
International Standard



6623

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Internal combustion engines — Piston rings — Scraper rings

Moteurs à combustion interne — Segments de piston — Segments racleurs mixtes

First edition — 1986-08-15

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UDC 621.43-242.3 : 629.11

Ref. No. ISO 6623-1986 (E)

Descriptors: road vehicles, internal combustion engines, piston rings, dimensions.

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.

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.

International Standard ISO 6623 was prepared by Technical Committee ISO/TC 22, *Road vehicles*.

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 — Scraper rings

0 Introduction

ISO 6623 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.¹⁾

Part 5: Quality requirements.¹⁾

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

Part 1: Rectangular rings.

Part 2: Rectangular rings with narrow ring width.²⁾

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.³⁾

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

ISO 6626, *Internal combustion engines — Coil spring loaded oil control rings.¹⁾*

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 dimensional features of N-, NM-, E- and EM-scraper piston ring types.

Dimensional tables 7 and 8 offer the choice of two radial wall thicknesses:

- radial wall thickness “regular” (table 7);
- radial wall thickness “D/22” (table 8).

The requirements of this International Standard apply to scraper rings for reciprocating internal combustion piston engines, up to and including 200 mm diameter. It may also be used for piston rings of compressors working under similar conditions.

2 Reference

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

Part 3: Material specifications.

Part 4: General specifications.¹⁾

1) At present at the stage of draft.

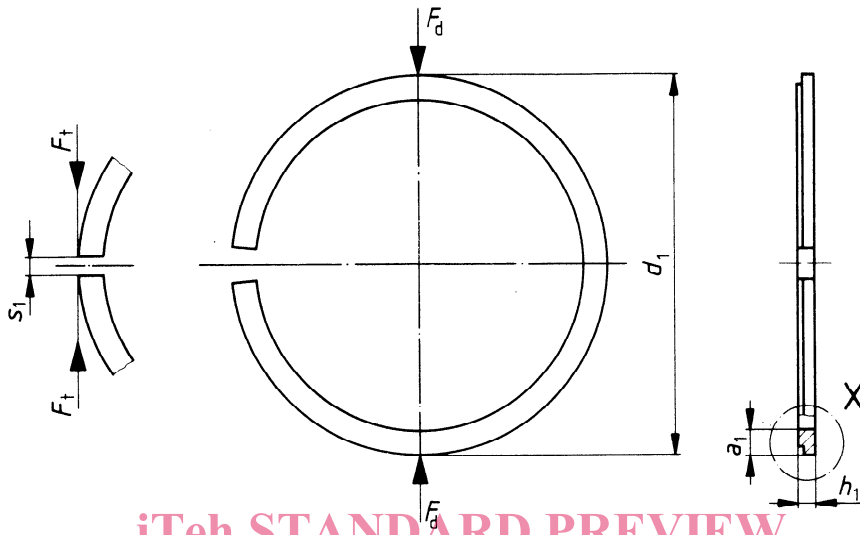
2) At present at the stage of draft (will be published as a Technical Report).

3) In preparation (will be published as a Technical Report).

3 Ring types and designation examples

3.1 Types N, NM, E and EM — Scraper rings — Common general features

NOTE — See table 7 or 8 for dimensions and forces.



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Figure 1 — Types N, NM, E and EM

3.2 Type N — Napier ring (undercut step)

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3.2.1 General features

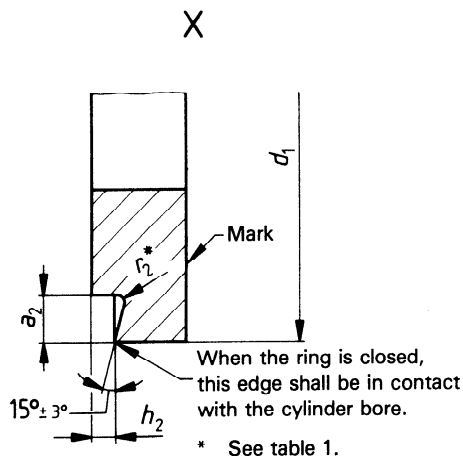


Table 1 — r_2 dimensions

Dimensions in millimetres

d_1	r_2 max.
$30 < d_1 < 175$	0,3
$175 < d_1 < 200$	0,7

Figure 2 — Type N — Detail of figure 1

3.2.2 Designation example

Designation of a Napier ring of $d_1 = 90$ mm nominal diameter, radial wall thickness "regular", $h_1 = 2,5$ mm ring width, made of grey cast iron, non-heat-treated (material subclass 12), general features as shown in figures 1 and 2, and inside chamfered edges :

Piston ring ISO 6623 - N - 90 × 2,5 - MC12 KI

3.3 Type NM – Napier ring (undercut step), taper faced

3.3.1 General features

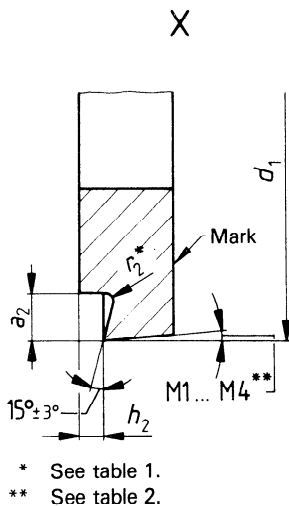


Table 2 – Taper

Taper	Uncoated and coated rings (molybdenum)	Tolerance
M1	10'	
M2	30'	
M3	60'	
M4	90'	

