dimensions

Specific dimensions for the plastics plugs and elastomer plug washers shall be as shown in Figures B.6 and B.7 and specified in Table B.3.

The plastics plugs and elastomer plug washers may deviate from those shown in the figures.



a) G 3/4 thread

b) G 2 thread

Figure B.6 — Plastics plug

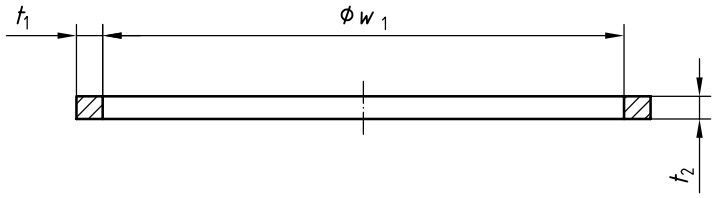


Figure B.7 — Plug washer

Table B.3 — Plastics plug and elastomer plug washer

Dimensions in millimetres

Thread	Nominal pitch diameter	Plastics plug dimensions				Elastomer plug washer dimensions
	d_1	p_1	p_2	p_3	p_4	$w_1 \times t_1 \times t_2$
		$\pm$ 0,9	min.	min.	$\pm$ 0,8	$\pm$ 0,5 $\times$ $\pm$ 0,8 $\times$ $\pm$ 0,5
G 3/4	a	38,7	18,2	6,4	16,1	25,4 $\times$ 5,4 $\times$ 3,0
G 2	a	73,5	51,2	39,9	21,1	58,0 $\times$ 6,4 $\times$ 3,0

[a] Conforming to ISO 228-1.

B.4.2 Materials and configuration

Plugs shall be made from a copolymer of polypropylene; other suitable materials may be agreed between the purchaser and supplier.

Plug washers shall be made from elastomer. The specific type of elastomer shall be agreed between the purchaser and supplier.

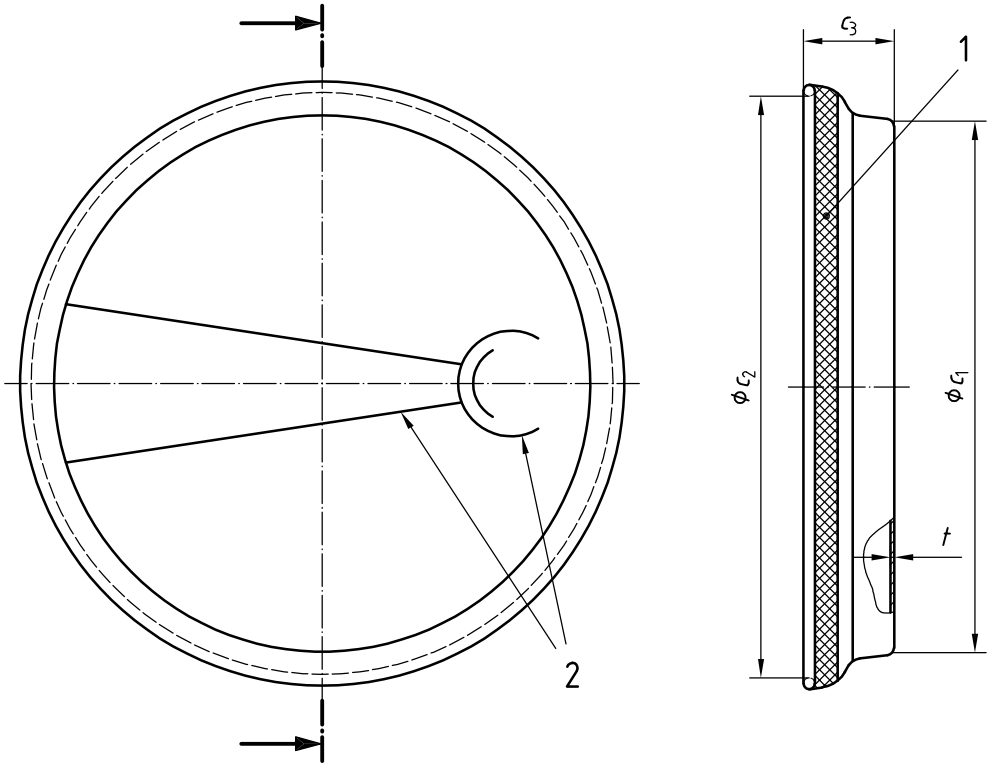
Alternative configurations of plugs and plug washers should be agreed between purchaser and supplier.

B.5 Protective covers and metal overseals

B.5.1 Dimensions

Specific dimensions for the protective covers and overseals shall be as shown in Figure B.8 and specified in Table B.4.

The protective covers or overseals may deviate from that shown in the figure.



Key

1 Compound
2 Scored lines

Figure B.8 — Overseal

Table B.4 — Metal overseal

Dimensions in millimetres

Thread	Metal overseal dimensions			Thickness of printed capseals
	c_1 max.	c_2 min.	c_3 max.	t ± 0,05
G 3/4	41,5	48,1	13,8	0,23
G 2	78,7	85,6	14,7	0,23
NOTE Printing of the overseal (if required) should be agreed between the purchaser and supplier.				

B.5.2 Materials and configuration

Overseals shall be made from low-carbon sheet steel according to ISO 11949 or ISO 11950, or other material suitable for its intended use.

