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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

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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

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

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

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

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

This 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.

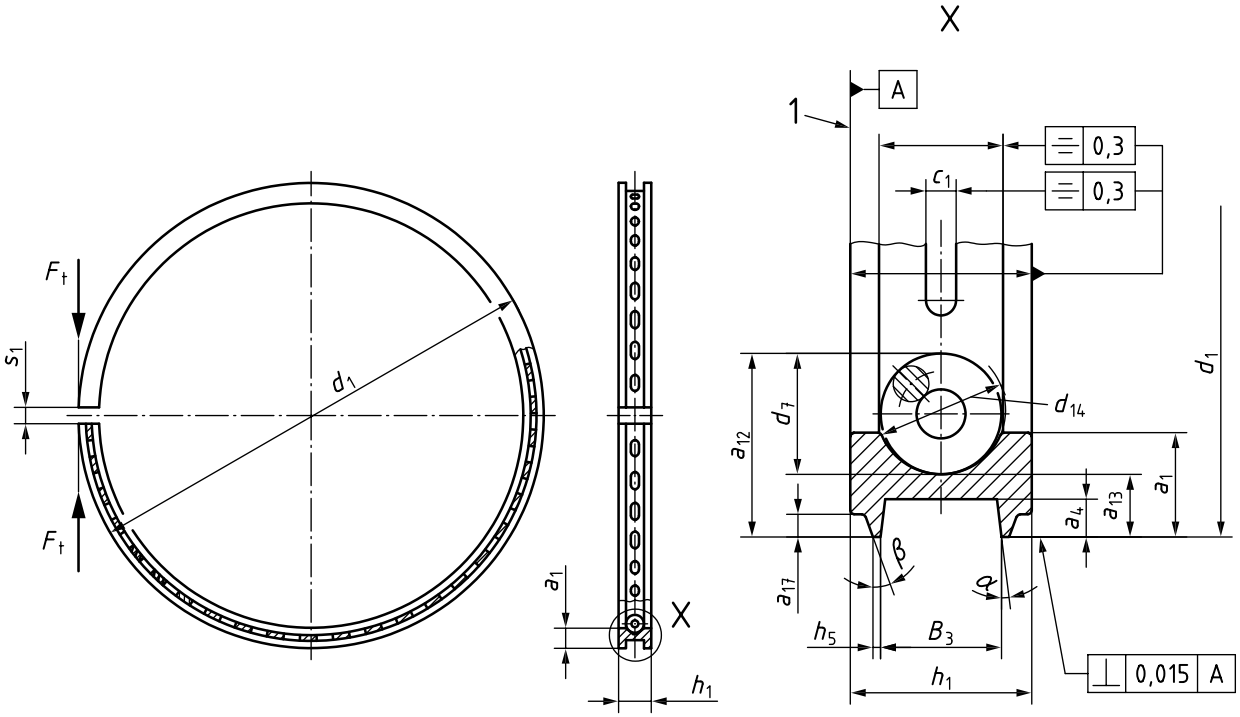
4 Piston ring types and designation examples

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):

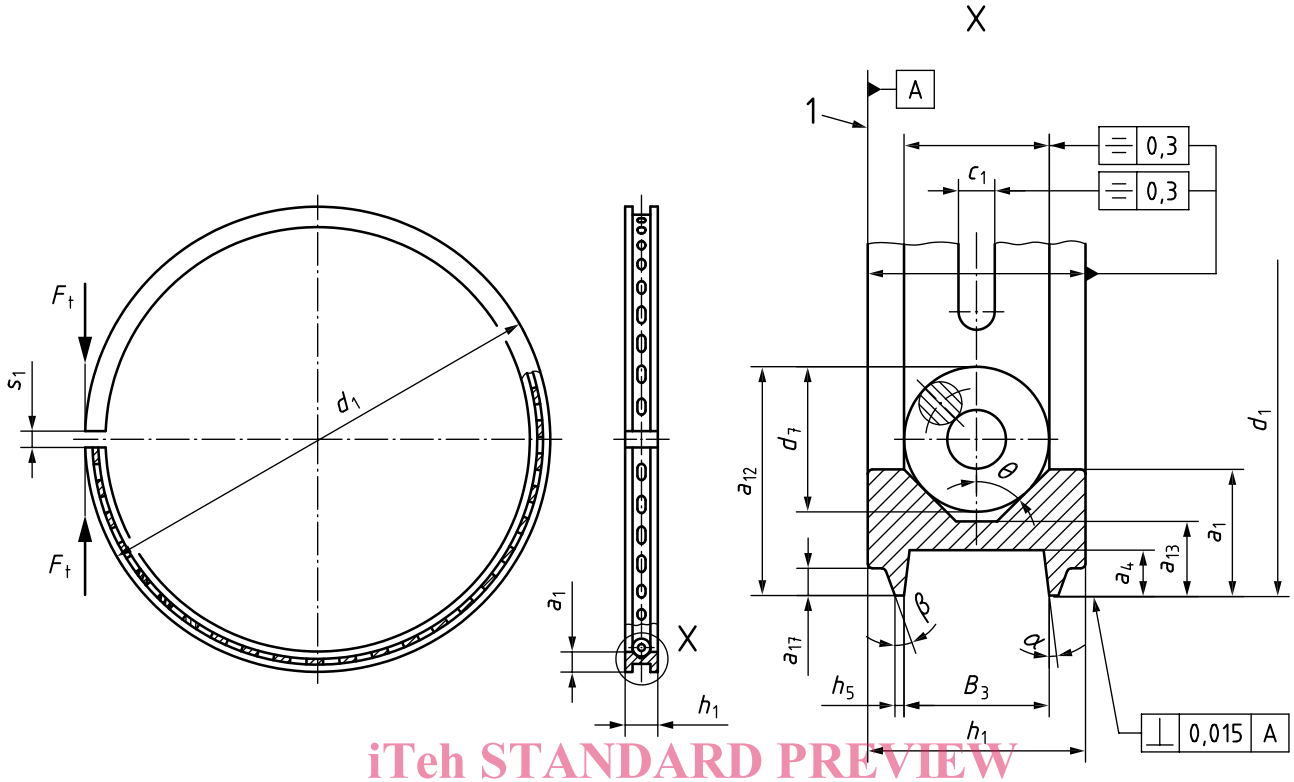
Piston ring ISO 6626-3 SOR-S - 100 × 3 × 0,20 – MC65/NT030 WF CSE PN1,5

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 $a_1 \pm 0,15$		Type
	Small (Code: S)	Large (Code: L)	
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).

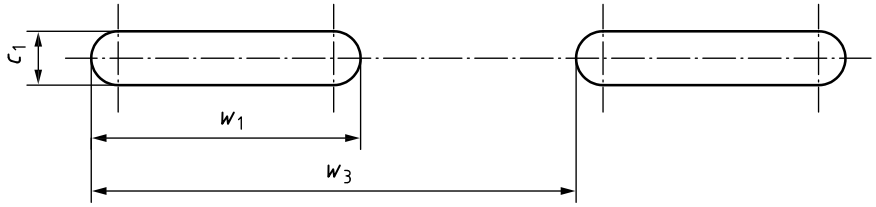


Figure 3 — Arrangement of slots

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	Sideface
	min.	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.