INTERNATIONAL STANDARD

ISO 6626

First edition
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Internal combustion engines — Piston rings — Coil-spring-loaded oil control rings

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Reference number
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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.

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

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International Standard ISO 6626 was prepared by Technical Committee ISO/TC 22, *Road vehicles*.

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

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Internal combustion engines — Piston rings — Coil-spring-loaded oil control rings

0 Introduction

ISO 6626 is one of a series of International Standards dealing with piston rings for reciprocating internal combustion engines:

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

Part 1: Vocabulary.

Part 2: Measuring principles.

Part 3: Material specifications.

Part 4: General specifications.

Part 5: Quality requirements.

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

Part 1: Rectangular rings.

Part 2: Rectangular rings with narrow ring width. [1)]

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

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

Part 1: Keystone rings.

Part 2: Half keystone rings. [1)]

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

ISO 6626, *Internal combustion engines — Piston rings — Coil-spring-loaded oil control rings.*

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

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

1 Scope and field of application

This International Standard specifies the essential 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 ISO 6621-3. 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 clause 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 International Standard 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 analogous conditions.

2 References

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

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

Part 3: Material specifications.

Part 4: General specifications.

Part 5: Quality requirements.

1) Part will be published as a Technical Report (ISO/TR 6622-2 and ISO/TR 6624-2).

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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 — Dimensions and forces: see tables 9 and 15.

Dimensions in millimetres

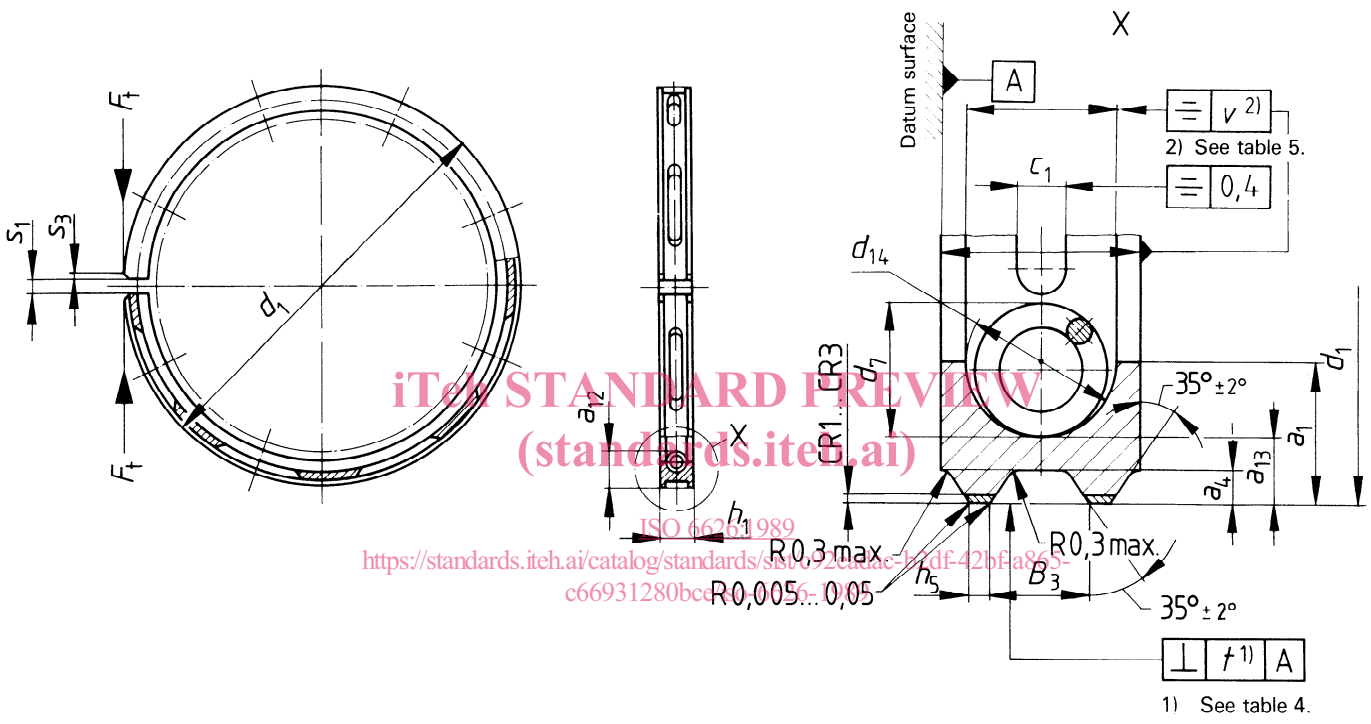

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Figure 1 — Type DSF-C

3.1.2 Designation example

Designation of a piston ring complying with the requirements of ISO 6626, being a coil-spring-loaded bevelled-edge oil control ring, chromium-plated and profile ground (DSF-C), of nominal diameter d_1 = 125 mm (125), a nominal ring width h_1 = 5 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):

