

SURFACE VEHICLE RECOMMENDED PRACTICE

Submitted for recognition as an American National Standard

SAE SAE J2003
(ISO 6626)

Issued 1990-09-10

INTERNAL COMBUSTION ENGINES - PISTON RINGS COIL SPRING LOADED OIL CONTROL RINGS

This document is equivalent to ISO Standard 6626

1. SCOPE AND FIELD OF APPLICATION:

This SAE Recommended Practice is equivalent to ISO Standard 6626.

Differences, where they exist, are shown in the appendix with associated rationale.

This document specified the essential dimensions of piston ring types DSF-C, DSF-CNP, SSF, GSF, DSF, DSF-NG, and SSF-L coil spring loaded oil control rings.

For the cast iron part the recommended material is class 10 according to SAE J1590. For special applications material classes 20 to 50 may be used.

Variation in face design and spring groove from these may be used, as recommended by individual manufacturers, in plain or chromed versions.

The tangential forces of coil spring loaded oil control rings can be varied over a wide range. Explanations and recommendations are given in Section 6.

The normal range for axial width of coil spring loaded oil control rings (3 to 8 mm inclusive) is divided into 0.5 or 1.0 mm steps. In Tables 15 to 20 dimensions are given for coil spring loaded oil control rings with an axial width of 4.75 mm (i.e. 3/16 in) for existing applications in inch units.

This document applies to coil spring loaded oil control rings up to 200 mm inclusive for reciprocating internal combustion engines. It may also be used for piston rings of compressors working under similar conditions.

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SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

2. REFERENCES:

SAE DESIGNATION	ISO ¹ EQUIVALENT	
		INTERNAL COMBUSTION ENGINES - PISTON RINGS
J1588	6621/1	Vocabulary
J1589	6621/2	Measuring principles
J1590	6621/3	Material specifications
J1591	6621/4	General specifications
J1996	6621/5	Quality requirements
		INTERNAL COMBUSTION ENGINES - PISTON RINGS
J1997	6622/1	Rectangular rings
J1998	6622/2 TR	Rectangular rings with narrow ring width
J1999	6623	INTERNAL COMBUSTION ENGINES - PISTON RINGS - SCRAPER RINGS
		INTERNAL COMBUSTION ENGINES - PISTON RINGS
J2000	6624/1	Keystone rings
J2001	6624/2 TR	Half keystone rings
J2002	6625	INTERNAL COMBUSTION ENGINES - PISTON RINGS - OIL CONTROL RINGS
J2003	6626	INTERNAL COMBUSTION ENGINES - COIL SPRING LOADED OIL CONTROL RINGS
J2004	6627 TR	INTERNAL COMBUSTION ENGINES - EXPANDER/SEGMENT OIL CONTROL RINGS
	1101	TECHNICAL DRAWINGS - Tolerancing of form, orientation, location and run-out - Generalities, definitions, symbols indications on drawings

¹TR refers to Technical Report

3. PISTON RING TYPES AND DESIGNATION EXAMPLES:

3.1 Type DSF-C – Coil Spring Loaded Bevelled Edge Oil Control Ring, Chromium-Plated and Profile Ground:

3.1.1 General Features:

NOTE: See Tables 9 and 15 for dimensions and forces.

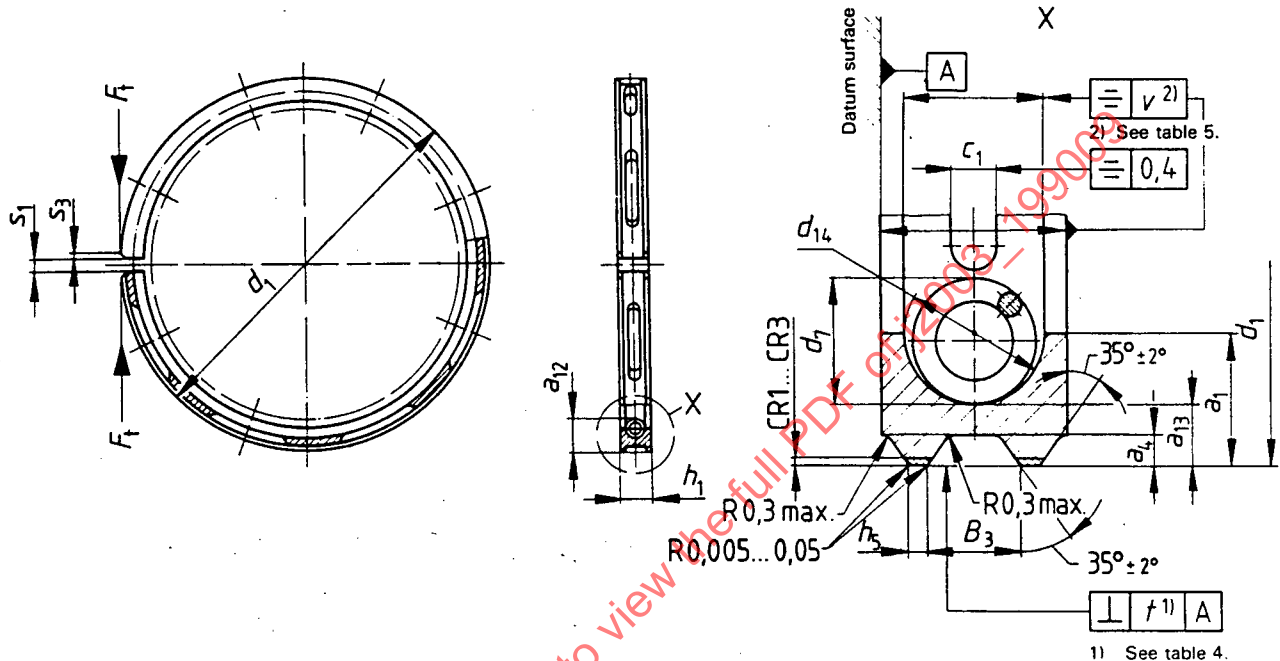


FIGURE 1 - Type DSF-C

3.1.2 Designation Example: Designation of a piston ring complying with the requirements of SAE J2003 being a coil spring loaded bevelled edge oil control ring, chromium-plated and profile ground (DSF-C), of nominal diameter $d_1 = 125 \text{ mm}$ (125), a nominal ring width $h_1 = 5 \text{ mm}$ (5), made of grey cast iron, non-heat-treated, material subclass 11 (MC 11). A selected closed gap of 0.2 mm (S02), a chromium layer thickness on the lands of 0.15 mm min (CR3) phosphated on all cast iron surfaces to depth of 0.002 mm min (PO), reduced slot length (WK), coil spring with reduced heat set (WF), and variable pitch with coil diameter d_7 ground (CSE), tangential force F_t according to the medium nominal contact pressure class (PNM) and the ring marked with manufacturer's mark (MM):

3.2 Type DSF-CNP – Coil Spring Loaded Bevelled Edge Oil Control Ring, Chromium-Plated Not Profile Ground:

3.2.1 General Features:

NOTE: See Tables 10 and 16 for dimensions and forces.

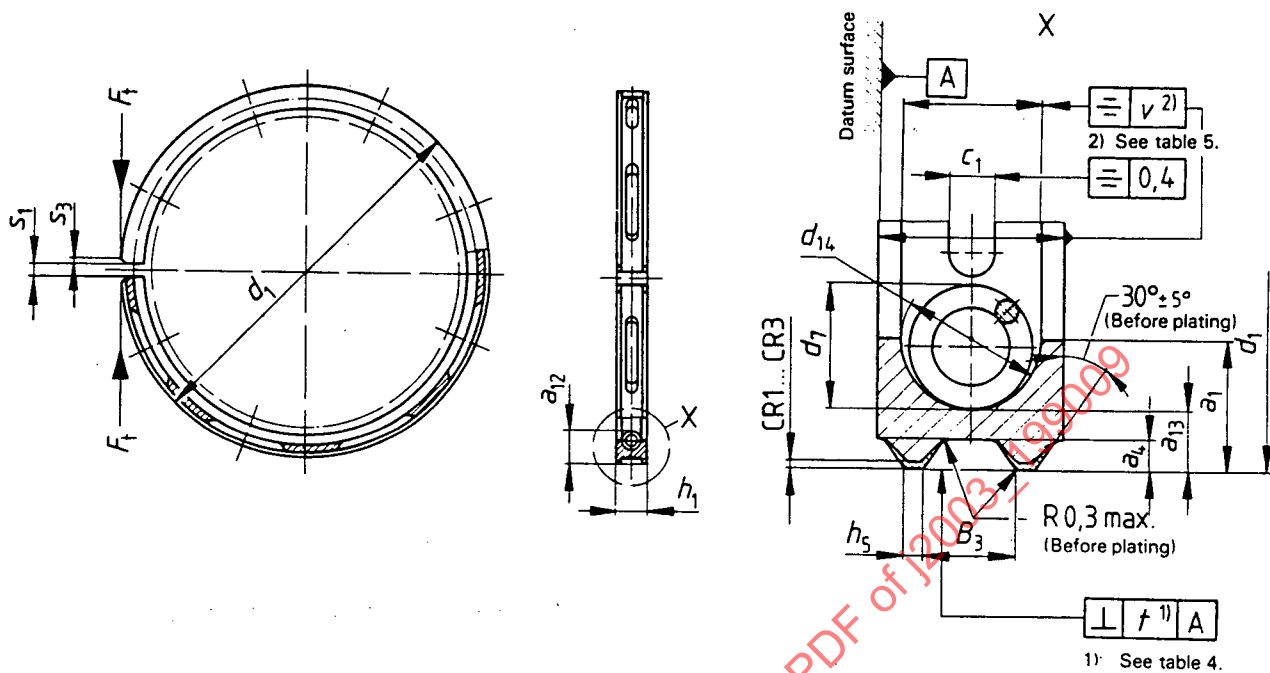


FIGURE 2 - Type DSF-CNP

3.2.2 Designation Example: Designation of a piston ring complying with the requirements of SAE J2003 being a coil spring loaded bevelled edge oil control ring, chromium-plated not profile ground (DSF-CNP), of nominal diameter $d_1 = 180 \text{ mm}$ (180) and nominal ring width $h_1 = 8 \text{ mm}$ (8), made of grey cast iron, non-heat-treated, material subclass 12 (MC12), a chromium layer thickness on the lands of 0.05 mm min (CR1), constant pitch spring (CSN) and tangential force F_t according to the high nominal contact pressure class (PNH):

3.3 Type SSF - Coil Spring Loaded Slotted Oil Control Ring:

3.3.1 General Features:

NOTE: See Tables 11 and 17 for dimensions and forces.

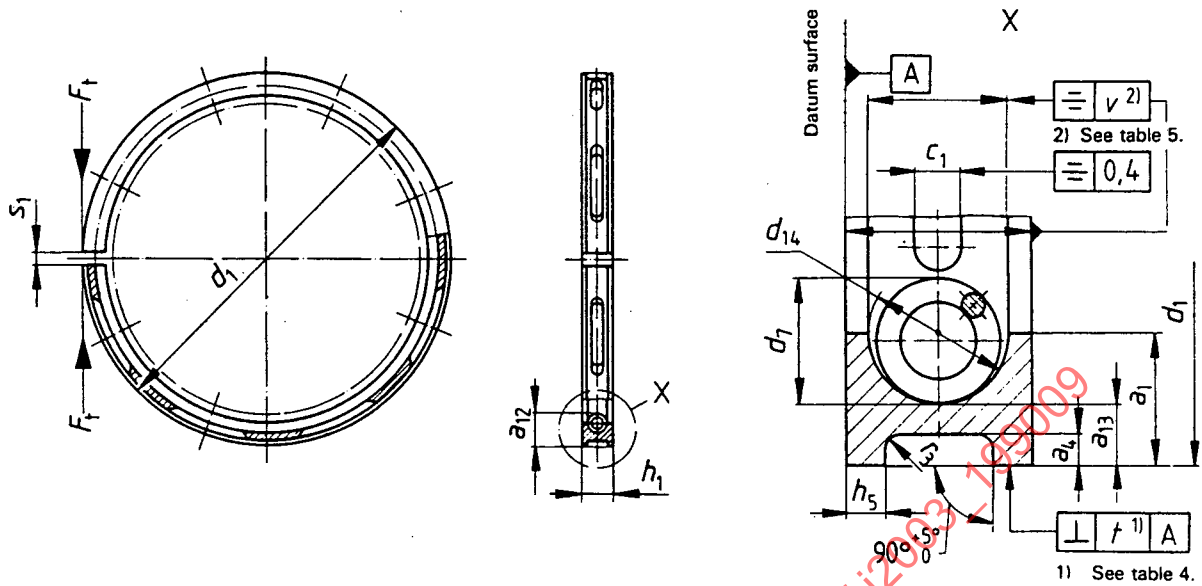


FIGURE 3 - Type SSF

3.3.2 Designation Example: Designation of a piston ring complying with the requirements of SAE J2003 being a coil spring loaded slotted oil control ring (SSF), of nominal diameter $d_1 = 80 \text{ mm}$ (80) and nominal ring width $h_1 = 4 \text{ mm}$ (4), made of grey cast iron, nonheat-treated, material subclass 12 (MC12), constant pitch spring (CSN) and tangential force F_t according to the low nominal contact pressure class (PNL):

3.4 Type GSF - Coil Spring Loaded Double Bevelled Oil Control Ring:

3.4.1 General Features:

NOTE: See Tables 12 and 18 for dimensions and forces.

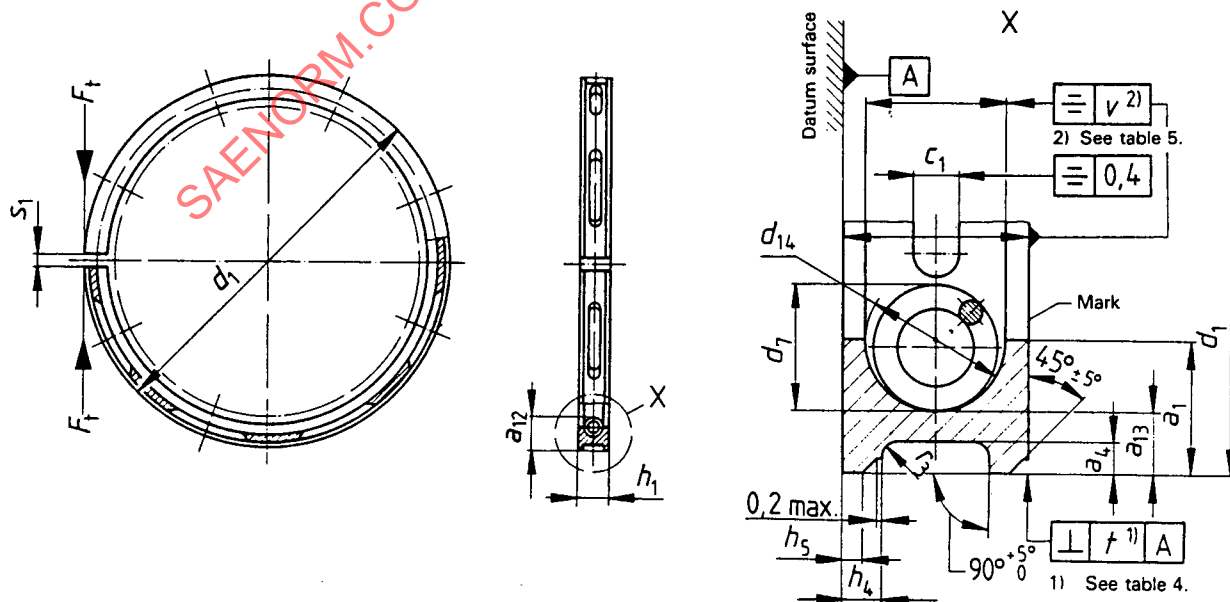


FIGURE 4 - Type GSF

3.4.2 Designation Example: Designation of a piston ring complying with the requirements of SAE J2003 being a coil spring loaded double bevelled oil control ring (GSF), of nominal diameter $d_1 = 75 \text{ mm}$ (75), a nominal ring width $h_1 = 3 \text{ mm}$ (3), made of grey cast iron, nonheat-treated, material subclass 12 (MC12), constant pitch spring (CSN) and a tangential force F_t according to the low nominal contact pressure class (PNL):

3.5 Type DSF – Coil Spring Loaded Bevelled Edge Oil Control Ring:

3.5.1 General Features:

NOTE: See Tables 12 and 18 for dimensions and forces.