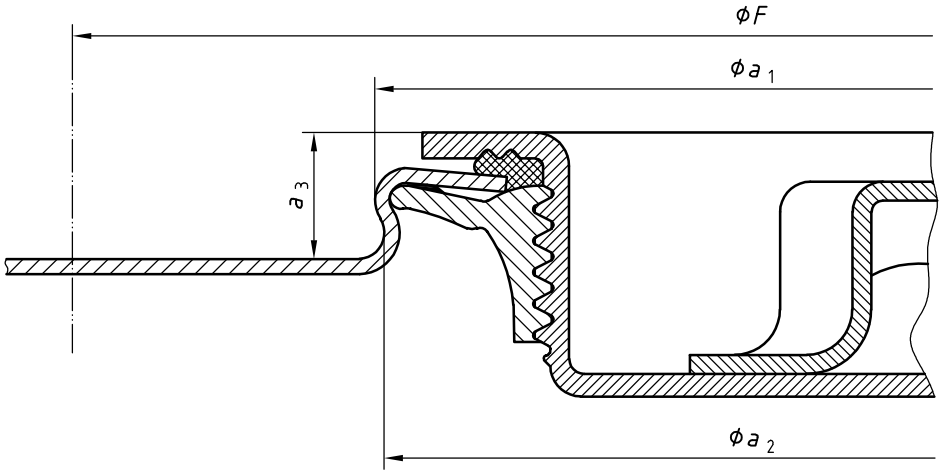
Alternative configurations of the overseal should be agreed between the purchaser and supplier.

B.6 Closure assembly without overseal

B.6.1 Dimensions

Specific dimensions for the closure assembly without overseal shall be as shown in Figure B.9 and specified in Table B.5.

The closure assembly may deviate from that shown in the figure.



NOTE Parts 1 and 2 of ISO 15750 require that the closure assembly does not protrude above the drum chime.

Figure B.9 — Assembly without overseal

Table B.5 — Assembly without overseal

Dimensions in millimetres

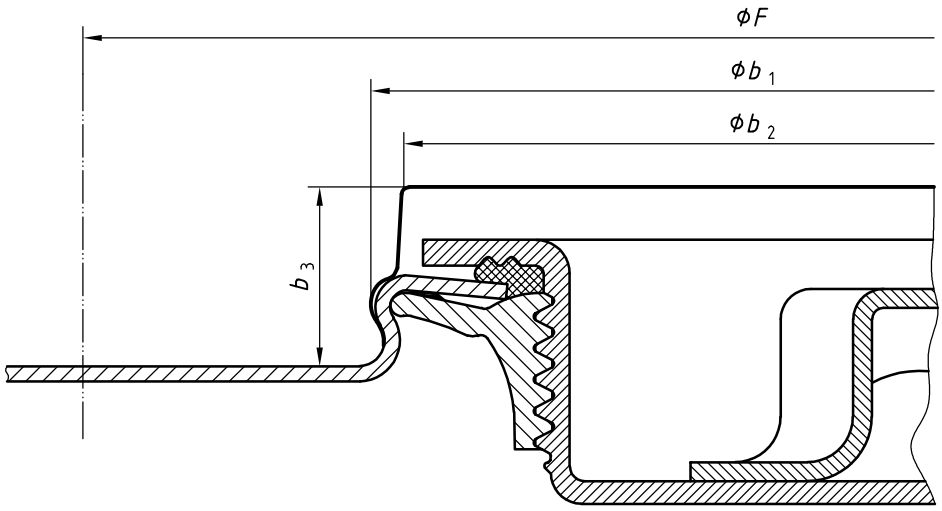
Thread	Closure assembly dimensions			Minimum free space required around closure for overseal application tools
	a_1	a_2	a_3	F
Tolerances	± 0,5	± 1,7	max.	min.
G 3/4	47,6	45,1	12,7	76,0
Tolerances	± 1,0	± 2,3	max.	min.
G 2	84,7	81,0	14,0	128,0
NOTE The recommendations of the supplier of the closures on insertion of the flanges should be followed if they deviate from the above.				

B.7 Closure assembly with overseal

B.7.1 Dimensions

Specific dimensions for a closure assembly with overseal shall be as shown in Figure B.10 and specified in Table B.6.

The closure assembly may deviate from that shown in the figure.



NOTE Parts 1 and 2 of ISO 15750 require that the closure assembly does not protrude above the drum chime.

Figure B.10 — Assembly with overseal

Table B.6 — Assembly with overseal

Dimensions in millimetres

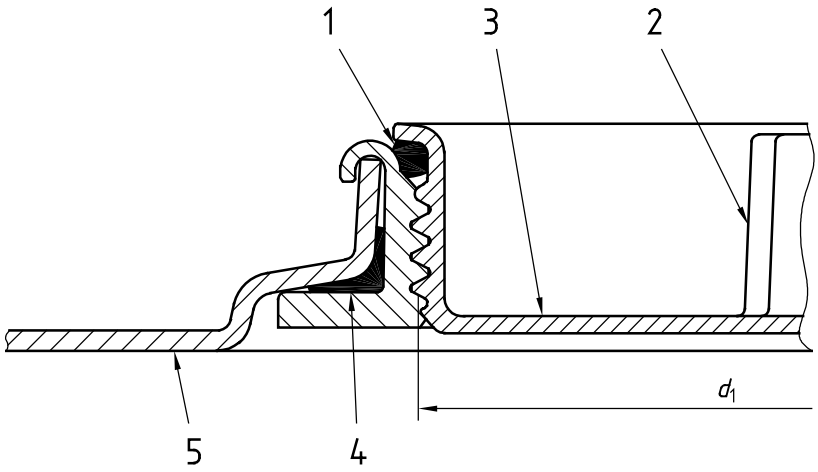
Thread	Closure assembly dimensions			Minimum free space required around closure for capseal application tools
	b_1 ± 2,0	b_2 ± 1,0	b_3 max.	F
G 3/4	50,1	43,8	15,0	76,0
G 2	86,3	80,6	15,0	128,0
NOTE The recommendations of the supplier of the closures on insertion of the flanges should be followed if they deviate from the above.				

