

International Standard



6625

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

Internal combustion engines — Piston rings — Oil control rings

Moteurs à combustion interne — Segments de piston — Segments racleurs régulateurs d'huile

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 6625 was prepared by Technical Committee ISO/TC 22, *Road vehicles*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Internal combustion engines — Piston rings — Oil control rings

0 Introduction

ISO 6625 is one of a series of International Standards dealing with piston rings for reciprocating internal combustion engines:

ISO 6621, *Internal combustion engines — Piston rings —*

Part 1: Vocabulary.

Part 2: Measuring principles.

Part 3: Material specifications.

*Part 4: General specifications.*¹⁾

*Part 5: Quality requirements.*¹⁾

ISO 6622, *Internal combustion engines — Piston rings —*

Part 1: Rectangular rings.

*Part 2: Rectangular rings with narrow ring width.*²⁾

ISO 6623, *Internal combustion engines — Piston rings — Scraper rings.*

ISO 6624, *Internal combustion engines — Piston rings —*

Part 1: Keystone rings.

*Part 2: Half keystone rings.*³⁾

ISO 6625, *Internal combustion engines — Piston rings — Oil control rings.*

ISO 6626, *Internal combustion engines — Coil spring loaded oil control rings.*¹⁾

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

It is also essential that the designer refers to the specifications and requirements of ISO 6621/3 and ISO 6621/4, before completing his selection.

1 Scope and field of application

This International Standard specifies the essential dimensional features of S-, G-, D- and DV-oil control piston ring types.

The normal range for the axial width of oil control rings (2,5 to 8 mm inclusive) is divided into 0,5 or 1,0 mm increments. In table 7, dimensions in inch units are given for oil control rings with axial width 4,75 mm (equal to 3/16 in) for existing applications.

The requirements of this International Standard apply to oil control rings for reciprocating internal combustion piston engines, up to and including 200 mm diameter. It may also be used for piston rings of compressors working under similar conditions.

2 References

ISO 1101, *Technical drawings — Geometrical tolerancing — Tolerancing of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings.*

ISO 6621, *Internal combustion engines — Piston rings —*

Part 3: Material specifications.

*Part 4: General specifications.*¹⁾

1) At present at the stage of draft.

2) At present at the stage of draft (will be published as a Technical Report).

3) In preparation (will be published as a Technical Report).

3 Ring types and designation examples

3.1 Type S — Slotted oil control ring

3.1.1 General features

NOTE — See table 5 or 7 for dimensions and forces.

