INTERNATIONAL STANDARD

ISO 6622-1

Third edition
2021-08

Internal combustion engines — Piston rings —

Part 1: Rectangular rings made of cast iron

Moteurs à combustion interne — Segments de piston —

Partie 1: Segments rectangulaires en fonte moulée

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

Reference number
ISO 6622-1:2021(E)

© ISO 2021

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2021 – All rights reserved

Contents

Page

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www. iso. org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www. iso. org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www. iso. org/iso/foreword. html.

This document was prepared by Technical Committee ISO/TC *22*, *Road vehicles*, Subcommittee SC 34, *Propulsion, powertrain and powertrain fluids*.

This third edition cancels and replaces the second edition (ISO 6622-1:2003), which has been technically revised.

The main changes compared to the previous edition are as follows:

— figures were updated for a better understanding;

— added M6 taper in Table 3;

— added h_{19} dimension in Table 5;

— editorial adaptations according to ISO directives.

A list of all parts in the ISO 6622 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

 © ISO 2021 – All rights reserved

Introduction

The ISO 6622 series is one of a number of series of International Standards dealing with piston rings for reciprocating internal combustion engines. Others are ISO 6621,[2],[3],[4] ISO 6623,[5] ISO 6624 [6],[7], [8] [9], ISO 6625,[10] ISO 6626 [11],[12] and ISO 6627 [13].

The common features and dimensional tables presented in this document constitute a broad range of variables and, in selecting a particular ring type, it is important for the designer to bear in mind the conditions under which it will be required to operate.

It is also important that the designer refers to the specifications and requirements of ISO 6621-3 [3] and ISO 6621-4 before completing selection.

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

Internal combustion engines — Piston rings —

Part 1: Rectangular rings made of cast iron

1 Scope

This document specifies the essential dimensional features of rectangular rings made of cast iron, Types R, B, BA and M, having diameters up to and including 200 mm, used in reciprocating internal combustion piston engines. It is also applicable to piston rings of compressors working under similar conditions.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6621-1, *Internal combustion engines — Piston rings — Part 1: Vocabulary*

ISO 6621-4, *Internal combustion engines — Piston rings — Part 4: General specifications*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6621-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Overview

The rectangular ring types are specified in Tables 1 to 3 and Figures 1 to 4. Their common features and the dimensions of those features are specified in Tables 4 to 10 and Figures 5 to 13. Tables 11 and 12 give the force factors for the different ring types, while Tables 13 and 14 give the dimensions and forces of rectangular rings of radial wall thickness regular and thicker "D/22", respectively.

5 Ring types and designation examples

5.1 Overview

The rectangular ring types are specified in Tables 1 to 3 and Figures 1 to 4.

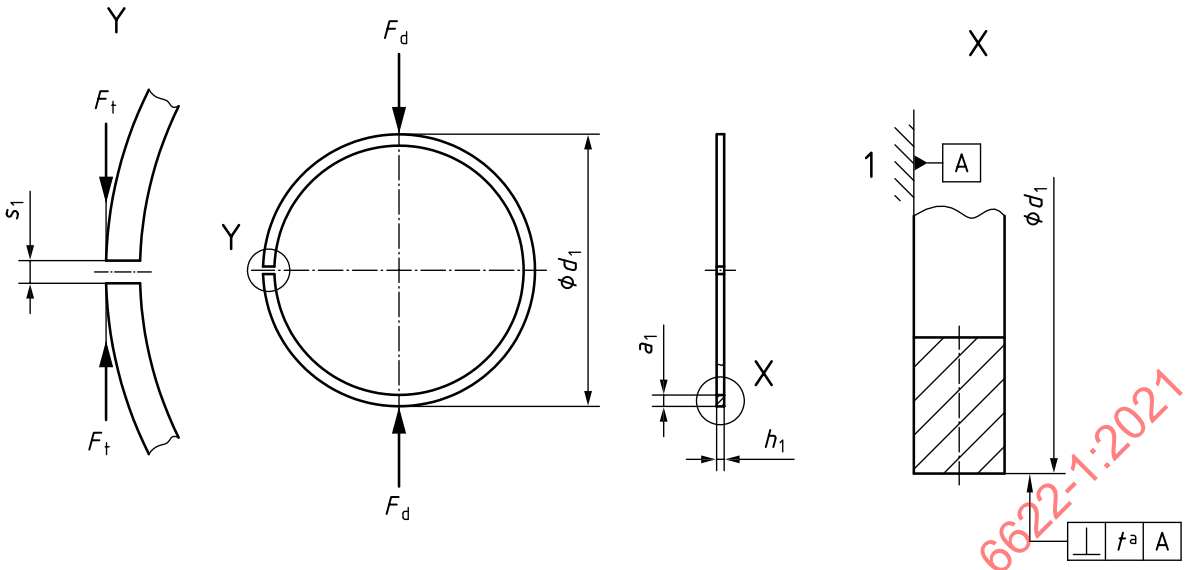
5.2 Type R — Straight faced rectangular ring

5.2.1 General features

See Table 13 or 14 for dimensions and forces.

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved



Key

1 reference plane

[a] $t = 0{,}005 \times h_1$.

Figure 1 — Type R

5.2.2 Designation

EXAMPLE Designation of a piston ring complying with the requirements of ISO 6622-1, being a rectangular ring made of cast iron, with a straight faced peripheral surface (R), of nominal diameter d_1 = 90 mm (90), of nominal ring width h_1 = 2,5 mm (2,5), made of non-heat treated grey cast iron, subclass 12 (MC12), phosphated on all sides (PO):

Piston ring ISO 6622-1 R 90 × 2,5 - MC12/PO

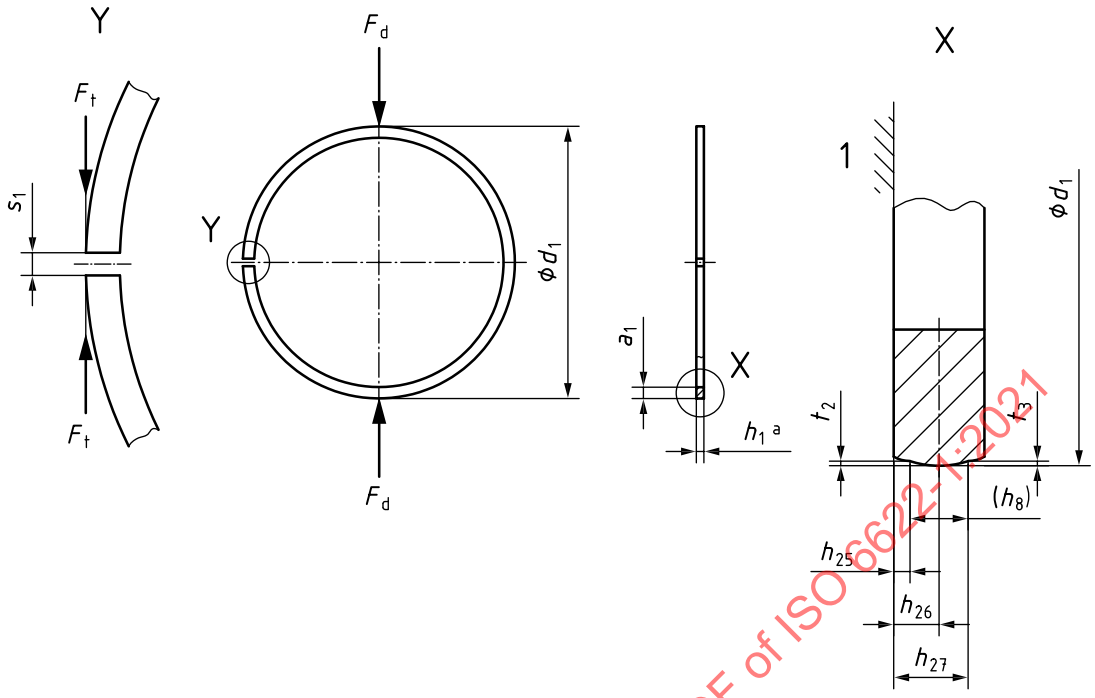
5.3 Type B — Barrel faced rectangular ring

5.3.1 General features

See Table 13 or 14 for dimensions and forces.