Annex C
(normative)

Octagonal(G 2)/hexagonal (G 3/4) base closure system (type C closure)

C.1 Nomenclature for closure system

Closure components of the closure system may deviate from those shown in Figure C.1, however the specified dimensions shall be followed.



d_1 is the nominal pitch diameter.

Key

1 Plug washer
2 Wrenching part
3 Example with zinc alloy plug
4 Flange washer
5 Drum stock

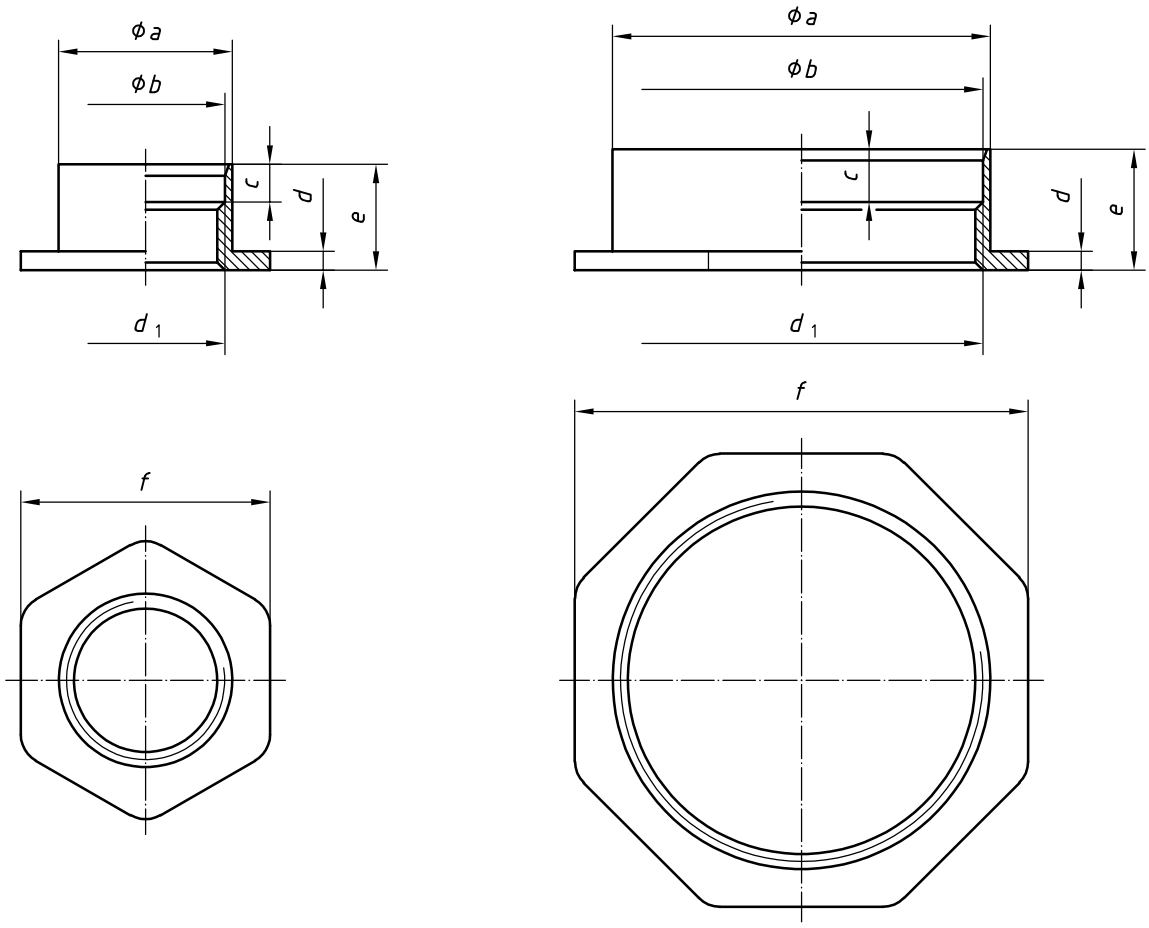
Figure C.1 — Assembly in medium- and heavy-gauge drum stock

C.2 Configuration and dimensions of flanges

C.2.1 Dimensions

Specific dimensions for flanges shall be as shown in Figure C.2 and specified in Table C.1.

The flanges may deviate from that shown in the figure.



a) G 3/4 thread **b) G 2 thread**

Figure C.2 — Flange

Table C.1 — Flange

Dimensions in millimetres

Thread	Nominal pitch diameter d_1	Flange dimensions					
		a ± 0,3	b ± 0,3	c ± 0,3	d ± 0,4	e ± 0,4	f ± 0,3
G 3/4	a	30,0	28,2	7,5	3,1	16,8	40,5
G 2	a	63,5	61,2	8,5	3,1	19,0	75,0

a Conforming to ISO 228-1 as inserted.