Piston ring ISO 6626-DSF-C-125 × 5-MC11/S02 CR3 PO WK WF CSE PNM 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 — Dimensions and forces: see tables 10 and 16.

Dimensions in millimetres

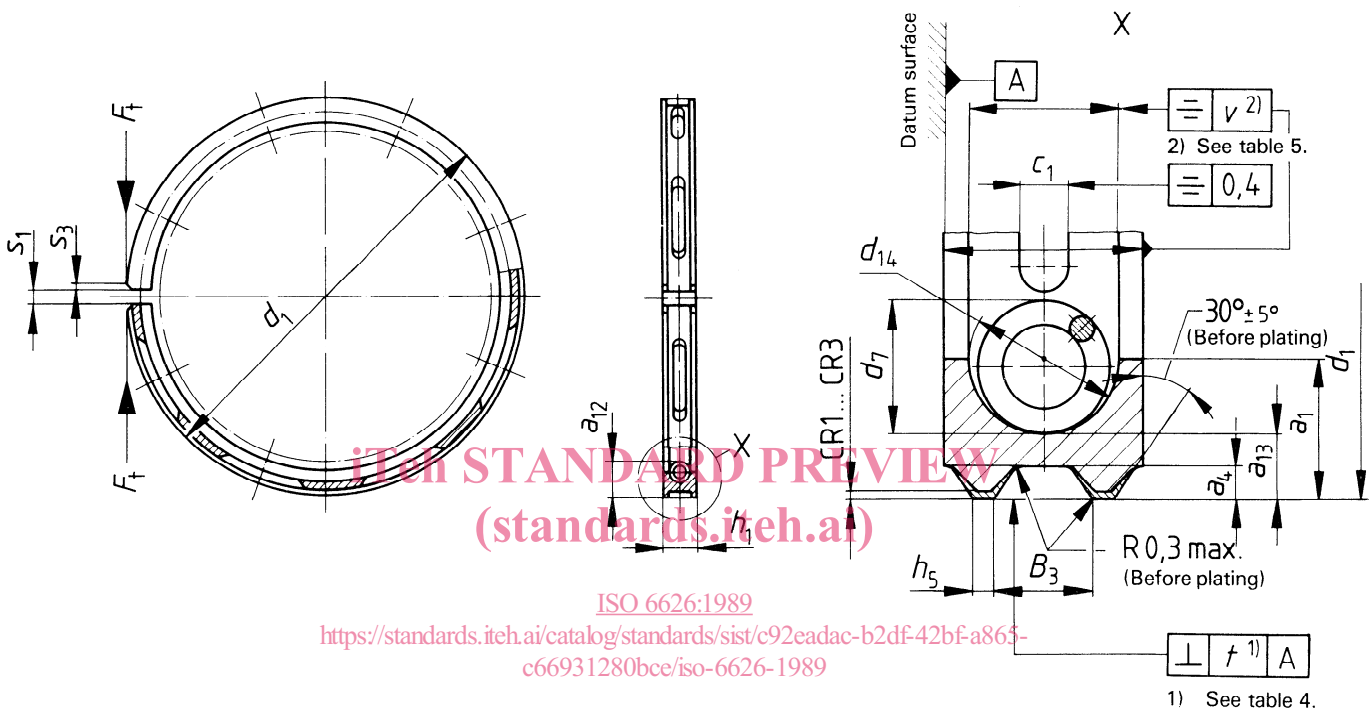

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Figure 2 — Type DSF-CNP

3.2.2 Designation example

Designation of a piston ring complying with the requirements of ISO 6626, being a coil-spring-loaded bevelled-edge oil control ring, chromium-plated not profile ground (DSF-CNP), of nominal diameter d_1 = 180 mm (180) and nominal ring width h_1 = 8 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):

Piston ring ISO 6626-DSF-CNP-180 × 8-MC12/CR1 CSN PNH

3.3 Type SSF — Coil-spring-loaded slotted oil control ring

3.3.1 General features

NOTE — Dimensions and forces: see tables 11 and 17.