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved



Key

1 reference plane

a See Table 1.

Figure 2 — Type B

Table 1 — Gauge width (h_8) and barrel dimensions for symmetrical barrel faced compression rings

Dimensions in millimetres

h_1	h_{25}[a]	h_{26}	h_{26} tolerance	h_{27}	t_2, t_3[b]	h_8[c]
1,2	0,30	0,60	±0,20	0,90	0,002...0,012	0,60
1,5	0,35	0,75	±0,25	1,15	0,003...0,015	0,80
1,75	0,35	0,85	±0,30	1,35		1,00
2,0	0,40	1,00	±0,30	1,60		1,20
2,5	0,45	1,25	±0,40	2,05		1,60
3,0	0,50	1,50	±0,50	2,50	0,005...0,020	2,00
3,5	0,55	1,75	±0,50	2,95		2,40
4,0	0,60	2,00	±0,60	3,40	0,005...0,023	2,80
4,5	0,65	2,25	±0,60	3,85		3,20

a h_{25} may be lowered for rings with reduced edge dimensions.

b t_2 and/or t_3 can be changed as agreed between edge dimensions.

c Gauge width (h_8) only informative; may be used only if agreed between manufacturer and client.

5.3.2 Designation

EXAMPLE Designation of a piston ring complying with the requirements of ISO 6622-1, being a rectangular ring made of cast iron, with a barrel faced peripheral surface (B), of nominal diameter d_1 = 90 mm (90), of nominal width h_1 = 2,5 mm (2,5), made of heat-treated martensitic spheroidal graphite cast iron, subclass 51 (MC51), with a chromium plated coating on the peripheral surface, and of minimum thickness 0,15 mm (CR3):

Piston ring ISO 6622-1 - B 90 × 2,5 - MC51/CR3

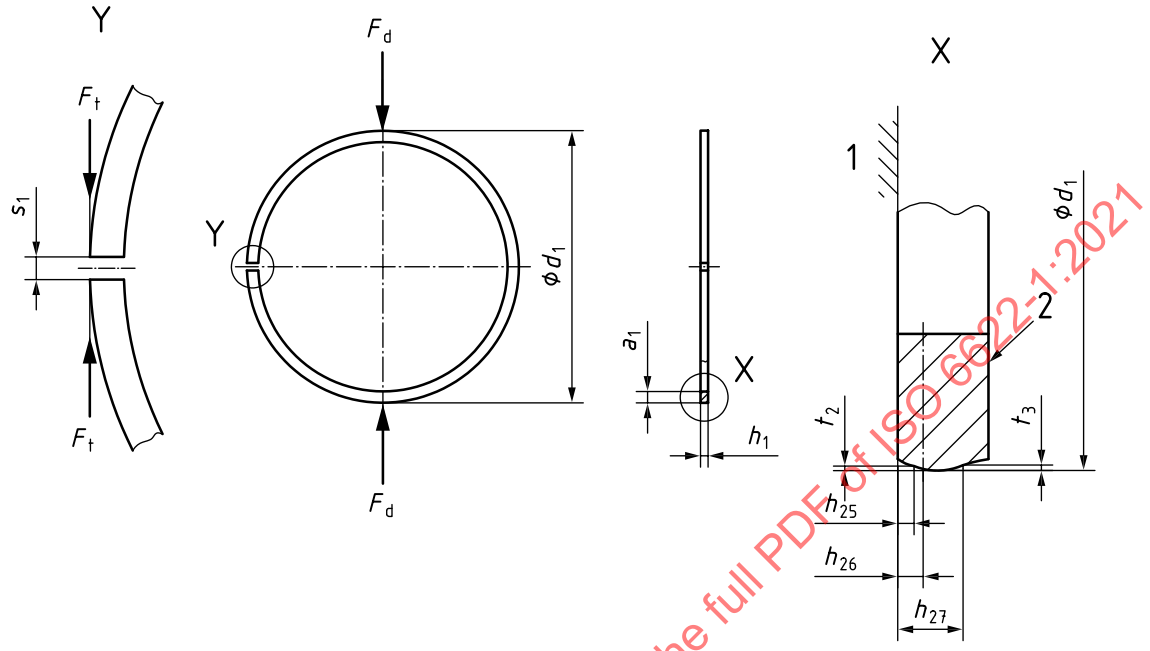
STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

5.4 Type BA — Asymmetrical barrel faced rectangular ring $h_1 \geq 1{,}2$ mm

5.4.1 General features

See Table 13 or 14 for dimensions and forces.



Key

1 reference plane

2 top side identification mark

Figure 3 — Type BA

Table 2 — Asymmetrical barrel dimensions

Dimensions in millimetres

h_1	h_{25}[a]	h_{26}	h_{26} tolerance	h_{27}	t_2[b]	t_3[b]
1,2	0,20 [c] 0,28	0,35 0,43	±0,15	0,80 0,90	0...0,005	0,005...0,016
1,5	0,35	0,50	±0,15	1,15		0,007...0,022
1,75	0,35	0,55	±0,20	1,35	0...0,007	0,008...0,025
2,0	0,40	0,60		1,50		0,009...0,030
2,5	0,45	0,70	±0,25	1,80	0...0,008	0,011...0,035
3,0	0,55	0,80		2,10		0,012...0,038
3,5	0,60	0,90	±0,30	2,40	0...0,009	0,012...0,040
4,0	0,65	0,95		2,80		0,013... 0,045
4,5	0,70	1,05	±0,35	3,20	0...0,010	0,015... 0,050

[a] h_{25} may be lowered for rings with reduced edge dimensions.

[b] t_2 and/or t_3 may be varied as agreed between manufacturer and client.

[c] Recommended for bottom edge smaller than 0,2 mm.