C.2.2 Materials and configuration

Flanges shall be made from either mild steel according to ISO 3573 or ISO 3574, or another material suitable for its intended use.

The configuration and material of the flange washer(s) should be agreed between the purchaser and supplier.

Alternative configurations of the flange should be agreed between the purchaser and supplier.

C.3 Configuration and dimensions of label rings and protection rings

For light-, medium- and heavy-gauge end stock material, label rings and/or protection rings are optional.

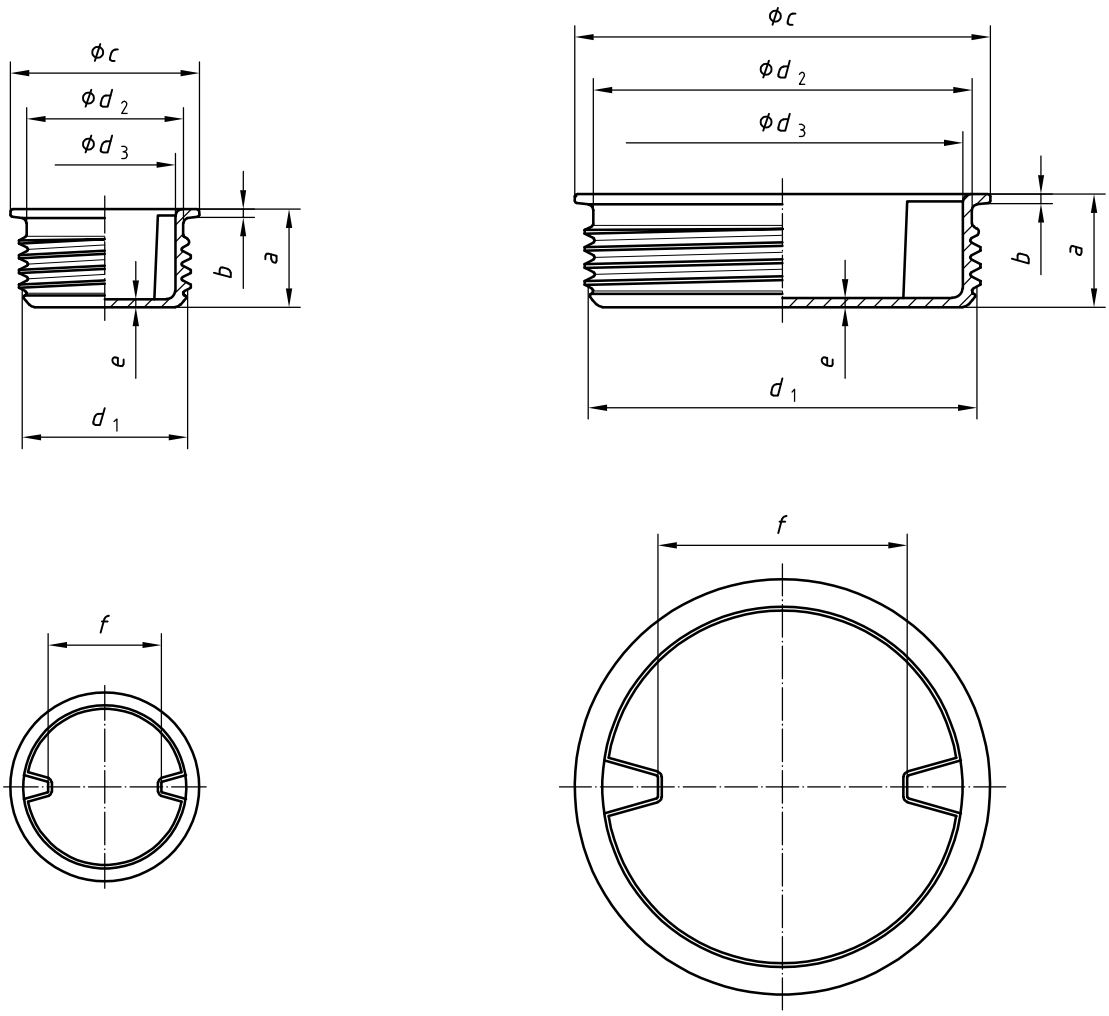
If such rings are required, rings similar to those specified under A.3 should be used.

C.4 Configuration and dimensions of zinc-alloy die cast plugs

C.4.1 Dimensions

Specific dimensions for zinc alloy plugs shall be as shown in Figure C.3 and specified in Table C.2.

The zinc alloy plugs may deviate from that shown in the figure.



a) G 3/4 thread **b) G 2 thread**

Figure C.3 — Zinc-alloy die cast plug

Table C.2 — Zinc-alloy die cast plug

Dimensions in millimetres

Thread	Nominal pitch diameter	Plug dimensions						
	d_1	a	b	c	d_2	d_3	e	f
		$\pm$ 0,3	$^{0}_{-0,3}$	$\pm$ 0,3	$\pm$ 0,3	$\pm$ 0,5	min.	$\pm$ 0,5
G 3/4	a	14,0	3,0	28,0	23,7	20,0	1,5	9,0
G 2	a	16,0	3,0	61,0	56,0	53,0	1,5	37,0

[a] Conforming to ISO 228-1.

C.4.2 Materials and configuration

Plugs shall be made from either zinc alloy according to ISO 301 or another material suitable for its intended use.

