INTERNATIONAL STANDARD

ISO 6626-3

Second edition
2019-09

Internal combustion engines — Piston rings —

Part 3: **Coil-spring-loaded oil control rings made of steel**

Moteurs à combustion interne — Segments de piston —

Partie 3: Segments racleurs régulateurs d'huile, en acier, mis en charge par ressort hélicoïdal

Reference number
ISO 6626-3:2019(E)

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Published in Switzerland

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Foreword

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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).

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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 second edition cancels and replaces the first edition (ISO 6266-3:2008), which has been technically revised. The main changes compared to the previous edition are as follows:

— added subclause 5.8.2, Actual tangential force, F_t and tolerance;

— added subclause 5.8.3, Normalized tangential force, F_N;

— added Table 9, Normalized tangential forces, F_N;

— raised table numbers by one from Table 9 onward;

— made editorial changes to Table 16.

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.

Introduction

ISO 6626 (all parts) is one of a series of International Standards dealing with piston rings for reciprocating internal combustion engines. Others are ISO 6621 (all parts), ISO 6622 (all parts), ISO 6623, ISO 6624 (all parts), ISO 6625 and ISO 6627 (see Clause 2 and Bibliography).

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

Internal combustion engines — Piston rings —

Part 3:
Coil-spring-loaded oil control rings made of steel

1 Scope

This document specifies the essential dimensions of coil-spring-loaded oil control rings made of steel, of piston ring types SOR (with R-shaped groove) and SOV (with V-shaped groove).

This document applies to coil-spring-loaded oil control rings made of steel with a diameter from 60 mm up to and including 160 mm for reciprocating internal combustion engines. It can also be used for piston rings in compressors working under analogous conditions.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and symbols

No terms and definitions are listed in this document.

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 http://www.electropedia.org/

3.1 Symbols

a_1 radial wall thickness

a_4 groove depth

a_{12} radial thickness over coil spring

a_{13} groove depth and bridge

a_{17} external land depth

B_3 land spacing

c_1 slot width

d_1 nominal diameter (nominal bore diameter)

d_7 coil-spring diameter

d_{14} coil-spring groove diameter for type SOR

f_1 coil-spring excursion

F_t tangential force

h_1 ring width

h_5 land width

p_0 contact pressure

s_1 closed gap

w_1 slot length

w_3 slot spacing

α land angle inside

β land angle outside

θ groove angle for type SOV

NOTE These symbols (including associated indices) are in accordance with the symbols used in ISO 6621 (all parts), ISO 6622 (all parts), ISO 6623, ISO 6624 (all parts), ISO 6625, ISO 6627 and other parts of the ISO 6626 series.

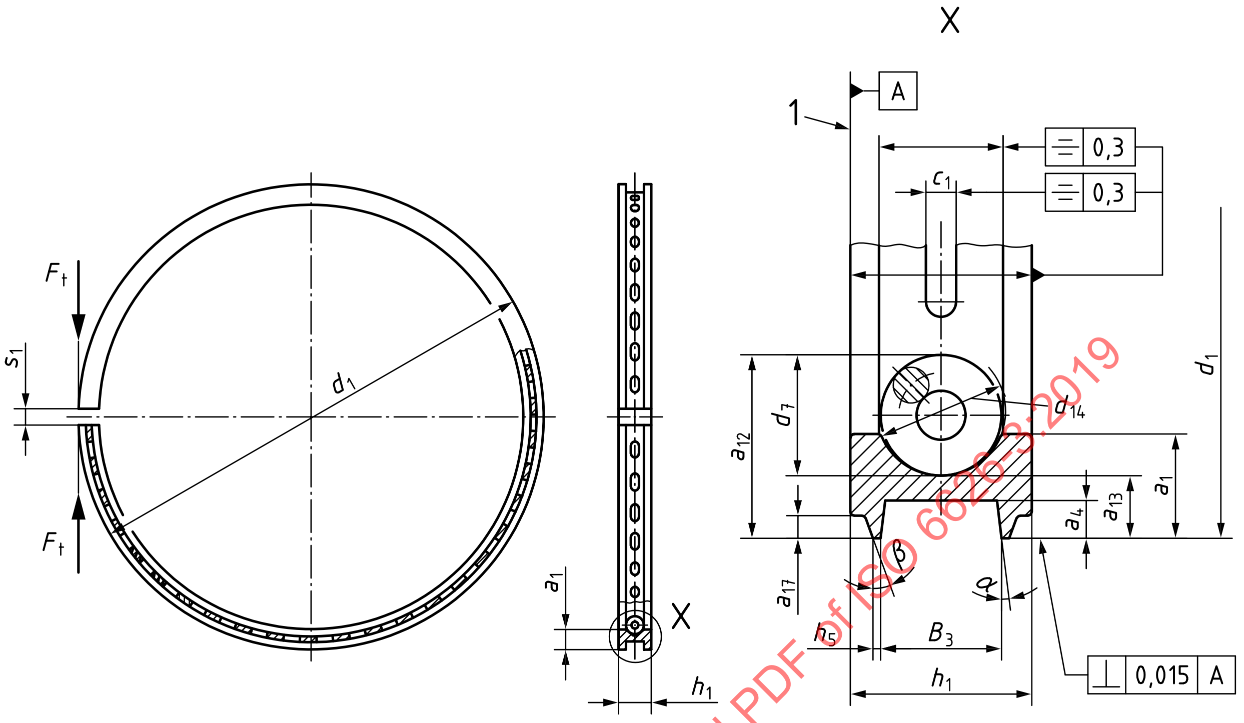
4 Piston ring types and designation examples

4.1 Type SOR — Steel oil control rings with R-shaped groove

4.1.1 General features and dimensions

Figure 1 shows the general features and dimensions of piston ring type SOR.

Dimensions in millimetres



Key

1 reference plane

NOTE 1 For definitions of symbols, see Clause 3.

NOTE 2 For dimensions, see Tables 1, 2, 3, 4, 5, 11, 12, 14, 15, 16, 17, 18 and 19.