Dimensions in millimetres

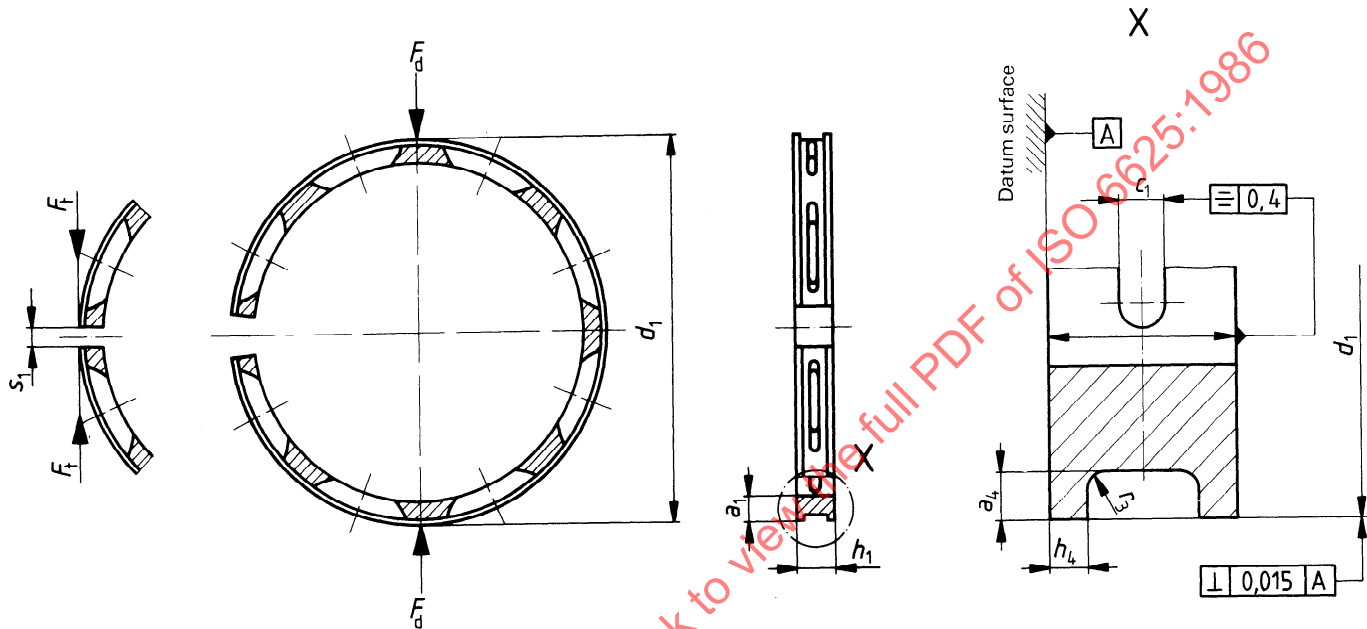


Figure 1 — Type S

3.1.2 Designation example

Designation of a slotted oil control ring of $d_1 = 90$ mm nominal diameter, $h_1 = 4$ mm ring width, made of grey cast iron, non-heat-treated (material subclass 12), general features as shown in figure 1, and inside chamfered edges:

Piston ring ISO 6625 - S - 90 × 4 - MC12 KI

3.2 Type G — Double-bevelled oil control ring

3.2.1 General features

NOTE — See table 6 or 7 for dimensions and forces.

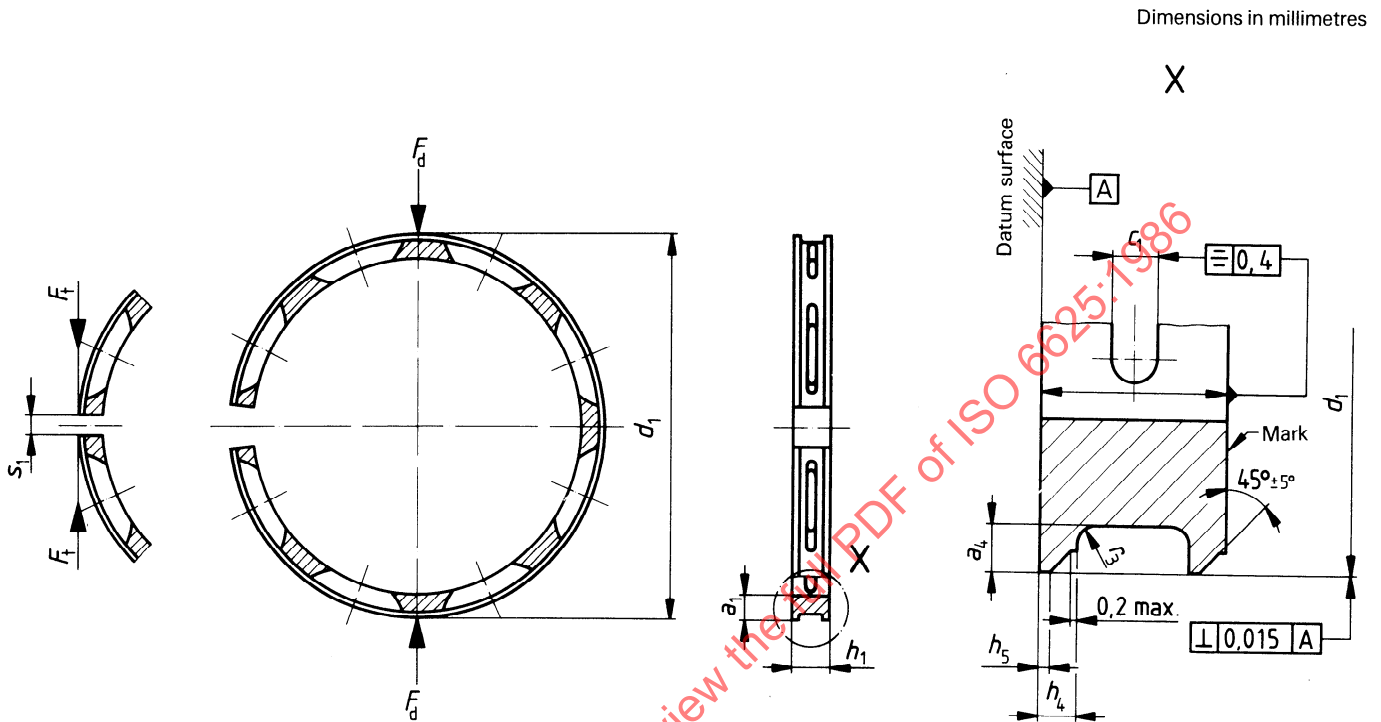


Figure 2 — Type G

3.2.2 Designation example

Designation of a double-bevelled oil control ring of $d_1 = 90$ mm nominal diameter, $h_1 = 4$ mm ring width, made of grey cast iron, non-heat-treated (material subclass 12), general features as shown in figure 2, and phosphated all over:

Piston ring ISO 6625 - G - 90 × 4 - MC12 PO

3.3 Type D — Bevelled-edge oil control ring

3.3.1 General features

NOTE — See table 6 or 7 for dimensions and forces.