The configuration and material specification of the plug washer shall be agreed between the purchaser and supplier.

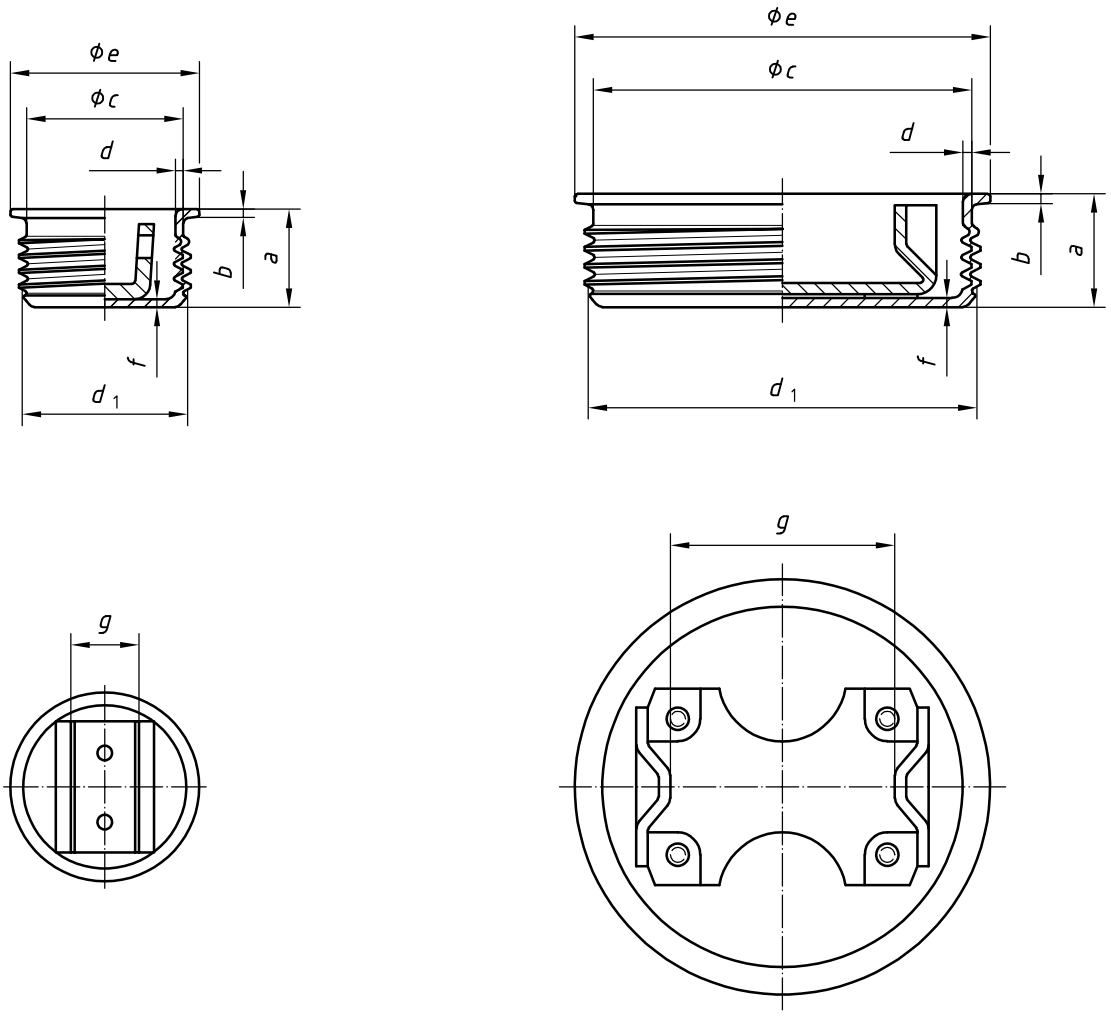
Alternative configurations of the plug should be agreed between the purchaser and supplier.

C.5 Configuration and dimensions of steel plugs

C.5.1 Dimensions

Specific dimensions for steel plugs shall be as shown in Figure C.4 and specified in Table C.3.

The steel plugs may deviate from that shown in the figure.



a) G 3/4 thread **b) G 2 thread**

Figure C.4 — Steel plug

Table C.3 — Steel plug

Dimensions in millimetres

Thread	Nominal pitch diameter d_1	Plug dimensions						
		a min.	b min.	c ± 0,3	d min.	e ± 0,5	f min.	g ± 1,5
G 3/4	[a]	14,0	1,0	23,7	1,0	28,0	1,0	9,5
G 2	[a]	15,0	1,0	56,0	1,0	61,0	1,0	34,5

[a] Conforming to ISO 228-1.

C.5.2 Materials and configuration

Plugs shall be made from either mild steel according to ISO 3573 or ISO 3574, or another material suitable for its intended use.

The configuration and material specification of the plug washers shall be agreed between the purchaser and supplier.

Alternative configurations of the plugs should be agreed between the purchaser and supplier.