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

5.4.2 Designation

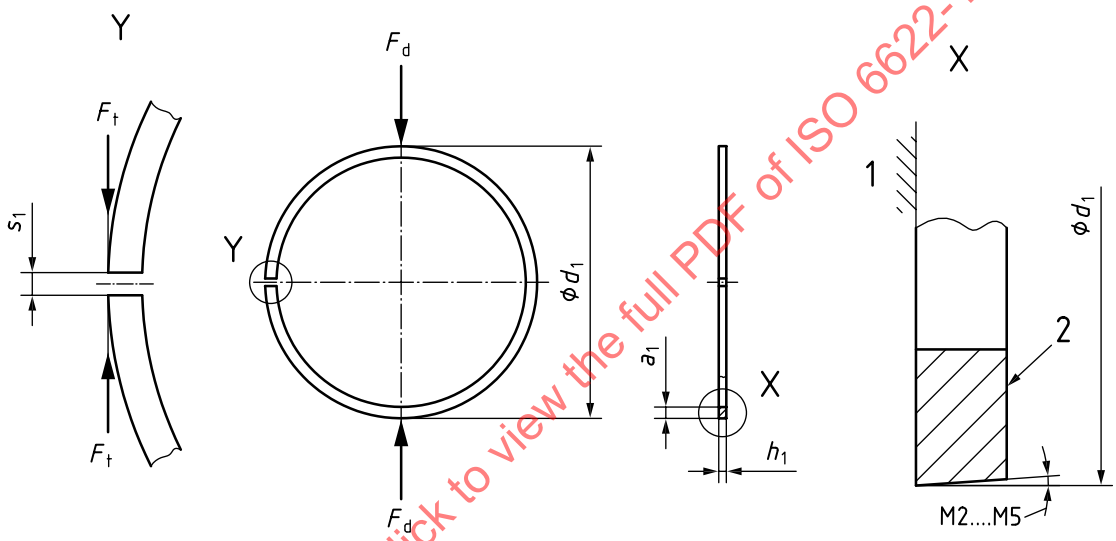
EXAMPLE Designation of a piston ring complying with the requirements of ISO 6622-1, being a rectangular ring made of cast iron, with an asymmetrical barrel faced peripheral surface (BA), of nominal diameter d_1 = 90 mm (90), of nominal width h_1 = 2,5 mm (2,5), made of heat-treated martensitic spheroidal graphite cast iron subclass 51 (MC51), and having a chromium plated coating on the peripheral surface with a minimum thickness of 0,15 mm (CR3):

Piston ring ISO 6622-1 BA 90 × 2,5 - MC51/CR3

5.5 Type M — Taper faced rectangular ring

5.5.1 General features

See Table 13 or 14 for dimensions and forces.



Key

1 reference plane

2 top side identification mark

Figure 4 — Type M

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

Table 3 — Taper

Dimensions in minutes

Code	Uncoated rings with peripheral surface turned and chromium plated or spray coated rings with peripheral surface ground and chromium plated rings with surface not ground [a]					
	Taper	Tolerance	with IF or IW (top side)[b]		with IFU or IWU (bottom side) [b, c]	
			Taper	Tolerance	Taper	Tolerance [d]
M1[c]	10	$^{+40}_{0}$	10	$^{+60}_{0}$	—	—
M2	30	$^{+50}_{0}$	30		—	—
M3	60		60		60	$^{+60}_{0}$
M4	90		90		90	
M5	120		120		120	
M6	180		180		180	

[a] For chromium plated rings with tapered peripheral surface not ground, the tolerance shall be increased by 10 (e.g. M3 = 60: $^{+60}_{0}$ for M rings or $^{+70}_{0}$ for M rings (negative twist type) with IF or IW and IFU or IWU).

[b] IF and IW, and IFU and IWU, are explained in Figures 7 and 8.

[c] M1 should not be used for rings of width <1,5 mm or for those with a partly cylindrical peripheral surface.

[d] For M rings (negative twist type) M3, M4 and M5, the twist angle should not exceed 90 % of the minimum taper angle.

5.5.2 Designation

EXAMPLE Designation of a piston ring complying with the requirements of ISO 6622-1, being a rectangular ring made of cast iron, with a 10' taper faced peripheral surface (M1), of diameter d_1 = 90 mm (90), of nominal width h_1 = 2,5 mm (2,5), made of heat treated grey cast iron, subclass 23 (MC23) and having an inlaid spray coating on the peripheral surface with a minimum thickness of 0,1 mm (SC2F):

Piston ring ISO 6622-1 M1 90 × 2,5 - MC23/SC2F

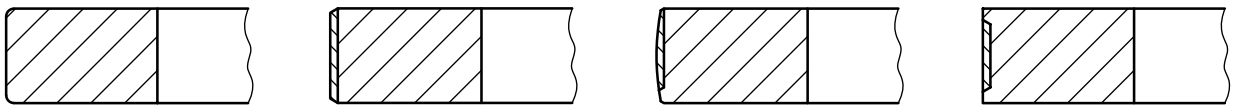
6 Common features

6.1 Face coating types

Figure 5 shows the types of piston ring face coatings.

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

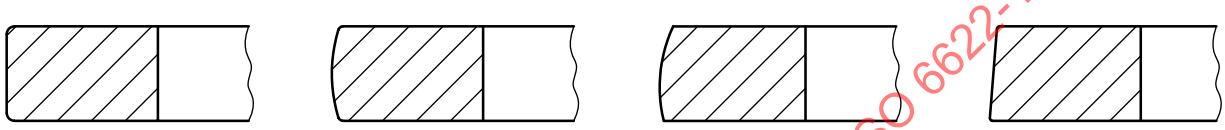


a) uncoated **b) fully faced** **c) semi inlaid** **d) inlaid**

Figure 5 — Piston ring face types

6.2 Face shape types

Figure 6 shows the types of piston ring face shapes.



a) Type R
straight faced

b) Type B
barrel faced

c) Type BA
asymmetrical barrel faced

d) Type M
taper faced

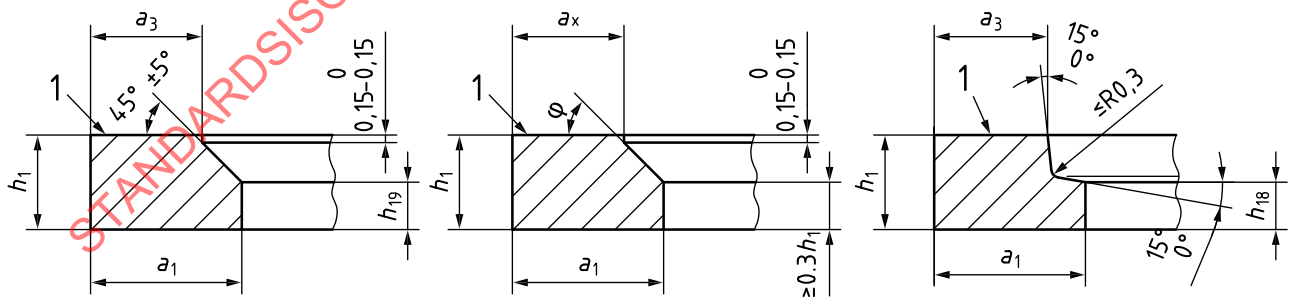
Figure 6 — Types piston ring face shapes

6.3 Piston ring twist features

When the standard twist of 0,01/0,05 mm for rings ≤2 mm axial width and 0,01/0,04 mm for rings >2 mm axial width per 2 mm of radial ring thickness is specified, the dimension a_x, the angle φ and the width of the bevel are at the discretion of the manufacturer. In such cases, the design should correspond to one or the other of the designs shown in Figures 7 and 8.

Figure 7 shows the types of piston ring positive twist features.

Dimensions in millimetres



a) Type IF
internal bevel top side

b) Type IFV
variable internal bevel on the top side

c) Type IW
internal step top side

Key

1 top side identification mark

Reference Tables 4 and 5 for dimensions.