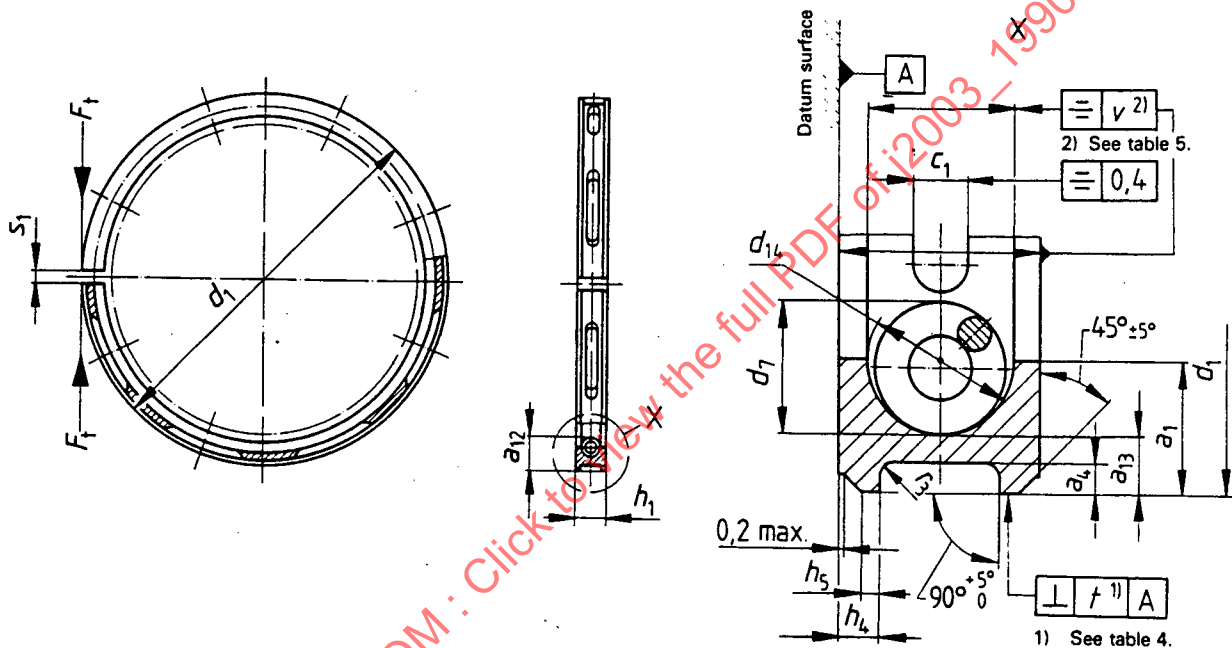


FIGURE 5 – Type DSF

3.5.2 Designation Example: Designation of a piston ring complying with the requirements of SAE J2003 being a coil spring loaded bevelled edge oil control ring (DSF), of nominal diameter $d_1 = 90 \text{ mm}$ (90) and nominal ring width $h_1 = 3.5 \text{ mm}$ (3.5), made of grey cast iron, nonheat-treated, material subclass 12 (MC12), constant pitch spring (CSN) and tangential force F_t according to the reduced nominal contact pressure class (PNR):

3.6 Type DSF-NG - Coil Spring Loaded Bevelled Edge Oil Control Ring (Face Geometry Similar to Type DSF-C or Type DSF-CNP):

3.6.1 General Features:

NOTE: See Tables 13 and 19 for dimensions and forces.

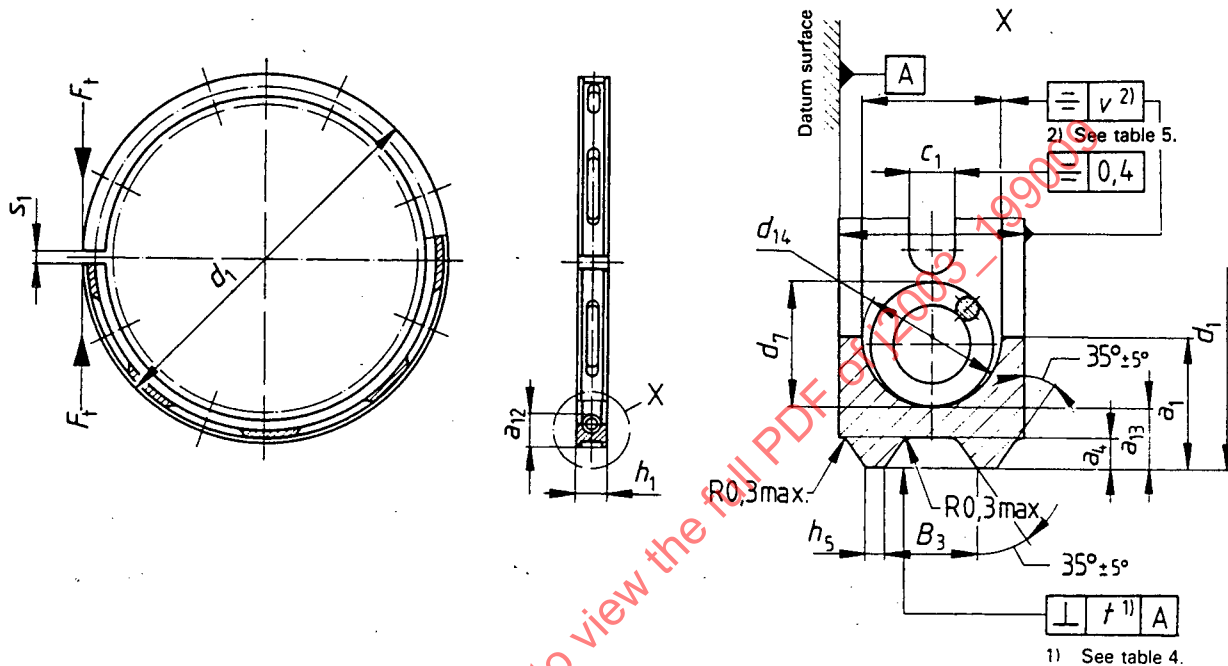


FIGURE 6 - Type DSF-NG

3.6.2 Designation Example: Designation of a piston ring complying with the requirements of SAE J2003 being a coil spring loaded bevelled edge oil control ring (DSF-NG) of nominal diameter $d_1 = 140 \text{ mm}$ (140) and nominal ring width $h_1 = 6 \text{ mm}$ (6), made of grey cast iron, nonheat-treated, material subclass 12 (MC12), constant pitch spring (CSN) and a tangential force F_t according to the medium nominal contact pressure class (PNM):

3.7 Type SSF-L - Coil Spring Loaded Slotted Oil Control Ring With 0.6 mm Nominal Land Width:

3.7.1 General Features:

NOTE: See Tables 14 and 20 for dimensions and forces.

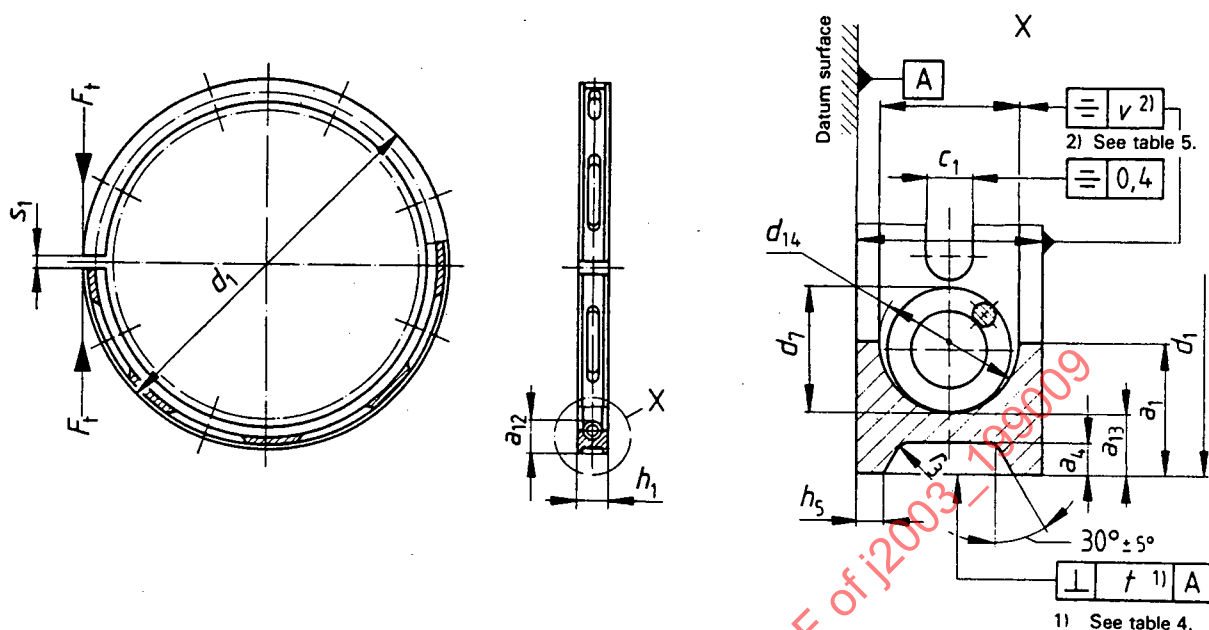


FIGURE 7 - Type SSF-L

- 3.7.2 Designation Example: Designation of a piston ring complying with the requirements of SAE J2003 being a coil spring loaded slotted oil control ring with 0.6 mm nominal land width (SSF-L), of nominal diameter $d_1 = 100$ mm (100) and nominal ring width $h_1 = 4.5$ mm (4.5), made of grey cast iron, nonheat-treated, material subclass 12 (MC12), constant pitch spring (CSN) and tangential force F_t according to the reduced nominal contact pressure class (PNR):

4. COMMON FEATURES:

4.1 Arrangement of Slots:

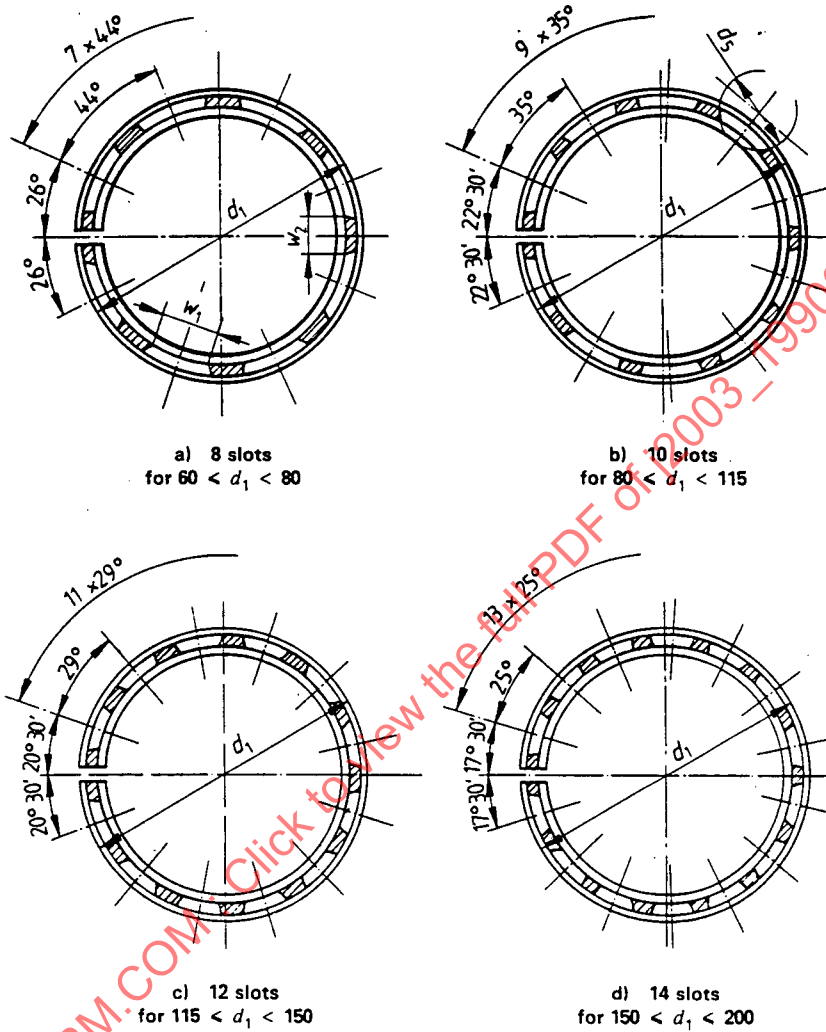


FIGURE 8 - Arrangement of Slots

TABLE 1 - Cutter diameter

Dimensions in millimeters	
Nominal diameter d_1	Cutter diameter d_5 max
$60 \leq d_1 < 150$	60
$150 \leq d_1 \leq 200$	75

4.2 Slot Length:

4.2.1 Standard Slot Length: Slot length, w_1 , equal to bridge length, w_2 .
Tolerance on difference between w_1 and w_2 : 4 mm.

4.2.2 Reduced Slot Length (Retaining Same Number and Spacing):

TABLE 2 - Reduced Slot Length

Dimensions in millimeters	
d_1	w_1
$60 \leq d_1 < 80$	8.5 ± 2.5
$80 \leq d_1 < 115$	10.5 ± 2.5
$115 \leq d_1 < 150$	12.5 ± 2.5
$150 \leq d_1 \leq 200$	15.0 ± 3.0

4.3 DSF-C and DSF-CNP - Layer Thickness:

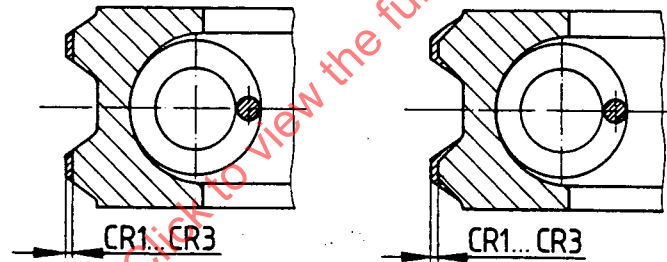


FIGURE 9 - Layer Thickness

TABLE 3 - Layer Thickness

Dimensions in millimeters	
Chromium	Thickness min
CR1	0.05
CR2	0.1
CR3	0.15

4.4 Tolerances of Spring Groove Offset and Land Offset:

TABLE 4 - Land Offset Tolerance

Dimensions in millimeters	
h_1	t
$3 \leq h_1 < 5$	0.015
$5 \leq h_1 \leq 8$	0.025

TABLE 5 - Spring Groove Offset Tolerance

Dimensions in millimeters	
h_1	v
$h_1 < 3.5$	0.3
$h_1 \geq 3.5$	0.4

5. COIL SPRING:

5.1 Types:

All values in the dimensional tables are based on cylindrical coil springs made of round wire. The three designs shown in 5.1.1 to 5.1.3 are common.

5.1.1 Type CSN - Coil Spring With Constant Pitch:

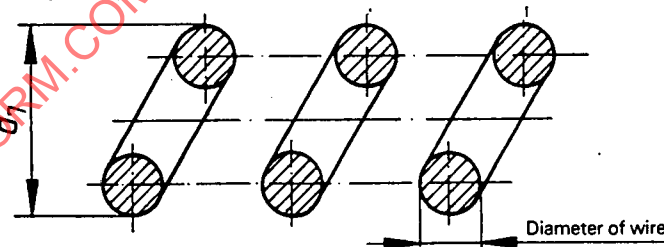


FIGURE 10 - Type CSN Coil Spring

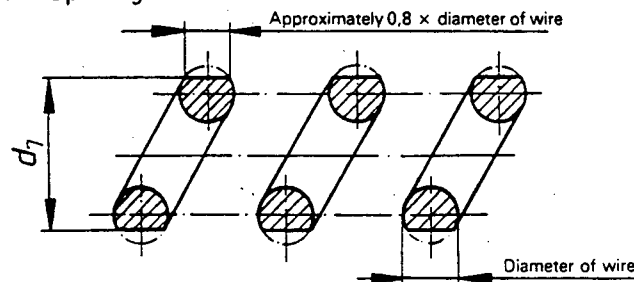
5.1.2 Type CSG - Coil Spring With Constant Pitch (Coil Diameter, d_1 , Ground):

FIGURE 11 - Type CSG Coil Spring

5.1.3 Type CSE – Coil Spring With Variable Pitch (Coil Diameter, d_1 , Ground):

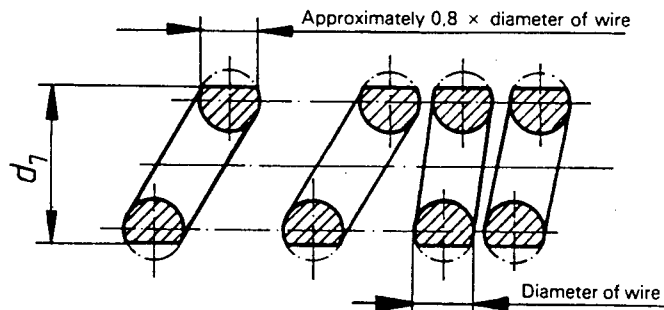


FIGURE 12 – Type CSE Coil Spring

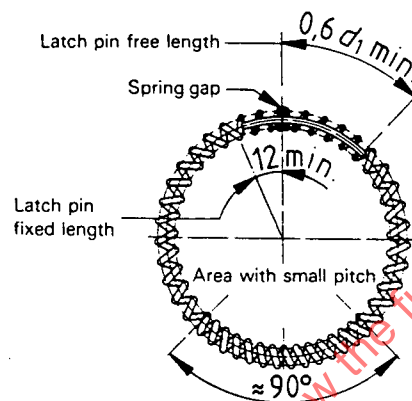


FIGURE 13 – Position of Area With Small Pitch

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

5.2 Excursion:

Coil spring excursion is the distance between the ends of the ring gap with unstressed ring, measured in the middle of the spring groove (see Figure 14).

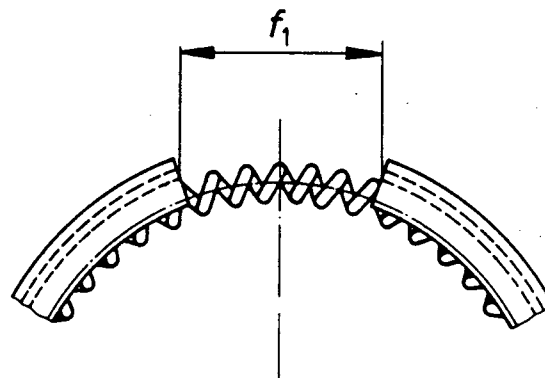


FIGURE 14 – Coil Spring Excursion

TABLE 6 - Coil Spring Excursion

Dimensions in millimeters	
d_1	$f_{1 \max}$
$60 \leq d_1 < 125$	$0.13 \times d_1$
$125 \leq d_1 \leq 200$	$0.12 \times d_1$

5.3 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.