Figure 1 — General features and dimensions of piston ring type SOR

4.1.2 Designation

EXAMPLE A coil-spring-loaded oil control ring with R-shaped groove (SOR), a radial wall thickness class = small (S), of nominal diameter d_1 = 100 mm (100), a nominal ring width h_1 = 3 mm (3), a land width h_5 = 0,20 mm (0,20), made of steel MC65 (MC65), a nitrided depth of 0,030 mm min. (NT030), coil spring with reduced heat set (WF), and variable pitch with coil diameter d_7 ground (CSE), medium nominal contact pressure p_0 = 1,5 MPa (PN1,5):

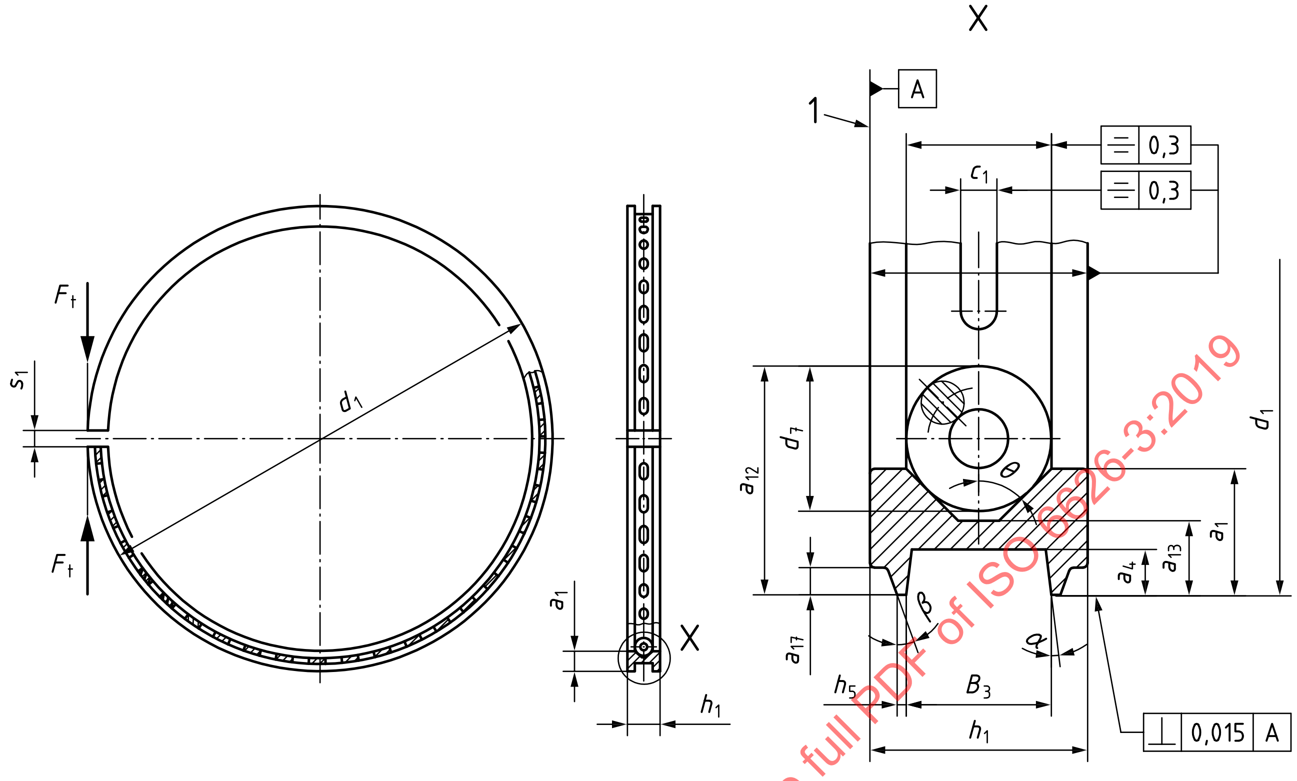
Piston ring ISO 6626-3 SOR-S - 100 × 3 × 0,20 – MC65/NT030 WF CSE PN1,5

4.2 Type SOV — Steel oil control rings with V-shaped groove

4.2.1 General features and dimensions

Figure 2 shows the general features and dimensions of piston ring type SOV.

Dimensions in millimetres



Key

1 reference plane

NOTE 1 For definitions of symbols, see Clause 3.

NOTE 2 For dimensions, see Tables 1, 2, 3, 4, 5, 11, 13, 14, 20, 21 and 22.

Figure 2 — General features and dimensions of piston ring type SOV

4.2.2 Designation

EXAMPLE A coil-spring-loaded oil control ring with V-shaped groove (SOV), a radial wall thickness class = small (S), V-shaped groove angle 40° (V40), of nominal diameter d_1 = 100 mm (100), a nominal ring width h_1 = 3 mm (3), a land width h_5 = 0,20 mm (0,20), made of steel MC65 (MC65), a nitrided depth of 0,030 mm min. (NT030), coil spring with reduced heat set (WF), and constant pitch with coil diameter d_7 ground (CSN), medium nominal contact pressure p_0 = 1,5 MPa (PN1,5):

Piston ring ISO 6626-3 SOV-S-V40 - 100 × 3 × 0,20 – MC65/NT030 WF CSN PN1,5

5 Common features

5.1 Ring width h_1 and radial wall thickness a_1

Table 1 shows common features for ring width h_1 and radial wall thickness a_1.

Table 1 — Ring width h_1 and radial wall thickness a_1

Dimensions in millimetres

Ring width $h_1 = {}^{-0,01}_{-0,03}$	Radial wall thickness $a_1 \pm 0,15$ Small (Code: S)	Radial wall thickness $a_1 \pm 0,15$ Large (Code: L)	Type
1,5	1,5 to 1,8	—	SOR
2,0	1,8 to 2,0	—	SOR
2,5	1,8 to 2,0	—	SOR
3,0	1,8 to 2,0	2,3 to 2,6	SOR and SOV
4,0	2,0 to 2,6	2,8 to 3,2	SOR and SOV

5.2 Land width h_5

Table 2 shows common features for land width h_5.

Table 2 — Land width h_5

Dimensions in millimetres

Ring width h_1	Land width $h_5 \pm 0,07$		
1,5	0,18	—	—
2,0	0,20	—	—
2,5	0,20	0,25	—
3,0	0,20	0,25	0,30
4,0	0,20[a]	0,25	0,30

[a] For diameters greater than 120 mm and ring width equal to 4,0 mm, land width equal to 0,20 mm shall not be used.

5.3 Land angle *α*, *β*

Table 3 shows common features for land angle *α*, *β*.

Table 3 — Land angle *α*, *β*

Land angle	Range of nominal angle	Tolerance
inside *α*	5° to 20°[a]	±5°
outside *β*	10° to 30°[a]	±5°

[a] Nominal angle subject to agreement between manufacturer and customer.

5.4 Land spacing B_3

Table 4 shows common features for land spacing B_3.

Table 4 — Land spacing B_3

Dimensions in millimetres

Ring width h_1	Land spacing B_3
1,5	0,90 to 1,00
2,0	1,25 to 1,45[a]
2,5	1,35 to 1,75[a]
3,0	1,45 to 2,10[a]
4,0	1,80 to 3,20[a]

[a] $B_3 > (c_1 + 0{,}95)$.

5.5 Slot sizes

Table 5 shows common features for slot sizes.

Table 5 — Standard slot sizes

Dimensions in millimetres

Ring width h_1	Slot width c_1	Slot length w_1	Slot spacing w_3
1,5	0,3 to 0,5	1,4 to 2,5	5 to 10
2,0	0,3 to 0,5	1,4 to 2,5	5 to 10
2,5	0,4 to 0,6	2,0 to 3,0	5 to 10
3,0	0,5 to 0,7	2,5 to 3,5	5 to 10
4,0	0,6 to 1,0	3,0 to 5,0	5 to 10

Slots may open into the gap faces (see Figure 3).