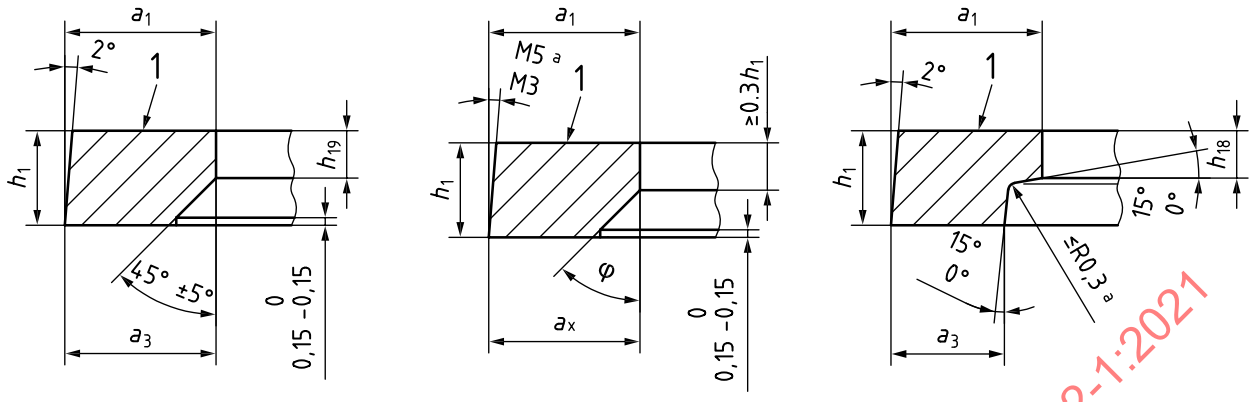
Figure 7 — Types piston ring positive twist features

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

Figure 8 shows the types of piston ring negative twist features.

Dimensions in millimetres



a) Type IFU
internal bevel bottom side

b) Type IFVU
variable internal bevel on the bottom side

c) Type IWU
internal step bottom side

Key

1 top side identification mark

Reference Tables 4 and 5 for dimensions.

[a] See Table 3.

Figure 8 — Types piston ring negative twist features

Table 4 — a_3, h_{18} and h_{19} dimensions for rings h_1 < 1,5 mm

Dimensions in millimetres

d_1	a_3[a]	Tolerance	h_{18}, h_{19}	Tolerance
$30 \le d_1 < 60$	$0{,}85 \times a_1$	$^{0}_{-0,2}$	$0{,}6 \times h_1$	$^{0}_{-0,25}$
$60 \le d_1 \le 90$	$0{,}9 \times a_1$	$^{0}_{-0,3}$	$0{,}6 \times h_1$	$^{0}_{-0,25}$

[a] Dimension may not apply for IF and IFU rings because h_{19} is specified for this feature.

Table 5 — a_3, h_{18} and h_{19} dimensions for rings $h_1 \ge 1{,}5$ mm

Dimensions in millimetres

d_1	a_3[a]	Tolerance	h_{18}, h_{19}	Tolerance
$30 \le d_1 < 80$	$0{,}8 \times a_1$	$^{0}_{-0,2}$	$0{,}6 \times h_1$	$^{0}_{-0,25}$
$80 \le d_1 < 100$	$0{,}8 \times a_1$	$^{0}_{-0,3}$	$0{,}6 \times h_1$	$^{0}_{-0,25}$
$100 \le d_1 < 150$	$0{,}8 \times a_1$	$^{0}_{-0,3}$	$0{,}6 \times h_1$	$^{0}_{-0,35}$
$150 \le d_1 \le 200$	$0{,}8 \times a_1$	$^{0}_{-0,4}$	$0{,}6 \times h_1$	$^{0}_{-0,45}$

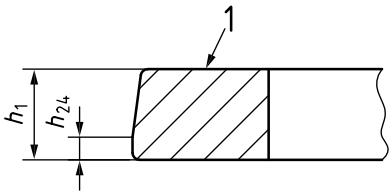
[a] Dimension may not apply for IF and IFU rings because h_{19} is specified for this feature.

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

6.3.1 Taper faced rectangular ring with partly cylindrical machined (LM) or lapped (LP) peripheral surface

Figure 9 shows a partly cylindrical machined or lapped Type M ring and the axial dimensions of the cylindrical part of the peripheral surface h_{24} are shown in Table 6.



Key

1 top side identification mark

Figure 9 — Partly cylindrical machined or lapped Type M rings

Table 6 — Axial dimensions of the cylindrical part of peripheral surface h_{24}

Dimensions in millimetres

h_1	h_{24}[a] max.	h_{24} max. each side of gap up to 30°
1,2	0,4	0,8
1,5	0,5	1,0
1,75	0,6	1,2
2,0	0,7	1,4
2,5	0,8	1,6
3,0	1,0	2,0
3,5	1,2	2,3
4,0	1,3	2,6
4,5	1,5	3,0

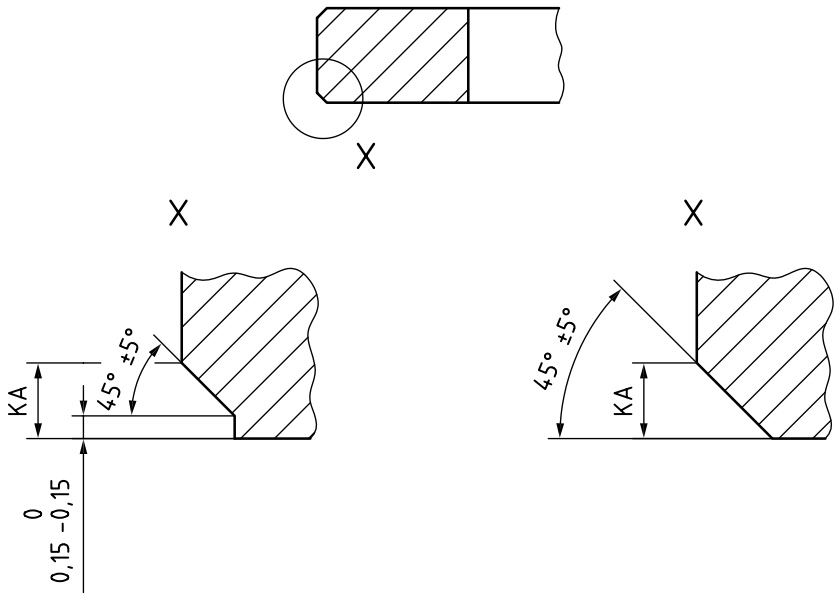
[a] Partly cylindrical peripheral surface shall be visible.

6.4 Chamfered edges

Outside chamfered edges (KA) are shown in Figure 10. Inside chamfered edges (KI) are shown in Figure 11. KA and KI dimensions are shown in Table 7.

