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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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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 6626-3 was prepared by Technical Committee ISO/TC 22, *Road vehicles*.

ISO 6626 consists of the following parts, under the general title *Internal combustion engines — Piston rings*:

— *Coil-spring-loaded oil control rings*[1)]

— *Part 2: Coil-spring-loaded oil control rings of narrow width made of cast iron*

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

1) ISO 6626:1989, published without a part number, is regarded as the first part of the ISO 6626 series since publication of the other parts.

Introduction

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

The common features and dimensional tables presented in this part of ISO 6626 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 part of ISO 6626 specifies the essential dimensions of coil-spring-loaded, nitrided oil control rings made of steel, of piston ring types SOR (with R-shaped groove) and SOV (with V-shaped groove).

This part of ISO 6626 applies to coil-spring-loaded, nitrided oil control rings made of steel with a diameter of between 60 mm and 200 mm inclusive for reciprocating internal combustion engines. It can also be used for piston rings of compressors working under analogous conditions.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

3 Symbols

The following symbols are used in this part of ISO 6626.

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

a_1 radial wall thickness

a_4 groove depth

a_{12} radial thickness over coil spring

a_{13} groove depth and bridge

a_{14} 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

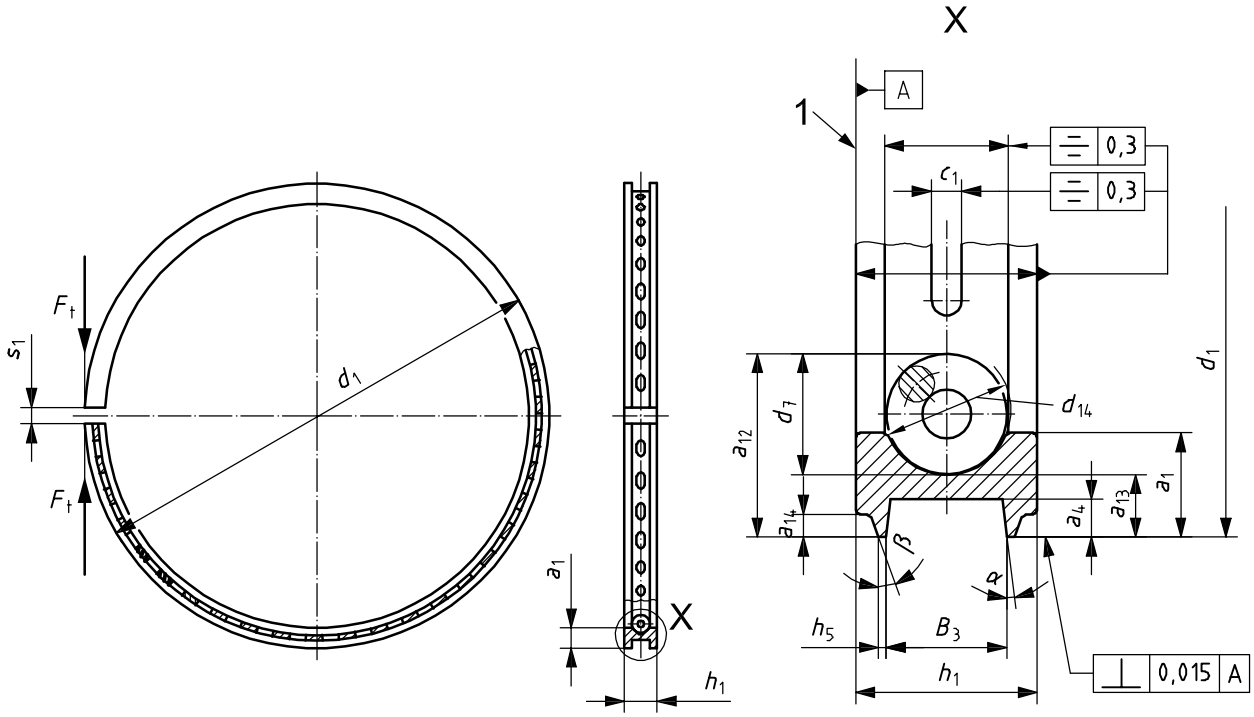
4 Piston ring types and designation examples

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



For definitions of symbols, see Clause 3.