Dimensions in millimetres

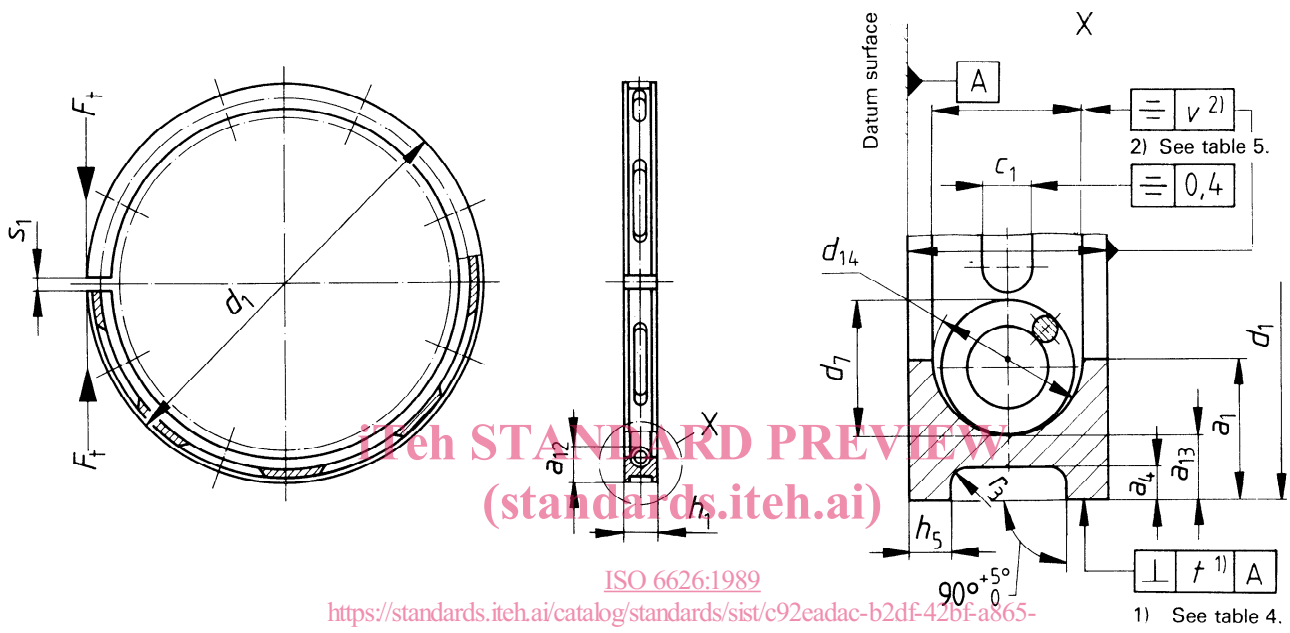

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Figure 3 — Type SSF

3.3.2 Designation example

Designation of a piston ring complying with the requirements of ISO 6626, being a coil-spring-loaded slotted oil control ring (SSF), of nominal diameter d_1 = 80 mm (80) and nominal ring width h_1 = 4 mm (4), made of grey cast iron, non-heat-treated, material subclass 12 (MC12), constant pitch spring (CSN) and tangential force F_t according to the low nominal contact pressure class (PNL):

Piston ring ISO 6626-SSF-80 × 4-MC12/CSN PNL

3.4 Type GSF — Coil-spring-loaded double-bevelled oil control ring

3.4.1 General features

NOTE — Dimensions and forces: see tables 12 and 18.