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

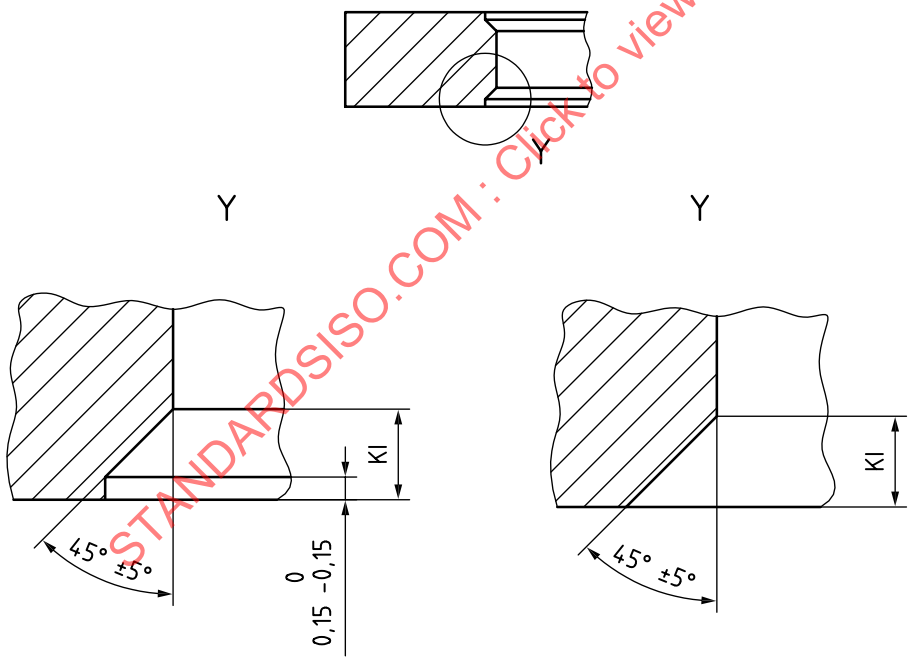


a) Chamfer with step for nominal KA ≥ 0,3

b) Chamfer KA

NOTE KA applies to uncoated rings only.

Figure 10 — Outside chamfered edges, KA



a) Chamfer with step for nominal KI ≥ 0,3

b) Chamfer KI

Figure 11 — Inside chamfered edges, KI

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

Table 7 — KA and KI dimensions

Dimensions in millimetres

d_1	KA	KI
$30 \leq d_1 < 50$	≤0,2	≤0,2
$50 \leq d_1 < 125$	0,3 ± 0,1	0,3 ± 0,15
$125 \leq d_1 < 175$	0,4 ± 0,1	0,4 ± 0,15
$175 \leq d_1 \leq 200$	0,5 ± 0,1	0,6 ± 0,20

6.5 Type R, B, BA and M rings (fully faced, semi-inlaid and inlaid) — Plating/coating thickness

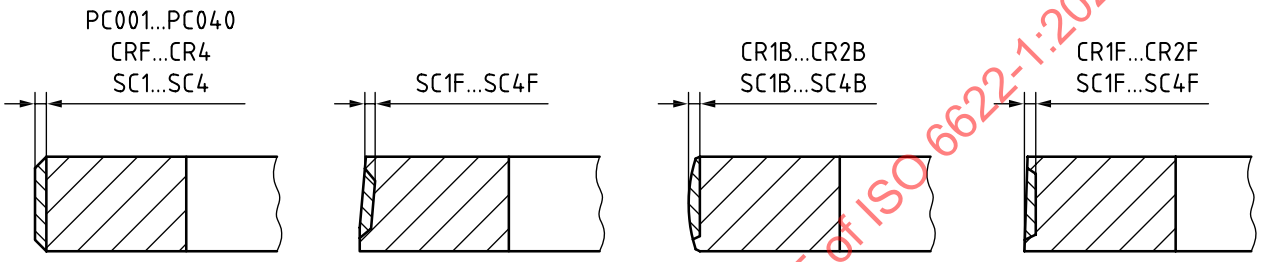


Figure 12 — Plating/coating thickness

Table 8 — Plating/spray coating thickness

Dimensions in millimetres

Chromium plating code	Spray coating code	Thickness min.
CRF	—	0,005
CR1	**SC1**	0,050
CR2	**SC2**	0,100
CR3[a]	**SC3**[a]	0,150
CR4[a]	**SC4**[a]	0,200

[a] Not recommended for rings $h_1 \leq 1,2$.

Table 9 — PVD coating thickness

Dimensions in millimetres

Code	Peripheral surface min.
PC001	0,001
PC003	0,003
PC006	0,006
PC010	0,010
PC020	0,020
PC030	0,030
PC040[a]	0,040

[a] Not applicable to diamond-like carbon (DLC) coatings.

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

6.6 Type R, B, BA, and M rings — Nitrided case depth

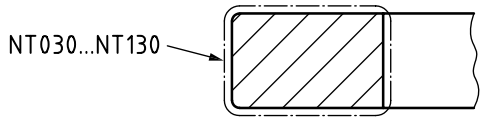


Figure 13 — Nitrided case depth

Table 10 — Nitrided case depth

Dimensions in millimetres

Code	Nitrided case depth min.	
	Peripheral surface	Side faces
NT030	0,03	0,010
NT050	0,05	0,015
NT070	0,07	0,020
NT090	0,09	0,020
NT110	0,11	0,030
NT130	0,13	0,030

7 Force factors

The tangential and diametral forces given in Tables 13 and 14 shall be corrected when additional features and/or materials other than grey cast iron with a modulus of elasticity of 100 GN/m^2 are being used. For common features, the multiplier correction factors given in Tables 11 and 12 and the force correction factors given in ISO 6621-4 shall be used. The factors of Table 12 have been calculated with mean plating/coating thickness.

Table 11 — Force correction factors for R, B, BA and M rings with features KA, KI, IF, IW, IFU and IWU

d_1 (mm)	Factor					
	KA	KI	Taper		IF IFU	IW IWU
			M2 or M3	M4 or M5		
$30 \leq d_1 < 50$	1	1	0,97	0,93	0,88	0,75
$50 \leq d_1 < 200$	0,97	0,97	0,98	0,96	0,88	0,78
NOTE The force correction factors for IFV and IFVU are calculated based on the design.						

Table 12 — Force correction factors for chromium plated or spray coated R, B, BA and M rings (fully faced, semi-inlaid and inlaid types)

d_1 (mm)	Factor					
	CRF/PC001... PC030	CR1/PC040	CR2/SC1	CR3/SC2	CR4/SC3	SC4
$30 \leq d_1 < 50$	1	0,81	0,70	0,64	—	—
$50 \leq d_1 < 75$	1	0,90	0,85	0,81	0,75	0,71
$75 \leq d_1 < 100$	1	0,92	0,88	0,85	0,81	0,77
$100 \leq d_1 < 125$	1	0,94	0,91	0,88	0,86	0,83
$125 \leq d_1 < 150$	1	0,95	0,92	0,90	0,88	0,85

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

Table 12 *(continued)*

d_1 (mm)	Factor					
	CRF/PC001… PC030	**CR1/PC040**	**CR2/SC1**	**CR3/SC2**	**CR4/SC3**	**SC4**
$150 \leq d_1 \leq 200$	1	0,96	0,93	0,91	0,89	0,87

8 Dimensions

See Tables 13 and 14.