5.4 Material:

Coil springs are made of valve spring wire, oil heat-treated. A suitable material for coil spring expanders is subclass 63 (see SAE J1590).

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 SAE J1996, Table 10.

6. TANGENTIAL FORCE AND NOMINAL CONTACT PRESSURE:

6.1 Tangential Force:

The tangential force of coil spring loaded oil control rings is mainly determined by the force of the spring. The cast iron part itself has a very small tangential force due to its low radial wall thickness and the decreased ratio "total free gap/nominal diameter".

The tangential force measurement only can be used because of the flexible design of the cast iron part of coil spring loaded oil control rings.

6.2 Force Factors:

Because of the small contribution of the cast iron part in the tangential force, force factors are not necessary when additional features and/or materials other than subclass 12 are being used (see SAE J1590).

6.3 Tangential Force, F_t :

The tangential force, F_t , of a spring loaded oil control ring is determined by the following:

- Nominal diameter, d_1 , in millimeters;
- Land width, h_t , in millimeters;
- Required nominal contact pressure, p_o , in newtons per square millimeter;

and can be calculated from the following equation:

$$F_t = \frac{1}{2} \cdot d_1 \cdot 2h_5 \cdot p_o \quad (\text{Eq.1})$$

The land width, h_5 , depends on ring type, nominal diameter and ring width. The nominal contact pressure, p_o , can be selected over a wide range to suit the application and the required oil scraping effect.

- 6.3.1 Specific Tangential Force, F_{tc} : F_{tc} is the specific tangential force required to maintain a spring loaded oil control ring at a unit contact pressure p_{ou} , of 1 N/mm²:

$$F_{tc} = \frac{1}{2} \cdot d_1 \cdot 2h_5 \quad (\text{Eq.2})$$

In Section 7, F_{tc} is tabulated for every ring type.

- 6.3.2 Actual Tangential Force, F_t , and Tolerance: The actual tangential force of a spring loaded oil control ring can be calculated with the F_{tc} value and the required nominal contact pressure from the following equation:

$$F_t = \frac{p_o}{p_{ou}} \cdot F_{tc} \quad (\text{Eq.3})$$

The tolerance on F_t is the actual value $F_t \pm 20\%$.

6.4 Classes of Nominal Contact Pressure:

The range of the nominal contact pressure has been subdivided into six classes, in accordance with Table 7.

TABLE 7 - Classes of Nominal Contact Pressure

Class	Meaning
PNE	very low nominal contact pressure
PNL	low nominal contact pressure
PNR	reduced nominal contact pressure
PNM	medium nominal contact pressure
PNH	high nominal contact pressure
PNV	very high nominal contact pressure

The nominal contact pressure, p_0 , normally decreases with increasing nominal diameter. Figure 15 shows characteristic values of p_0 depending on d_1 .

The range possible for the nominal contact pressure, p_0 , varies according to the ring type, ring dimensions and features of the contact lands (if plain or chromium-plated).

The classification given in Table 8 is taken from the dimensional tables in Section 7, where p_0 values are given in the following three categories for every nominal diameter:

- "Low" category: Low friction design oil control rings
- "Mean" category: Normal design oil control rings
- "High" category: High contact pressure oil control rings for high oil scraping effect

TABLE 8 - Oil Control Ring Pressure Classes

Ring Type	Class According to Nominal Contact Pressure					
	PNE	PNL	PNR	PNM	PNH	PNV
DSF-C	(-)	Low	Mean	Mean	High	(x)
DSF-CNP	(-)	Low	Mean	Mean	High	(x)
SSF	Low	Mean	High	(x)	(-)	(-)
GSF	(x)	Low	Mean	High	(x)	(-)
DSF	(x)	Low	Mean	High	(x)	(-)
DSF-NG	(x)	Low	Mean	High	(x)	(-)
SSF-L	Low	Mean	High	(-)	(-)	(-)
(x) For special applications.						
(-) This pressure class is not used with this ring type.						

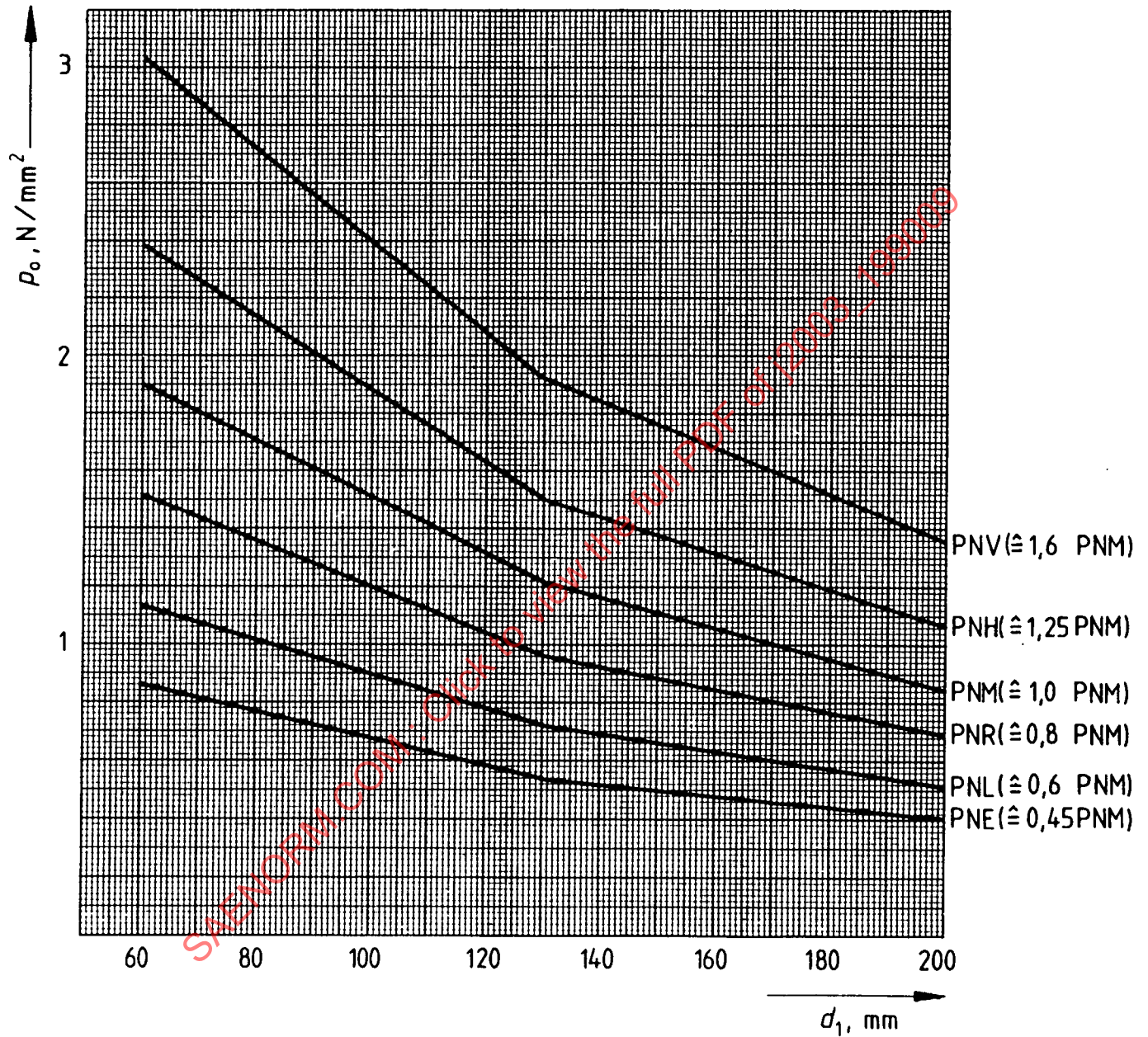


FIGURE 15 - Characteristic Values of p_0 Depending on d_1

7. DIMENSIONS:

TABLE 9 - Dimensions for DSF-G

Nominal diameter d_1	Radial thickness over coil spring a_{12} for h_1 shown in column				Ring width h_1 Column					Closed gap s_1	Radial wall thickness a_1 for h_1 shown in column					Land width h_5 for h_1 shown in column				Land spacing $\approx B_3$ for h_1 shown in column				Groove depth a_4 for h_1 shown in column			
	1	2	3	4	1	2	3	4	Tolerance		1	2	3	4	Tolerance	1	2	3	4	1	2	3	4	1	2	3	4
60 61 62 63 64	—	3.5 0	3.5 0								—	2.4	2.4														
65 66 67 68 69	—		3.7 0	—0.25						0.2 +0.2 0	—	2.45	2.5														
70 71 72 73 74	—		3.8 0	3.9 0	—	3	3.5	4			—	2.55	2.6	2.6													
75 76 77 78 79	—	3.7 0	3.9 0	4 0					—0.010 —0.030 For phos- phated P0 surface: +0.005 —0.025		—	2.6	2.7	2.7											0.45 —0.1	0.45 —0.1	0.5 —0.1
80 81 82 83 84	3.8 0	—0.25							0.25		2.7	2.7	2.8	2.8													
85 86 87 88 89		4 0	4.1 0	4.1 0					+0.25 0		2.8	2.8	2.9	2.9													
90 91 92 93 94	3.9 0	—0.25			3	3.5	4	4.5																	0.45 —0.1	0.45 —0.1	0.5 —0.1
95 96 97 98 99		4.1 0	4.2 0	4.2 0							2.85	2.9	2.95	3													
	4 0	—0.25	—0.25	—0.25							2.95	3	3.05	3.1													
100 101 102 103 104									0.3																		
105 106 107 108 109	4.2 0	4.4 0	4.5 0	4.7 0					+0.25 0		3.05	3.1	3.15	3.2													
	—0.25	—0.25	—0.25	—0.25							3.1	3.15	3.2	3.3													
110 111 112 113 114	4.3 0	4.5 0	4.6 0	4.8 0	3.5	4	4.5	5			3.2	3.25	3.3	3.4										0.45 —0.1	0.45 —0.1	0.5 —0.1	0.5 —0.1
115 116 117 118 119			4.7 0	4.9 0					0.35		3.3	3.35	3.4	3.5													
120 121 122 123 124	4.4 0	4.6 0							+0.30 0																		
	—0.25	—0.25	4.8 0	5 0							3.4	3.45	3.5	3.6													

This table is shown in ISO format. Commas represent decimal points.

Coil Spring Loaded Oil Control Rings

Dimensions in millimeters

Groove depth and bridge a_{13} for h_1 shown in column				Number of slots	Slot width c_1 for h_1 shown in column				Coil spring groove diameter d_{14} for h_1 shown in column				Coil spring diameter d_7 for h_1 shown in column				Tangential force F_{tc} , N for unit pressure $p_{ou} = 1 \text{ N/mm}^2$ for h_1 shown in column				Recommended class of nominal contact pressure N/mm ²								
1	2	3	4		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	PNL Low	PNM Mean	PNH High						
—	1.5 0 -0.15	1.5 0 -0.15	1.5 0 -0.15	8	—	0.7 ± 0.1	0.8 ± 0.1	—	2.1 +0.1 0	2.3 +0.1 0	—	2 0 -0.1	2.2 0 -0.1	—	21 21.4 21.7 22.1 22.4	21 21.4 21.7 22.1 22.4	24 24.4 24.8 25.2 25.6	1.14 1.13 1.13 1.12 1.12	1.9 1.89 1.88 1.87 1.86	2.38 2.36 2.35 2.34 2.33	—	—	—						
	1.6 0 -0.15																												
	1.7 0 -0.15																												
	1.8 0 -0.15																												
	1.9 0 -0.15	1.6 0 -0.15	1.6 0 -0.15			0.7 ± 0.1	0.8 ± 0.1	—	2.1 +0.1 0	2.3 +0.1 0	—	2 0 -0.1	2.2 0 -0.1	—	22.8 23.1 23.5 23.8 24.2	22.8 23.1 23.5 23.8 24.2	26 26.4 26.8 27.2 27.6	1.11 1.1 1.1 1.09 1.09	1.85 1.84 1.83 1.82 1.81	2.31 2.3 2.29 2.28 2.26									
	2 0 -0.15																												
	2.1 0 -0.15																												
	2.2 0 -0.15																												
	2.3 0 -0.15	1.6 0 -0.15	1.6 0 -0.15			0.7 ± 0.1	0.8 ± 0.1	—	2.1 +0.1 0	2.3 +0.1 0	—	2 0 -0.1	2.2 0 -0.1	—	24.5 24.9 25.2 25.6 25.9	24.5 24.9 25.2 25.6 25.9	28 28.4 28.8 29.2 29.6	1.08 1.07 1.07 1.06 1.06	1.8 1.79 1.78 1.77 1.76	2.25 2.24 2.23 2.21 2.2									
	2.4 0 -0.15																												
	2.5 0 -0.15																												
	2.6 0 -0.15																												
2.7 0 -0.15	1.6 0 -0.15	1.6 0 -0.15			0.7 ± 0.1	0.8 ± 0.1	—	2.1 +0.1 0	2.3 +0.1 0	—	2 0 -0.1	2.2 0 -0.1	—	26.3 26.6 27 27.3 27.7	26.3 26.6 27 27.3 27.7	30 30.4 30.8 31.2 31.6	1.05 1.04 1.04 1.03 1.03	1.75 1.74 1.73 1.72 1.71	2.19 2.18 2.16 2.15 2.14										
2.8 0 -0.15																													
2.9 0 -0.15																													
3 0 -0.15																													
—	1.8 0 -0.15	1.7 0 -0.15	1.7 0 -0.15	10	—	0.7 ± 0.1	0.8 ± 0.1	1 ± 0.1	1.2 ± 0.1	2.1 +0.1 0	2.3 +0.1 0	2.5 +0.1 0	2.5 +0.1 0	2 0 -0.1	2.2 0 -0.1	2.4 0 -0.1	2.4 0 -0.1	28 28.4 28.7 29.1 29.4	28 28.4 28.7 29.1 29.4	32 32.4 32.8 33.2 33.6	1.02 1.01 1.01 1 1	1.7 1.69 1.68 1.67 1.66		2.13 2.11 2.1 2.09 2.08					
	1.8 0 -0.15																												
	1.9 0 -0.15																												
	2 0 -0.15																												
	1.9 0 -0.15	1.8 0 -0.15	1.8 0 -0.15			0.7 ± 0.1	0.8 ± 0.1	1 ± 0.1	1.2 ± 0.1	2.1 +0.1 0	2.3 +0.1 0	2.5 +0.1 0	2.5 +0.1 0	2 0 -0.1	2.2 0 -0.1	2.4 0 -0.1	2.4 0 -0.1	29.8 30.1 30.5 30.8 31.2	29.8 30.1 30.5 30.8 31.2	34 34.4 34.8 35.2 35.6	0.99 0.98 0.98 0.97 0.97	1.65 1.64 1.63 1.62 1.61		2.06 2.05 2.04 2.03 2.01					
	2 0 -0.15																												
	2.1 0 -0.15																												
	2.2 0 -0.15																												
	2.3 0 -0.15	1.8 0 -0.15	1.8 0 -0.15			0.7 ± 0.1	0.8 ± 0.1	1 ± 0.1	1.2 ± 0.1	2.1 +0.1 0	2.3 +0.1 0	2.5 +0.1 0	2.5 +0.1 0	2 0 -0.1	2.2 0 -0.1	2.4 0 -0.1	2.4 0 -0.1	31.5 31.9 32.2 32.6 32.9	31.5 31.9 32.2 32.6 32.9	36 36.4 36.8 37.2 37.6	0.96 0.95 0.95 0.94 0.94	1.6 1.59 1.58 1.57 1.56		2 1.99 1.98 1.96 1.95					
	2.4 0 -0.15																												
	2.5 0 -0.15																												
	2.6 0 -0.15																												
2.7 0 -0.15	1.8 0 -0.15	1.8 0 -0.15			0.7 ± 0.1	0.8 ± 0.1	1 ± 0.1	1.2 ± 0.1	2.1 +0.1 0	2.3 +0.1 0	2.5 +0.1 0	2.5 +0.1 0	2 0 -0.1	2.2 0 -0.1	2.4 0 -0.1	2.4 0 -0.1	33.3 33.6 34 34.3 34.7	33.3 33.6 34 34.3 34.7	38 38.4 38.8 39.2 39.6	0.93 0.92 0.92 0.91 0.91	1.55 1.54 1.53 1.52 1.51	1.94 1.93 1.91 1.9 1.89							
2.8 0 -0.15																													
2.9 0 -0.15																													
3 0 -0.15																													
2 0 -0.15	1.9 0 -0.2	1.9 0 -0.2			0.7 ± 0.1	0.8 ± 0.1	1 ± 0.1	1.2 ± 0.1	2.1 +0.1 0	2.3 +0.1 0	2.5 +0.1 0	2.5 +0.1 0	2 0 -0.1	2.2 0 -0.1	2.4 0 -0.1	2.4 0 -0.1	35 35.4 35.7 36.1 36.4	40 40.4 40.8 41.2 41.6	40 40.4 40.8 41.2 41.6	0.9 0.89 0.89 0.88 0.88	1.5 1.49 1.48 1.47 1.46	1.88 1.86 1.85 1.84 1.83							
2 0 -0.2																													
2.1 0 -0.2																													
2.2 0 -0.2																													
2.3 0 -0.2	1.9 0 -0.2	1.9 0 -0.2			0.7 ± 0.1	0.8 ± 0.1	1 ± 0.1	1.2 ± 0.1	2.1 +0.1 0	2.3 +0.1 0	2.5 +0.1 0	2.5 +0.1 0	2 0 -0.1	2.2 0 -0.1	2.4 0 -0.1	2.4 0 -0.1	36.8 37.1 37.5 37.8 38.2	42 42.4 42.8 43.2 43.6	42 42.4 42.8 43.2 43.6	0.87 0.86 0.86 0.85 0.85	1.45 1.44 1.43 1.42 1.41	1.81 1.8 1.79 1.78 1.76							
2.4 0 -0.2																													
2.5 0 -0.2																													
2.6 0 -0.2																													
2.7 0 -0.2	1.9 0 -0.2	1.9 0 -0.2			0.7 ± 0.1	0.8 ± 0.1	1 ± 0.1	1.2 ± 0.1	2.1 +0.1 0	2.3 +0.1 0	2.5 +0.1 0	2.5 +0.1 0	2 0 -0.1	2.2 0 -0.1	2.4 0 -0.1	2.4 0 -0.1	38.5 38.9 39.2 39.6 39.9	44 44.4 44.8 45.2 45.6	44 44.4 44.8 45.2 45.6	0.84 0.83 0.83 0.82 0.82	1.4 1.39 1.38 1.37 1.36	1.75 1.74 1.73 1.71 1.7							
2.8 0 -0.2																													
2.9 0 -0.2																													
3 0 -0.2																													
—	2.1 0 -0.2	2.1 0 -0.2	2.1 0 -0.2	12	—	0.8 ± 0.1	1 ± 0.1	1.2 ± 0.1	1.2 ± 0.1	2.3 +0.1 0	2.5 +0.1 0	2.7 +0.1 0	2.9 +0.1 0	2.2 0 -0.1	2.4 0 -0.1	2.6 0 -0.1	2.9 0 -0.1	40.3 40.6 41 41.3 41.7	46 46.4 46.8 47.2 47.6	46 46.4 46.8 47.2 47.6	46 46.4 46.8 47.2 47.6	0.81 0.8 0.8 0.79 0.79	1.35 1.34 1.33 1.32 1.31	1.69 1.68 1.66 1.65 1.64					
	2.2 0 -0.2																												
	2.2 0 -0.2	2.2 0 -0.2	2.2 0 -0.2			0.8 ± 0.1	1 ± 0.1	1.2 ± 0.1	1.2 ± 0.1	2.3 +0.1 0	2.5 +0.1 0	2.7 +0.1 0	2.9 +0.1 0	2.2 0 -0.1	2.4 0 -0.1	2.6 0 -0.1	2.9 0 -0.1	42 42.4 42.7 43.1 43.4	48 48.4 48.8 49.2 49.6	48 48.4 48.8 49.2 49.6	48 48.4 48.8 49.2 49.6	0.78 0.77 0.77 0.76 0.76	1.3 1.29 1.28 1.27 1.26	1.63 1.61 1.6 1.59 1.58					
	2.3 0 -0.2																												
	2.4 0 -0.2	2.3 0 -0.2	2.3 0 -0.2			0.8 ± 0.1	1 ± 0.1	1.2 ± 0.1	1.2 ± 0.1	2.3 +0.1 0	2.5 +0.1 0	2.7 +0.1 0	2.9 +0.1 0	2.2 0 -0.1	2.4 0 -0.1	2.6 0 -0.1	2.9 0 -0.1	43.4 43.8 44.2 44.6 45	49.6 50 50.4 50.8 51.2	49.6 50 50.4 50.8 51.2	49.6 50 50.4 50.8 51.2	0.76 0.76 0.76 0.76 0.76	1.26 1.26 1.26 1.26 1.26	1.58 1.58 1.58 1.58 1.58					
	2.5 0 -0.2																												
2.6 0 -0.2	2.5 0 -0.2	2.5 0 -0.2	0.8 ± 0.1	1 ± 0.1	1.2 ± 0.1	1.2 ± 0.1	2.3 +0.1 0	2.5 +0.1 0	2.7 +0.1 0	2.9 +0.1 0	2.2 0 -0.1	2.4 0 -0.1	2.6 0 -0.1	2.9 0 -0.1	44 44.4 44.8 45.2 45.6	50 50.4 50.8 51.2 51.6	50 50.4 50.8 51.2 51.6	50 50.4 50.8 51.2 51.6	0.76 0.76 0.76 0.76 0.76	1.26 1.26 1.26 1.26 1.26	1.58 1.58 1.58 1.58 1.58								
2.7 0 -0.2																													