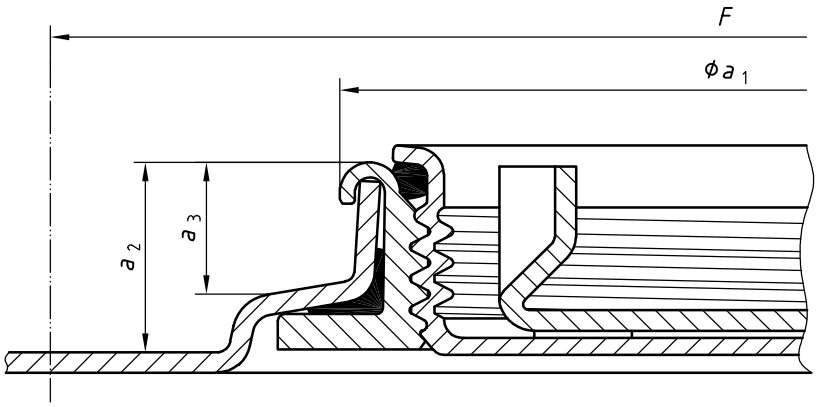
C.6 Configuration and dimensions of capseals

Should capseals be required to protect the closures and or the product packed, then the capseals similar to those as specified under A.6 should be used.

C.7 Assembly without capseal

Specific dimensions for an assembly without capseal shall be as shown in Figure C.5 and specified in Table C.4.

The assembly without capseal may deviate from that shown in the figure.



NOTE Parts 1 and 2 of ISO 15750 require that the closure assembly does not protrude above the drum chime.

Figure C.5 — Assembly without capseal

Table C.4 — Assembly without capseal

Dimensions in millimetres

Thread	Closure assembly dimensions			Minimum free space required around closure for capseal application tools
	a_1	a_2	a_3	F
	± 0,5	± 1,0	± 1,0	
G 3/4	35,5	10,9	7,0	90
G 2	69,5	12,5	8,6	110
NOTE The recommendations of the supplier of the closures on insertion of the flanges should be followed if they deviate from the above.				

C.8 Elastomer washers

C.8.1 Elastomer washers for flanges

C.8.1.1 Dimensions

Specific dimensions for the elastomer washers for flanges shall be as shown in Figure C.6 and specified in Table C.5.

The elastomer washers for flanges may deviate from that shown in the figure.

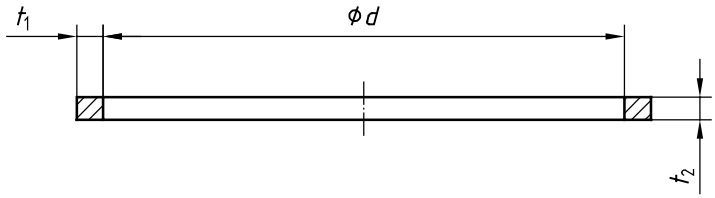


Figure C.6 — Elastomer washer for flange

Table C.5 — Elastomer washer for flange

Dimensions in millimetres

Thread	Dimension		
	d ± 1,0	t_1 ± 0,5	t_2 ± 0,5
G 3/4	29,0	2,0	2,8
G 2	62,0	2,3	3,0

C.8.1.2 Materials and configuration

The configuration and material specification of the washer for the flange shall be agreed between the purchaser and supplier.

C.8.2 Elastomer washers for plugs

C.8.2.1 Dimensions

Specific dimensions for the elastomer washers for plugs shall be as shown in Figure C.7 and specified in Table C.6.

The elastomer washers for plugs may deviate from that shown in the figure.

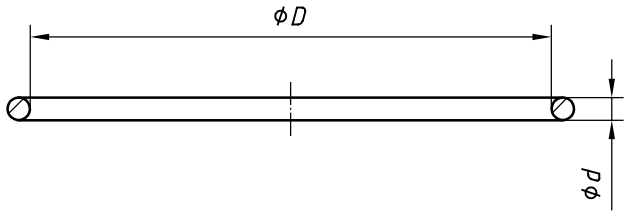


Figure C.7 — Elastomer washer for plug

Table C.6 — Elastomer washer for plug

Dimensions in millimetres

Thread	Dimensions	
	D ± 1,0	d ± 0,5
G 3/4	20,0	3,4
G 2	50,0	3,4

C.8.2.2 Materials and configuration

The configuration and material specification of the washer for the plug shall be agreed between the purchaser and supplier.

Annex D
(informative)

Plug wrench adaptors

D.1 Plug wrench adaptors for type A and type C closures

Figures D.1 and D.2 and Table D.1 give examples of plug wrench adaptors for type A and type C closures.