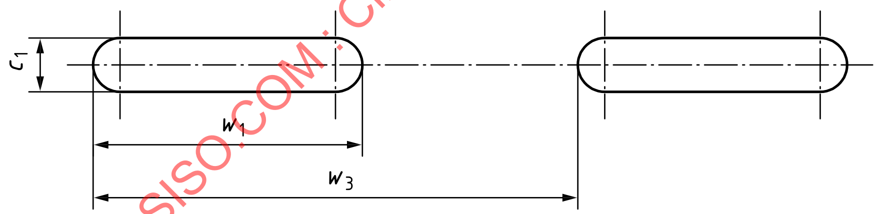


Figure 3 — Arrangement of slots

5.6 Nitrided surface

Table 6 shows common features for nitrided surfaces.

Table 6 — Nitrided case depth of peripheral surface and sideface

Dimensions in millimetres

Code	Nitrided case depth[a]	
	Peripheral surface min.	Sideface min.
NT010	0,010	0,005

[a] It is not recommended for rings h_1 = 1,5 mm.

[b] It is not recommended for land width $h_5 \leq 0{,}20$ mm.

Table 6 *(continued)*

Code	Nitrided case depth[a]	
	Peripheral surface min.	Sideface min.
NT030	0,030	0,010
NT050[b]	0,050	0,015

[a] It is not recommended for rings h_1 = 1,5 mm.

[b] It is not recommended for land width $h_5 \leq$ 0,20 mm.

5.7 PVD coating thickness of peripheral surface

Table 7 shows PVD coating thickness of peripheral surface.

Table 7 — PVD coating thickness of peripheral surface

Dimensions in millimetres

Code	PVD coating thickness Peripheral surface min.
PC001	0,001
PC003	0,003
PC005	0,005
PC010[a]	0,010
PC020[a]	0,020

[a] Not typical for diamond-like carbon (DLC) coatings.

5.8 Nominal contact pressure and tangential force

5.8.1 Nominal contact pressure

Table 8 shows common features for nominal contact pressure.

Table 8 — Nominal contact pressure classes

Ring width h_1 mm	Nominal contact pressure p_0 MPa			
	Code PN1,0	**Code PN1,5**	**Code PN2,0**	**Code PN2,5**
1,5	1,0	1,5	—	—
2,0	1,0	1,5	2,0	—
2,5	1,0	1,5	2,0	—
3,0	—	1,5	2,0	2,5
4,0	—	1,5	2,0	2,5

5.8.2 Actual tangential force, F_t, and tolerance

The actual tangential force of a spring-loaded oil control ring can be calculated with the tabulated normalized tangential force, F_t/d_1, given in Table 7, according to the required nominal contact pressure, p_0, from the equation:

$$F_t = F_N \cdot d_1$$

The tolerance on F_t is the actual value F_t ± 20 %. Actual values of tangential force should be rounded up or down in accordance with ISO 6621-4.

5.8.3 Normalized tangential force, F_N

The normalized tangential force F_N is defined:

$$F_N = \left(\frac{F_t}{d_1} \right)$$

For different nominal contact pressure, p_0, F_N is tabulated in Table 9.

Table 9 — Normalized tangential forces, F_N

Code	h_5 / p_0	0,18	0,2	0,25	0,28	0,30	0,35	0,40	0,50	0,60	0,70	0,80	0,90	1,10	1,30	1,60
PN2,5	2,5	0,45	0,50	0,63	0,70	0,75	0,88	1,00	1,25	1,50	1,75	2,00	2,25	2,75	3,25	4,00
PN2,0	2,0	0,36	0,40	0,50	0,56	0,60	0,70	0,80	1,00	1,20	1,40	1,60	1,80	2,20	2,60	3,20
PN1,5	1,5	0,27	0,30	0,38	0,42	0,45	0,53	0,60	0,75	0,90	1,05	1,20	1,35	1,65	1,95	2,40
PN1,0	1,0	0,18	0,20	0,25	0,28	0,30	0,35	0,40	0,50	0,60	0,70	0,80	0,90	1,10	1,30	1,60
PN0,5	0,5	0,09	0,10	0,13	0,14	0,15	0,18	0,20	0,25	0,30	0,35	0,40	0,45	0,55	0,65	0,80

5.9 Tolerance of tangential force F_t

Table 10 shows common features for tangential force F_t, following Formula (1):

$$F_t = d_1 \times h_5 \times p_0 \quad (1)$$

Table 10 — Tolerance of tangential force F_t

Tangential force N	Tolerance
$F_t < 20$	±4 N
$F_t \geq 20$	±20 %

6 Coil springs

6.1 Types of coil spring

6.1.1 All values in the dimensional tables are based on cylindrical coil springs made of round wire.

The three designs shown in Figures 4 to 7 are common.

6.1.2 Figure 4 illustrates the design of type CSN coil spring with constant pitch.

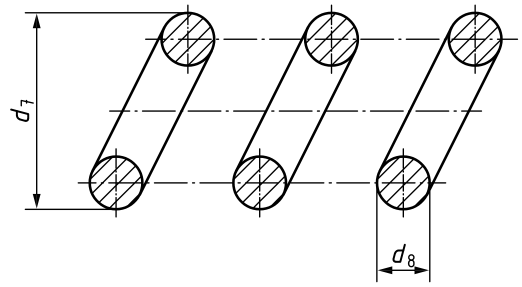
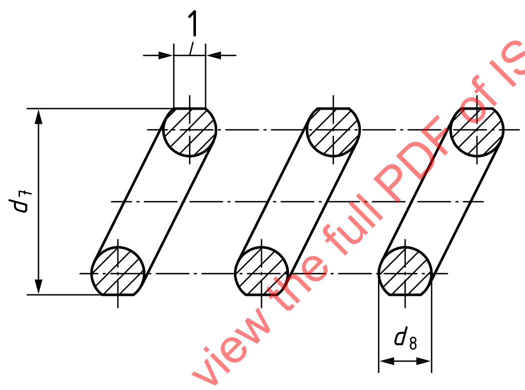


Figure 4 — Type CSN coil spring

6.1.3 Figure 5 illustrates the design of type CSG coil spring with constant pitch (coil diameter d_7 ground).

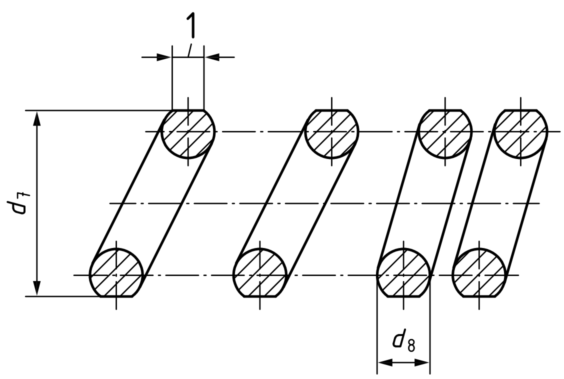


Key

1 approx. 0,8 × d_8 - diameter of wire

Figure 5 — Type CSG coil spring

6.1.4 Figure 6 illustrates the design of type CSE coil spring with variable pitch (coil diameter d_7 ground), and Figure 7 shows the position of the area with small pitch.