Figure 3 – Type NM – Detail of figure 1

3.3.2 Designation example

Designation of a Napier ring, taper faced M4 = 90' of $d_1 = 90$ mm nominal diameter, radial wall thickness "regular", $h_1 = 2,5$ mm ring width, made of grey cast iron, heat-treated (material subclass 21), general features as shown in figures 1 and 3, and phosphated all over:

Piston ring ISO 6623 - NM4 - 90 × 2,5 MC21 PO

3.4 Type E – Scraper ring (stepped)

3.4.1 General features

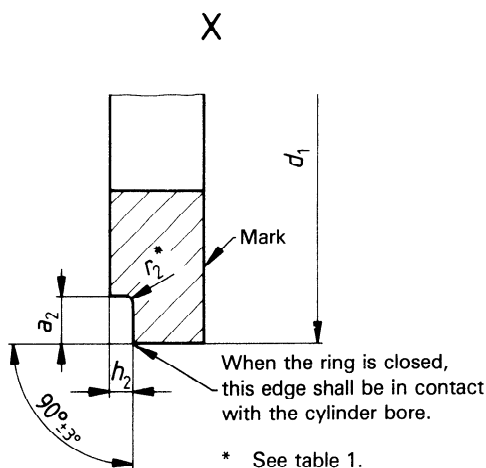


Figure 4 – Type E – Detail of figure 1

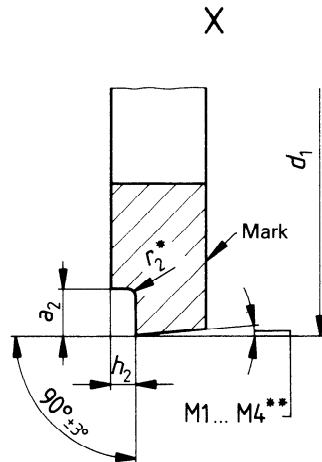
3.4.2 Designation example

Designation of a scraper ring of $d_1 = 90$ mm nominal diameter, radial wall thickness "regular", $h_1 = 2,5$ mm ring width, made of grey cast iron, non-heat-treated (material subclass 12), general features as shown in figures 1 and 4, and periphery molybdenum-coated inlaid design, 0,10 mm minimum thickness:

Piston ring ISO 6623 - E - 90 × 2,5 - MC12 MO2F

3.5 Type EM — Scraper ring (stepped) taper faced

3.5.1 General features



* See table 1.
 ** See table 2.

Figure 5 — Type EM — Detail of figure 1
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3.5.2 Designation example

Designation of a scraper ring taper faced M2 = 30', of $d_1 = 90$ mm nominal diameter, radial wall thickness "regular", $h_1 = 2,5$ mm ring width, made of grey cast iron, heat-treated (material subclass 22), general features as shown in figures 1 and 5, and inside chamfered edges:

Piston ring ISO 6623 - EM2 - 90 × 2,5 - MC22 KI

4 Common features

4.1 N-, NM-, E- and EM-rings — Inside chamfered edges (KI)

Dimensions in millimetres

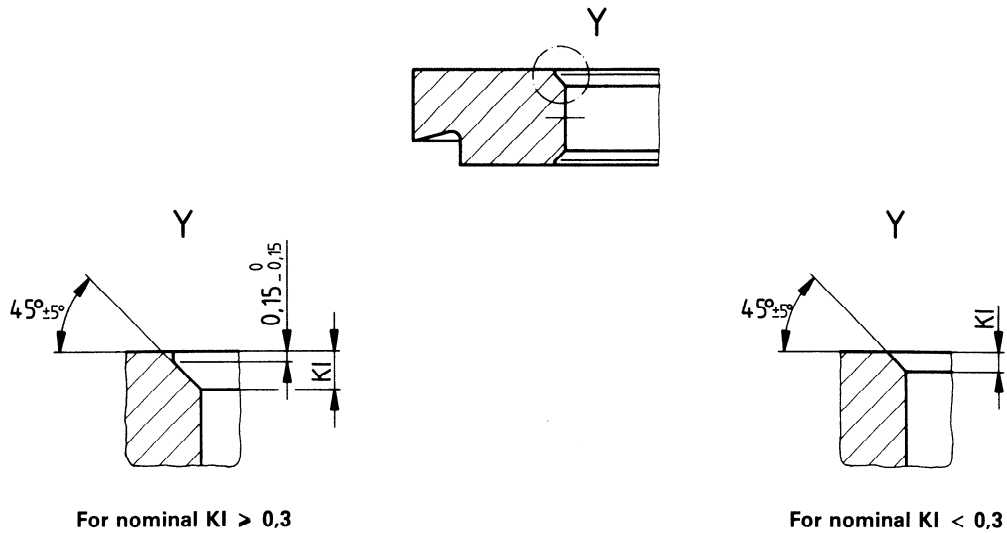


Figure 6 — Inside chamfered edges (KI)
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Table 3 — KI dimensions