Dimensions in millimetres

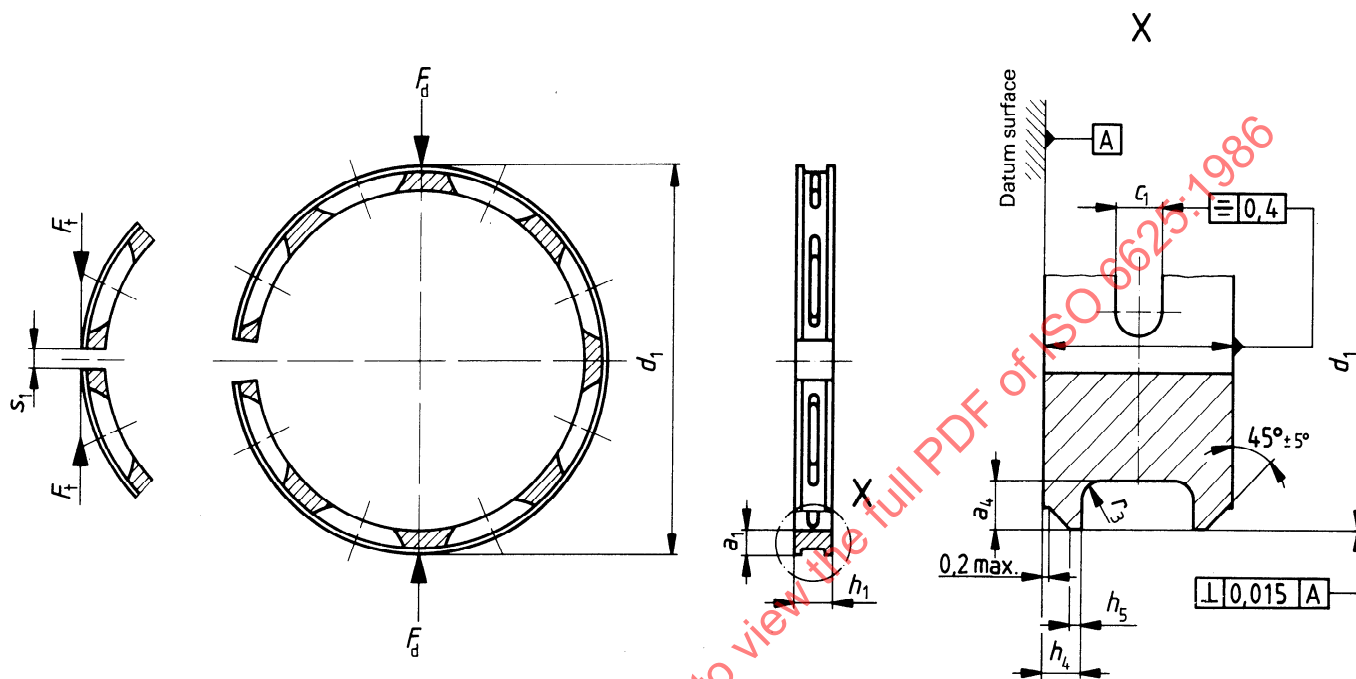


Figure 3 — Type D

3.3.2 Designation example

Designation of a bevelled-edge oil control ring of $d_1 = 90$ mm nominal diameter, $h_1 = 4$ mm ring width, made of grey cast iron, non-heat-treated (material subclass 12), general features as shown in figure 3:

Piston ring ISO 6625 - D - 90 × 4 - MC12

3.4 Type DV — Bevelled-edge V-groove oil control ring (only for ring widths $h_1 \geq 4$ mm)

3.4.1 General features

NOTE — See table 6 or 7 for dimensions and forces.