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

Table 13 — Dimensions of R, B, BA and M rectangular rings — Radial wall thickness “regular”

Dimensions in millimetres

Nominal diameter d_1	Radial wall thickness “regular” a_1		Ring width h_1						Closed gap s_1		Tangential force F_t (N)						Diametral force F_d (N)					
		Tolerance	Column					Tolerance		Tolerance	For h_1 shown in column					Tolerance	For h_1 shown in column					Tolerance
			1	2	3	4	5				1	2	3	4	5		1	2	3	4	5	
30	1,25	±0,15 Within a ring: 0,15 max.	1,2	1,5	1,75	2	2,5	–0,010 –0,025 For phosphated PO surface: –0,005 –0,025	0,15	+0,2 0	—	—	—	—	—	±30 % if F_t < 10 N ±20 % if F_t ≥ 10 N	6,0	7,5	8,6	9,9	12,5	±30 % if F_d < 21,5 N ±20 % if F_d ≥ 21,5 N
31	1,30																6,2	8,0	9,2	10,5	13,1	
32	1,35																6,7	8,2	9,7	11,0	13,8	
33	1,40																6,9	8,6	10,1	11,6	14,6	
34	1,40																6,5	8,2	9,5	11,0	13,8	
35	1,45																6,9	8,6	10,1	11,4	14,4	
36	1,50																7,1	9,0	10,5	12,0	15,1	
37	1,55																7,5	9,5	11,0	12,7	15,7	
38	1,60																7,7	9,9	11,4	13,1	16,6	
39	1,65																8,2	10,3	12,0	13,8	17,2	
40	1,65																7,7	9,7	11,4	13,1	16,3	
41	1,70																8,2	10,1	11,8	13,5	17,0	
42	1,75																8,4	10,5	12,3	14,2	17,6	
43	1,80																8,8	11,0	12,9	14,6	18,3	
44	1,85																9,0	11,4	13,3	15,3	19,1	
45	1,90																9,2	11,8	13,8	15,7	19,6	
46	1,90																9,0	11,2	13,1	15,1	18,7	
47	1,95																9,2	11,6	13,5	15,5	19,4	
48	2,00																9,7	12,0	14,0	16,1	20,2	
49	2,05																9,9	12,5	14,6	16,6	20,9	
50	2,10										4,8	6,0	7,0	8,0	10,0		10,3	12,9	15,1	17,2	21,5	
51	2,15										4,9	6,2	7,2	8,3	10,3		10,5	13,3	15,5	17,8	22,1	
52	2,15										4,7	5,9	6,9	7,9	9,9		10,1	12,7	14,8	17,0	21,3	
53	2,20										4,9	6,1	7,2	8,2	10,3		10,5	13,1	15,5	17,6	22,1	
54	2,25										5,0	6,3	7,4	8,5	10,6		10,8	13,5	15,9	18,3	22,8	

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

Table 13 *(continued)*

Nominal diameter d_1	Radial wall thickness "regular" a_1		Ring width h_1						Closed gap s_1		Tangential force F_t (N)						Diametral force F_d (N)					
		Tolerance	Column					Tolerance		Tolerance	For h_1 shown in column					Tolerance	For h_1 shown in column					Tolerance
			1	2	3	4	5				1	2	3	4	5		1	2	3	4	5	
55	2,30	±0,15 Within a ring: 0,15 max.	1,2	1,5	1,75	2	2,5	–0,010 –0,025 For phosphated PO surface: –0,005 –0,025	0,15	+0,2 0	5,2	6,5	7,6	8,7	10,9	±30 % if F_t < 10 N ±20 % if F_t ≥ 10 N	11,2	14,0	16,3	18,7	23,4	±30 % if F_d < 21,5 N ±20 % if F_d ≥ 21,5 N
56	2,35										5,4	6,7	7,8	9,0	11,2		11,6	14,4	16,8	19,4	24,1	
57	2,40										5,5	6,9	8,1	9,2	11,6		11,8	14,8	17,4	19,8	24,9	
58	2,40										5,3	6,7	7,8	8,9	11,2		11,4	14,4	16,8	19,1	24,1	
59	2,45										5,5	6,9	8,0	9,2	11,5		11,8	14,8	17,2	19,8	24,7	
60	2,50							–0,010 –0,030 For phosphated PO surface: –0,005 –0,030	0,2		5,6	7,0	8,2	9,4	11,7		12,0	15,1	17,6	20,2	25,2	
61	2,55										5,7	7,2	8,4	9,6	12,1		12,3	15,5	18,1	20,6	26,0	
62	2,60										5,9	7,4	8,6	9,9	12,4		12,7	15,9	18,5	21,3	26,7	
63	2,65										6,1	7,6	8,9	10,1	12,7		13,1	16,3	19,1	21,7	27,3	
64	2,65										5,9	7,3	8,6	9,8	12,3		12,7	15,7	18,5	21,1	26,4	
65	2,70										6,0	7,5	8,8	10,1	12,6		12,9	16,1	18,9	21,7	27,1	
66	2,75										6,2	7,7	9,0	10,3	12,9		13,3	16,6	19,4	22,1	27,7	
67	2,80										6,3	7,9	9,3	10,6	13,3		13,3	17,0	20,0	22,8	28,6	
68	2,85										6,5	8,1	9,5	10,9	13,6		14,0	17,4	20,4	23,4	29,2	
69	2,90										6,6	8,3	9,7	11,1	13,9		14,2	17,8	20,9	23,9	29,9	
70	2,90										6,4	8,1	9,4	10,8	13,5		13,8	17,4	20,2	23,2	29,0	
71	2,95										6,6	8,3	9,7	11,1	13,8		14,2	17,8	20,9	23,9	29,7	
72	3,00										6,7	8,5	9,9	11,3	14,2		14,4	18,3	21,3	24,3	30,5	
73	3,05										6,9	8,6	10,1	11,6	14,5		14,8	18,5	21,7	24,9	31,2	
74	3,10										7,1	8,8	10,3	11,8	14,8		15,3	18,9	22,1	25,4	31,8	
75	3,15								0,25	+0,25 0	7,2	9,0	10,5	12,0	15,1		15,5	19,4	22,6	25,8	32,5	
76	3,15										7,0	8,8	10,2	11,7	14,7		15,1	18,9	21,9	25,2	31,6	
77	3,20										7,1	8,9	10,5	12,0	15,0		15,3	19,1	22,6	25,8	32,3	
78	3,25										7,3	9,1	10,7	12,2	15,3		15,7	19,6	23,0	26,2	32,9	
79	3,30										7,4	9,3	10,9	12,5	15,6		15,9	20,0	23,4	26,9	33,5	

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

Table 13 *(continued)*

Nominal diameter d_1	Radial wall thickness "regular" a_1		Ring width h_1						Closed gap s_1		Tangential force F_t (N)						Diametral force F_d (N)					
		Tolerance	Column					Tolerance		Tolerance	For h_1 shown in column					Tolerance	For h_1 shown in column					Tolerance
			1	2	3	4	5				1	2	3	4	5		1	2	3	4	5	
80	3,35										7,6	9,5	11,1	12,7	16,0		16,3	20,4	23,9	27,3	34,4	
81	3,40										7,8	9,7	11,4	13,0	16,3		16,8	20,9	24,5	28,0	35,0	
82	3,40										7,6	9,5	11,1	12,7	15,9		16,3	20,4	23,9	27,3	34,2	
83	3,45										7,7	9,7	11,3	12,9	16,2		16,6	20,9	24,3	27,7	34,8	
84	3,50										7,9	9,9	11,5	13,2	16,5		17,0	21,3	24,7	28,4	35,5	
85	3,55		1,2	1,5	1,75	2	2,5		0,25		8,0	10,1	11,8	13,5	16,8		17,2	21,7	25,4	29,0	36,1	
86	3,60										8,2	10,3	12,0	13,7	17,2		17,6	22,1	25,8	29,5	37,0	
87	3,65										8,3	10,4	12,2	14,0	17,5		17,8	22,4	26,2	30,1	37,6	
88	3,65	±0,15						–0,010 –0,030 For phosphated PO surface: –0,005 –0,030			8,1	10,2	11,9	13,6	17,1		17,4	21,9	25,6	29,2	36,8	
89	3,70	Within a ring:									8,3	10,4	12,2	13,9	17,4		17,8	22,4	26,2	29,9	37,4	
90	3,75											12,3	14,1	17,6	21,2			26,4	30,3	37,8	45,6	
91	3,80	0,15 max.										12,5	14,3	18,0	21,6	±30 % if F_t < 10 N		26,9	30,7	38,7	46,4	±30 % if F_d < 21,5 N
92	3,85									+0,25 0		12,8	14,6	18,3	22,0			27,5	31,4	39,3	47,3	
93	3,90											13,0	14,9	18,6	22,4	±20 % if $F_t \geq 10$ N		28,0	32,0	40,0	48,2	±20 % if $F_d \geq 21,5$ N
94	3,90											12,7	14,5	18,2	21,9			27,3	31,2	39,1	47,1	
95	3,95			1,75	2	2,5	3					12,9	14,8	18,5	22,3			27,7	31,8	39,8	47,9	
96	4,00											13,2	15,1	18,8	22,6			28,4	32,5	40,4	48,6	
97	4,05		—						0,3		—	13,4	15,3	19,2	23,0		—	28,8	32,9	41,3	49,5	
98	4,10											13,6	15,6	19,5	23,4			29,2	33,5	41,9	50,3	
99	4,15											13,8	15,8	19,8	23,8			29,7	34,0	42,6	51,2	
100	4,15	±0,20						–0,010 –0,030 For phosphated PO surface: 0 –0,030					15,5	19,4	23,3				33,3	41,7	50,1	
101	4,20	Within a ring:											15,7	19,7	23,7				33,8	42,4	51,0	
102	4,25			—	2	2,5	3					—	16,0	20,0	24,0			—	34,4	43,0	51,6	
103	4,25	0,20 max.											16,2	20,3	24,4				34,8	43,6	52,5	
104	4,30												15,9	19,9	23,9				34,2	42,8	51,4	