TABLE 9 (Continued)

Nominal diameter d_1	Radial thickness over coil spring a_{12} for h_1 shown in column				Ring width h_1 Column					Closed gap s_1	Radial wall thickness a_1 for h_1 shown in column					Land width h_5 for h_1 shown in column				Land spacing $\approx B_3$ for h_1 shown in column				Groove depth a_4 for h_1 shown in column			
	1	2	3	4	1	2	3	4	Tolerance		1	2	3	4	Tolerance	1	2	3	4	1	2	3	4	1	2	3	4
125										0.35																	
126										+0.30	3.5	3.6	3.6	3.7													
127										0																	
128			5	5.2																							
129			0	0																							
130	4.7	4.9																									
131	0	0																									
132	-0.25	-0.25	5.1	5.3							3.5	3.6	3.7	3.8													
133			0	0																							
134			-0.25	-0.25																							
135																											
136																											
137					4	4.5	5	6			3.6	3.7	3.8	3.9		0.4	0.4	0.4	0.5	2.3	2.8	2.9	3.5	0.5	0.7	0.7	0.5
138																± 0.07	± 0.07	± 0.07	± 0.07					± 0.1	± 0.1	± 0.1	± 0.1
139										0.4																	
140									-0.010	+0.35																	
141	4.9	5.1	5.3	5.5					-0.040	0	3.7	3.8	3.9	4													
142	0	0	0	0					For phosphated surface:																		
143	-0.25	-0.25	-0.25	-0.25					+0.005																		
144									-0.035																		
145											3.8	3.9	4	4.1													
146																											
147																											
148																											
149																											
150															± 0.20												
152															within a ring												
154	5.4	5.4	5.5	5.5							3.9	4	4.1	4.2	0.20 max.												
155	0	0	0	0																							
156	-0.25	-0.25	-0.25	-0.25																							
158																											
160					4.5	5	6	7		0.45						0.4	0.4	0.5	0.6	2.8	2.9	3.5	3.9	0.7	0.7	0.9	1.2
162										-0.35						± 0.07	± 0.07	± 0.07	± 0.09					± 0.1	± 0.1	± 0.1	± 0.15
164										0																	
165	5.4	5.6	5.8	6							4	4.2	4.3	4.4													
166	0	0	0	0																							
168	-0.25	-0.25	-0.25	-0.25																							
170																											
172																											
174																											
175																											
176																											
178	5.8	6	6.3	6.7							4.6	4.7	4.8	5													
180	0	0	0	0																							
182	-0.35	-0.35	-0.35	-0.35																							
184																											
185																											
186					5	6	7	8		0.55						0.4	0.5	0.6	0.6	2.9	3.5	3.9	4.3	0.7	0.9	1.2	1.5
188										-0.40						± 0.07	± 0.07	± 0.09	± 0.09					± 0.1	± 0.1	± 0.15	± 0.15
190										0																	
192																											
194	6.2	6.5	6.7	7.1							4.9	5	5.1	5.3													
195	0	0	0	0																							
196	-0.4	-0.4	-0.4	-0.4																							
198																											
200																											

NOTES:

¹For intermediate sizes (e.g. repair sizes), the radial thickness of the next smaller nominal diameter applies.

²Values of specific tangential force F_{tc} are calculated with mean land width (h_5).

This table is shown in ISO format. Commas represent decimal points.

Coil Spring Loaded Oil Control Rings (Concluded)

Dimensions in millimeters

Groove depth and bridge a_{13} for h_1 shown in column				Number of slots	Slot width c_1 for h_1 shown in column				Coil spring groove diameter d_{14} for h_1 shown in column				Coil spring diameter d_7 for h_1 shown in column				Tangential force F_{tc} , N for unit contact pressure $p_{ou} = 1 \text{ N/mm}^2$ for h_1 shown in column				Recommended class of nominal contact pressure N/mm ²		
1	2	3	4		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	PNL Low	PNM Mean	PNH High
		2.2 0 -0.2	2.2 0 -0.2	12													50 50.4 50.8 51.2 51.6	50 50.4 50.8 51.2 51.6	50 50.4 50.8 51.2 51.6	62.5 63 63.5 64 64.5	0.75 0.74 0.74 0.73 0.73	1.25 1.24 1.23 1.22 1.21	1.56 1.55 1.54 1.53 1.51
									2.5 +0.1 0	2.7 +0.1 0	2.9 +0.1 0	3.1 +0.1 0	2.4 0 -0.1	2.6 0 -0.1	2.8 0 -0.1	3 0 -0.1	52 52.4 52.8 53.2 53.6	52 52.4 52.8 53.2 53.6	52 52.4 52.8 53.2 53.6	65 65.5 66 66.5 67	0.72 0.72 0.71 0.71 0.71	1.2 1.2 1.19 1.19 1.18	1.5 1.49 1.49 1.48 1.48
2.3 0 -0.2	2.3 0 -0.2				1 ±0.1	1.2 ±0.1	1.2 ±0.1	1.4 ±0.1									54 54.4 54.8 55.2 55.6	54 54.4 54.8 55.2 55.6	54 54.4 54.8 55.2 55.6	67.5 68 68.5 69 69.5	0.71 0.7 0.7 0.7 0.69	1.18 1.17 1.17 1.16 1.16	1.47 1.46 1.46 1.45 1.44
									2.7 +0.1 0	2.9 +0.1 0	3.1 +0.1 0	3.3 +0.15 0	2.6 0 -0.1	2.8 0 -0.1	3 0 -0.1	3.2 0 -0.1	56 56.4 56.8 57.2 57.6	56 56.4 56.8 57.2 57.6	56 56.4 56.8 57.2 57.6	70 70.5 71 71.5 72	0.69 0.69 0.68 0.68 0.68	1.15 1.15 1.14 1.14 1.13	1.44 1.43 1.43 1.42 1.41
																	58 58.4 58.8 59.2 59.6	58 58.4 58.8 59.2 59.6	58 58.4 58.8 59.2 59.6	72.5 73 73.5 74 74.5	0.68 0.67 0.67 0.67 0.66	1.13 1.12 1.12 1.11 1.11	1.41 1.4 1.39 1.39 1.38
	2.4 0 -0.2	2.3 0 -0.2	2.3 0 -0.2									3.3 +0.15 0				3.2 0 -0.1	60 60.8 61.6	60 60.8 61.6	75 76 77	90 91.2 92.4	0.66 0.65 0.65	1.1 1.09 1.08	1.38 1.36 1.35
																	62 62.4 63.2	62 62.4 63.2	77.5 78 79	93 93.6 94.8	0.65 0.64 0.64	1.08 1.07 1.06	1.34 1.34 1.33
2.6 0 -0.2					1.2 ±0.1	1.2 ±0.1	1.4 ±0.1	1.6 ±0.1	2.9 +0.1 0	3.1 +0.1 0	3.3 +0.15 0		2.8 0 -0.1	3 0 -0.1	3.2 0 -0.1		64 64.8 65.6	64 64.8 65.6	80 81 82	96 97.2 98.4	0.63 0.63 0.62	1.05 1.04 1.03	1.31 1.3 1.29
	2.6 0 -0.2	2.6 0 -0.2	2.4 0 -0.2									3.7 +0.15 0				3.6 0 -0.1	66 66.4 67.2	66 66.4 67.2	82.5 83 84	99 99.6 100.8	0.62 0.61 0.61	1.03 1.02 1.01	1.28 1.28 1.26
																	68 68.8 69.6	68 68.8 69.6	85 86 87	102 103.2 104.4	0.6 0.59 0.59	1 0.99 0.98	1.25 1.24 1.23
2.8 0 -0.2	2.8 0 -0.2								3.1 +0.1 0	3.3 +0.15 0	3.7 +0.15 0	4.15 +0.15 0	3 0 -0.1	3.2 0 -0.1	3.6 0 -0.1	4 0 -0.12	70 70.4 71.2	70 70.4 71.2	87.5 88 89	105 105.6 106.8	0.59 0.58 0.58	0.98 0.97 0.96	1.22 1.21 1.2
																	72 72.8 73.6	72 72.8 73.6	90 91 92	108 109.2 110.4	0.57 0.56 0.56	0.95 0.94 0.93	1.19 1.18 1.16
		2.7 0 -0.2	2.7 0 -0.2		1.2 ±0.1	1.4 ±0.1	1.6 ±0.1	1.8 ±0.15									74 74.4 75.2	74 74.4 75.2	92.5 93 94	111 111.6 112.8	0.56 0.55 0.55	0.93 0.92 0.91	1.16 1.15 1.14
																	76 76.8 77.6	76 76.8 77.6	95 96 97	114 115.2 116.4	0.54 0.53 0.53	0.9 0.89 0.88	1.13 1.11 1.1
3 0 -0.2	2.9 0 -0.2								3.3 +0.15 0	3.7 +0.15 0	4.15 +0.15 0	4.55 +0.15 0	3.2 0 -0.1	3.6 0 -0.1	4 0 -0.12	4.4 0 -0.12	78 78.4 79.2	78 78.4 79.2	97.5 98 99	117 117.6 118.8	0.53 0.52 0.52	0.88 0.87 0.86	1.09 1.09 1.08
																	80	100	120	120	0.51	0.85	1.06

This table is shown in ISO format. Commas represent decimal points.

TABLE 10 - Dimensions for DSF-CNP

Nominal diameter d_1	Radial thickness over coil spring a_{12} for h_1 shown in column				Ring width h_1 Column					Closed gap s_1	Radial wall thickness a_1 for h_1 shown in column					Land width h_5 for h_1 shown in column				Land spacing $\approx B_3$ for h_1 shown in column				Groove depth a_4 for h_1 shown in column				
	1	2	3	4	1	2	3	4	Tolerance		1	2	3	4	Tolerance	1	2	3	4	1	2	3	4	1	2	3	4	
60 61 62 63 64	—	3.5 0	3.5 0	— —0.25	3.7 0 —0.25	—	3	3.5	4	—	0.2 +0.2 0	—	2.4	2.4	2.5	—	0.4 ± 0.12	0.4 ± 0.12	0.4 ± 0.12	—	1.5	1.8	2.3	—	0.5 —0.1	0.5 —0.1	0.5 —0.1	
65 66 67 68 69	—	3.6 0	—0.25	3.7 0																								—0.25
70 71 72 73 74	—	—0.25	3.8 0	3.9 0																								—0.25
75 76 77 78 79	—	3.7 0	3.9 0	4 0																								—0.25
80 81 82 83 84	3.8 0	—0.25	4 0	4.1 0																								4.1 0
85 86 87 88 89	3.9 0	—0.25	—0.25	—0.25																								—0.25
90 91 92 93 94	—0.25	4.1 0	4.2 0	4.2 0																								—0.25
95 96 97 98 99	4 0	—0.25	—0.25	—0.25																								—0.25
100 101 102 103 104	4.2 0	4.4 0	4.5 0	4.7 0																								—0.25
105 106 107 108 109	—0.25	—0.25	—0.25	—0.25																								—0.25
110 111 112 113 114	4.3 0	4.5 0	4.6 0	4.8 0	—0.25																							
115 116 117 118 119	4.4 0	4.6 0	4.7 0	4.9 0	—0.25																							
120 121 122 123 124	—0.25	—0.25	4.8 0	5 0	—0.25																							

This table is shown in ISO format. Commas represent decimal points.