Dimensions in millimetres

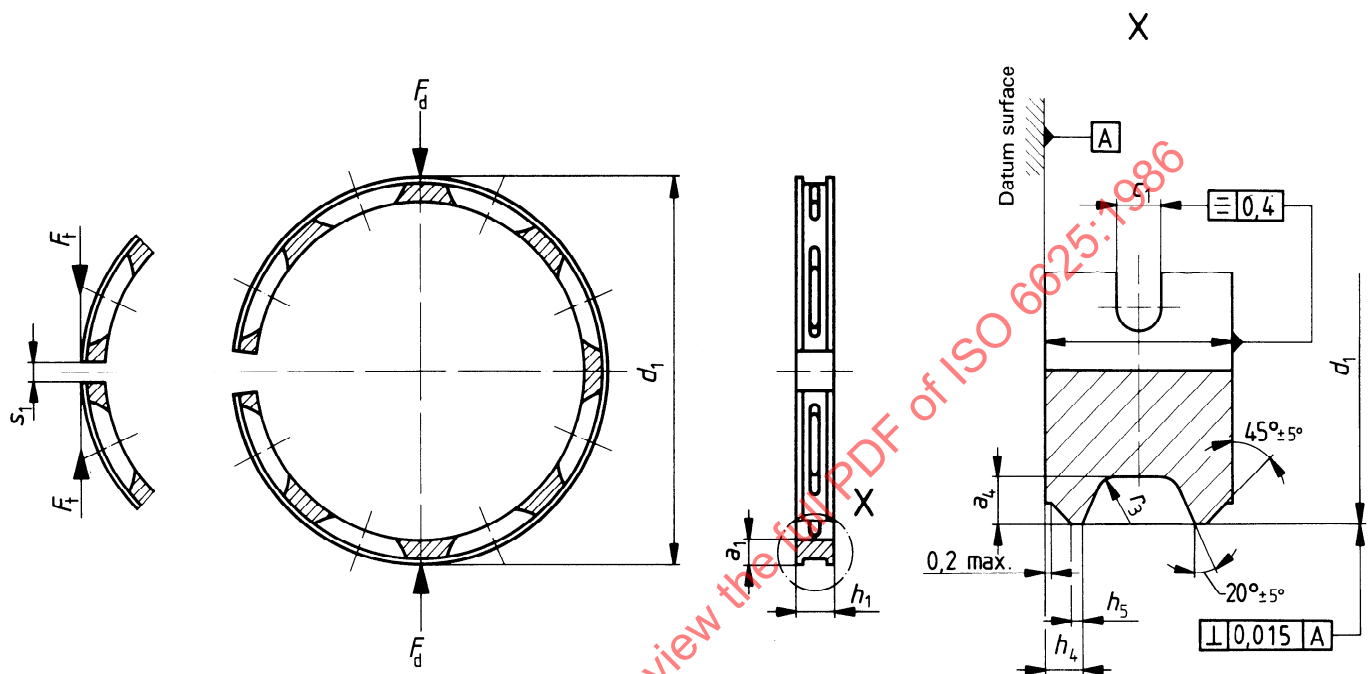


Figure 4 — Type DV

3.4.2 Designation example

Designation of a bevelled-edge V-groove oil control ring of $d_1 = 90$ mm nominal diameter, $h_1 = 4,5$ mm ring width, made of grey cast iron, non-heat-treated (material subclass 12), general features as shown in figure 4:

Piston ring ISO 6625 - DV - 90 × 4,5 - MC12

4 Common features

4.1 S-, G-, D- and DV-rings — Arrangement of slots

Dimensions in millimetres

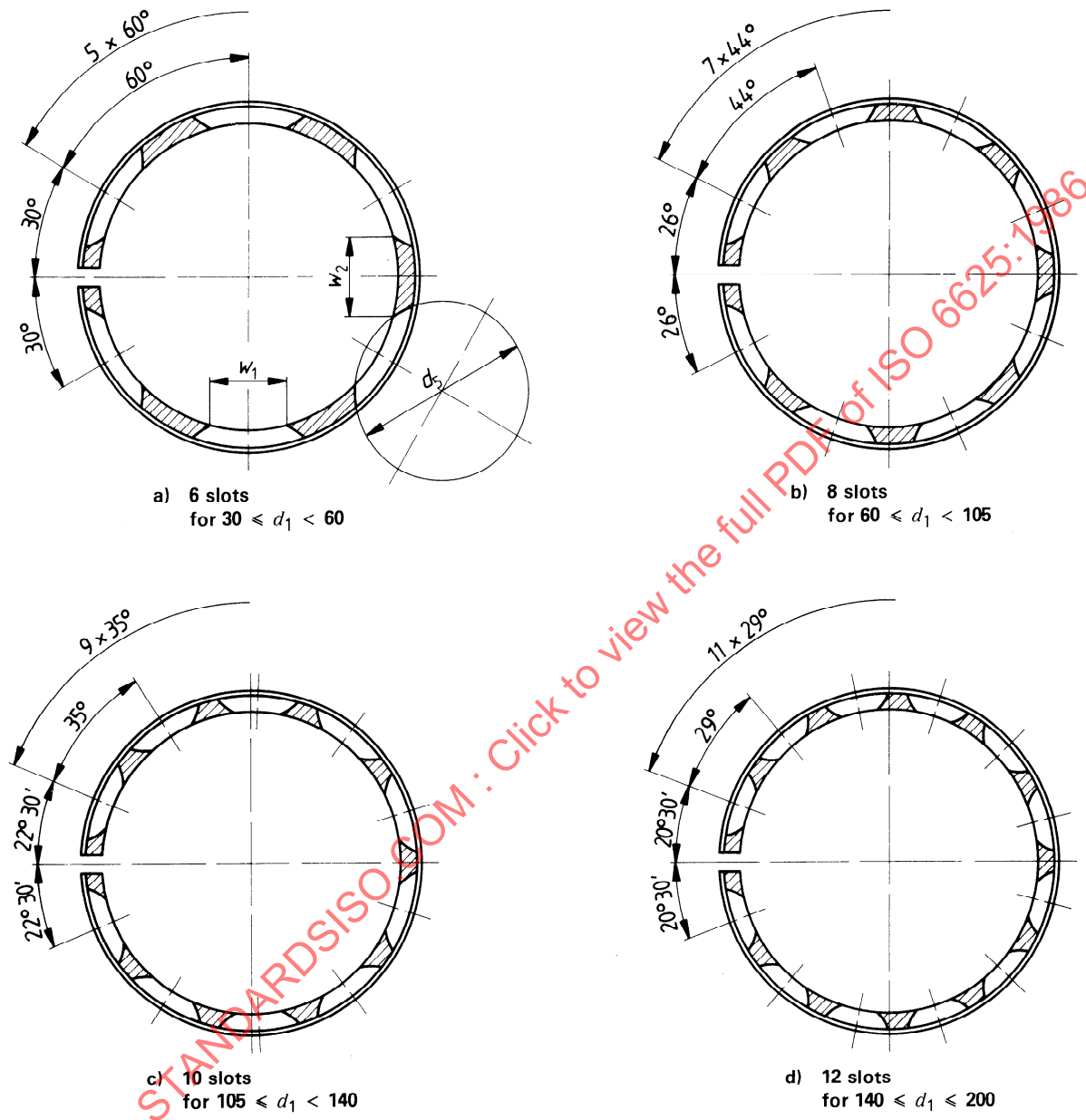


Figure 5 — Arrangement of slots

Table 1 — Cutter diameter

Dimensions in millimetres

d_1	Cutter diameter d_5 max.
$30 < d_1 < 50$	55
$50 < d_1 < 170$	60
$170 < d_1 < 200$	75

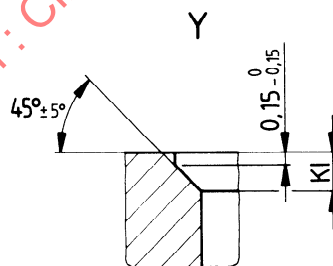
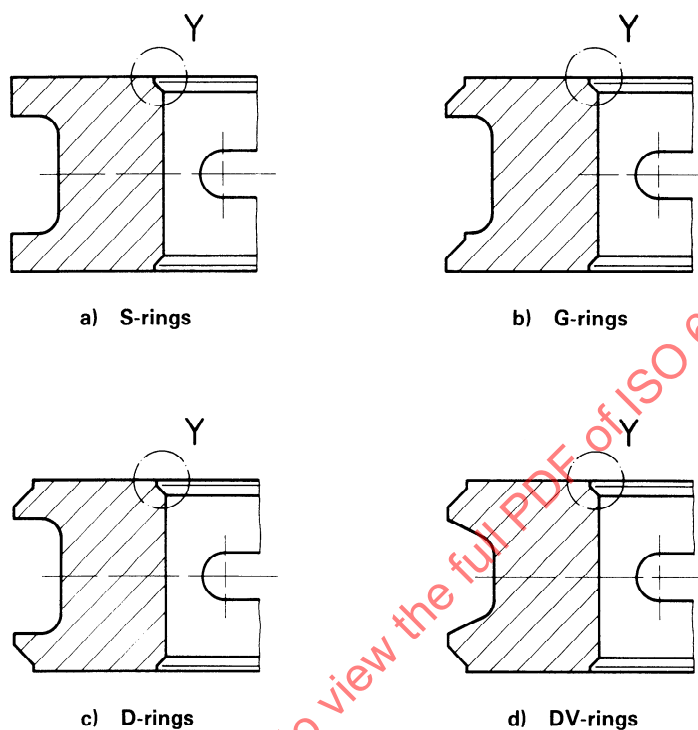
Table 2 — Slot length

Dimensions in millimetres

d_1	Slot length		Permissible difference between w_1 and w_2
	w_1	Tolerance	
$30 \leq d_1 < 36$	5	± 2	—
$36 \leq d_1 < 40$	6	± 2	—
$40 \leq d_1 < 50$	8	± 2	—
$50 \leq d_1 < 170$	$w_1 = w_2$	—	2
$170 \leq d_1 \leq 200$	$w_1 = w_2$	—	4