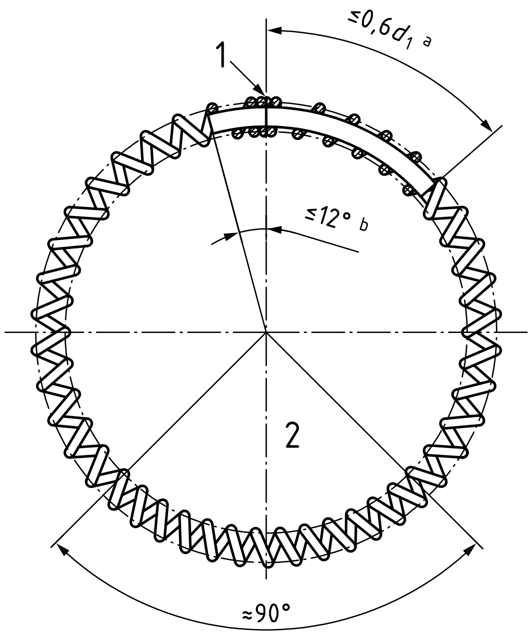


Key

1 approx. 0,8 × d_8 - diameter of wire

Figure 6 — Type CSE coil spring

Dimensions in millimetres



Key

1 spring gap

2 area with small pitch

a Latch pin free length.

b Latch pin fixed length.

Figure 7 — Position of area with small pitch

NOTE The use of different spring designs can be agreed between manufacturer and customer. Changed spring groove configurations and dimensions can then be necessary.

6.2 Coil-spring excursion (extended gap)

Coil-spring excursion, f_1, is the distance between the ends of the ring gap, with unstressed ring, measured in the middle of the spring groove (see Figure 8 and Table 11).

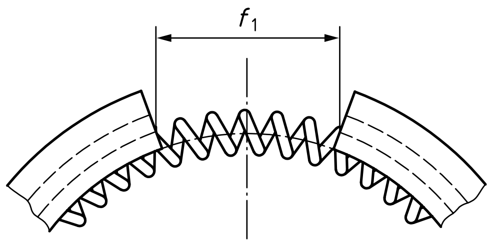


Figure 8 — Coil-spring excursion

Table 11 — Coil-spring excursion

Dimensions in millimetres

Nominal diameter d_1	Coil-spring excursion f_1 max.
$60 \leq d_1 < 100$	$0{,}1 \times d_1$

Table 11 *(continued)*

Nominal diameter d_1	Coil-spring excursion f_1 max.
$100 \leq d_1 \leq 160$	$0{,}12 \times d_1$

6.3 Position of coil spring gap and fixing

The spring gap shall be approximately 180° from the ring gap and the spring gap ends fixed with a connecting or latch pin.

6.4 Material

Coil springs are made of materials as shown in ISO 6621-3, subclasses MC62 (valve spring wire), MC67 (stainless steel) and MC68 (piano wire).

Springs are available with two different heat set resistance levels (loss of tangential force under load and temperature):

— standard heat resistance;

— reduced heat set, code WF.

The test conditions and the permissible loss of tangential forces are given in ISO 6621-5.

7 Type SOR

Table 12 gives the tolerance and calculation criteria on a_4, a_{13}, a_{17}, d_{14}, d_7 and a_{12} for type SOR.

Table 12 — Tolerance and calculation criteria on a_4, a_{13}, a_{17}, d_{14}, d_7 and a_{12} for type SOR

Dimensions in millimetres

Item	Symbol	Tolerance	Calculation criteria
Groove depth	a_4	±0,1	$a_4 = (0{,}35 \text{ to } 0{,}6) \times a_1 - 0{,}2$
Groove depth and bridge	a_{13}	±0,1	$a_{13} = a4 + (0{,}45 \text{ to } 0{,}65)$
External land depth	a_{17}[a]	max.	$a_{17} = (0{,}1 \text{ to } 0{,}3) \times a_1$
Coil-spring groove diameter	d_{14}	±0,05	$d_{14} = (0{,}65 \text{ to } 0{,}85)$[b]
Coil-spring diameter	d_7	±0,05	$d_7 = d_{14} - (0{,}1 \text{ to } 0{,}4)$
Radial thickness over coil spring	a_{12}	±0,15	$a_{12} = a_{13} + d_7$

[a] This value is to be determined between manufacturer and customer.

[b] When h_1 is 1,5 to 2,5, $d_{14} = (0{,}75 \text{ to } 0{,}85) \times h_1$.

8 Type SOV

8.1 The angle of inside groove, θ, is as follows:

40° ± 1° (code V40) or 45° ± 1° (code V45) ± 1° (angle to reference plane).

See Figure 2.

8.2 Table 13 gives the tolerance and calculation criteria on a_4, a_{13}, a_{17}, d_7 and a_{12} for type SOV.

Table 13 — Tolerance and calculation criteria on a_4, a_{13}, a_{17}, d_7 and a_{12} for type SOV

Dimensions in millimetres

Item	Symbol	Tolerance	Calculation criteria
Groove depth	a_4	±0,1	$a_4 = (0{,}35 \text{ to } 0{,}6) \times a_1 - 0{,}3$
Groove depth and bridge	a_{13}	±0,1	$a_{13} = a_4 + (0{,}45 \text{ to } 0{,}65)$
External land depth	a_{17}[a]	max.	$a_{17} = (0{,}1 \text{ to } 0{,}3) \times a_1$
Coil-spring diameter	d_7	±0,05	$d_7 = (0{,}6 \text{ to } 0{,}8) \times h_1$
Radial thickness over coil spring	a_{12}	±0,15	$a_{12} = a_4 + (-0{,}1 \text{ to } 0{,}4) + \left(1 + \frac{1}{\sin\theta}\right) \times \frac{d_7}{2}$

[a] This value is to be determined between manufacturer and customer.

9 Dimensions

The two cross-sections specified in this document (SOR and SOV) are applicable for different diameter ranges. Table 14 provides a summary of the specifications given in Tables 15 to 22. The detailed Tables 15 to 22 contain the recommended nominal tangential forces of all types and diameters shown in Table 14.