ISO 6623:1986 Dimensions in millimetres

d_1	KI
$30 \leq d_1 < 50$	0,2 max.
$50 < d_1 < 125$	$0,3 \pm 0,15$
$125 < d_1 < 175$	$0,4 \pm 0,15$
$175 < d_1 < 200$	$0,6 \pm 0,2$

4.2 N-, NM-, E- and EM-rings, coated (molybdenum inlaid) — Layer thickness

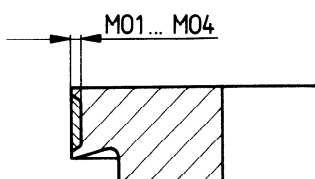


Figure 7 — Layer thickness

Table 4 — Layer thickness

Dimensions in millimetres

Molybdenum	Thickness min.
MO1	0,05
MO2	0,10
MO3	0,15
MO4	0,20

5 Force factors

The tangential and diametral forces given in tables 7 and 8 shall be corrected, when additional features and/or materials other than grey cast iron with a modulus of elasticity of 100 GN/m² are being used.

For common features, the multiplier correction factors given in tables 5 and 6 and the force correction factors given in ISO 6621/4 shall be used.

The factors of table 6 have been calculated with mean coating thickness.

Table 5 — Force correction factors for N-, NM-, E- and EM-rings, with feature KI

d_1 mm	Factor
$30 < d_1 < 50$	1
$50 < d_1 < 200$	0,97

Table 6 — Force correction factors for N-, NM-, E- and EM-rings, molybdenum-coated (inlaid type)

d_1 mm	Factor			
	MO1	MO2	MO3	MO4
$30 < d_1 < 50$	0,81	0,75	—	—
$50 < d_1 < 100$	0,90	0,86	0,83	0,80
$100 < d_1 < 150$	0,94	0,91	0,89	0,87
$150 < d_1 < 200$	0,95	0,94	0,92	0,90

6 Dimensions

Table 7 — Dimensions for N-, NM-, E- and EM-scrapers rings (radial wall thickness "regular")

Dimensions in millimetres

Nominal diameter d_1	Radial wall thickness "regular" a_1		Ring width h_1				Closed gap s_1		Axial width of step h_2				Radial depth of step a_2		Tangential force F_t, N				Diametral force F_d, N					
	Tolerance		Column				Tolerance		For h_2 shown in column				Tolerance		For h_1 shown in column				Tolerance					
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
30	1,25													0,3							6,2	7,5	8,6	10,8
31	1,3													$\pm 0,15$							6,7	8	9	11,4
32	1,35																				7,1	8,4	9,7	12
33	1,4																				7,1	8,6	9,9	12,5
34	1,4																				6,7	8	9,2	11,6
35	1,45																				7,1	8,4	9,7	12,3
36	1,5																				7,5	8,8	10,3	12,9
37	1,55													0,4							8	9,2	10,8	13,5
38	1,6													$\pm 0,15$							8,2	9,7	11,2	14,2
39	1,65																				8,6	10,1	11,8	14,8
40	1,65																				8,2	9,7	11,2	14,2
41	1,7																				8,6	10,1	11,6	14,8
42	1,75																				9	10,5	12,3	15,5
43	1,8																				9	10,8	12,5	15,7
44	1,85																				9,5	11,2	12,9	16,3
45	1,9																				9,7	11,6	13,3	16,8
46	1,9																				9,2	11	12,7	16,1
47	1,95																				9,7	11,4	13,1	16,8
48	2																				10,1	11,8	13,8	17,4
49	2,05																				10,5	12,3	14,2	18,1
50	2,1																				10,8	12,7	14,8	18,7
51	2,15																				11,2	13,3	15,3	19,4
52	2,15																				10,8	12,7	14,6	18,5
53	2,2																				10,8	12,9	14,8	18,7
54	2,25																				11,2	13,3	15,3	19,4
55	2,3																				11,6	13,8	15,9	20
56	2,35																				12	14,2	16,3	20,6
57	2,4																				12,3	14,6	16,8	21,3
58	2,4																				11,8	14,2	16,3	20,6
59	2,45																				12,3	14,6	16,8	21,3
60	2,5																				12,7	14,8	17,2	21,7
61	2,55																				12,9	15,3	17,6	22,4
62	2,6																				13,1	15,5	17,8	22,6
63	2,65																				13,3	15,9	18,3	23,2
64	2,65																				12,9	15,3	17,8	22,6
65	2,7																				13,3	15,7	18,3	23,2
66	2,75																				13,8	16,3	18,7	23,9
67	2,8																				14,2	16,8	19,4	24,5
68	2,85																				14,4	17,2	19,8	25,2
69	2,9																				14,8	17,6	20,2	25,8