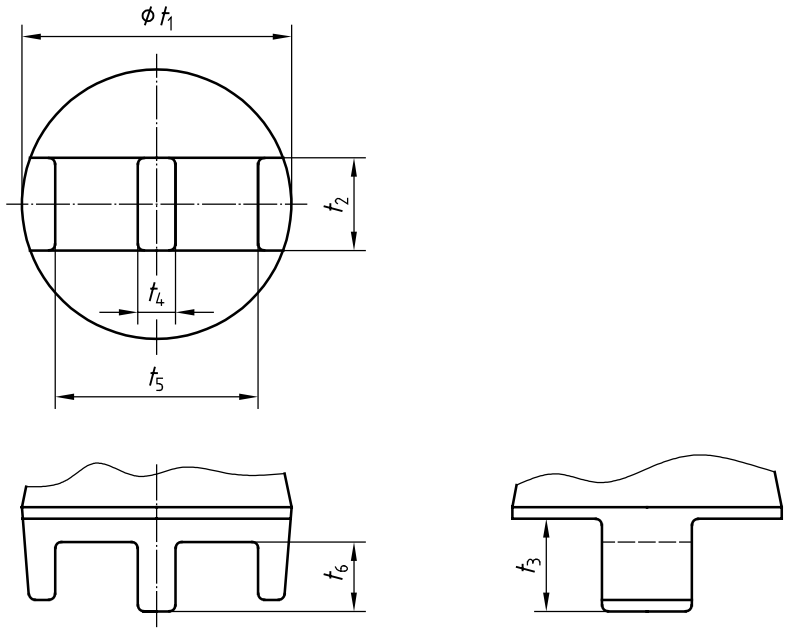


Figure D.1 — Plug wrench adaptor for G 2 and G 3/4

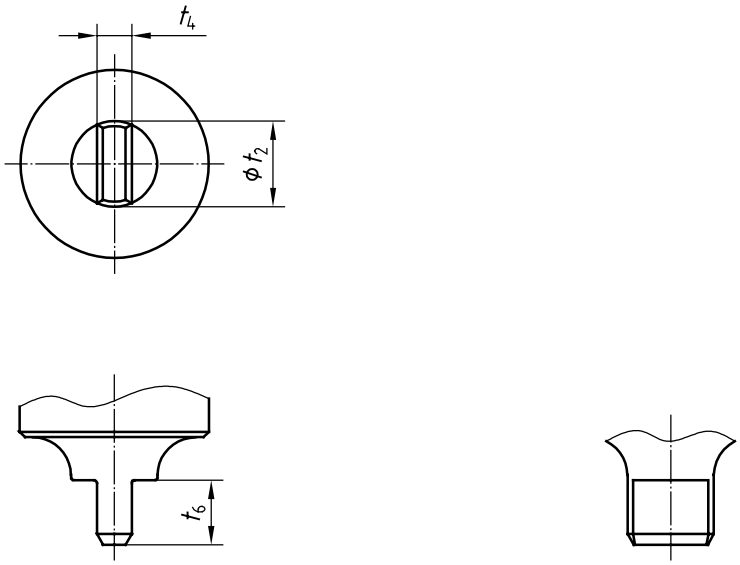


Figure D.2 — Plug wrench adaptor for G 3/4 only

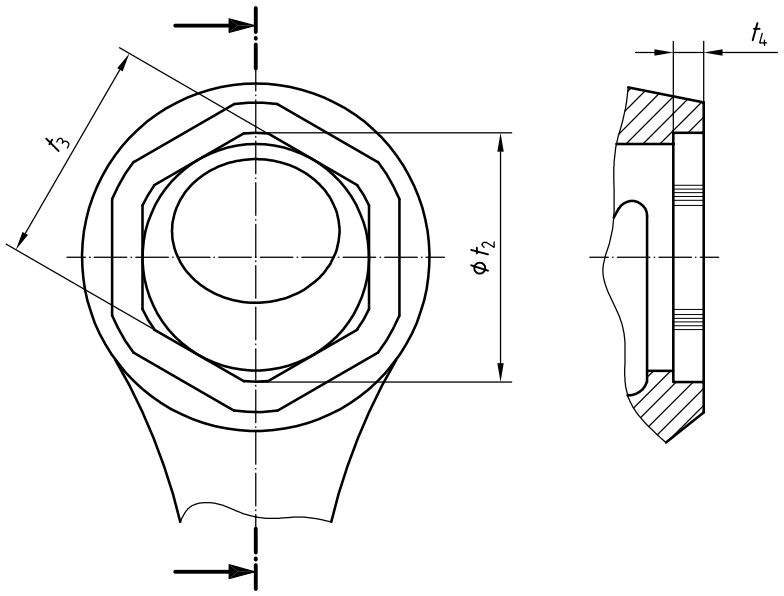
Table D.1 — Plug wrench adaptor

Dimensions in millimetres

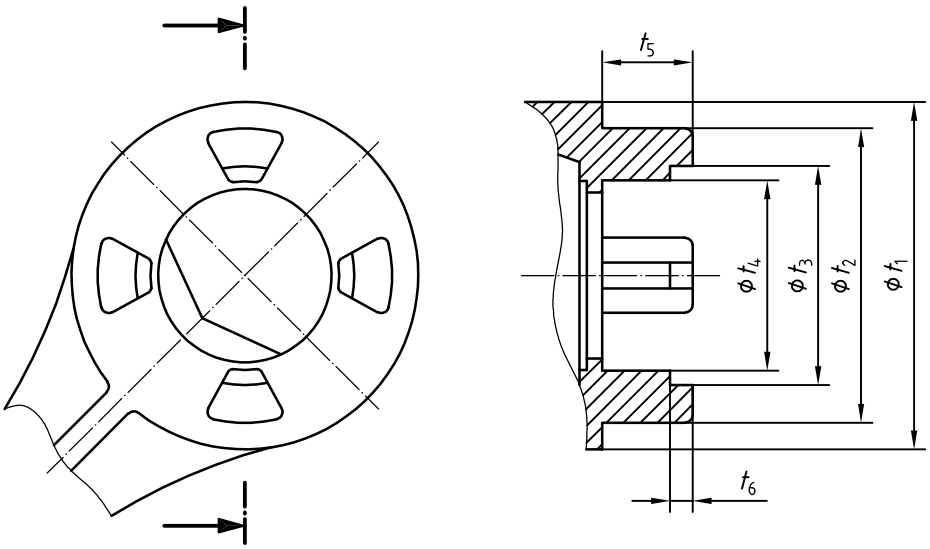
Thread	Dimensions					
	t_1 ± 0,3	t_2 ± 0,2	t_3 ± 0,3	t_4 ± 0,2	t_5 ± 0,3	t_6 ± 0,3
G 3/4	N.A.	15,8	N.A.	6,4	N.A	12,0
G 2 + G 3/4	50,7	15,8	16,0	6,4	36,0	12,0
N.A. Not applicable.						