Dimensions in millimetres

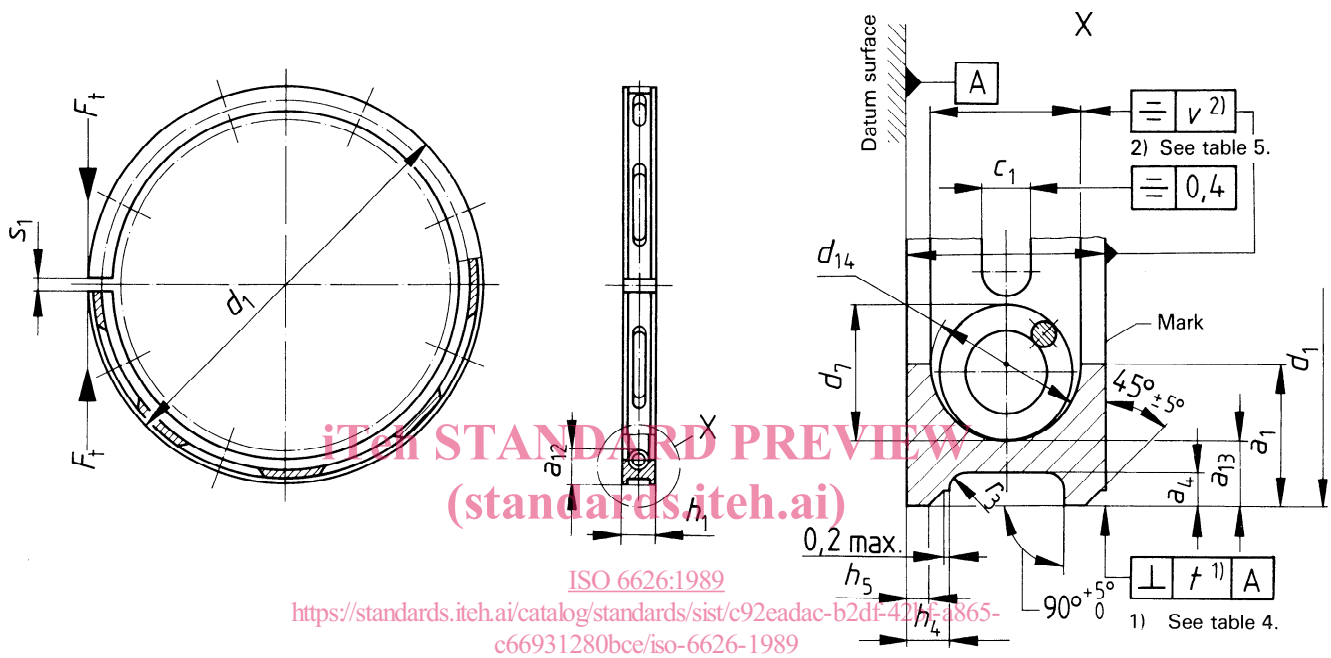

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Figure 4 — Type GSF

3.4.2 Designation example

Designation of a piston ring complying with the requirements of ISO 6626, being a coil-spring-loaded double-bevelled oil control ring (GSF), of nominal diameter d_1 = 75 mm (75), a nominal ring width h_1 = 3 mm (3), made of grey cast iron, non-heat-treated, material subclass 12 (MC12), constant pitch spring (CSN) and a tangential force F_t according to the low nominal contact pressure class (PNL):

Piston ring ISO 6626-GSF-75 × 3-MC12/CSN PNL

3.5 Type DSF — Coil-spring-loaded bevelled-edge oil control ring

3.5.1 General features

NOTE — Dimensions and forces: see tables 12 and 18.