Table 14 — Index of Tables 15 to 22

Dimensions in millimetres

Table	Type	Ring width h_1	Radial wall thickness a_1	Nominal diameter d_1
15	**SOR**	1,5	SOR-S	60 to 89
16		2,0 and 2,5	SOR-S	60 to 100
17		3,0	SOR-S and SOR-L	65 to 120
18		4,0	SOR-S and SOR-L	80 to 124
19		4,0	SOR-S and SOR-L	125 to 160
20	**SOV**	3,0	SOV-S and SOV-L	70 to 120
21		4,0	SOV-S and SOV-L	80 to 124
22		4,0	SOV-S and SOV-L	125 to 160

NOTE Codes S and L are described in Table 1.

Table 15 — Recommended nominal tangential force of ring type SOR-S (h_1 = 1,5 mm)

Nominal diameter d_1 mm	Closed gap s_1 mm	Recommended nominal tangential force N Ring type SOR-S $h_1 = 1{,}5^{-0{,}01}_{-0{,}03}$ h_5 = 0,18 ± 0,07 PN1,0 (1,0 MPa)	 PN1,5 (1,5 MPa)
60	$0{,}2^{+0{,}2}_{0}$	10,8	16,2
61		11	16,5
62		11,2	16,7
63		11,3	17
64		11,5	17,3
65		11,7	17,6
66		11,9	17,8
67		12,1	18,1
68		12,2	—
69		12,4	
70		12,6	
71		12,8	
72		13,0	
73		13,1	
74		13,3	
75	$0{,}25^{+0{,}2}_{0}$	13,5	
76		13,7	
77		13,9	
78		14	
79		14,2	
80		14,4	
81		14,6	
82		14,8	
83		14,9	
84		15,1	
85		15,3	
86		15,5	
87		15,7	
88		15,8	
89		16	
Diameters without value for tangential force are not recommended for use.			

Table 16 — Recommended nominal tangential force of ring type SOR-S (h_1 = 2,0 mm and h_1 = 2,5 mm)

Nominal diameter d_1 mm	Closed gap s_1 mm	Recommended nominal tangential force N								
		Ring type SOR-S mm								
		$h_1 = 2{,}0^{-0{,}01}_{-0{,}03}$			$h_1 = 2{,}5^{-0{,}01}_{-0{,}03}$					
		h_5 = 0,2 ± 0,07			h_5 = 0,2 ± 0,07			h_5 = 0,25 ± 0,07		
		PN1,0 (1,0 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN1,0 (1,0 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN1,0 (1,0 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)
60		12	18	24	12	18	24	15	22,5	30
61		12,2	18,3	24,4	12,2	18,3	24,4	15,3	22,9	30,5
62		12,4	18,6	24,8	12,4	18,6	24,8	15,5	23,3	31
63		12,6	18,9	25,2	12,6	18,9	25,2	15,8	23,7	31,5
64		12,8	19,2	25,6	12,8	19,2	25,6	16	24	32
65		13	19,5	26	13	19,5	26	16,3	24,4	32,5
66		13,2	19,8		13,2	19,8	26,4	16,5	24,8	33
67		13,4	20,1		13,4	20,1	26,8	16,8	25,1	33,5
68	$0{,}2^{+0{,}2}_{0}$	13,6	20,4		13,6	20,4	27,2	17	25,5	34
69		13,8	20,7		13,8	20,7	27,6	17,3	25,9	34,5
70		14	21	—	14	21	28	17,5	26,3	35
71		14,2	21,3		14,2	21,3	28,4	17,8	26,6	35,5
72		14,4	21,6		14,4	21,6	28,8	18	27	36
73		14,6	21,9		14,6	21,9	29,2	18,3	27,4	36,5
74		14,8	22,2		14,8	22,2	29,6	18,5	27,8	37
75		15	22,5		15	22,5	30	18,8	28,1	37,5
76		15,2	22,8		15,2	22,8	30,4	19	28,5	38
77		15,4	23,1		15,4	23,1	30,8	19,3	28,9	38,5
78		15,6	23,4		15,6	23,4	31,2	19,5	29,3	39
79		15,8	23,7		15,8	23,7	31,6	19,8	29,6	39,5
80		16	24		16	24	32	20	30	40
81		16,2	24,3		16,2	24,3	32,4	20,3	30,4	40,5
82	$0{,}25^{+0{,}2}_{0}$	16,4	24,6	—	16,4	24,6	32,8	20,5	30,8	41
83		16,6	24,9		16,6	24,9	33,2	20,8	31,1	41,5
84		16,8	25,2		16,8	25,2	33,6	21	31,5	42
85		17	25,5		17	25,5	34	21,3	31,9	42,5
86		17,2	25,8		17,2	25,8	34,4	21,5	32,3	
87		17,4	26,1		17,4	26,1	34,8	21,8	32,6	—
88		17,6	26,4		17,6	26,4	35,2	22	33	
89		17,8	26,7		17,8	26,7	35,6	22,3	33,4	
90		18	27		18	27	36	22,5	33,8	
91		18,2			18,2	27,3	36,4	22,8	34,1	
92		18,4			18,4	27,6	36,8	23	34,5	
93	$0{,}3^{+0{,}25}_{0}$	18,6			18,6	27,9	37,2	23,3	34,9	
94		18,8			18,8	28,2	37,6	23,5	35,3	
95		19			19	28,5	38	23,8	35,6	
96					19,2	28,8	38,4	24	36	
97					19,4	29,1	38,8	24,3	36,4	

Table 16 *(continued)*

Nominal diameter d_1 mm	Closed gap s_1 mm	Recommended nominal tangential force N — Ring type SOR-S mm — $h_1 = 2,0^{-0,01}_{-0,03}$ — h_5 = 0,2 ± 0,07 — PN1,0 (1,0 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	$h_1 = 2,5^{-0,01}_{-0,03}$ — h_5 = 0,2 ± 0,07 — PN1,0 (1,0 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	h_5 = 0,25 ± 0,07 — PN1,0 (1,0 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)
98	$0,3^{+0,25}_{0}$	—	—	—	19,6	29,4	39,2	24,5	36,8	—
99	$0,3^{+0,25}_{0}$	—	—	—	19,8	29,7	39,6	24,8	37,1	—
100	$0,3^{+0,25}_{0}$	—	—	—	20	30	40	25	37,5	—
101	$0,3^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
102	$0,3^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
103	$0,3^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
104	$0,3^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
105	$0,3^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
106	$0,3^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
107	$0,3^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
108	$0,3^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
109	$0,3^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
110	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
111	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
112	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
113	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
114	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
115	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
116	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
117	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
118	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
119	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
120	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
121	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
122	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
123	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—
124	$0,35^{+0,25}_{0}$	—	—	—	—	—	—	—	—	—

Diameters without value for tangential force are not recommended for use.