D.2 Plug wrench adaptors for type B closures

Figure D.3 and Table D.2 give an example of the plug wrench adaptor for type B closures.



a) G 3/4 thread



b) G 2 thread

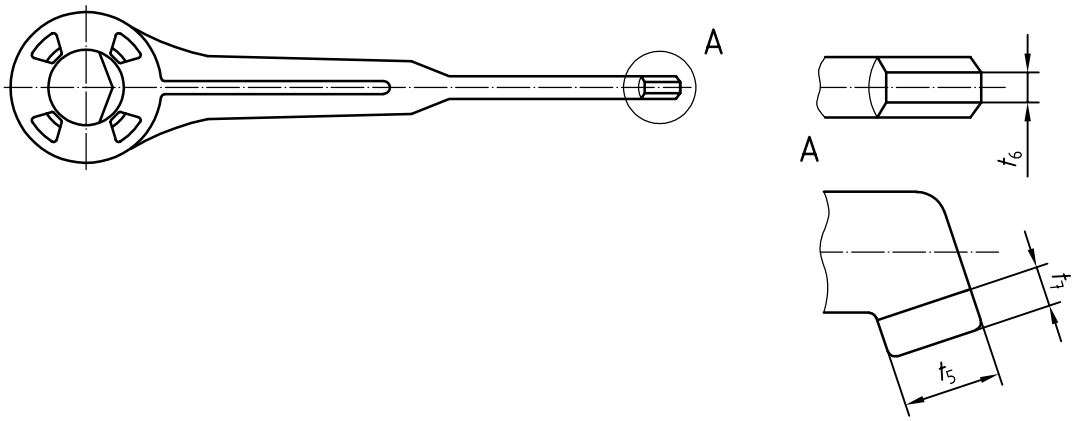


Figure D.3 — Plug wrench adaptor

Table D.2 — Plug wrench adaptor

Dimensions in millimetres

Thread	Dimensions						
	t_1 ± 2,0	t_2 ± 1,0	t_3 ± 0,8	t_4 ± 1,2	t_5 ± 1,2	t_6 ± 0,8	t_7 ± 0,8
G 3/4	N.A.	42,4	38,9	4,8	16,2	4,4	7,1
G 2	57,7	49,5	36,4	29,7	14,9	4,1	N.A.
N.A. Not applicable.							

Annex E
(informative)

Closing torques

E.1 Closing torques for type A and type C closures

Tables E.1 and E.2 give recommendations for the closing torques for types A and C closures, for drum makers and drum fillers.

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

It should be noted that the torque recommendations are valid for tightening of plugs, i.e. in a clockwise direction. Measured torques on releasing plugs, i.e. in an anticlockwise direction, are different from those given below.

Table E.1 — Closing torques of steel drums for drum makers

Plug type	Washer type	G 3/4 closure N·m	G 2 closure N·m
Steel	Elastomer	10 to 20	10 to 20
	Thermoplastics	15 to 25	15 to 25
Plastics	Elastomer	10 to 15	10 to 20
	Thermoplastics	10 to 15	10 to 20

Table E.2 — Closing torques of steel drums for drum fillers

Plug type	Washer type	G 3/4 closure N·m	G 2 closure N·m
Steel	Elastomer	10 to 20	20 to 30
	Thermoplastics	15 to 25	20 to 30
Plastics	Elastomer	10 to 15	20 to 30
	Thermoplastics	10 to 15	20 to 30

E.2 Closing torques for type B closures

E.2.1 Tables E.3 and E.4 give recommendations for the closing torques for type B closures, for drum makers and drum fillers.

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

E.2.2 It should be noted that the torque recommendations are valid for tightening of plugs, i.e. in a clockwise direction. Measuring torques on releasing plugs, i.e. in an anticlockwise direction, are different from those given below.

E.2.3 For plastics plugs, EPDM elastomer washers are recommended.

Table E.3 — Closing torques for drum makers

Plug type	Washer type	G 3/4 closure N·m	G 2 closure N·m
Steel	Elastomer	18 to 22	18 to 23
	Thermoplastics	25 to 30	24 to 30
Plastics	Elastomer	10 to 14	11 to 16
	Thermoplastics	See E.2.3	See E.2.3

Table E.4 — Closing torques for drum fillers

Plug type	Washer type	G 3/4 closure N·m	G 2 closure N·m
Steel	Elastomer	18 to 22	38 to 42
	Thermoplastics	25 to 30	50 to 54
Plastics	Elastomer	10 to 14	25 to 30
	Thermoplastics	See E.2.3	See E.2.3

Bibliography

[1] ISO 472:1999, *Plastics — Vocabulary*

[2] ISO 15750-1, *Packaging — Steel drums — Part 1: Removable head (open head) drums with a minimum total capacity of 208 l, 210 l and 216,5 l*

[3] ISO 15750-2, *Packaging — Steel drums — Part 2: Non-removable head (tight head) drums with a minimum total capacity of 212 l, 216,5 l and 230 l*

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