Dimensions in millimetres

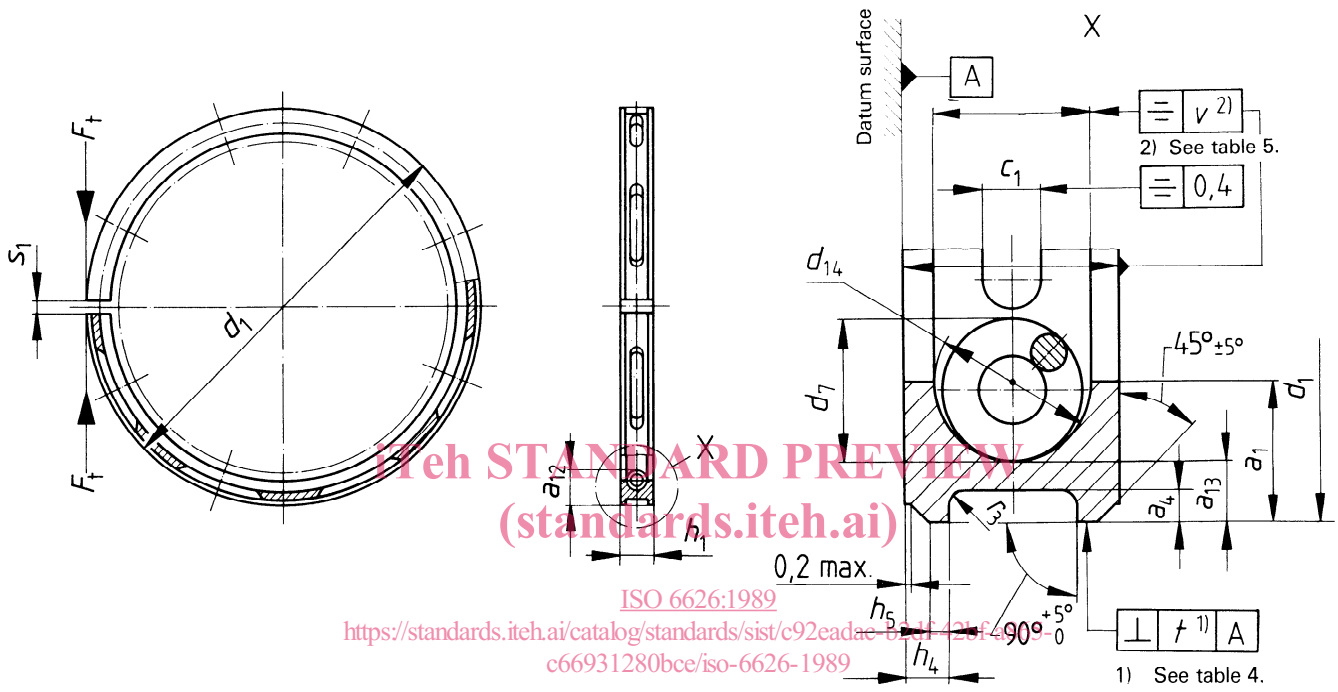

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Figure 5 — Type DSF

3.5.2 Designation example

Designation of a piston ring complying with the requirements of ISO 6626, being a coil-spring-loaded bevelled-edge oil control ring (DSF), of nominal diameter d_1 = 90 mm (90) and nominal ring width h_1 = 3,5 mm (3,5), made of grey cast iron, non-heat-treated, material subclass 12 (MC12), constant pitch spring (CSN) and tangential force F_t according to the reduced nominal contact pressure class (PNR):

Piston ring ISO 6626-DSF-90 × 3,5-MC12/CSN 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 — Dimensions and forces: see tables 13 and 19.