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1.5 0 -0.15	8	-	0.7 ±0.1	0.8 ±0.1	-	2.1 +0.1 0	2.3 -0.1 0	2 0 -0.1	2.2 0 -0.1	24.4 24.8 25.2 25.6	24.4 24.8 25.2 25.6	24.4 24.8 25.2 25.6	24.4 24.8 25.2 25.6
1.6 0 -0.15			0.7 ±0.1	0.8 ±0.1	-	2.1 +0.1 0	2.3 -0.1 0	2 0 -0.1	2.2 0 -0.1	26 26.4 26.8 27.2 27.6	26 26.4 26.8 27.2 27.6	26 26.4 26.8 27.2 27.6	26 26.4 26.8 27.2 27.6
1.7 0 -0.15			0.7 ±0.1	0.8 ±0.1	-	2.1 +0.1 0	2.3 -0.1 0	2 0 -0.1	2.2 0 -0.1	28 28.4 28.8 29.2 29.6	28 28.4 28.8 29.2 29.6	28 28.4 28.8 29.2 29.6	28 28.4 28.8 29.2 29.6
1.8 0 -0.15	10		0.7 ±0.1	0.8 ±0.1	1 ±0.1	2.1 +0.1 0	2.3 -0.1 0	2 0 -0.1	2.2 0 -0.1	30 30.4 30.8 31.2 31.6	30 30.4 30.8 31.2 31.6	30 30.4 30.8 31.2 31.6	30 30.4 30.8 31.2 31.6
1.9 0 -0.2			0.7 ±0.1	0.8 ±0.1	1 ±0.1	2.1 +0.1 0	2.3 -0.1 0	2 0 -0.1	2.2 0 -0.1	32 32.4 32.8 33.2 33.6	32 32.4 32.8 33.2 33.6	32 32.4 32.8 33.2 33.6	32 32.4 32.8 33.2 33.6
			0.7 ±0.1	0.8 ±0.1	1 ±0.1	2.1 +0.1 0	2.3 -0.1 0	2 0 -0.1	2.2 0 -0.1	34 34.4 34.8 35.2 35.6	34 34.4 34.8 35.2 35.6	34 34.4 34.8 35.2 35.6	34 34.4 34.8 35.2 35.6
			0.7 ±0.1	0.8 ±0.1	1 ±0.1	2.1 +0.1 0	2.3 -0.1 0	2 0 -0.1	2.2 0 -0.1	36 36.4 36.8 37.2 37.6	36 36.4 36.8 37.2 37.6	36 36.4 36.8 37.2 37.6	36 36.4 36.8 37.2 37.6
			0.7 ±0.1	0.8 ±0.1	1 ±0.1	2.1 +0.1 0	2.3 -0.1 0	2 0 -0.1	2.2 0 -0.1	38 38.4 38.8 39.2 39.6	38 38.4 38.8 39.2 39.6	38 38.4 38.8 39.2 39.6	38 38.4 38.8 39.2 39.6
			0.7 ±0.1	0.8 ±0.1	1 ±0.1	2.1 +0.1 0	2.3 -0.1 0	2 0 -0.1	2.2 0 -0.1	40 40.4 40.8 41.2 41.6	40 40.4 40.8 41.2 41.6	40 40.4 40.8 41.2 41.6	40 40.4 40.8 41.2 41.6
			0.7 ±0.1	0.8 ±0.1	1 ±0.1	2.1 +0.1 0	2.3 -0.1 0	2 0 -0.1	2.2 0 -0.1	42 42.4 42.8	42 42.4 42.8	42 42.4 42.8	42 42.4 42.8

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TABLE 10 (Continued)

Nominal Diameter d_1	Radial thickness over coil spring a_{12} for h_1 shown in column				Ring width h_1 Column					Closed gap s_1	Radial wall thickness a_1 for h_1 shown in column					Land width h_5 for h_1 shown in column				Land spacing $\approx B_3$ for h_1 shown in column				Groove depth a_4 for h_1 shown in column			
	1	2	3	4	1	2	3	4	Tolerance		1	2	3	4	Tolerance	1	2	3	4	1	2	3	4	1	2	3	4
125																											
126			5	5.2						0.35	3.5	3.6	3.6	3.7													
127			0	0						+0.30																	
128			-0.25	-0.25						0																	
129	4.7	4.9																									
130	0	0																									
131	-0.25	-0.25	5.1	5.3							3.5	3.6	3.7	3.8													
132			0	0																							
133			-0.25	-0.25																							
134																											
135																											
136																											
137					4	4.5	5	6			3.6	3.7	3.8	3.9		0.4	0.4	0.4	0.5	2.3	2.65	2.9	3.5	0.5	0.5	0.7	0.9
138																± 0.12	± 0.12	± 0.12	± 0.12					± 0.1	± 0.1	± 0.1	± 0.1
139										-0.010																	
140										-0.040																	
141	4.9	5.1	5.3	5.5						For																	
142	0	0	0	0						phos-	3.7	3.8	3.9	4													
143	-0.25	-0.25	-0.25	-0.25						phated																	
144										P0																	
145										surface:																	
146										+0.005																	
147										-0.035																	
148																											
149																											
150																											
152															± 0.20												
154	5.4	5.4	5.5	5.5							3.9	4	4.1	4.2	within												
155	0	0	0	0											a ring												
156	-0.25	-0.25	-0.25	-0.25											0.20												
158															max.												
160					4.5	5	6	7		0.45						0.4	0.4	0.5	0.6	2.65	2.9	3.5	3.9	0.5	0.7	0.9	1.2
162										-0.35						± 0.12	± 0.12	± 0.12	± 0.12					± 0.1	± 0.1	± 0.1	± 0.15
164										0																	
165	5.4	5.6	5.8	6							4	4.2	4.3	4.4													
166	0	0	0	0																							
168	-0.25	-0.25	-0.25	-0.25																							
170																											
172																											
174																											
175																											
176	5.8	6	6.3	6.7							4.6	4.7	4.8	5													
178	0	0	0	0																							
180	-0.35	-0.35	-0.35	-0.35																							
182																											
184																											
185																											
186					5	6	7	8		0.55						0.4	0.5	0.6	0.6	2.9	3.5	3.9	4.3	0.7	0.9	1.2	1.5
188										-0.40						± 0.12	± 0.12	± 0.12	± 0.12					± 0.1	± 0.1	± 0.15	± 0.15
190										0																	
192																											
194	6.2	6.5	6.7	7.1							4.9	5	5.1	5.3													
195	0	0	0	0																							
196	-0.4	-0.4	-0.4	-0.4																							
198																											
200																											

NOTES:

¹For intermediate sizes (e.g. repair sizes), the radial thickness of the next smaller nominal diameter applies.

²Values of specific tangential force F_{tc} are calculated with mean land width (h_5).

This table is shown in ISO format. Commas represent decimal points.

C

C

[illegible]

C

TABLE 11 - Dimensions for SSF

Nominal diameter d_1	Radial thickness over coil spring a_{12} for h_1 shown in column				Ring width h_1 Column					Closed gap s_1	Radial wall thickness a_1 for h_1 shown in column					Land width h_5 for h_1 shown in column				Radius r_3	Groove depth a_4 for h_1 shown in column			
	1	2	3	4	1	2	3	4	Tolerance		1	2	3	4	Tolerance	1	2	3	4		1	2	3	4
60 61 62 63 64	—	3.5 0 -0.25	3.5 0 -0.25								—	2.4	2.4											
65 66 67 68 69	—	3.8 0 -0.25	3.7 0 -0.25							0.2 +0.2 0	—	2.45	2.5											
70 71 72 73 74	—		3.8 0 -0.25	3.9 0 -0.25	3		3.5	4			—	2.55	2.6	2.6			0.6 ± 0.1	0.7 ± 0.1	0.7 ± 0.1		—	0.5 ± 0.1	0.5 ± 0.1	0.5 ± 0.1
75 76 77 78 79	—	3.7 0 -0.25	3.9 0 -0.25	4 0 -0.25					-0.010 -0.030 For phosphated P0 surface: +0.005 -0.025		—	2.6	2.7	2.7	± 0.15 within a ring 0.15 max.									
80 81 82 83 84	3.8 0 -0.25								0.25 +0.25 0		2.7	2.7	2.8	2.8										
85 86 87 88 89		4 0 -0.25	4.1 0 -0.25	4.1 0 -0.25							2.8	2.8	2.9	2.9										
90 91 92 93 94	3.9 0 -0.25				3	3.5	4	4.5								0.6 ± 0.1	0.7 ± 0.1	0.7 ± 0.1	0.8 ± 0.1	0.2 max.	0.5 ± 0.1	0.5 ± 0.1	0.5 ± 0.1	0.7 ± 0.1
95 96 97 98 99		4.1 0 -0.25	4.2 0 -0.25	4.2 0 -0.25							2.85	2.9	2.95	3										
100 101 102 103 104	4 0 -0.25								0.3 +0.3 0		2.95	3	3.05	3.1										
105 106 107 108 109		4.2 0 -0.25	4.4 0 -0.25	4.5 0 -0.25							3.05	3.1	3.15	3.2										
110 111 112 113 114	4.3 0 -0.25	4.5 0 -0.25	4.6 0 -0.25	4.8 0 -0.25	3.5	4	4.5	5			3.1	3.15	3.2	3.3										
115 116 117 118 119			4.7 0 -0.25	4.9 0 -0.25					0.35 +0.35 0		3.2	3.25	3.3	3.4	± 0.20 within a ring 0.20 max.	0.7 ± 0.1	0.7 ± 0.1	0.8 ± 0.1	0.9 ± 0.1		0.5 ± 0.1	0.5 ± 0.1	0.7 ± 0.1	0.7 ± 0.1
120 121 122 123 124	4.4 0 -0.25	4.6 0 -0.25									3.3	3.35	3.4	3.5										
			4.8 0 -0.25	5 0 -0.25							3.4	3.45	3.5	3.6										

This table is shown in ISO format. Commas represent decimal points.

Coil Spring Loaded Oil Control Rings

Dimensions in millimeters

Groove depth and bridge				Number of slots	Slot width				Coil spring groove diameter				Coil spring diameter				Tangential force F_{tc} , N for unit contact pressure $p_{ou} = 1 \text{ N/mm}^2$ for h_1 shown in column				Recommended class of nominal contact pressure N/mm^2		
a_{13} for h_1 shown in column					c_1 for h_1 shown in column				d_{14} for h_1 shown in column				d_7 for h_1 shown in column								PNE Low	PNL Mean	PNR High
1	2	3	4		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4			
—	1.5 0 -0.15	1.5 0 -0.15	1.5 0 -0.15	8	—	0.7 ± 0.1	0.8 ± 0.1	—	2.1 ± 0.1	2.3 ± 0.1	2.3 ± 0.1	2.3 ± 0.1	2.0 0 -0.1	2.2 0 -0.1	2.2 0 -0.1	2.2 0 -0.1	—	36 36.6 37.2 37.8 38.4	42 42.7 43.4 44.1 44.8	42 42.7 43.4 44.1 44.8	0.86 0.85 0.85 0.84 0.84	1.14 1.13 1.13 1.12 1.12	1.52 1.51 1.5 1.5 1.49
	—																39 39.6 40.2 40.8 41.4	45.5 46.2 46.9 47.6 48.3	45.5 46.2 46.9 47.6 48.3	0.83 0.83 0.82 0.82 0.81	1.11 1.1 1.1 1.09 1.09	1.48 1.47 1.46 1.46 1.45	
	—																42 42.6 43.2 43.8 44.4	49 49.7 50.4 51.1 51.8	49 49.7 50.4 51.1 51.8	0.81 0.81 0.8 0.8 0.79	1.08 1.07 1.07 1.06 1.06	1.44 1.43 1.42 1.41 1.41	
	—																45 45.6 46.2 46.8 47.4	52.5 53.2 53.9 54.6 55.3	52.5 53.2 53.9 54.6 55.3	0.79 0.78 0.78 0.77 0.77	1.05 1.04 1.04 1.03 1.03	1.4 1.39 1.38 1.38 1.37	
1.8 0 -0.15	1.8 0 -0.15	1.7 0 -0.15	10	—	0.7 ± 0.1	0.8 ± 0.1	1 ± 0.1	1.2 ± 0.1	2.1 ± 0.1	2.3 ± 0.1	2.5 ± 0.1	2.5 ± 0.1	2 0 -0.1	2.2 0 -0.1	2.4 0 -0.1	2.4 0 -0.1	48 48.6 49.2 49.8 50.4	56 56.7 57.4 58.1 58.8	56 56.7 57.4 58.1 58.8	64 64.8 65.6 66.4 67.2	0.77 0.76 0.76 0.75 0.75	1.02 1.01 1.01 1 1	1.36 1.35 1.34 1.34 1.33
																	51 51.6 52.2 52.8 53.4	59.5 60.2 60.9 61.6 62.3	59.5 60.2 60.9 61.6 62.3	68 68.8 69.6 70.4 71.2	0.74 0.74 0.74 0.73 0.73	0.99 0.98 0.98 0.97 0.97	1.32 1.31 1.3 1.3 1.29
																	54 54.6 55.2 55.8 56.4	63 63.7 64.4 65.1 65.8	63 63.7 64.4 65.1 65.8	72 72.8 73.6 74.4 75.2	0.72 0.72 0.71 0.71 0.7	0.96 0.95 0.95 0.94 0.94	1.28 1.27 1.26 1.26 1.25
																	57 57.6 58.2 58.8 59.4	66.5 67.2 67.9 68.6 69.3	66.5 67.2 67.9 68.6 69.3	76 76.8 77.6 78.4 79.2	0.7 0.69 0.69 0.68 0.68	0.93 0.92 0.92 0.91 0.91	1.24 1.23 1.22 1.22 1.21
2 0 -0.15	2 0 -0.2	1.9 0 -0.2	12	—	0.8 ± 0.1	1 ± 0.1	1.2 ± 0.1	1.2 ± 0.1	2.3 ± 0.1	2.5 ± 0.1	2.7 ± 0.1	2.9 ± 0.1	2.2 0 -0.1	2.4 0 -0.1	2.6 0 -0.1	2.8 0 -0.1	70 70.7 71.4 72.1 72.8	80 80.8 81.6 82.4 83.2	80 80.8 81.6 82.4 83.2	90 90.9 91.8 92.7 93.6	0.68 0.67 0.67 0.66 0.66	0.9 0.89 0.89 0.88 0.88	1.2 1.19 1.18 1.18 1.17
																	73.5 74.2 74.9 75.6 76.3	84 84.8 85.6 86.4 87.2	84 84.8 85.6 86.4 87.2	94.5 95.4 96.3 97.2 98.1	0.65 0.65 0.64 0.64 0.63	0.87 0.86 0.86 0.85 0.85	1.16 1.15 1.14 1.14 1.13
																	77 77.7 78.4 79.1 79.8	88 88.8 89.6 90.4 91.2	88 88.8 89.6 90.4 91.2	99 99.9 100.8 101.7 102.6	0.63 0.63 0.62 0.62 0.61	0.84 0.83 0.83 0.82 0.82	1.12 1.11 1.1 1.1 1.09
																	80.5 81.2 81.9 82.6 83.3	92 92.8 93.6 94.4 95.2	92 92.8 93.6 94.4 95.2	103.5 104.4 105.3 106.2 107.1	0.61 0.6 0.6 0.59 0.59	0.81 0.8 0.8 0.79 0.79	1.08 1.07 1.06 1.06 1.05
2.2 0 -0.2	2.2 0 -0.2	2.2 0 -0.2	12	—	0.8 ± 0.1	1 ± 0.1	1.2 ± 0.1	1.2 ± 0.1	2.3 ± 0.1	2.5 ± 0.1	2.7 ± 0.1	2.9 ± 0.1	2.2 0 -0.1	2.4 0 -0.1	2.6 0 -0.1	2.8 0 -0.1	84 84.7 85.4 86.1 86.8	96 96.8 97.6 98.4 99.2	96 96.8 97.6 98.4 99.2	108 108.9 109.8 110.7 111.6	0.59 0.58 0.58 0.57 0.57	0.78 0.77 0.77 0.76 0.76	1.04 1.03 1.02 1.02 1.01

This table is shown in ISO format. Commas represent decimal points.

TABLE 11 (Continued)

Nominal diameter d_1	Radial thickness over coil spring a_{12} for h_1 shown in column				Ring width h_1 Column					Closed gap s_1	Radial wall thickness a_1 for h_1 shown in column					Land width h_5 for h_1 shown in column				Radius r_3	Groove depth a_4 for h_1 shown in column			
	1	2	3	4	1	2	3	4	Tolerance		1	2	3	4	Tolerance	1	2	3	4		1	2	3	4
125																								
126				5						0.35	3.5	3.6	3.6	3.7										
127				0						+0.30														
128				-0.25						0														
129	4.7	4.9																						
130	0	0																						
131	-0.25	-0.25																						
132				5.1							3.5	3.6	3.7	3.8										
133				0																				
134				-0.25																				
135																								
136																								
137					4	4.5	5	6			3.6	3.7	3.8	3.9		0.7	0.8	0.9	1.1		0.5	0.7	0.7	0.9
138																±0.1	±0.1	±0.1	±0.1		±0.1	±0.1	±0.1	±0.1
139																								
140										0.4														
141	4.9	5.1	5.3	5.5						+0.35														
142	0	0	0	0						0	3.7	3.8	3.9	4										
143	-0.25	-0.25	-0.25	-0.25																				
144																								
145																								
146																								
147																								
148																								
149																								
150																								
152																								
154	5.4	5.4	5.5	5.5							3.9	4	4.1	4.2										
155	0	0	0	0																				
156	-0.25	-0.25	-0.25	-0.25																				
158																								
160					4.5	5	6	7																
162																								
164																								
165	5.4	5.6	5.8	6																				
166	0	0	0	0																				
168	-0.25	-0.25	-0.25	-0.25																				
170																								
172																								
174																								
175																								
176																								
178	5.8	6	6.3	6.7							4.6	4.7	4.8	5										
180	0	0	0	0																				
182	-0.35	-0.35	-0.35	-0.35																				
184																								
185																								
186																								
188					5	6	7	8																
190																								
192																								
194	6.2	6.5	6.7	7.1																				
195	0	0	0	0																				
196	-0.4	-0.4	-0.4	-0.4																				
198																								
200																								

NOTES:

¹For intermediate sizes (e.g. repair sizes), the radial thickness of the next smaller nominal diameter applies.

²Values of specific tangential force F_{tc} are calculated with mean land width (h_5).

This table is shown in ISO format. Commas represent decimal points.