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

Table 13 *(continued)*

Nominal diameter d_1	Radial wall thickness "regular" a_1		Ring width h_1						Closed gap s_1		Tangential force F_t (N)						Diametral force F_d (N)					
		Tolerance	Column					Tolerance		Tolerance	For h_1 shown in column					Tolerance	For h_1 shown in column					Tolerance
			1	2	3	4	5				1	2	3	4	5		1	2	3	4	5	
105	4,35	±0,20 Within a ring: 0,20 max.	—	—	2	2,5	3	–0,010 –0,030 For phosphated PO surface: 0 –0,030	0,3	+0,25 0	—	—	16,1	20,1	24,2	±30 % if F_t < 10 N ±20 % if F_t ≥ 10 N	—	—	34,6	43,2	52,0	±30 % if F_d < 21,5 N ±20 % if F_d ≥ 21,5 N
106	4,40												16,3	20,4	24,6				35,0	43,9	52,9	
107	4,40												16,0	20,0	24,1				34,4	43,0	51,8	
108	4,45												16,2	20,3	24,4				34,8	43,6	52,5	
109	4,50												16,4	20,6	24,8				35,3	44,3	53,3	
110	4,55				2,5	3	3,5		0,35				20,8	25,0	29,2				44,7	53,8	62,8	
111	4,55												20,4	24,5	28,6				43,9	52,7	61,5	
112	4,60												20,7	24,9	29,0				44,5	53,5	62,4	
113	4,65												21,0	25,2	29,4				45,2	54,2	63,2	
114	4,70												21,3	25,6	29,8				45,8	55,0	64,1	
115	4,70												20,9	25,1	29,3				44,9	54,0	63,0	
116	4,75												21,1	25,4	29,7				45,4	54,6	63,9	
117	4,80												21,4	25,8	30,1				46,0	55,5	64,7	
118	4,85												21,0	25,3	29,5				45,2	54,4	63,4	
119	4,85												21,3	25,6	29,9				45,8	55,0	64,3	
120	4,90												21,6	25,9	30,3				46,4	55,7	65,1	
121	4,95												21,9	26,3	30,7				47,1	56,5	66,0	
122	4,95												21,5	25,8	30,1				46,2	55,5	64,7	
123	5,00												21,8	26,1	30,5				46,9	56,1	65,6	
124	5,05												22,0	26,5	30,9				47,3	57,0	66,4	
125	5,05												21,6	26,0	30,4				46,4	55,9	65,4	
126	5,10												21,9	26,3	30,7				47,1	56,5	66,0	
127	5,15												22,2	26,7	31,1				47,7	57,4	66,9	
128	5,20												22,5	27,0	31,5				48,4	58,1	67,7	
129	5,20												22,1	26,5	31,0				47,5	57,0	66,7	

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

Table 13 *(continued)*

Nominal diameter d_1	Radial wall thickness "regular" a_1		Ring width h_1						Closed gap s_1		Tangential force F_t (N)						Diametral force F_d (N)					
		Tolerance	Column					Tolerance		Tolerance	For h_1 shown in column					Tolerance	For h_1 shown in column					Tolerance
			1	2	3	4	5				1	2	3	4	5		1	2	3	4	5	
130	5,25												22,3	26,8	31,3				47,9	57,6	67,3	
131	5,30												22,6	27,1	31,6				48,6	58,3	67,9	
132	5,30												22,2	26,6	31,1				47,7	57,2	66,9	
133	5,35												22,4	27,0	31,5				48,2	58,1	67,7	
134	5,40				2,5	3	3,5						22,7	27,3	31,9				48,8	58,7	68,6	
135	5,40												22,3	26,8	31,3				47,9	57,6	67,3	
136	5,45												22,6	27,2	31,7				48,6	58,5	68,2	
137	5,50												22,9	27,5	32,1				49,2	59,1	69,0	
138	5,50							–0,010 –0,030 For phosphated PO surface: 0 –0,030					22,5	27,0	31,6				48,4	58,1	67,9	
139	5,55												22,8	27,3	31,9				49,0	58,7	68,6	
140	5,60								0,4	+0,25 0			27,7	32,3	36,9				59,6	69,4	79,3	
141	5,65	±0,20											28,0	32,7	37,4	±30 % if F_t < 10 N			60,2	70,3	80,4	±30 % if F_d < 21,5 N
142	5,65	Within											27,5	32,2	36,8				59,1	69,2	79,1	
143	5,70	a ring:	—	—							—	—	27,8	32,5	37,2	±20 % if F_t ≥ 10 N	—	—	59,8	69,9	80,0	±20 % if F_d ≥ 21,5 N
144	5,75	0,20 max.											28,2	32,9	37,6				60,6	70,7	80,8	
145	5,75												27,7	32,4	37,0				59,6	69,7	79,6	
146	5,80												28,0	32,7	37,4				60,2	70,3	80,4	
147	5,85				3	3,5	4						28,3	33,1	37,9				60,8	71,2	81,5	
148	5,85												27,9	32,6	37,3				60,0	70,1	80,2	
149	5,90												28,2	33,0	37,7				60,6	71,0	81,1	
150	5,95												28,3	33,1	37,8				60,8	71,2	81,3	
152	6,00							–0,010 –0,035 For phosphated PO surface: 0 –0,035					28,2	32,9	37,7				60,6	70,7	81,1	
154	6,05								0,5	+0,3 0			28,1	32,8	37,5				60,4	70,5	80,6	
155	6,10												28,4	33,2	37,9				61,1	71,4	81,5	
156	6,15												28,7	33,5	38,3				61,7	72,0	82,3	
158	6,20												28,6	33,4	38,2				61,5	71,8	82,1	