Table 17 — Recommended nominal tangential force of ring type SOR-S and SOR-L (h_1 = 3,0 mm)

Nominal diameter d_1 mm	Closed gap s_1 mm	Recommended nominal tangential force N											
		Ring type SOR-S mm						Ring type SOR-L mm					
		$h_1 = 3{,}0^{-0{,}01}_{-0{,}03}$						$h_1 = 3{,}0^{-0{,}01}_{-0{,}03}$					
		h_5 = 0,2 ± 0,07			h_5 = 0,25 ± 0,07			h_5 = 0,2 ± 0,07			h_5 = 0,25 ± 0,07		
		PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5MPa)
60													
61													
62		—	—	—	—	—	—						
63													
64													
65		19,5	26	32,5	24,4	32,5	40,6						
66		19,8	26,4	33	24,8	33	41,3	—	—	—	—	—	—
67	$0{,}2^{+0{,}2}_{0}$	20,1	26,8	33,5	25,1	33,5	41,9						
68		20,4	27,2	34	25,5	34	42,5						
69		20,7	27,6	34,5	25,9	34,5	43,1						
70		21	28	35	26,3	35	43,8						
71		21,3	28,4	35,5	26,6	35,5	44,4						
72		21,6	28,8	36	27	36	45						
73		21,9	29,2	36,5	27,4	36,5	45,6						
74		22,2	29,6	37	27,8	37	46,3						
75		22,5	30	37,5	28,1	37,5	46,9						
76		22,8	30,4	38	28,5	38	47,5						
77		23,1	30,8	38,5	28,9	38,5	48,1	—	—	—	—	—	—
78		23,4	31,2	39	29,3	39	48,8						
79		23,7	31,6	39,5	29,6	39,5	49,4						
80		24	32	40	30	40	50	24	32	40	30	40	50
81		24,3	32,4	40,5	30,4	40,5	50,6	24,3	32,4	40,5	30,4	40,5	50,6
82	$0{,}25^{+0{,}2}_{0}$	24,6	32,8	41	30,8	41	51,3	24,6	32,8	41	30,8	41	51,3
83		24,9	33,2	41,5	31,1	41,5	51,9	24,9	33,2	41,5	31,1	41,5	51,9
84		25,2	33,6	42	31,5	42	52,5	25,2	33,6	42	31,5	42	52,5
85		25,5	34	42,5	31,9	42,5	53,1	25,5	34	42,5	31,9	42,5	53,1
86		25,8	34,4	43	32,3	43	53,8	25,8	34,4	43	32,3	43	53,8
87		26,1	34,8	43,5	32,6	43,5	54,4	26,1	34,8	43,5	32,6	43,5	54,4
88		26,4	35,2	44	33	44	55	26,4	35,2	44	33	44	55
89		26,7	35,6	44,5	33,4	44,5	55,6	26,7	35,6	44,5	33,4	44,5	55,6
90		27	36	45	33,8	45	56,3	27	36	45	33,8	45	56,3
91		27,3	36,4	45,5	34,1	45,5	56,9	27,3	36,4	45,5	34,1	45,5	56,9
92	$0{,}3^{+0{,}25}_{0}$	27,6	36,8	46	34,5	46	57,5	27,6	36,8	46	34,5	46	57,5
93		27,9	37,2	46,5	34,9	46,5	58,1	27,9	37,2	46,5	34,9	46,5	58,1
94		28,2	37,6	47	35,3	47	58,8	28,2	37,6	47	35,3	47	58,8

Table 17 *(continued)*

Nominal diameter d_1 mm	Closed gap s_1 mm	Recommended nominal tangential force N											
		Ring type SOR-S mm						Ring type SOR-L mm					
		$h_1 = 3{,}0^{-0{,}01}_{-0{,}03}$						$h_1 = 3{,}0^{-0{,}01}_{-0{,}03}$					
		h_5 = 0,2 ± 0,07			h_5 = 0,25 ± 0,07			h_5 = 0,2 ± 0,07			h_5 = 0,25 ± 0,07		
		PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5MPa)
95	$0{,}3^{+0{,}25}_{0}$	28,5	38	47,5	35,6	47,5	59,4	28,5	38	47,5	35,6	47,5	59,4
96		28,8	38,4	48	36	48	60	28,8	38,4	48	36	48	60
97		29,1	38,8	48,5	36,4	48,5	60,6	29,1	38,8	48,5	36,4	48,5	60,6
98		29,4	39,2	49	36,8	49	61,3	29,4	39,2	49	36,8	49	61,3
99		29,7	39,6	49,5	37,1	49,5	61,9	29,7	39,6	49,5	37,1	49,5	61,9
100		30	40	50	37,5	50	62,5	30	40	50	37,5	50	62,5
101		30,3	40,4	50,5	37,9	50,5	—	30,3	40,4	50,5	37,9	50,5	—
102		30,6	40,8	51	38,3	51		30,6	40,8	51	38,3	51	
103		30,9	41,2	51,5	38,6	51,5		30,9	41,2	51,5	38,6	51,5	
104		31,2	41,6	52	39	52		31,2	41,6	52	39	52	
105		31,5	42	52,5	39,4	52,5		31,5	42	52,5	39,4	52,5	
106		31,8	42,4	53	39,8	53		31,8	42,4	53	39,8	53	
107		32,1	42,8	53,5	40,1	53,5		32,1	42,8	53,5	40,1	53,5	
108		32,4	43,2	54	40,5	54		32,4	43,2	54	40,5	54	
109		32,7	43,6	54,5	40,9	54,5		32,7	43,6	54,5	40,9	54,5	
110	$0{,}35^{+0{,}25}_{0}$	33	44	55	41,3	55		33	44	55	41,3	55	
111		—	—	—	—	—		33,3	44,4	55,5	41,6	55,5	
112								33,6	44,8	56	42	56	
113								33,9	45,2	56,5	42,4	56,5	
114								34,2	45,6	57	42,8	57	
115								34,5	46	57,5	43,1	57,5	
116								34,8	46,4	58	43,5	58	
117								35,1	46,8	58,5	43,9	58,5	
118								35,4	47,2	59	44,3	59	
119								35,7	47,6	59,5	44,6	59,5	
120								36	48	60	45	60	
121								—	—	—	—	—	
122													
123													
124													

Table 18 — Recommended nominal tangential force of ring type SOR-S and SOR-L (h_1 = 4,0 mm; nominal diameters d_1 < 125 mm)