4.2 S-, G-, D- and DV-rings — Inside chamfered edges (KI)

Dimensions in millimetres



Nominal KI ≥ 0,3

Figure 6 — Inside chamfered edges

Table 3 — KI dimensions

Dimensions in millimetres

d_1	KI
$30 < d_1 < 125$	$0,3 \pm 0,15$
$125 < d_1 < 175$	$0,4 \pm 0,15$
$175 < d_1 < 200$	$0,6 \pm 0,2$

5 Force factors

The tangential and diametral forces, given in tables 5, 6 and 7, shall be corrected when additional features and/or materials other than grey cast iron with a modulus of elasticity of 100 GN/m² are being used.

For common features, the multiplier correction factors given in table 4 and the force correction factors given in ISO 6621/4 shall be used.

Table 4 — Force correction factors for S-, G-, D- and DV-rings with KI feature

d_1 mm	Factor
$30 \leq d_1 < 50$	1
$50 \leq d_1 < 100$	0,98
$100 \leq d_1 < 150$	0,98
$150 \leq d_1 \leq 200$	0,97

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6 Dimensions

Table 5 — Dimensions of S-oil control rings

Dimensions in millimetres

Nominal diameter d_1	Radial wall thickness "regular" a_1	Ring width h_1				Closed gap s_1	Radius r_3	Land width h_4				Groove depth a_4	Num-ber of slots	Slot width c_1				Tangential force F_t , N				Diametral force F_d , N								
		Column						For h_1 shown in column						For h_1 shown in column				For h_1 shown in column												
		1	2	3	4			1	2	3	4			1	2	3	4	1	2	3	4	1	2	3	4					
30	1,25																	7,5	9,2	10,8	11,5									
31	1,3																	8	9,9	11,4	12,3									
32	1,35																	8,6	10,3	12,3	13,1									
33	1,4																	9	11	12,9	13,8									
34	1,4																	8,6	10,3	12	13,1									
35	1,45																	9	11	12,9	13,8									
36	1,5																	9,5	11,6	13,5	14,6									
37	1,55																	9,9	12,3	14,2	15,5									
38	1,6																	10,5	12,9	15,1	16,1									
39	1,65																	11	13,5	15,7	17									
40	1,65																	9,9	12,3	14,2	15,3									
41	1,7																	10,5	12,7	14,8	15,9									
42	1,75																	11	13,3	15,7	16,8									
43	1,8																	11,4	14	16,3	17,6									
44	1,85																	12	14,6	17	18,3									
45	1,9																	12,3	15,1	17,4	18,9									
46	1,9																	11,6	14,4	16,8	18,1									
47	1,95																	12,3	14,8	17,4	18,9									
48	2																	12,7	15,5	18,1	19,6									
49	2,05																	13,1	16,1	18,9	20,4									
50	2,1		2,5	3	3,5	4	0,5 $\pm 0,1$	0,6 $\pm 0,1$	0,7 $\pm 0,1$	0,8 $\pm 0,1$			0,7 $\pm 0,1$	0,8 $\pm 0,1$	1 $\pm 0,1$			13,3	16,1	18,9	20,4									
51	2,15																	13,8	16,8	19,6	21,1									
52	2,15																	13,3	16,1	18,9	20,4									
53	2,2																	13,8	16,8	19,6	21,1									
54	2,25																	14,2	17,4	20,2	21,9									
55	2,3																	14,8	18,1	21,1	22,8									
56	2,35																	15,3	18,7	21,7	23,4									
57	2,4																	15,7	19,1	22,6	24,3									
58	2,4																	15,3	18,5	21,7	23,4									
59	2,45																	15,7	19,1	22,4	24,3									
60	2,5																	15,3	18,5	21,7	23,2									
61	2,55																	15,7	19,1	22,4	23,9									
62	2,6																	16,1	19,8	23	24,7									
63	2,65																	16,6	20,2	23,7	25,4									
64	2,65																	16,1	19,6	23	24,5									
65	2,7																	16,6	20,2	23,7	25,4									
66	2,75																	17	20,9	24,3	26,2									
67	2,8																	17,6	21,5	24,9	26,9									
68	2,85																	18,1	21,9	25,8	27,7									
69	2,9																	18,5	22,6	26,4	28,6									

Table 5 (continued)

Dimensions in millimetres

Nominal diameter d_1	Radial wall thickness "regular" a_1	Ring width h_1				Closed gap s_1		Radius r_3	Land width h_4				Groove depth a_4	Num-ber of slots	Slot width c_1				Tangential force F_t , N				Diametral force F_d , N				Tolerance																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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		1	2	3	4		1		2	3	4	1			2	3	4	1	2	3	4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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Table 5 (continued)