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

Table 13 *(continued)*

Nominal diameter d_1	Radial wall thickness "regular" a_1		Ring width h_1						Closed gap s_1		Tangential force F_t (N)						Diametral force F_d (N)					
		Tolerance	Column					Tolerance		Tolerance	For h_1 shown in column					Tolerance	For h_1 shown in column					Tolerance
			1	2	3	4	5				1	2	3	4	5		1	2	3	4	5	
160	6,25	±0,20 Within a ring: 0,20 max.	—	—	3	3,5	4	–0,010 –0,035 For phosphated PO surface: 0 –0,035	0,5	+0,3 0	—	—	28,5	33,2	38,0	±30 % if F_t < 10 N ±20 % if F_t ≥ 10 N	—	—	61,3	71,4	81,7	±30 % if F_d < 21,5 N ±20 % if F_d ≥ 21,5 N
162	6,35												29,0	33,9	38,8				62,4	72,9	83,4	
164	6,40												28,9	33,8	38,7				62,1	72,7	83,2	
165	6,40												28,5	33,3	38,1				61,3	71,6	81,9	
166	6,45												28,8	33,7	38,5				61,9	72,5	82,8	
168	6,50												28,7	33,5	38,4				61,7	72,0	82,6	
170	6,60												29,3	34,2	39,1				63,0	73,5	84,1	
172	6,65												29,2	34,1	39,0				62,8	73,3	83,9	
174	6,70												29,1	34,0	38,8				62,6	73,1	83,4	
175	6,75				3,5	4	4,5		0,6				34,1	39,0	44,0				73,3	83,9	94,6	
176	6,80												34,5	39,4	44,4				74,2	84,7	95,5	
178	6,85												34,3	39,3	44,2				73,7	84,5	95,0	
180	6,90												34,2	39,1	44,1				73,5	84,1	94,8	
182	6,95												34,1	39,0	43,9				73,3	83,9	94,4	
184	7,05												34,7	39,7	44,7				74,6	85,4	96,1	
185	7,05												34,3	39,2	44,2				73,7	84,3	95,0	
186	7,10												34,6	39,6	44,6				74,4	85,1	95,9	
188	7,15												34,5	39,5	44,4				74,2	84,9	95,5	
190	7,20												34,4	39,3	44,3				74,0	84,5	95,2	
192	7,25												34,3	39,2	44,2				73,7	84,3	95,0	
194	7,35												34,9	39,9	44,9				75,0	85,8	96,5	
195	7,35												34,5	39,5	44,4				74,2	84,9	95,5	
196	7,40												34,8	39,8	44,8				74,8	85,6	96,3	
198	7,45												34,7	39,7	44,7				74,6	85,4	96,1	
200	7,50												34,6	39,6	44,5				74,4	85,1	95,7	

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

Table 13 *(continued)*

Nominal diameter d_1	**Radial wall thickness "regular"** a_1		**Ring width** h_1						**Closed gap** s_1		**Tangential force** F_t (N)						**Diametral force** F_d (N)					
		Tolerance	Column 1	2	3	4	5	Tolerance		Tolerance	For h_1 shown in column 1	2	3	4	5	Tolerance	For h_1 shown in column 1	2	3	4	5	Tolerance
For intermediate sizes (for example repair sizes), the radial wall thickness of the next smaller nominal diameter should be applied.																						
Solely for the purposes of this document, the assumed average ratio F_d/F_t is 2,15. However, for rings up to 50 mm, the ratio F_d/F_t shall be determined between the manufacturer and client.																						
Additional ring widths can be agreed between supplier and customer.																						
NOTE The values for F_t and F_d, given in Table 13, apply to as-cast grey cast iron with a typical modulus of elasticity (E_n) of 100 GN/m^2. Multiplying factors for materials having a different modulus (E_n) are given in ISO 6621-4. Mean forces are calculated for nominal radial wall thickness (a_1) and mean ring width (h_1).																						

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved

Table 14 — Dimensions of R, B, BA and M rectangular rings — Radial wall thickness "D/22"

Dimensions in millimetres

Nominal diameter d_1	Radial wall thickness "D/22" a_1		Ring width h_1					Closed gap s_1		Tangential force F_t (N)					Diametral force F_d (N)				
		Tolerance	Column 1	Column 2	Column 3	Column 4	Tolerance		Tolerance	For h_1 shown in column 1	For h_1 shown in column 2	For h_1 shown in column 3	For h_1 shown in column 4	Tolerance	For h_1 shown in column 1	For h_1 shown in column 2	For h_1 shown in column 3	For h_1 shown in column 4	Tolerance
50	2,25	±0,15 Within a ring: 0,15 max.	1,5	1,75	2	2,5	−0,010 −0,025 For phosphated PO surface: −0,005 −0,025	0,15	+0,2 0	7,4	8,7	9,9	12,4	±30 % if F_t < 10 N ±20 % if F_t ≥ 10 N	15,9	18,7	21,3	26,7	±30 % if F_d < 21,5 N ±20 % if F_d ≥ 21,5 N
51	2,30									7,6	8,9	10,2	12,7		16,3	19,1	21,9	27,3	
52	2,35									7,8	9,1	10,4	13,1		16,8	19,6	22,4	28,2	
53	2,40									8,0	9,4	10,7	13,4		17,2	20,2	23,0	28,8	
54	2,45									8,2	9,6	11,0	13,8		17,6	20,6	23,7	29,7	
55	2,50									8,4	9,9	11,3	14,1		18,1	21,3	24,3	30,3	
56	2,55									8,6	10,1	11,5	14,5		18,5	21,7	24,7	31,2	
57	2,60									8,8	10,3	11,8	14,8		18,9	22,1	25,4	31,8	
58	2,65									9,0	10,6	12,1	15,2		19,4	22,8	26,0	32,7	
59	2,70									9,3	10,8	12,4	15,5		20,0	23,2	26,7	33,3	
60	2,75									9,4	11,0	12,6	15,7		20,2	23,7	27,1	33,8	
61	2,75									9,1	10,6	12,2	15,2		19,6	22,8	26,2	32,7	
62	2,80									9,3	10,9	12,4	15,6		20,0	23,4	26,7	33,5	
63	2,85									9,5	11,1	12,7	15,9		20,4	23,9	27,3	34,2	
64	2,90									9,7	11,3	13,0	16,3		20,9	24,3	28,0	35,0	
65	2,95						−0,010 −0,030 For phosphated PO surface: 0,005 −0,030	0,2		9,9	11,6	13,3	16,6		21,3	24,9	28,6	35,7	
66	3,00									10,1	11,8	13,5	16,9		21,7	25,4	29,0	36,3	
67	3,05									10,3	12,1	13,8	17,3		22,1	26,0	29,7	37,2	
68	3,10									10,5	12,3	14,1	17,6		22,6	26,4	30,3	37,8	
69	3,15									10,7	12,5	14,4	18,0		23,0	26,9	31,0	38,7	
70	3,20									10,9	12,8	14,6	18,3		23,4	27,5	31,4	39,3	
71	3,25									11,1	13,0	14,9	18,7		23,9	28,0	32,0	40,2	
72	3,25									10,8	12,7	14,5	18,1		23,2	27,3	31,2	38,9	
73	3,30									11,0	12,9	14,8	18,5		23,7	27,7	31,8	39,8	
74	3,35									11,2	13,1	15,0	18,8		24,1	28,2	32,3	40,4	

STANDARDSISO.COM : Click to view the full PDF of ISO 6622-1:2021

© ISO 2021 – All rights reserved