For dimensions, see Tables 3, 4, 5, 10, 13, 14, 15 and 16.

Key

1 reference plane

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

4.1.2 Designation

EXAMPLE A coil-spring-loaded, nitrided oil control ring made of steel 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), 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):

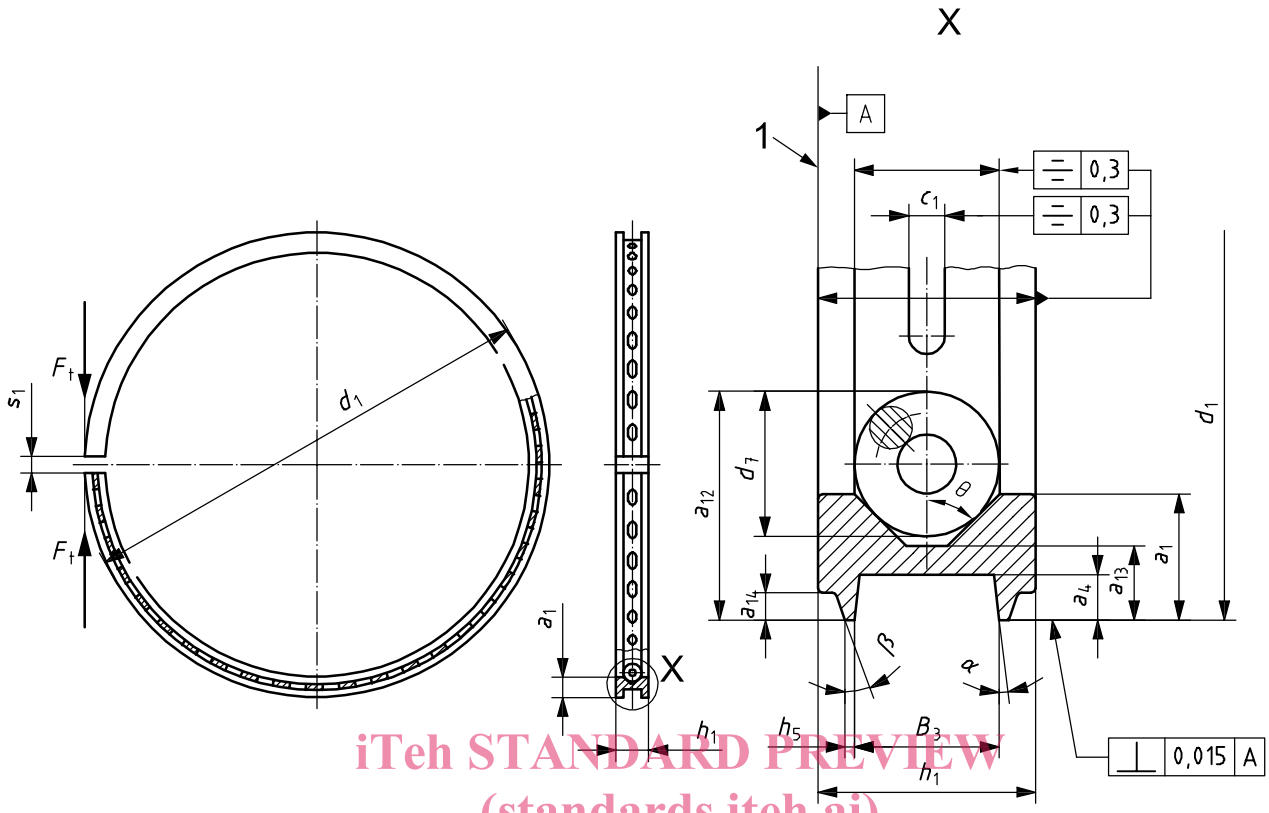
Piston ring ISO 6626-3-SOR-S 100 x 3 x 0,20 NT030 WF CSE PN1,5

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



For definitions of symbols, see Clause 3.

For dimensions, see Tables 3, 4, 5, 11, 17, 18 and 19.

Key

1 reference plane

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

4.2.2 Designation

EXAMPLE A coil-spring-loaded, nitrided oil control ring made of steel 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), 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 x 3 x 0,20 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)	
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 $h_5 \pm 0,07$		
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 client.