Dimensions in millimetres

Nom- inal diam- eter d_1	Radial wall thickness "regular" a_1		Ring width h_1				Closed gap s_1	Radius r_3	Land width h_4				Groove depth a_4	Num- ber of slots	Slot width c_1				Tangential force F_t , N				Diametral force F_d , N			
			Column	1	2	3	4																			
115	4,7																									
116	4,75																									
117	4,8																									
118	4,85																									
119	4,85																									
120	4,9																									
121	4,95																									
122	4,95																									
123	5																									
124	5,05																									
125	5,05																									
126	5,1																									
127	5,15																									
128	5,2																									
129	5,2																									
130	5,25																									
131	5,3																									
132	5,3																									
133	5,35																									
134	5,4																									
135	5,4																									
136	5,45																									
137	5,5																									
138	5,5																									
139	5,55																									
140	5,6																									
141	5,65																									
142	5,65																									
143	5,7																									
144	5,75																									
145	5,75																									
146	5,8																									
147	5,85																									
148	5,85																									
149	5,9																									
150	5,95																									
152	6																									
154	6,05																									
155	6,1																									
156	6,15																									
158	6,2																									

Table 5 (concluded)

Dimensions in millimetres

Nominal diameter d_1	Radial wall thickness "regular" a_1	Ring width h_1					Closed gap s_1	Radius r_3	Land width h_4	Groove depth a_4	Number of slots	Slot width c_1				Tangential force F_t, N				Diametral force F_d, N				Tolerance								
		Column										For h_1 shown in column				For h_1 shown in column				For h_1 shown in column												
		1	2	3	4	Tolerance						1	2	3	4	1	2	3	4	1	2	3	4		1	2	3	4				
160	6,25																	25,3	28,5	34,5	40,5	54,4	61,3	74,2	87,1							
162	6,35																	25,9	29,2	35,3	41,5	55,7	62,8	75,9	89,2							
164	6,4																	25,9	29,1	35,2	41,4	55,7	62,6	75,7	89							
165	6,4																	25,5	28,7	34,8	40,8	54,8	61,7	74,8	87,7							
166	6,45																	25,8	29,1	35,2	41,3	55,5	62,6	75,7	88,8							
168	6,5																	25,8	29	35,1	41,2	55,5	62,4	75,5	88,6							
170	6,6																	26,6	29,7	36	42,2	56,8	63,9	77,4	90,7							
172	6,65																	26,3	29,7	35,9	42,1	56,5	63,9	77,2	90,5							
174	6,7																	26,3	29,6	35,8	42	56,5	63,6	77	90,3							
175	6,75																	29	35,1	41,3	48,7	62,4	75,5	88,8	104,7							
176	6,8																	29,3	35,5	41,7	49,2	63	76,3	89,7	105,8							
178	6,85																	29,3	35,5	41,6	49,1	63	76,3	89,4	105,6							
180	6,9																	29,2	35,4	41,6	49	62,8	76,1	89,4	105,4							
182	6,95																	29,2	35,3	41,5	48,9	62,8	75,9	89,2	105,1							
184	7,05																	29,9	36,1	42,4	50	64,3	77,6	91,2	107,5							
185	7,05																	29,5	35,7	41,9	49,4	63,4	76,8	90,1	106,2							
186	7,1																	29,8	36,1	42,3	49,9	64,1	77,6	90,9	107,3							
188	7,15																	29,8	36	42,3	49,8	64,1	77,4	90,9	107,1							
190	7,2																	29,7	36	42,2	49,7	63,9	77,4	90,7	106,9							
192	7,25																	29,7	35,9	42,1	49,6	63,9	77,2	90,5	106,6							
194	7,35																	30,3	36,7	43,1	50,7	65,1	78,9	92,7	109							
195	7,35																	29,9	36,2	42,5	50,1	64,3	77,8	91,4	107,7							
196	7,4																	30,3	36,6	43	50,6	65,1	78,7	92,5	108,8							
198	7,45																	30,2	36,6	42,9	50,5	64,9	78,7	92,2	108,6							
200	7,5																	30,2	36,5	42,9	50,4	64,9	78,5	92,2	108,4							

NOTES

1 For intermediate sizes (for example repair sizes), the radial wall thickness of the next smaller nominal diameter should be applied.

2 The values for F_t and F_d , given in table 5, apply to as-cast grey cast iron with a typical modulus of elasticity (E_n) of 100 GN/m². 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).