Coil Spring Loaded Oil Control Rings (Concluded)

Dimensions in millimeters

Groove depth and bridge a_{13} for h_1 shown in column				Number of slots	Slot width c_1 for h_1 shown in column				Coil spring groove diameter d_{14} for h_1 shown in column				Coil spring diameter d_7 for h_1 shown in column				Tangential force F_{tc} , N for unit contact pressure $p_{ou} = 1 \text{ N/mm}^2$ for h_1 shown in column				Recommended class of nominal contact pressure N/mm ²		
1	2	3	4		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	PNE Low	PNL Mean	PNR High
		2.2 0 -0.2	2.2 0 -0.2	12													87.5 88.2 88.9 89.6 90.3	100 100.8 101.6 102.4 103.2	112.5 113.4 114.3 115.2 116.1	137.5 138.6 139.7 140.8 141.9	0.56 0.56 0.55 0.55 0.54	0.75 0.74 0.74 0.73 0.73	1 0.99 0.98 0.98 0.97
									2.5 +0.1 0	2.7 +0.1 0	2.9 +0.1 0	3.1 +0.1 0	2.4 0 -0.1	2.6 0 -0.1	2.8 0 -0.1	3 0 -0.1	91 91.7 92.4 93.1 93.8	104 104.8 105.6 106.4 107.2	117 117.9 118.8 119.7 120.6	143 144.1 145.2 146.3 147.4	0.54 0.54 0.54 0.53 0.53	0.72 0.72 0.71 0.71 0.71	0.96 0.96 0.95 0.95 0.94
2.3 0 -0.2	2.3 0 -0.2				1 ±0.1	1.2 ±0.1	1.2 ±0.1	1.4 ±0.1									94.5 95.2 95.9 96.6 97.3	108 108.8 109.6 110.4 111.2	121.5 122.4 123.3 124.2 125.1	148.5 149.6 150.7 151.8 152.9	0.53 0.53 0.52 0.52 0.52	0.71 0.7 0.7 0.7 0.69	0.94 0.94 0.93 0.93 0.92
		2.3 0 -0.2	2.3 0 -0.2						2.7 +0.1 0	2.9 +0.1 0	3.1 +0.1 0	3.3 +0.15 0	2.6 0 -0.1	2.8 0 -0.1	3 0 -0.1	3.2 0 -0.1	98 98.7 99.4 100.1 100.8	112 112.8 113.6 114.4 115.2	126 126.9 127.8 128.7 129.6	154 155.1 156.2 157.3 158.4	0.52 0.52 0.51 0.51 0.51	0.69 0.69 0.68 0.68 0.68	0.92 0.92 0.91 0.91 0.9
																	101.5 102.2 102.9 103.6 104.3	116 116.8 117.6 118.4 119.2	130.5 131.4 132.3 133.2 134.1	159.5 160.6 161.7 162.8 163.9	0.51 0.5 0.5 0.5 0.5	0.68 0.67 0.67 0.67 0.66	0.9 0.9 0.89 0.89 0.88
		2.4 0 -0.2	2.3 0 -0.2									3.3 -0.15 0				3.2 0 -0.1	120 121.6 123.2	135 136.8 138.6	165 167.2 169.4	195 197.6 200.2	0.5 0.49 0.49	0.66 0.65 0.65	0.88 0.87 0.86
																	124 124.8 126.4	139.5 140.4 142.2	170.5 171.6 173.8	201.5 202.8 205.4	0.48 0.48 0.48	0.65 0.64 0.64	0.86 0.86 0.85
2.6 0 -0.2					1.2 ±0.1	1.2 ±0.1	1.4 ±0.1	1.6 ±0.1	2.9 -0.1 0	3.1 +0.1 0	3.3 +0.15 0		2.8 0 -0.1	3 0 -0.1	3.2 0 -0.1		128 129.6 131.2	144 145.8 147.6	176 178.2 180.4	208 210.6 213.2	0.47 0.47 0.46	0.63 0.62 0.62	0.84 0.83 0.82
		2.6 0 -0.2	2.4 0 -0.2									3.7 -0.15 0				3.6 0 -0.1	132 132.8 134.4	148.5 149.4 151.2	181.5 182.6 184.8	214.5 215.8 218.4	0.46 0.46 0.45	0.62 0.61 0.61	0.82 0.82 0.81
																	136 137.6 139.2	153 154.8 156.6	187 189.2 191.4	221 223.6 226.2	0.45 0.45 0.44	0.6 0.6 0.59	0.8 0.79 0.78
																	157.5 158.4 160.2	192.5 193.6 195.8	227.5 228.8 231.4	280 281.6 284.8	0.44 0.44 0.43	0.59 0.58 0.58	0.78 0.78 0.77
2.8 0 -0.2	2.8 0 -0.2								3.1 -0.1 0	3.3 +0.15 0	3.7 -0.15 0	4.15 -0.15 0	3 0 -0.1	3.2 0 -0.1	3.6 0 -0.1	4 0 -0.12	162 163.8 165.6	198 200.2 202.4	234 236.6 239.2	288 291.2 294.4	0.43 0.42 0.42	0.57 0.56 0.56	0.76 0.75 0.74
				14													166.5 167.4 169.2	203.5 204.6 206.8	240.5 241.8 244.4	296 297.6 300.8	0.42 0.41 0.41	0.56 0.55 0.55	0.74 0.74 0.73
		2.7 0 -0.2	2.7 0 -0.2		1.2 ±0.1	1.4 ±0.1	1.6 ±0.1	1.8 ±0.15									171 172.8 174.6	209 211.2 213.4	247 249.6 252.2	304 307.2 310.4	0.41 0.4 0.4	0.54 0.53 0.53	0.72 0.71 0.7
3 0 -0.2	2.9 0 -0.2								3.3 -0.15 0	3.7 +0.15 0	4.15 -0.15 0	4.55 -0.15 0	3.2 0 -0.1	3.6 0 -0.12	4 0 -0.12	4.4 0 -0.12	175.5 176.4 178.2	214.5 215.6 217.8	253.5 254.8 257.4	312 313.6 316.8	0.4 0.39 0.39	0.53 0.52 0.52	0.7 0.7 0.69
																	180 180.8 181.6	220 221.6 223.2	260 261.6 263.2	320 321.6 323.2	0.38 0.38 0.38	0.51 0.51 0.51	0.68 0.68 0.68

This table is shown in ISO format. Commas represent decimal points.

TABLE 12 - Dimensions for GSF and DSF

Nominal diameter d_1	Radial thickness over coil spring a_{12} for h_1 shown in column				Ring width h_1 Column					Closed gap s_1	Radial wall thickness a_1 for h_1 shown in column					Land width h_4 for h_1 shown in column				Land width h_5 for h_1 shown in column				Radius r_3
	1	2	3	4	1	2	3	4	Tolerance		1	2	3	4	Tolerance	1	2	3	4	1	2	3	4	
60 61 62 63 64	—	3.5 0 -0.25	3.5 0 -0.25	3.7 0 -0.25	— 3 3.5 4	-0.010 -0.030 For phosphated P0 surface: +0.005 -0.025	0.2 +0.2 0	—	2.4	2.4	2.5	— 0.6 ±0.1 0.7 ±0.1 0.7 ±0.1	— 0.28 ±0.08 0.35 ±0.1 0.4 ±0.1	0.2 max.										
65 66 67 68 69	—	3.6 0 -0.25	3.7 0 -0.25	—				2.45	2.5															
70 71 72 73 74	—	3.8 0 -0.25	3.9 0 -0.25	—				2.55	2.6	2.6														
75 76 77 78 79	—	3.7 0 -0.25	3.9 0 -0.25	4 0 -0.25				—	2.6	2.7	2.7				±0.15 within a ring 0.15 max.									
80 81 82 83 84	3.8 0 -0.25	4 0 -0.25	4.1 0 -0.25	4.1 0 -0.25				3 3.5 4 4.5	0.25 +0.25 0	2.7	2.7				2.8	2.8	0.6 ±0.1 0.7 ±0.1 0.7 ±0.1 0.8 ±0.1 0.28 ±0.08 0.35 ±0.1 0.4 ±0.1 0.4 ±0.1	0.2 max.						
85 86 87 88 89	3.9 0 -0.25	4 0 -0.25	4.1 0 -0.25	4.1 0 -0.25						2.8	2.8				2.9	2.9								
90 91 92 93 94	4 0 -0.25	4.1 0 -0.25	4.2 0 -0.25	4.2 0 -0.25						2.85	2.9				2.95	3								
95 96 97 98 99	4 0 -0.25	4.1 0 -0.25	4.2 0 -0.25	4.2 0 -0.25						2.95	3				3.05	3.1								
100 101 102 103 104	4.2 0 -0.25	4.4 0 -0.25	4.5 0 -0.25	4.7 0 -0.25						3.5 4 4.5 5	+0.25 0				3.05	3.1			3.15	3.2	±0.20 within a ring 0.20 max.	0.7 ±0.1 0.7 ±0.1 0.8 ±0.1 0.9 ±0.1 0.35 ±0.1 0.4 ±0.1 0.4 ±0.1 0.4 ±0.1	0.2 max.	
105 106 107 108 109	4.2 0 -0.25	4.4 0 -0.25	4.5 0 -0.25	4.7 0 -0.25											3.1	3.15			3.2	3.3				
110 111 112 113 114	4.3 0 -0.25	4.5 0 -0.25	4.6 0 -0.25	4.8 0 -0.25	3.2	3.25	3.3					3.4												
115 116 117 118 119	4.4 0 -0.25	4.6 0 -0.25	4.7 0 -0.25	4.9 0 -0.25	3.3	3.35	3.4					3.5												
120 121 122 123 124	4.4 0 -0.25	4.6 0 -0.25	4.8 0 -0.25	5 0 -0.25	3.4	3.45	3.5					3.6												

This table is shown in ISO format. Commas represent decimal points.

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—	1.6 0 -0.15	0 -0.15	8	—	0.7 ±0.1	0.8 ±0.1	—	2.1 +0.1 0	—	2 0 -0.1	2.2 0 -0.1	2.4 0 -0.1	—	—	—	22.4 22.7 23 23.2 23.5	
	1.6 0 -0.15	1.7 0 -0.15				1 ±0.1		2.3 +0.1 0		2.5 +0.1 0						23.8 24.1 24.4 24.6 24.9	
1.8 0 -0.15	1.7 0 -0.15	1.7 0 -0.15			0.7 ±0.1	0.8 ±0.1	1 ±0.1	1.2 ±0.1	2.1 -0.1 0	2.3 +0.1 0	2.5 +0.1 0	2.5 +0.1 0	2 0 -0.1	2.2 0 -0.1	2.4 0 -0.1	2.4 0 -0.1	25.2 25.5 25.8 26 26.3
1.9 0 -0.15	1.8 0 -0.15	1.8 0 -0.15	10														26.6 26.9 27.2 27.4 27.7
2 0 -0.15	2 0 -0.2	1.9 0 -0.2															35 35.4 35.7 36.1 36.4

TABLE 12 (Continued)

Nominal diameter d_1	Radial thickness over coil spring a_{12} for h_1 shown in column				Ring width h_1 Column					Closed gap s_1	Radial wall thickness a_1 for h_1 shown in column					Land width h_4 for h_1 shown in column				Land width h_5 for h_1 shown in column				Radius r_3
	1	2	3	4	1	2	3	4	Tolerance		1	2	3	4	Tolerance	1	2	3	4	1	2	3	4	
125										0.35 +0.30 0	3.5	3.6	3.6	3.7										
126			5	5.2																				
127			0	0																				
128			-0.25	-0.25																				
129	4.7	4.9																						
130	0	0								0.4 -0.35 0	3.5	3.6	3.7	3.8										
131	-0.25	-0.25	5.1	5.3																				
132			0	0																				
133			-0.25	-0.25																				
134																								
135										-0.010 -0.040 For phos- phated PO surface: +0.005 -0.035	3.6	3.7	3.8	3.9		0.7 ±0.1	0.8 ±0.1	0.9 ±0.1	1.1 ±0.1	0.4 ±0.1	0.4 ±0.1	0.4 ±0.1	0.5 ±0.1	
136					4	4.5	5	6																
137																								
138																								
139																								
140										±0.20 within a ring 0.20 max	3.7	3.8	3.9	4										
141	4.9	5.1	5.3	5.5																				
142	0	0	0	0																				
143	-0.25	-0.25	-0.25	-0.25																				
144																								
145										0.45 -0.35 0	3.8	3.9	4	4.1										
146																								
147																								
148																								
149																								
150										±0.20 within a ring 0.20 max	3.9	4	4.1	4.2										
152																								
154	5.4	5.4	5.5	5.5																				
155	0	0	0	0																				
156	-0.25	-0.25	-0.25	-0.25																				
158										0.95 -0.40 0	4	4.2	4.3	4.4										
160					4.5	5	6	7																
162																								
164																								
165	5.4	5.6	5.8	6																				
166	0	0	0	0																				
168	-0.25	-0.25	-0.25	-0.25																				
170										0.95 -0.40 0	4.6	4.7	4.8	5										
172																								
174																								
175																								
176																								
178	5.8	6	6.3	6.7																				
180	0	0	0	0																				
182	-0.35	-0.35	-0.35	-0.35																				
184										0.95 -0.40 0														
185					5	6	7	8																
186																								
188																								
190																								
192										0.95 -0.40 0	4.9	5	5.1	5.3										
194	6.2	6.5	6.7	7.1																				
195	0	0	0	0																				
196	-0.4	-0.4	-0.4	-0.4																				
198																								
200																								

NOTES:

¹For intermediate sizes (e.g. repair sizes), the radial thickness of the next smaller nominal diameter applies.

²Values of specific tangential force F_{tc} are calculated with mean land width (h_5).

This table is shown in ISO format. Commas represent decimal points.

Coil Spring Loaded Oil Control Rings (Concluded)

Dimensions in millimeters

Groove depth				Groove depth and bridge				Number of slots	Slot width				Coil spring groove diameter				Coil spring diameter				Tangential force F_{tc} , N for unit contact pressure $P_{ov} = 1 \text{ N/mm}^2$ for h_1 shown in column				Recommended class of nominal contact pressure N/mm ²		
a_4 for h_1 shown in column				a_{13} for h_1 shown in column					c_1 for h_1 shown in column				d_{14} for h_1 shown in column				d_7 for h_1 shown in column								PNL	PNR	PNM
1	2	3	4	1	2	3	4		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	Low	Mean	High
0.5 ±0.1	0.7 ±0.1	0.7 ±0.1	0.9 ±0.1	2.3 0 -0.2	2.3 0 -0.2	2.2 0 -0.2	2.2 0 -0.2	12	1 ±0.1	1.2 ±0.1	1.2 ±0.1	1.4 ±0.1	2.5 +0.1 0	2.7 +0.1 0	2.9 +0.1 0	3.1 +0.1 0	2.4 0 -0.1	2.6 0 -0.1	2.8 0 -0.1	3 0 -0.1	50	50	50	62.5	0.75	1	1.25
						50.4	50.4														50.4	63	0.74	0.99	1.24		
						50.8	50.8														50.8	63.5	0.74	0.98	1.23		
						51.2	51.2														51.2	64	0.73	0.98	1.22		
						51.6	51.6														51.6	64.5	0.73	0.97	1.21		
						52	52														52	65	0.72	0.96	1.2		
						52.4	52.4														52.4	65.5	0.72	0.96	1.2		
						52.8	52.8														52.8	66	0.71	0.95	1.19		
						53.2	53.2														53.2	66.5	0.71	0.95	1.19		
						53.6	53.6														53.6	67	0.71	0.94	1.18		
						54	54														54	67.5	0.71	0.94	1.18		
						54.4	54.4														54.4	68	0.7	0.94	1.17		
0.7 ±0.1	0.7 ±0.1	0.9 ±0.1	1.2 ±0.15	2.6 0 -0.2	2.6 0 -0.2	2.3 0 -0.2	2.3 0 -0.2	14	1.2 ±0.1	1.2 ±0.1	1.4 ±0.1	1.6 ±0.1	2.7 -0.1 0	2.9 +0.1 0	3.1 +0.1 0	3.3 +0.15 0	2.6 0 -0.1	2.8 0 -0.1	3 0 -0.1	3.2 0 -0.1	54.8	54.8	54.8	68.5	0.7	0.93	1.17
						55.2	55.2														55.2	69	0.7	0.93	1.16		
						55.6	55.6														55.6	69.5	0.69	0.92	1.16		
						56	56														56	70	0.69	0.92	1.15		
						56.4	56.4														56.4	70.5	0.69	0.92	1.15		
						56.8	56.8														56.8	71	0.68	0.91	1.14		
						57.2	57.2														57.2	71.5	0.68	0.91	1.14		
						57.6	57.6														57.6	72	0.68	0.9	1.13		
						58	58														58	72.5	0.68	0.9	1.13		
						58.4	58.4														58.4	73	0.67	0.9	1.12		
						58.8	58.8														58.8	73.5	0.67	0.89	1.12		
						59.2	59.2														59.2	74	0.67	0.89	1.11		
0.7 ±0.1	0.9 ±0.15	1.2 ±0.15	1.5 ±0.15	2.6 0 -0.2	2.6 0 -0.2	2.4 0 -0.2	2.3 0 -0.2	14	1.2 ±0.1	1.2 ±0.1	1.4 ±0.1	1.6 ±0.1	3.3 -0.15 0	2.9 -0.1 0	3.1 -0.1 0	3.3 -0.15 0	2.8 -0.1 0	3 -0.1 0	3.2 0 -0.1	3.6 0 -0.1	60	60	75	90	0.66	0.88	1.1
						60.8	60.8														76	91.2	0.65	0.87	1.09		
						61.6	61.6														77	92.4	0.65	0.86	1.08		
						62	62														77.5	93	0.65	0.86	1.08		
						62.4	62.4														78	93.6	0.64	0.86	1.07		
						63.2	63.2														79	94.8	0.64	0.85	1.06		
						64	64														80	96	0.63	0.84	1.05		
						64.8	64.8														81	97.2	0.62	0.83	1.04		
						65.6	65.6														82	98.4	0.62	0.82	1.03		
						66	66														82.5	99	0.62	0.82	1.03		
						66.4	66.4														83	99.6	0.61	0.82	1.02		
						67.2	67.2														84	100.8	0.61	0.81	1.01		
0.7 ±0.1	0.9 ±0.15	1.2 ±0.15	1.5 ±0.15	2.6 0 -0.2	2.6 0 -0.2	2.4 0 -0.2	2.3 0 -0.2	14	1.2 ±0.1	1.4 ±0.1	1.6 ±0.1	1.8 ±0.15	3.3 -0.15 0	3.7 -0.15 0	4.15 -0.15 0	4.55 -0.15 0	3.2 0 -0.1	3.6 0 -0.1	4 0 -0.1	4.4 0 -0.1	68	68	85	102	0.6	0.8	1
						68.8	68.8														86	103.2	0.59	0.79	0.99		
						69.6	69.6														87	104.4	0.59	0.78	0.98		
						70	87.5														105	105	0.59	0.78	0.98		
						70.4	88														105.6	105.6	0.58	0.78	0.97		
						71.2	89														106.8	106.8	0.58	0.77	0.96		
						72	90														108	108	0.57	0.76	0.95		
						72.8	91														109.2	109.2	0.56	0.75	0.94		
						73.6	92														110.4	110.4	0.56	0.75	0.93		
						74	92.5														111	111	0.56	0.74	0.93		
						74.4	93														111.6	111.6	0.55	0.74	0.92		
						75.2	94														112.8	112.8	0.55	0.73	0.91		
0.7 ±0.1	0.9 ±0.15	1.2 ±0.15	1.5 ±0.15	2.6 0 -0.2	2.6 0 -0.2	2.7 0 -0.2	2.7 0 -0.2	14	1.2 ±0.1	1.4 ±0.1	1.6 ±0.1	1.8 ±0.15	3.3 -0.15 0	3.7 -0.15 0	4.15 -0.15 0	4.55 -0.15 0	3.2 0 -0.1	3.6 0 -0.1	4 0 -0.1	4.4 0 -0.1	76	95	114	114	0.54	0.72	0.9
						76.8	96														115.2	115.2	0.53	0.71	0.89		
						77.6	97														116.4	116.4	0.53	0.7	0.88		
						78	97.5														117	117	0.53	0.7	0.88		
						78.4	98														117.6	117.6	0.52	0.7	0.87		
						79.2	99														118.8	118.8	0.52	0.69	0.86		
						80	100														120	120	0.51	0.68	0.85		