Dimensions in millimetres

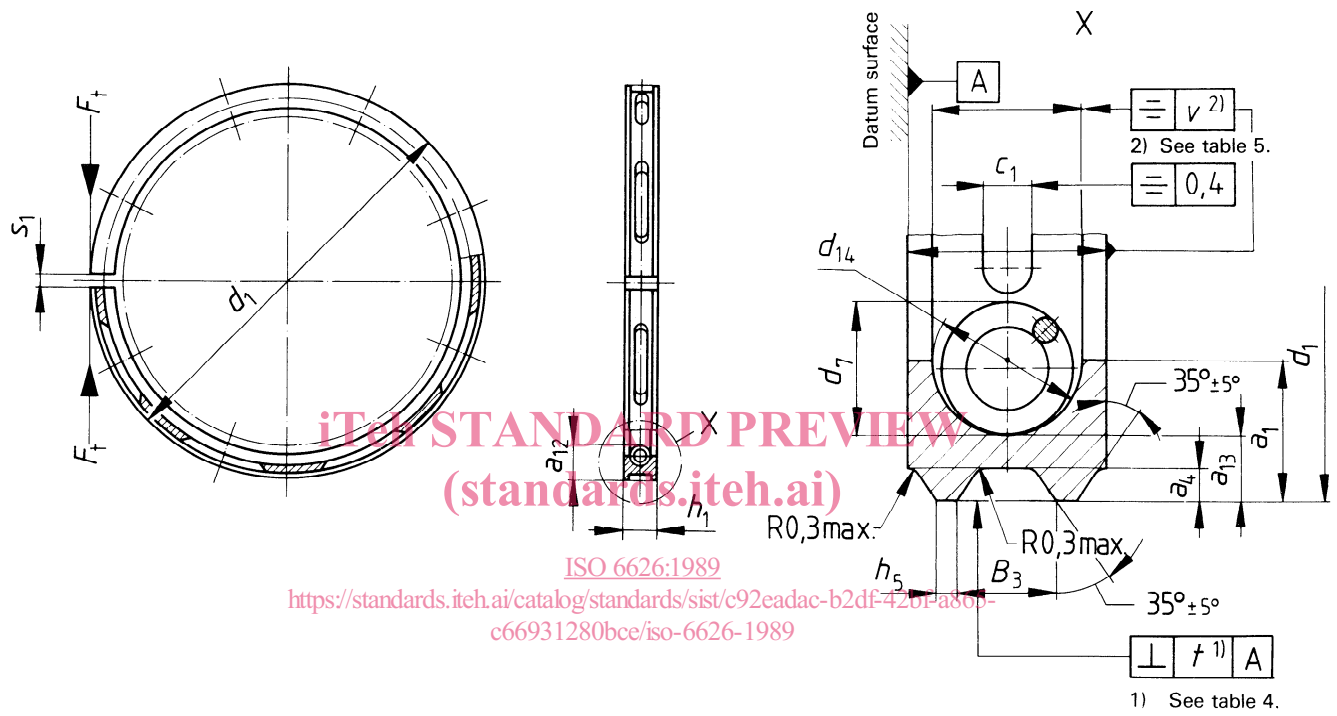

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Figure 6 — Type DSF-NG

3.6.2 Designation example

Designation of a piston ring complying with the requirements of ISO 6626, being a coil-spring-loaded bevelled-edge oil control ring (DSF-NG) of nominal diameter d_1 = 140 mm (140) and nominal ring width h_1 = 6 mm (6), made of grey cast iron, non-heat-treated, material subclass 12 (MC12), constant pitch spring (CSN) and a tangential force F_t according to the medium nominal contact pressure class (PNM):

Piston ring ISO 6626-DSF-NG-140 × 6-MC12/CSN 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 — Dimensions and forces: see tables 14 and 20.