Nominal diameter d_1 mm	Closed gap s_1 mm	Recommended nominal tangential force N														
		Ring type SOR-S mm									Ring type SOR-L mm					
		$h_1 = 4{,}0^{-0{,}01}_{-0{,}03}$									$h_1 = 4{,}0^{-0{,}01}_{-0{,}03}$					
		h_5 = 0,2 ± 0,07			h_5 = 0,2 ± 0,07			h_5 = 0,3 ± 0,07			h_5 = 0,25 ± 0,07			h_5 = 0,3 ± 0,07		
		PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)
60																
61																
62																
63																
64																
65																
66																
67	$0{,}2^{+0{,}2}_{0}$	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
68																
69																
70																
71																
72																
73																
74																
75																
76																
77		—	—	—	—	—	—	—	—	—						
78																
79																
80		24	32	40	30	40	50	36	48	60						
81		24,3	32,4	40,5	30,4	40,5	50,6	36,5	48,6	60,8						
82	$0{,}25^{+0{,}2}_{0}$	24,6	32,8	41	30,8	41	51,3	36,9	49,2	61,5	—	—	—	—	—	—
83		24,9	33,2	41,5	31,1	41,5	51,9	37,4	49,8	62,3						
84		25,2	33,6	42	31,5	42	52,5	37,8	50,4	63						
85		25,5	34	42,5	31,9	42,5	53,1	38,3	51	63,8						
86		25,8	34,4	43	32,3	43	53,8	38,7	51,6	64,5						
87		26,1	34,8	43,5	32,6	43,5	54,4	39,2	52,2	65,3						
88		26,4	35,2	44	33	44	55	39,6	52,8	66						
89		26,7	35,6	44,5	33,4	44,5	55,6	40,1	53,4	66,8						
90		27	36	45	33,8	45	56,3	40,5	54	67,5						
91		27,3	36,4	45,5	34,1	45,5	56,9	41	54,6	68,3						
92	$0{,}3^{+0{,}25}_{0}$	27,6	36,8	46	34,5	46	57,5	41,4	55,2	69	—	—	—	—	—	—
93		27,9	37,2	46,5	34,9	46,5	58,1	41,9	55,8	69,8						
94		28,2	37,6	47	35,3	47	58,8	42,3	56,4	70,5						

Table 18 *(continued)*

Nominal diameter d_1 mm	Closed gap s_1 mm	Recommended nominal tangential force N														
		Ring type SOR-S mm									Ring type SOR-L mm					
		$h_1 = 4{,}0^{-0{,}01}_{-0{,}03}$									$h_1 = 4{,}0^{-0{,}01}_{-0{,}03}$					
		$h_5 = 0{,}2 \pm 0{,}07$			$h_5 = 0{,}2 \pm 0{,}07$			$h_5 = 0{,}3 \pm 0{,}07$			$h_5 = 0{,}25 \pm 0{,}07$			$h_5 = 0{,}3 \pm 0{,}07$		
		PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)
95		28,5	38	47,5	35,6	47,5	59,4	42,8	57	71,3	—	—	—	—	—	—
96		28,8	38,4	48	36	48	60	43,2	57,6	72	—	—	—	—	—	—
97		29,1	38,8	48,5	36,4	48,5	60,6	43,7	58,2	72,8	—	—	—	—	—	—
98		29,4	39,2	49	36,8	49	61,3	44,1	58,8	73,5	—	—	—	—	—	—
99		29,7	39,6	49,5	37,1	49,5	61,9	44,6	59,4	74,3	—	—	—	—	—	—
100	$0{,}3^{+0{,}25}_{0}$	30	40	50	37,5	50	62,5	45	60	75	37,5	40	50	45	60	75
101		30,3	40,4	50,5	37,9	50,5	63,1	45,5	60,6	75,8	37,9	40,5	50,6	45,5	60,6	75,8
102		30,6	40,8	51	38,3	51	63,8	45,9	61,2	76,5	38,3	41	51,3	45,9	61,2	76,5
103		30,9	41,2	51,5	38,6	51,5	64,4	46,4	61,8	77,3	38,6	41,5	51,9	46,4	61,8	77,3
104		31,2	41,6	52	39	52	65	46,8	62,4	78	39,0	42	52,5	46,8	62,4	78
105		31,5	42	52,5	39,4	52,5	65,6	47,3	63	78,8	39,4	42,5	53,1	47,3	63	78,8
106		31,8	42,4	53	39,8	53	66,3	47,7	63,6	79,5	39,8	43	53,8	47,7	63,6	79,5
107		32,1	42,8	53,5	40,1	53,5	66,9	48,2	64,2	80,3	40,1	43,5	54,4	48,2	64,2	80,3
108		32,4	43,2	54	40,5	54	67,5	48,6	64,8	81	40,5	44	55	48,6	64,8	81
109		32,7	43,6	54,5	40,9	54,5	68,1	49,1	65,4	81,8	40,9	44,5	55,6	49,1	65,4	81,8
110		33	44	55	41,3	55	68,8	49,5	66	82,5	41,3	45	56,3	49,5	66	82,5
111		33,3	44,4	55,5	41,6	55,5	69,4	50	66,6	83,3	41,6	45,5	56,9	50	66,6	83,3
112		33,6	44,8	56	42	56	70	50,4	67,2	84	42,0	46	57,5	50,4	67,2	84
113		33,9	45,2	56,5	42,4	56,5	70,6	50,9	67,8	84,8	42,4	46,5	58,1	50,9	67,8	84,8
114		34,2	45,6	57	42,8	57	71,3	51,3	68,4	85,5	42,8	47	58,8	51,3	68,4	85,5
115		34,5	46	57,5	43,1	57,5	71,9	51,8	69	86,3	43,1	47,5	59,4	51,8	69	86,3
116		34,8	46,4	58	43,5	58	72,5	52,2	69,6	87	43,5	48	60	52,2	69,6	87
117	$0{,}35^{+0{,}25}_{0}$	35,1	46,8	58,5	43,9	58,5	73,1	52,7	70,2	87,8	43,9	48,5	60,6	52,7	70,2	87,8
118		35,4	47,2	59	44,3	59	73,8	53,1	70,8	88,5	44,3	49	61,3	53,1	70,8	88,5
119		35,7	47,6	59,5	44,6	59,5	74,4	53,6	71,4	89,3	44,6	49,5	61,9	53,6	71,4	89,3
120		36	48	60	45	60	75	54	72	90	45,0	50	62,5	54	72	90
121		—	—	—	45,4	60,5	75,6	54,5	72,6	90,8	45,4	50,5	63,1	54,5	72,6	90,8
122		—	—	—	45,8	61	76,3	54,9	73,2	91,5	45,8	51	63,8	54,9	73,2	91,5
123		—	—	—	46,1	61,5	76,9	55,4	73,8	92,3	46,1	51,5	64,4	55,4	73,8	92,3
124		—	—	—	46,5	62	77,5	55,8	74,4	93	46,5	52	65	55,8	74,4	93

Table 19 — Recommended nominal tangential force of ring type SOR-S and SOR-L (h_1 = 4,0 mm; nominal diameters d_1 ≥ 125 mm)