TABLE 13 - Dimensions for DSF-NG

Nominal diameter d_1	Radial thickness over coil spring a_{12} for h_1 shown in column				Ring width h_1 Column					Closed gap s_1	Radial wall thickness a_1 for h_1 shown in column					Land width h_5 for h_1 shown in column				Land spacing $\approx B_3$ for h_1 shown in column				Groove depth a_4 for h_1 shown in column			
	1	2	3	4	1	2	3	4	Tolerance		1	2	3	4	Tolerance	1	2	3	4	1	2	3	4	1	2	3	4
60																											
61	—	3.5	3.5								—	2.4	2.4														
62		0	0											2.5													
63		—0.25	—0.25																								
64				3.7																							
65				—0.25																							
66				3.7						0.2																	
67	—		3.6	0						+0.2	—	2.45	2.5														
68		—0.25	—0.25							0																	
69					—	3	3.5	4								—	0.35	0.35	0.4	1.55	1.85	2.3		0.5	0.5	0.5	
70																	±0.1	±0.1	±0.1					—0.1	—0.1	—0.1	
71																											
72	—		3.8	3.9							—	2.55	2.6	2.6													
73			0	0																							
74			—0.25	—0.25																							
75																											
76			3.7	3.9	4					—0.010																	
77	—		0	0	0					—0.030																	
78			—0.25	—0.25	—0.25																						
79										For					±0.15												
80										phos-					within												
81	3.8									phated	0.25	2.7	2.7	2.8	2.8	a ring											
82	0									PO	+0.25				0.15												
83	—0.25									surface:	0				max.												
84		4	4.1	4.1						+0.005																	
85		—0.25	—0.25	—0.25						—0.025																	
86												2.8	2.8	2.9	2.9												
87																											
88																											
89	3.9				3	3.5	4	4.5									0.35	0.35	0.4	0.4	1.55	1.85	2.3	2.65	0.5	0.5	0.5
90	—0.25																±0.1	±0.1	±0.1	±0.1					±0.1	±0.1	±0.1
91																											
92												2.85	2.9	2.95	3												
93																											
94		4.1	4.2	4.2																							
95		0	0	0																							
96	4	—0.25	—0.25	—0.25																							
97	0																										
98	—0.25																										
99										0.3																	
100										+0.25																	
101										0	3.05	3.1	3.15	3.2													
102																											
103																											
104	4.2	4.4	4.5	4.7																							
105	0	0	0	0																							
106	—0.25	—0.25	—0.25	—0.25																							
107																											
108												3.1	3.15	3.2	3.3												
109																											
110																											
111	4.3	4.5	4.6	4.8	3.5	4	4.5	5				3.2	3.25	3.3	3.4	±0.20											
112	0	0	0	0												within	0.35	0.4	0.4	0.4	1.85	2.3	2.65	2.9	0.5	0.5	0.7
113	—0.25	—0.25	—0.25	—0.25												a ring	±0.1	±0.1	±0.1	±0.1					±0.1	±0.1	±0.1
114																0.20											
115																max											
116																											
117																											
118										0.35																	
119	4.4	4.6	4.7	4.9						+0.30	3.3	3.35	3.4	3.5													
120	0	0	0	0						0																	
121	—0.25	—0.25																									
122																											
123																											
124																											

This table is shown in ISO format. Commas represent decimal points.

Dimensions in millimeters

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TABLE 13 (Continued)

Nominal diameter d_1	Radial thickness over coil spring a_{12} for h_1 shown in column				Ring width h_1 Column					Closed gap s_1	Radial wall thickness a_1 for h_1 shown in column					Land width h_5 for h_1 shown in column				Land spacing $\approx B_3$ for h_1 shown in column				Groove depth a_4 for h_1 shown in column			
	1	2	3	4	1	2	3	4	Tolerance		1	2	3	4	Tolerance	1	2	3	4	1	2	3	4	1	2	3	4
125										0.35 +0.30 0	3.5	3.6	3.6	3.7													
126			5	5.2																							
127			0	0																							
128			-0.25	-0.25																							
129	4.7 0	4.9 0								0.4 +0.35 0																	
130	-0.25	-0.25									3.5	3.6	3.7	3.8													
131			5.1	5.3																							
132			0	0																							
133			-0.25	-0.25						-0.010 -0.040 For phosphated PO surface: +0.005 -0.035																	
134																											
135					4	4.5	5	6			3.6	3.7	3.8	3.9		0.4 ± 0.1	0.4 ± 0.1	0.4 ± 0.1	0.5 ± 0.1	2.3	2.65	2.9	3.5	0.5 ± 0.1	0.7 ± 0.1	0.7 ± 0.1	0.9 ± 0.1
136																											
137										0.45 +0.35 0																	
138											3.7	3.8	3.9	4													
139																											
140	4.9 0	5.1 0	5.3 0	5.5 0							3.8	3.9	4	4.1													
141	-0.25	-0.25	-0.25	-0.25						± 0.20 within a ring 0.20 max.																	
142											3.9	4	4.1	4.2													
143	-0.25	-0.25	-0.25	-0.25																							
144																											
145										0.45 +0.35 0																	
146					4.5	5	6	7																			
147											4	4.2	4.3	4.4													
148	5.4 0	5.6 0	5.8 0	6 0																							
149	-0.25	-0.25	-0.25	-0.25						0.4 ± 0.1																	
150																											
152																											
154	5.4 0	5.4 0	5.5 0	5.5 0																							
155	-0.25	-0.25	-0.25	-0.25						0.5 ± 0.1																	
156																											
158																											
160																											
162										0.4 ± 0.1																	
164																											
165	5.4 0	5.6 0	5.8 0	6 0							4	4.2	4.3	4.4													
166	-0.25	-0.25	-0.25	-0.25																							
168										0.55 -0.40 0																	
170																											
172																											
174																											
175										0.4 ± 0.1																	
176																											
178	5.8 0	6 0	6.3 0	6.7 0							4.6	4.7	4.8	5													
180	-0.35	-0.35	-0.35	-0.35																							
182										0.5 ± 0.1																	
184																											
185																											
186					5	6	7	8																			
188										0.4 ± 0.1																	
190																											
192																											
194	6.2 0	6.5 0	6.7 0	7.1 0							4.9	5	5.1	5.3													
195	-0.4	-0.4	-0.4	-0.4						0.4 ± 0.1																	
196																											
198																											
200																											

NOTES:

¹For intermediate sizes (e.g. repair sizes), the radial thickness of the next smaller nominal diameter applies.

²Values of specific tangential force F_{tc} are calculated with mean land width (h_5).

This table is shown in ISO format. Commas represent decimal points.

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[illegible]

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TABLE 14 - Dimensions for SSF-L

Nominal diameter d_1	Radial thickness over coil spring a_{12} for h_1 shown in column				Ring width h_1 Column					Closed gap s_1	Radial wall thickness a_1 for h_1 shown in column					Land width h_5	Radius r_3	Groove depth a_4 for h_1 shown in column			
	1	2	3	4	1	2	3	4	Tolerance		1	2	3	4	Tolerance			1	2	3	4
60 61 62 63 64	—	3.5 0 -0.25	3.5 0 -0.25	3.7 0 -0.25	— 3 3.5 4	-0.010 -0.030 For phosphated P0 surface: +0.005 -0.025	0.2 +0.2 0	—	2.4	2.4	2.5			±0.15 within a ring 0.15 max.	0.6 ±0.1	0.2 max	—	0.5 ±0.1	0.5 ±0.1	0.5 ±0.1	
65 66 67 68 69	—	3.6 0 -0.25	3.7 0 -0.25	—				2.45	2.5				—				2.55	2.6	2.6		
70 71 72 73 74	—		3.8 0 -0.25	3.9 0 -0.25																	
75 76 77 78 79	—	3.7 0 -0.25	3.9 0 -0.25	4 0 -0.25							—	2.6	2.7				2.7				
80 81 82 83 84	3.8 0 -0.25									0.25	2.7	2.7	2.8				2.8				
85 86 87 88 89		4 0 -0.25	4.1 0 -0.25	4.1 0 -0.25						+0.25 0											
											2.8	2.8	2.9				2.9				
90 91 92 93 94	3.9 0 -0.25							3	3.5	4	4.5										
95 96 97 98 99		4.1 0 -0.25	4.2 0 -0.25	4.2 0 -0.25							2.85	2.9	2.95				3				
		4 0 -0.25									2.95	3	3.05				3.1				
100 101 102 103 104										0.3											
							+0.25 0	3.05	3.1	3.15	3.2										
105 106 107 108 109	4.2 0 -0.25	4.4 0 -0.25	4.5 0 -0.25	4.7 0 -0.25				3.1	3.15	3.2	3.3										
110 111 112 113 114	4.3 0 -0.25	4.5 0 -0.25	4.6 0 -0.25	4.8 0 -0.25	3.5	4	4.5	5													
								3.2	3.25	3.3	3.4										
115 116 117 118 119			4.7 0 -0.25	4.9 0 -0.25			0.35 +0.30 0	3.3	3.35	3.4	3.5										
120 121 122 123 124	4.4 0 -0.25	4.6 0 -0.25						3.4	3.45	3.5	3.6										

This table is shown in ISO format. Commas represent decimal points.

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			0.7 ±0.1			0.8 ±0.1			2.1 +0.1 0			2.3 +0.1 0			2 0 -0.1			2.2 0 -0.1			37.2 37.8 38.4	0.85 0.84 0.84
8	—	0.7 ±0.1	0.8 ±0.1	—																	39 39.6 40.2 40.8 41.4	0.83 0.83 0.82 0.82 0.81
						1 ±0.1						2.3 +0.1 0									42 42.6 43.2 43.8 44.4	0.81 0.81 0.8 0.8 0.79
												2.5 +0.1 0									45 45.6 46.2 46.8 47.4	0.79 0.78 0.78 0.77 0.77
																					48 48.6 49.2 49.8 50.4	0.77 0.76 0.76 0.75 0.75
																					51 51.6 52.2 52.8 53.4	0.74 0.74 0.74 0.73 0.73
		0.7 ±0.1	0.8 ±0.1	1 ±0.1	1.2 ±0.1	2.1 ±0.1 0	2.3 +0.1 0	2.5 +0.1 0	2.5 ±0.1 0	2 0 -0.1	2.2 0 -0.1	2.4 0 -0.1	2.4 0 -0.1							54 54.6 55.2 55.8 56.4	0.72 0.72 0.71 0.71 0.7	
10																					57 57.6 58.2 58.8 59.4	0.7 0.69 0.69 0.68 0.68
																					60 60.6 61.2 61.8 62.4	0.68 0.67 0.67 0.66 0.66
																					63 63.6 64.2 64.8	0.65 0.65 0.64 0.64

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TABLE 14 (Continued)

Nominal diameter d_1	Radial thickness over coil spring a_{12} for h_1 shown in column				Ring width h_1 Column					Closed gap s_1	Radial wall thickness a_1 for h_1 shown in column					Land width h_5	Radius r_3	Groove depth a_4 for h_1 shown in column			
	1	2	3	4	1	2	3	4	Tolerance		1	2	3	4	Tolerance			1	2	3	4
125																					
126			5	5.2						0.35	3.5	3.6	3.6	3.7							
127			0	0						+0.30											
128			-0.25	-0.25						0											
129	4.7	4.9																			
130	0	0																			
131	-0.25	-0.25	5.1	5.3							3.5	3.6	3.7	3.8							
132			0	0																	
133			-0.25	-0.25																	
134																					
135																					
136					4	4.5	5	6			3.6	3.7	3.8	3.9			0.5	0.7	0.7		
137																	±0.1	±0.1	±0.1		
138																					
139										0.4											
140										+0.35											
141	4.9	5.1	5.3	5.5					-0.010	0	3.7	3.8	3.9	4							
142	0	0	0	0					-0.040												
143	-0.25	-0.25	-0.25	-0.25					For												
144									phos-												
145									phated												
146									P0												
147									surface:		3.8	3.9	4	4.1			0.2				
148									+0.005								max.				
149									-0.035												
150																					
152															±0.20						
154	5.4	5.4	5.5	5.5							3.9	4	4.1	4.2	within						
155	0	0	0	0											a ring	0.6					
156	-0.25	-0.25	-0.25	-0.25											0.20	±0.1					
158															max.						
160					4.5	5	6	7		0.45											
162										-0.35								0.7	0.7		
164										0							±0.1	±0.1	±0.1		
165	5.4	5.6	5.8	6							4	4.2	4.3	4.4							
166	0	0	0	0																	
168	-0.25	-0.25	-0.25	-0.25																	
170																					
172																					
174																					
175																					
176																					
178	5.8	6	6.3	6.7							4.6	4.7	4.8	5							
180	0	0	0	0																	
182	-0.35	-0.35	-0.35	-0.35																	
184																					
185																					
186																					
188					5	6	7	8		0.55							0.5	0.7	0.9		
190										-0.40							max.	±0.1	±0.1		
192										0											
194	6.2	6.5	6.7	7.1							4.9	5	5.1	5.3							
195	0	0	0	0																	
196	-0.4	-0.4	-0.4	-0.4																	
198																					
200																					

NOTES:

¹For intermediate sizes (e.g. repair sizes), the radial thickness of the next smaller nominal diameter applies.

²Values of specific tangential force F_{tc} are calculated with mean land width (h_5).

This table is shown in ISO format. Commas represent decimal points.

Coil Spring Loaded Oil Control Rings (Concluded)

Dimensions in millimeters

Groove depth and bridge a_{13} for h_1 shown in column				Number of slots	Slot width c_1 for h_1 shown in column				Coil spring groove diameter d_{14} for h_1 shown in column				Coil spring diameter d_7 for h_1 shown in column				Tangential force F_{tc} , N for unit contact pressure $p_{ou} = 1 \text{ N/mm}^2$	Recommended class of nominal contact pressure N/mm ²		
1	2	3	4		1	2	3	4	1	2	3	4	1	2	3	4		PNE Low	PNL Mean	PNR High
2.3 0 -0.2	2.3 0 -0.2	2.2 0 -0.2	2.2 0 -0.2	12	1	1.2	1.2	1.4	2.5 +0.1 0	2.7 +0.1 0	2.9 +0.1 0	3.1 +0.1 0	2.4 0 -0.1	2.6 0 -0.1	2.8 0 -0.1	3 0 -0.1	75	0.56	0.75	1
																	75.6	0.56	0.74	0.99
																	76.2	0.55	0.74	0.98
																	76.8	0.55	0.73	0.98
																	77.4	0.54	0.73	0.97
																	78	0.54	0.72	0.96
																	78.6	0.54	0.72	0.96
																	79.2	0.54	0.71	0.95
																	79.8	0.53	0.71	0.95
																	80.4	0.53	0.71	0.94
																	81	0.53	0.71	0.94
																	81.6	0.53	0.7	0.94
																	82.2	0.52	0.7	0.93
																	82.8	0.52	0.7	0.93
																	83.4	0.52	0.69	0.92
																	84	0.52	0.69	0.92
																	84.6	0.52	0.69	0.92
																	85.2	0.51	0.68	0.91
																	85.8	0.51	0.68	0.91
																	86.4	0.51	0.68	0.9
																	87	0.51	0.68	0.9
																	87.6	0.5	0.67	0.9
																	88.2	0.5	0.67	0.89
																	88.8	0.5	0.67	0.89
																	89.4	0.5	0.66	0.88
2.6 0 -0.2	2.6 0 -0.2	2.4 0 -0.2	2.3 0 -0.2	14	1.2	1.2	1.4	1.6	2.9 -0.1 0	3.1 +0.1 0	3.3 -0.15 0	3.3 +0.15 0	2.8 0 -0.1	3 0 -0.1	3.2 0 -0.1	3.2 0 -0.1	90	0.5	0.66	0.88
																	91.2	0.49	0.65	0.87
																	92.4	0.49	0.65	0.86
																	93	0.48	0.65	0.86
																	93.6	0.48	0.64	0.86
																	94.8	0.48	0.64	0.85
																	96	0.47	0.63	0.84
																	97.2	0.47	0.62	0.83
																	98.4	0.46	0.62	0.82
																	99	0.46	0.62	0.82
																	99.6	0.46	0.61	0.82
																	100.8	0.45	0.61	0.81
																	102	0.45	0.6	0.8
																	103.2	0.45	0.6	0.79
																	104.4	0.44	0.59	0.78
																	105	0.44	0.59	0.78
																	105.6	0.44	0.58	0.78
																	106.8	0.43	0.58	0.77
																	108	0.43	0.57	0.76
																	109.2	0.42	0.56	0.75
																	110.4	0.42	0.56	0.74
																	111	0.42	0.56	0.74
																	111.6	0.41	0.55	0.74
																	112.8	0.41	0.55	0.73
3 0 -0.2	2.9 0 -0.2	2.7 0 -0.2	2.7 0 -0.2	14	1.2	1.4	1.6	1.8	3.3 -0.15 0	3.7 +0.15 0	4.15 -0.15 0	4.56 -0.15 0	3.2 0 -0.1	3.6 0 -0.1	4 0 -0.12	4.4 0 -0.12	114	0.41	0.54	0.72
																	115.2	0.4	0.53	0.71
																	116.4	0.4	0.53	0.7
																	117	0.4	0.53	0.7
																	117.6	0.39	0.52	0.7
																	118.8	0.39	0.52	0.69
																	120	0.38	0.51	0.68

This table is shown in ISO format. Commas represent decimal points.