Dimensions in millimetres

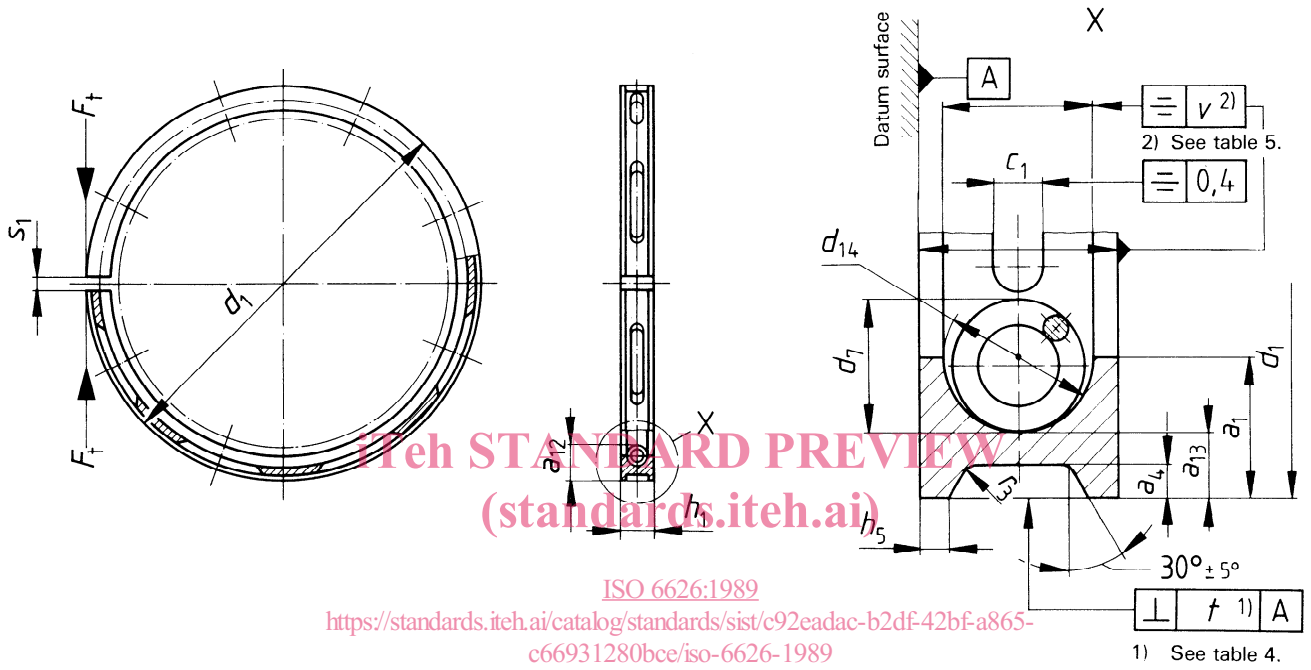

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Figure 7 — Type SSF-L

3.7.2 Designation example

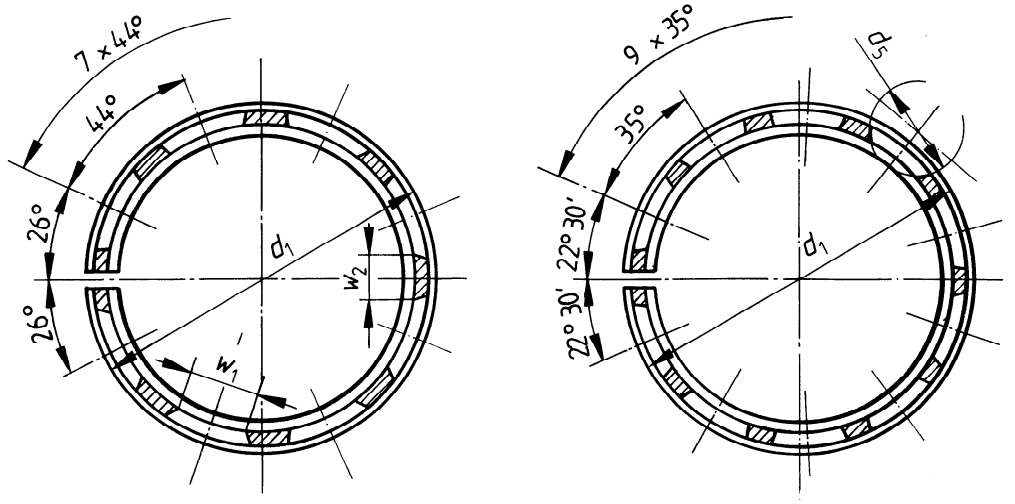
Designation of a piston ring complying with the requirements of ISO 6626, being a coil-spring-loaded slotted oil control ring with 0,6 mm nominal land width (SSF-L), of nominal diameter d_1 = 100 mm (100) and nominal ring width h_1 = 4,5 mm (4,5), made of grey cast iron, non-heat-treated, material subclass 12 (MC12), constant pitch spring (CSN) and tangential force F_t according to the reduced nominal contact pressure class (PNR):

Piston ring ISO 6626-SSF-L-100 × 4,5-MC12/CSN PNR

4 Common features

4.1 Arrangement of slots

Dimensions in millimetres



a) 8 slots
for $60 \leqslant d_1 < 80$

b) 10 slots
for $80 \leqslant d_1 < 115$

c) 12 slots
for $115 \leqslant d_1 < 150$

d) 14 slots
for $150 \leqslant d_1 \leqslant 200$

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Figure 8 — Arrangement of slots

Table 1 — Cutter diameter

Dimensions in millimetres

Nominal diameter d_1	Cutter diameter d_5 max.
$60 \leqslant d_1 < 150$	60
$150 \leqslant d_1 \leqslant 200$	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.

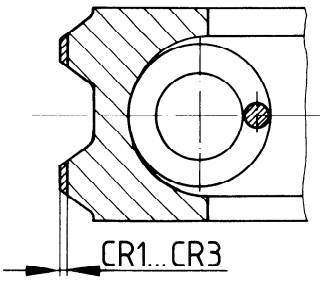
4.2.2 Reduced slot length (retaining same number and spacing)

Table 2 — Reduced slot length

Dimensions in millimetres

d_1	w_1
$60 \leqslant d_1 < 80$	8,5 ± 2,5
$80 \leqslant d_1 < 115$	10,5 ± 2,5
$115 \leqslant d_1 < 150$	12,5 ± 2,5
$150 \leqslant d_1 \leqslant 200$	15 ± 3