3 For the sole purpose of this International Standard, 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.

Table 6 — Dimensions for G-, D- and DV-oil control rings

Dimensions in millimetres

Nominal diameter d_1	Radial wall thickness "regular" a_1	Ring width h_1				Radius r_3	Land width h_4				Land width h_5				Groove depth a_4	Num-ber of slots	Slot width c_1				Tangential force F_t , N				Diametral force F_d , N			
		1	2	3	4		1	2	3	4	1	2	3	4			1	2	3	4	1	2	3	4	1	2	3	4
30	1,25																											
31	1,3																											
32	1,35																											
33	1,4																											
34	1,4																											
35	1,45																											
36	1,5																											
37	1,55																											
38	1,6																											
39	1,65																											
40	1,65																											
41	1,7																											
42	1,75																											
43	1,8																											
44	1,85																											
45	1,9																											
46	1,9																											
47	1,95																											
48	2																											
49	2,05																											
50	2,1																											
51	2,15																											
52	2,15																											
53	2,2																											
54	2,25																											
55	2,3																											
56	2,35																											
57	2,4																											
58	2,4																											
59	2,45																											
60	2,5																											
61	2,55																											
62	2,6																											
63	2,65																											
64	2,65																											
65	2,7																											
66	2,75																											
67	2,8																											
68	2,85																											
69	2,9																											

Table 6 (continued)

Dimensions in millimetre

Nominal diameter d_1	Radial wall thickness "regular" a_1	Ring width h_1					Closed gap s_1	Radius r_3	Land width h_4				Land width h_5				Groove depth a_4	Num-ber of slots	Slot width c_1				Tangential force F_t , N				Diametral force F_d , N			
		Column							For h_1 shown in column				For h_1 shown in column						For h_1 shown in column				For h_1 shown in column							
		1	2	3	4	Toler- ance			1	2	3	4	1	2	3	4			1	2	3	4	1	2	3	4	Toler- ance	1	2	3
70	2,9						0,2	0,3 max.																	17,4	20,6	23,4	25,4		
71	2,95																									18,1	21,3	24,1	26,2	
72	3																							18,5	21,9	24,9	26,9			
73	3,05																							18,9	22,6	25,6	27,7			
74	3,1																							19,6	26,2	26,2	28,6			
75	3,15																							19,8	23,7	26,9	29			
76	3,15																							19,4	23	26	28,4			
77	3,2																							19,8	23,7	26,9	29			
78	3,25																							20,2	24,1	27,5	29,9			
79	3,3																							20,9	24,7	28,2	30,7			
80	3,35																							24,3	27,5	29,7	32,5			
81	3,4																							24,9	28,4	30,5	33,3			
82	3,4																							24,3	27,5	29,7	32,5			
83	3,45																							24,9	28,4	30,5	33,3			
84	3,5																							25,6	29	31,4	34,2			
85	3,55																							26	29,7	32	35			
86	3,6																							26,7	30,3	32,9	35,9			
87	3,65																							27,3	31,2	33,5	36,8			
88	3,65																							26,7	30,3	32,9	36,1			
89	3,7																							27,3	31,2	33,5	37			
90	3,75																							27,7	31,6	34,2	37,6			
91	3,8																							28,4	32,5	35	38,5			
92	3,85																							29	33,1	35,9	39,3			
93	3,9																							29,7	33,8	36,8	40,2			
94	3,9																							29	33,1	35,9	39,3			
95	3,95																							29,7	33,8	36,8	40,2			
96	4																							29,7	33,8	36,8	40,2			
97	4,05																							29,7	33,8	36,8	40,2			
98	4,1																							29,7	33,8	36,8	40,2			
99	4,15																							29,7	33,8	36,8	40,2			
100	4,15																							29,7	33,8	36,8	40,2			
101	4,2																							29,7	33,8	36,8	40,2			
102	4,25																							29,7	33,8	36,8	40,2			
103	4,25																							29,7	33,8	36,8	40,2			
104	4,3																							29,7	33,8	36,8	40,2			
105	4,35																							29,7	33,8	36,8	40,2			
106	4,4																							29,7	33,8	36,8	40,2			
107	4,4																													

Table 6 (continued)

Dimensions in millimetres

Nominal diameter d_1	Radial wall thickness "regular" a_1	Ring width h_1							Closed gap s_1	Radius r_3	Land width h_4				Land width h_5				Groove depth a_4	Num-ber of slots	Slot width c_1				Tangential force F_{t_1} , N				Diametral force F_{d_1} , N																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
		Column									For h_1 shown in column				For h_1 shown in column						For h_1 shown in column				For h_1 shown in column				For h_1 shown in column																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
		1	2	3	4	5	6	7			1	2	3	4	1	2	3	4			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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