TABLE 15 - Dimensions for DSF-C Coil Spring Loaded Oil Control Rings With Special Ring Width $h_1 = 4.75$ mm (3/16 in)

Dimensions in millimeters

Nominal diameter d_1	Radial thickness over coil spring a_{12}	Ring width h_1 Tolerance	Closed gap s_1	Radial wall thickness a_1 Tolerance	Land width h_5	Land spacing $\approx B_3$	Groove depth a_4	Groove depth and bridge a_{13}	Number of slots	Slot width c_1	Coil spring groove diameter d_{14}	Coil spring diameter d_7	Tangential force F_{tc} , N for unit contact pressure $p_{ov} = 1 \text{ N/mm}^2$	Recommended class of nominal contact pressure N/mm ²		
														PNL Low	PNM Mean	PNH High
60 61 62 63 64	3.7 0 -0.25	4.75 For phosphated P0 surface +0.005 -0.025	0.2 +0.2 0	2.5	± 0.15 within a ring 0.15 max.	2.65	0.5 ± 0.1	1.5 0 -0.15	8	1.2 ± 0.1	2.3 +0.1 0	2.2 0 -0.1	24 24.4 24.8 25.2 25.6	1.14 1.13 1.13 1.12 1.12	1.9 1.89 1.88 1.87 1.86	2.38 2.36 2.35 2.34 2.33
65 66 67 68 69													26 26.4 26.8 27.2 27.6	1.11 1.1 1.1 1.09 1.09	1.85 1.84 1.83 1.82 1.81	2.31 2.3 2.29 2.28 2.26
70 71 72 73 74	3.9 0 -0.25			2.6									28 28.4 28.8 29.2 29.6	1.08 1.07 1.07 1.06 1.06	1.8 1.79 1.78 1.77 1.76	2.25 2.24 2.23 2.21 2.2
75 76 77 78 79	4 0 -0.25			2.7									30 30.4 30.8 31.2 31.6	1.05 1.04 1.04 1.03 1.03	1.75 1.74 1.73 1.72 1.71	2.19 2.18 2.16 2.15 2.14
80 81 82 83 84	4.1 0 -0.25			2.8									32 32.4 32.8 33.2 33.6	1.02 1.01 1.01 1 1	1.7 1.69 1.68 1.67 1.66	2.13 2.11 2.1 2.09 2.08
85 86 87 88 89				2.9									34 34.4 34.8 35.2 35.6	0.99 0.98 0.98 0.97 0.97	1.65 1.64 1.63 1.62 1.61	2.06 2.05 2.04 2.03 2.01
90 91 92 93 94	4.2 0 -0.25			3.0									36 36.4 36.8 37.2 37.6	0.96 0.95 0.95 0.94 0.94	1.6 1.59 1.58 1.57 1.56	2 1.99 1.98 1.96 1.95
95 96 97 98 99				3.1									38 38.4 38.8 39.2 39.6	0.93 0.92 0.92 0.91 0.91	1.55 1.54 1.53 1.52 1.51	1.94 1.93 1.91 1.9 1.89
100 101 102 103 104	4.5 0 -0.25			3.15									40 40.4 40.8 41.2 41.6	0.9 0.89 0.89 0.88 0.88	1.5 1.49 1.48 1.47 1.46	1.88 1.86 1.85 1.84 1.83
105 106 107 108 109				3.2									42 42.4 42.8 43.2 43.6	0.87 0.86 0.86 0.85 0.85	1.45 1.44 1.43 1.42 1.41	1.81 1.8 1.79 1.78 1.76
110 111 112 113 114	4.6 0 -0.25			3.3									44 44.4 44.8 45.2 45.6	0.84 0.83 0.83 0.82 0.82	1.4 1.39 1.38 1.37 1.36	1.75 1.74 1.73 1.71 1.7
115 116 117 118 119	4.7 0 -0.25			3.4									46 46.4 46.8 47.2 47.6	0.81 0.8 0.8 0.79 0.79	1.35 1.34 1.33 1.32 1.31	1.69 1.68 1.66 1.65 1.64
120 121 122 123 124	4.8 0 -0.25			3.5									48 48.4 48.8 49.2 49.6	0.78 0.77 0.77 0.76 0.76	1.3 1.29 1.28 1.27 1.26	1.63 1.61 1.6 1.59 1.58

This table is shown in ISO format. Commas represent decimal points.

TABLE 15 (Concluded)

Dimensions in millimeters

Nominal diameter d_1	Radial thickness over coil-spring a_{12}	Ring width h_1	Closed gap s_1	Radial wall thickness a_1	Land width h_5	Land spacing $\approx B_3$	Groove depth a_4	Groove depth and bridge a_{13}	Number of slots	Slot width c_1	Coil-spring groove diameter d_{14}	Coil-spring diameter d_7	Tangential force F_{tc} , N for unit contact pressure $p_{ou} = 1 \text{ N/mm}^2$	Recommended class of nominal contact pressure		
														N/mm ²		
														PNL	PNM	PNH
														Low	Mean	High
125			0,35										50	0,75	1,25	1,56
126													50,4	0,74	1,24	1,55
127													50,8	0,74	1,23	1,54
128			+0,30										51,2	0,73	1,22	1,53
129	4,9		0					2,3					51,6	0,73	1,21	1,51
130	0			3,6				0					52	0,72	1,2	1,5
131	-0,25							-0,2					52,4	0,72	1,2	1,49
132													52,8	0,71	1,19	1,49
133													53,2	0,71	1,19	1,48
134													53,6	0,71	1,18	1,48
135													54	0,71	1,18	1,47
136											2,7	2,6	54,4	0,7	1,17	1,46
137				3,7							+0,1	0	54,8	0,7	1,17	1,46
138											0	-0,1	55,2	0,7	1,16	1,45
139			0,4										55,6	0,69	1,16	1,44
140													56	0,69	1,15	1,44
141	5,1		+0,35					2,5					56,4	0,69	1,15	1,43
142	0		0	3,8				0					56,8	0,68	1,14	1,43
143	-0,25							-0,2					57,2	0,68	1,14	1,42
144													57,6	0,68	1,13	1,41
145													58	0,68	1,13	1,41
146													58,4	0,67	1,12	1,4
147													58,8	0,67	1,12	1,39
148													59,2	0,67	1,11	1,39
149													59,6	0,66	1,11	1,38
150				3,9									60	0,66	1,1	1,38
152													60,8	0,65	1,09	1,36
154													61,6	0,65	1,08	1,35
155													62	0,65	1,08	1,34
156													62,4	0,64	1,07	1,34
158													63,2	0,64	1,06	1,33
160													64	0,63	1,05	1,31
162	5,4		0,45					2,6			2,9	2,8	64,8	0,63	1,04	1,3
164	0		+0,35					0			-0,1	0	65,6	0,62	1,03	1,29
165	-0,25		0					-0,2			0	-0,1	66	0,62	1,03	1,28
166				4									66,4	0,61	1,02	1,28
168													67,2	0,61	1,01	1,26
170													68	0,6	1	1,25
172													68,8	0,59	0,99	1,24
174													69,6	0,59	0,98	1,23
175													70	0,59	0,98	1,22
176													70,4	0,58	0,97	1,21
178	5,8			4,6				2,8			3,1	3	71,2	0,58	0,96	1,2
180	0							0			-0,1	0	72	0,57	0,95	1,19
182	-0,35							-0,2			0	-0,1	72,8	0,56	0,94	1,18
184													73,6	0,56	0,93	1,16
185													74	0,56	0,93	1,16
186													74,4	0,55	0,92	1,15
188													75,2	0,55	0,91	1,14
190			0,55										76	0,54	0,9	1,13
192													76,8	0,53	0,89	1,11
194	6,2		+0,40					3			3,3	3,2	77,6	0,53	0,88	1,1
195	0		0	4,9				0			+0,15	0	78	0,53	0,88	1,09
196	-0,4							-0,2			0	-0,1	78,4	0,52	0,87	1,09
198													79,2	0,52	0,86	1,08
200													80	0,51	0,85	1,06

NOTES:

¹For intermediate sizes (e.g. repair sizes), the radial thickness of the next smaller nominal diameter applies.

²Values of specific tangential force F_{tc} are calculated with mean land width (h_5).

This table is shown in ISO format. Commas represent decimal points.

TABLE 16 - Dimensions for DSF-CNP Coil Spring Loaded Oil Control Rings With Special Ring Width $h_1 = 4.75$ mm (3/16 in)

Dimensions in millimeters

Nominal diameter d_1	Radial thickness over coil spring a_{12}	Ring width h_1 Tolerance	Closed gap s_1	Radial wall thickness a_1 Tolerance	Land width h_5	Land spacing $\approx B_3$	Groove depth a_4	Groove depth and bridge a_{13}	Number of slots	Slot width c_1	Coil spring groove diameter d_{14}	Coil spring diameter d_7	Tangential force F_{tc} , N for unit contact pressure $p_{ou} = 1 \text{ N/mm}^2$	Recommended class of nominal contact pressure N/mm ²		
														PNE Low	PNL Mean	PNR Hig
60													24	1.14	1.9	2.38
61													24.4	1.13	1.89	2.36
62													24.8	1.13	1.88	2.35
63													25.2	1.12	1.87	2.34
64	3.7 0 -0.25		0.2	2.5							2.3 +0.1 0	2.2 0 -0.1	25.6	1.12	1.86	2.33
65								1.5 0 -0.15					26	1.11	1.85	2.32
66													26.4	1.1	1.84	2.3
67													26.8	1.1	1.83	2.29
68													27.2	1.09	1.82	2.28
69													27.6	1.09	1.81	2.26
70													28	1.08	1.8	2.25
71	3.9 0 -0.25			2.6									28.4	1.07	1.79	2.24
72													28.8	1.07	1.78	2.23
73													29.2	1.06	1.77	2.21
74													29.6	1.06	1.76	2.2
75													30	1.05	1.75	2.19
76	4 0 -0.25			2.7				1.6 0 -0.15					30.4	1.04	1.74	2.16
77													30.8	1.04	1.73	2.16
78													31.2	1.03	1.72	2.15
79													31.6	1.03	1.71	2.14
80													32	1.02	1.7	2.13
81													32.4	1.01	1.69	2.11
82													32.8	1.01	1.68	2.1
83													33.2	1	1.67	2.09
84	4.1 0 -0.25			2.8				1.7 0 -0.15			2.5 +0.1 0	2.4 0 -0.1	33.6	1	1.66	2.08
85													34	0.99	1.65	2.06
86													34.4	0.98	1.64	2.05
87													34.8	0.98	1.63	2.04
88													35.2	0.97	1.62	2.03
89													35.6	0.97	1.61	2.01
90													36	0.96	1.6	2
91													36.4	0.95	1.59	1.99
92													36.8	0.95	1.58	1.98
93													37.2	0.94	1.57	1.96
94	4.2 0 -0.25			3.0				1.8 0 -0.15					37.6	0.94	1.56	1.95
95													38	0.93	1.55	1.94
96													38.4	0.92	1.54	1.93
97													38.8	0.92	1.53	1.91
98													39.2	0.91	1.52	1.9
99													39.6	0.91	1.51	1.88
100													40	0.9	1.5	1.88
101													40.4	0.89	1.49	1.86
102													40.8	0.89	1.48	1.85
103													41.2	0.88	1.47	1.84
104	4.5 0 -0.25			3.15				1.9 0 -0.2					41.6	0.88	1.46	1.83
105													42	0.87	1.45	1.81
106													42.4	0.86	1.44	1.8
107													42.8	0.86	1.43	1.78
108													43.2	0.85	1.42	1.78
109													43.6	0.85	1.41	1.76
110													44	0.84	1.4	1.75
111	4.6 0 -0.25			3.3				2.0 0 -0.2			2.7 -0.1 0	2.6 0 -0.1	44.4	0.83	1.39	1.74
112													44.8	0.83	1.38	1.73
113													45.2	0.82	1.37	1.71
114													45.6	0.82	1.36	1.7
115													46	0.81	1.35	1.69
116													46.4	0.8	1.34	1.68
117													46.8	0.8	1.33	1.66
118													47.2	0.79	1.32	1.65
119	4.7 0 -0.25			3.4				2.1 0 -0.2					47.6	0.79	1.31	1.64
120													48	0.78	1.3	1.63
121													48.4	0.77	1.29	1.61
122													48.8	0.77	1.28	1.6
123													49.2	0.76	1.27	1.59
124	4.8 0 -0.25			3.5				2.2 0 -0.2					49.6	0.76	1.26	1.58

This table is shown in ISO format. Commas represent decimal points.

TABLE 16 (Concluded)

Dimensions in millimeters

Nominal diameter d_1	Radial thickness over coil spring a_{12}	Ring width h_1	Closed gap s_1	Radial wall thickness a_1	Land width h_5	Land spacing $\approx B_3$	Groove depth a_4	Groove depth and bridge a_{13}	Number of slots	Slot width c_1	Coil spring groove diameter d_{14}	Coil spring diameter d_7	Tangential force F_{tc} , N for unit contact pressure $p_{0u} = 1 \text{ N/mm}^2$	Recommended class of nominal contact pressure N/mm ²		
		Tolerance		Tolerance										PNL Low	PNM Mean	PNH High
125			0,35										50	0,75	1,25	1,56
126													50,4	0,74	1,24	1,55
127			+0,30										50,8	0,74	1,23	1,54
128			0										51,2	0,73	1,22	1,53
129								2,3					51,6	0,73	1,21	1,51
130	4,9			3,6				0					52	0,72	1,2	1,5
131	0							-0,2					52,4	0,72	1,2	1,49
132	-0,25												52,8	0,71	1,19	1,49
133													53,2	0,71	1,19	1,48
134													53,6	0,71	1,18	1,48
135													54	0,71	1,18	1,47
136													54,4	0,7	1,17	1,46
137													54,8	0,7	1,17	1,46
138			0,4								2,7	2,6	55,2	0,7	1,16	1,45
139											+0,1	0	55,6	0,69	1,16	1,44
140											0	-0,1				
141	5,1												56	0,69	1,15	1,44
142	0		+0,35					2,5					56,4	0,69	1,15	1,43
143	-0,25		0					0					56,8	0,68	1,14	1,43
144								-0,2					57,2	0,68	1,14	1,42
145													57,6	0,68	1,13	1,41
146		-0,010											58	0,68	1,13	1,41
147		-0,040											58,4	0,67	1,12	1,4
148		For											58,8	0,67	1,12	1,39
149		phos-											59,2	0,67	1,11	1,39
		phated											59,6	0,66	1,11	1,38
		PO														
150		surface											60	0,66	1,1	1,38
152		+0,005											60,8	0,65	1,09	1,36
154		-0,035											61,6	0,65	1,08	1,35
155													62	0,65	1,08	1,34
156													62,4	0,64	1,07	1,34
158													63,2	0,64	1,06	1,33
160	5,4												64	0,63	1,05	1,31
162	0		0,45					2,6			2,9	2,8	64,8	0,63	1,04	1,3
164	-0,25		+0,35					0			+0,1	0	65,6	0,62	1,03	1,29
165			0					-0,2			0	-0,1				
166													66	0,62	1,03	1,28
168													66,4	0,61	1,02	1,28
													67,2	0,61	1,01	1,26
170													68	0,6	1	1,25
172													68,8	0,59	0,99	1,24
174													69,6	0,59	0,98	1,23
175													70	0,59	0,98	1,22
176													70,4	0,58	0,97	1,21
178	5,8							2,8			3,1	3	71,2	0,58	0,96	1,2
	0							-0,2			+0,1	0				
180	-0,35										0	-0,1	72	0,57	0,95	1,19
182													72,8	0,56	0,94	1,18
184													73,6	0,56	0,93	1,16
185			0,55										74	0,56	0,93	1,16
186													74,4	0,55	0,92	1,15
188			+0,40										75,2	0,55	0,91	1,14
			0													
190													76	0,54	0,9	1,13
192	6,2							3			3,3	3,2	76,8	0,53	0,89	1,11
194	0							0			-0,15	0	77,6	0,53	0,88	1,1
195	-0,4							-0,2			0	-0,1				
196													78	0,53	0,88	1,09
198													78,4	0,52	0,87	1,09
													79,2	0,52	0,86	1,08
200													80	0,51	0,85	1,06

NOTES:

¹For intermediate sizes (e.g. repair sizes), the radial thickness of the next smaller nominal diameter applies.

²Values of specific tangential force F_{tc} are calculated with mean land width (h_5).

This table is shown in ISO format. Commas represent decimal points.