Nominal diameter d_1 mm	Closed gap s_1 mm	Recommended nominal tangential force N														
		Ring type SOR-S mm									Ring type SOR-L mm					
		$h_1 = 4{,}0^{-0{,}01}_{-0{,}03}$									$h_1 = 4{,}0^{-0{,}01}_{-0{,}03}$					
		h_5 = 0,2 ± 0,07			h_5 = 0,25 ± 0,07			h_5 = 0,3 ± 0,07			h_5 = 0,25 ± 0,07			h_5 = 0,3 ± 0,07		
		PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)
125					46,9	62,5	78,1	56,3	75	93,8	46,9	62,5	78,1	56,3	75	93,8
126					47,3	63	78,8	56,7	75,6	94,5	47,3	63	78,8	56,7	75,6	94,5
127	$0{,}35^{+0{,}25}_{0}$	—	—	—	47,6	63,5	79,4	57,2	76,2	95,3	47,6	63,5	79,4	57,2	76,2	95,3
128					48	64	80	57,6	76,8	96	48	64	80	57,6	76,8	96
129					48,4	64,5	80,6	58,1	77,4	96,8	48,4	64,5	80,6	58,1	77,4	96,8
130					48,8	65	81,3	58,5	78	97,5	48,8	65	81,3	58,5	78	97,5
131					49,1	65,5	81,9	59	78,6	98,3	49,1	65,5	81,9	59	78,6	98,3
132					49,5	66	82,5	59,4	79,2	99	49,5	66	82,5	59,4	79,2	99
133					49,9	66,5	83,1	59,9	79,8	99,8	49,9	66,5	83,1	59,9	79,8	99,8
134					50,3	67	83,8	60,3	80,4	100,5	50,3	67	83,8	60,3	80,4	100,5
135					50,6	67,5	84,4	60,8	81	101,3	50,6	67,5	84,4	60,8	81	101,3
136					51	68	85	61,2	81,6	102	51	68	85	61,2	81,6	102
137					51,4	68,5	85,6	61,7	82,2	102,8	51,4	68,5	85,6	61,7	82,2	102,8
138					51,8	69	86,3	62,1	82,8	103,5	51,8	69	86,3	62,1	82,8	103,5
139		—	—	—	52,1	69,5	86,9	62,6	83,4	104,3	52,1	69,5	86,9	62,6	83,4	104,3
140	$0{,}4^{+0{,}3}_{0}$				52,5	70	87,5	63	84	105	52,5	70	87,5	63	84	105
141					52,9	70,5	88,1	63,5	84,6	105,8	52,9	70,5	88,1	63,5	84,6	105,8
142					53,3	71	88,8	63,9	85,2	106,5	53,3	71	88,8	63,9	85,2	106,5
143					53,6	71,5	89,4	64,4	85,8	107,3	53,6	71,5	89,4	64,4	85,8	107,3
144					54	72	90	64,8	86,4	108	54	72	90	64,8	86,4	108
145					54,4	72,5	90,6	65,3	87	108,8	54,4	72,5	90,6	65,3	87	108,8
146					54,8	73	91,3	65,7	87,6		54,8	73	91,3	65,7	87,6	
147					55,1	73,5	91,9	66,2	88,2	—	55,1	73,5	91,9	66,2	88,2	—
148					55,5	74	92,5	66,6	88,8		55,5	74	92,5	66,6	88,8	
149					55,9	74,5	93,1	67,1	89,4		55,9	74,5	93,1	67,1	89,4	
150					56,3	75	93,8	67,5	90		56,3	75	93,8	67,5	90	
152					57	76	95	68,4	91,2		57	76	95	68,4	91,2	
154					57,8	77	96,3	69,3	92,4		57,8	77	96,3	69,3	92,4	
155	$0{,}45^{+0{,}3}_{0}$	—	—	—	58,1	77,5	96,9	69,8	93	—	58,1	77,5	96,9	69,8	93	—
156					58,5	78	97,5	70,2	93,6		58,5	78	97,5	70,2	93,6	
158					59,3	79	98,8	71,1	94,8		59,3	79	98,8	71,1	94,8	
160					60	80	100	72	96		60	80	100	72	96	

Table 20 — Recommended nominal tangential force of ring type SOV-S and SOV-L (h_1 = 3,0 mm)

Nominal diameter d_1 mm	Closed gap s_1 mm	Recommended nominal tangential force N											
		Ring type SOV-S mm						Ring type SOV-L mm					
		$h_1 = 3,0_{-0,03}^{-0,01}$						$h_1 = 3,0_{-0,03}^{-0,01}$					
		h_5 = 0,2 ± 0,07			h_5 = 0,25 ± 0,07			h_5 = 0,2 ± 0,07			h_5 = 0,25 ± 0,07		
		PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)	PN1,5 (1,5 MPa)	PN2,0 (2,0 MPa)	PN2,5 (2,5 MPa)
60													
61													
62													
63													
64		—	—	—	—	—	—						
65													
66								—	—	—	—	—	—
67	$0,2_{0}^{+0,2}$												
68													
69													
70		21	28	35	26,3	30	43,8						
71		21,3	28,4	35,5	26,6	30,5	44,4						
72		21,6	28,8	36	27	31	45						
73		21,9	29,2	36,5	27,4	31,5	45,6						
74		22,2	29,6	37	27,8	32	46,3						
75		22,5	30	37,5	28,1	32,5	46,9						
76		22,8	30,4	38	28,5	33	47,5						
77		23,1	30,8	38,5	28,9	33,5	48,1	—	—	—	—	—	—
78		23,4	31,2	39	29,3	34	48,8						
79		23,7	31,6	39,5	29,6	34,5	49,4						
80		24	32	40	30	35	50	24	32	40	30	40	50
81		24,3	32,4	40,5	30,4	35,5	50,6	24,3	32,4	40,5	30,4	40,5	50,6
82	$0,25_{0}^{+0,2}$	24,6	32,8	41	30,8	36	51,3	24,6	32,8	41	30,8	41	51,3
83		24,9	33,2	41,5	31,1	36,5	51,9	24,9	33,2	41,5	31,1	41,5	51,9
84		25,2	33,6	42	31,5	37	52,5	25,2	33,6	42	31,5	42	52,5
85		25,5	34	42,5	31,9	37,5	53,1	25,5	34	42,5	31,9	42,5	53,1
86		25,8	34,4	43	32,3	38	53,8	25,8	34,4	43	32,3	43	53,8
87		26,1	34,8	43,5	32,6	38,5	54,4	26,1	34,8	43,5	32,6	43,5	54,4
88		26,4	35,2	44	33	39	55	26,4	35,2	44	33	44	55
89		26,7	35,6	44,5	33,4	39,5	55,6	26,7	35,6	44,5	33,4	44,5	55,6
90		27	36	45	33,8	40	56,3	27	36	45	33,8	45	56,3
91		27,3	36,4	45,5	34,1	40,5	56,9	27,3	36,4	45,5	34,1	45,5	56,9
92	$0,3_{0}^{+0,25}$	27,6	36,8	46	34,5	41	57,5	27,6	36,8	46	34,5	46	57,5
93		27,9	37,2	46,5	34,9	41,5	58,1	27,9	37,2	46,5	34,9	46,5	58,1
94		28,2	37,6	47	35,3	42	58,8	28,2	37,6	47	35,3	47	58,8