4.3 DSF-C and DSF-CNP — Layer thickness



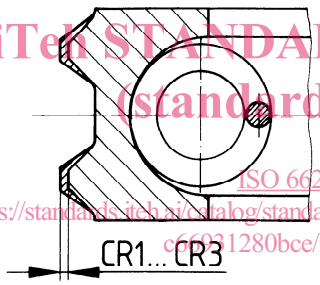


Table 3 — Layer thickness

Dimensions in millimetres

Chromium	Thickness min.
CR1	0,05
CR2	0,1
CR3	0,15

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Figure 9 — Layer thickness

4.4 Tolerances of spring groove offset and land offset

Table 4 — Land offset tolerance

Dimensions in millimetres

h_1	t
$3 \leqslant h_1 < 5$	0,015
$5 \leqslant h_1 \leqslant 8$	0,025

Table 5 — Spring groove offset tolerance

Dimensions in millimetres

h_1	v
$h_1 < 3,5$	0,3
$h_1 \geqslant 3,5$	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

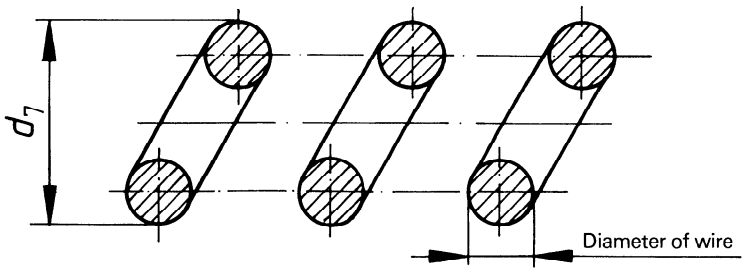

Figure 10 — Type CSN coil spring

5.1.2 Type CSG — Coil spring with constant pitch (coil diameter, d_7, ground)

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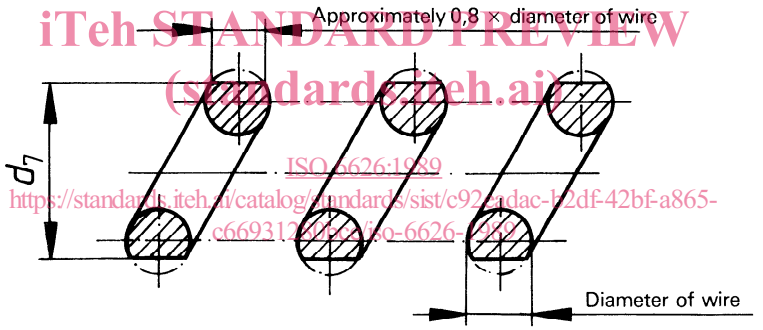

Figure 11 — Type CSG coil spring

5.1.3 Type CSE — Coil spring with variable pitch (coil diameter, d_7, ground)

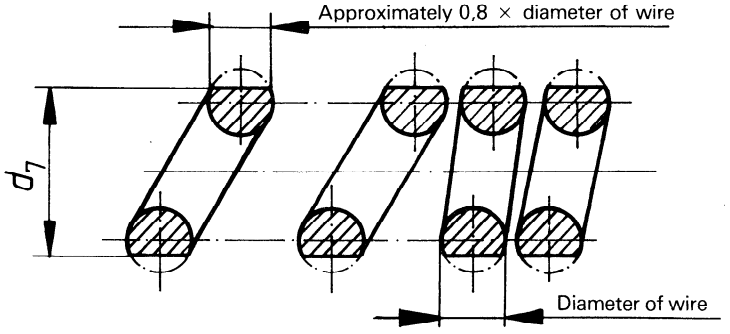

Figure 12 — Type CSE coil spring

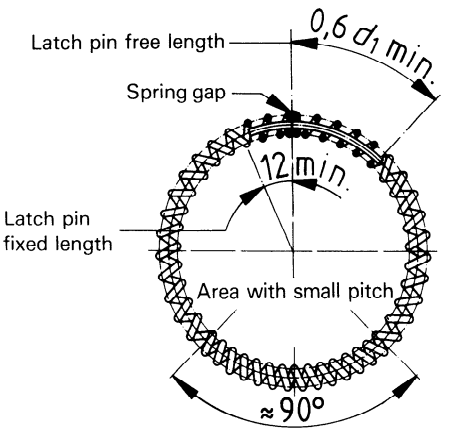

Figure 13 — Position of area with small pitch

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