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International Standard



6622/1

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## Internal combustion engines — Piston rings — Part 1: Rectangular rings

*Moteurs à combustion interne — Segments de piston — Partie 1: Segments rectangulaires*

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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.

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 6622/1 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 — Part 1: Rectangular rings

## 0 Introduction

ISO 6622/1 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.*<sup>1)</sup>

*Part 5: Quality requirements.*<sup>1)</sup>

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

*Part 1: Rectangular rings.*

*Part 2: Rectangular rings with narrow ring width.*<sup>2)</sup>

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

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

*Part 1: Keystone rings.*

*Part 2: Half keystone rings.*<sup>3)</sup>

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

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

The common features and dimensional tables presented in this part of ISO 6622 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 part of ISO 6622 specifies the essential dimensional features of R-, B- and M-rectangular piston ring types.

Dimensional tables 8 and 9 offer the choice of two radial wall thicknesses:

- radial wall thickness "regular" (table 8);
- radial wall thickness "D/22" (table 9).

The requirements of this part of ISO 6622 apply to rectangular 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 References

ISO 1101, *Technical drawings — Geometrical tolerancing — 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.*<sup>1)</sup>

1) At present at the stage of draft.

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

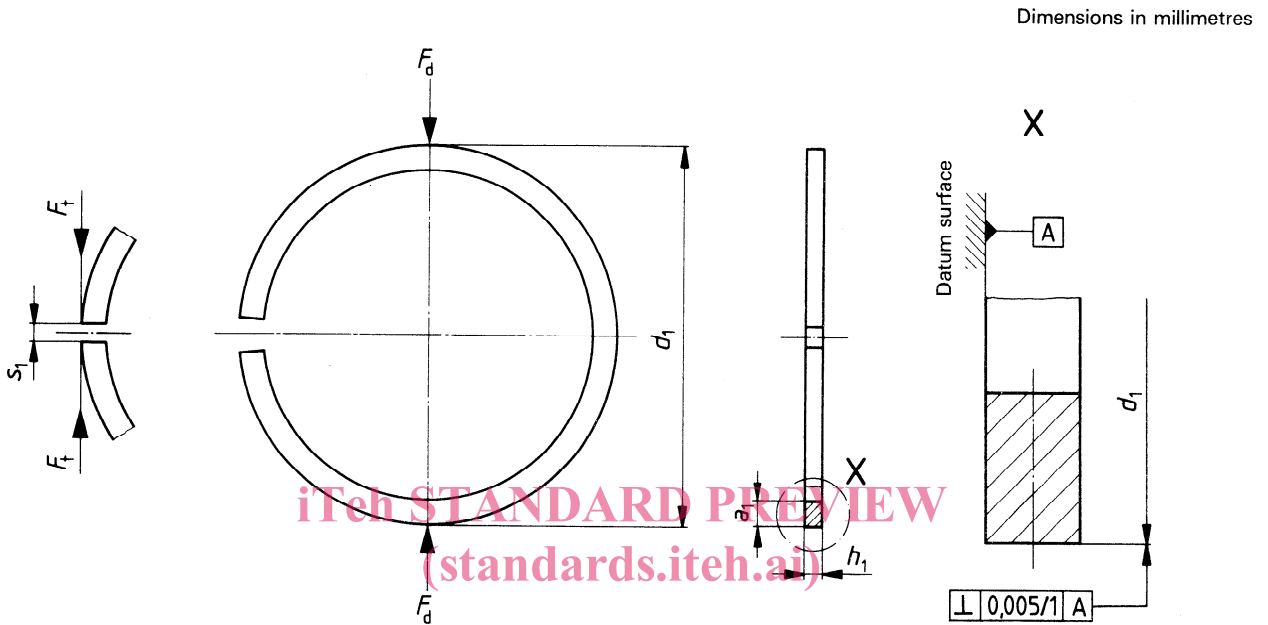
3) In preparation (will be published as a Technical Report).

3 Ring types and designation examples

3.1 Type R — Straight-faced rectangular ring

3.1.1 General features

NOTE — See table 8 or 9 for dimensions and forces.



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**Figure 1 — Type R**

3.1.2 Designation example

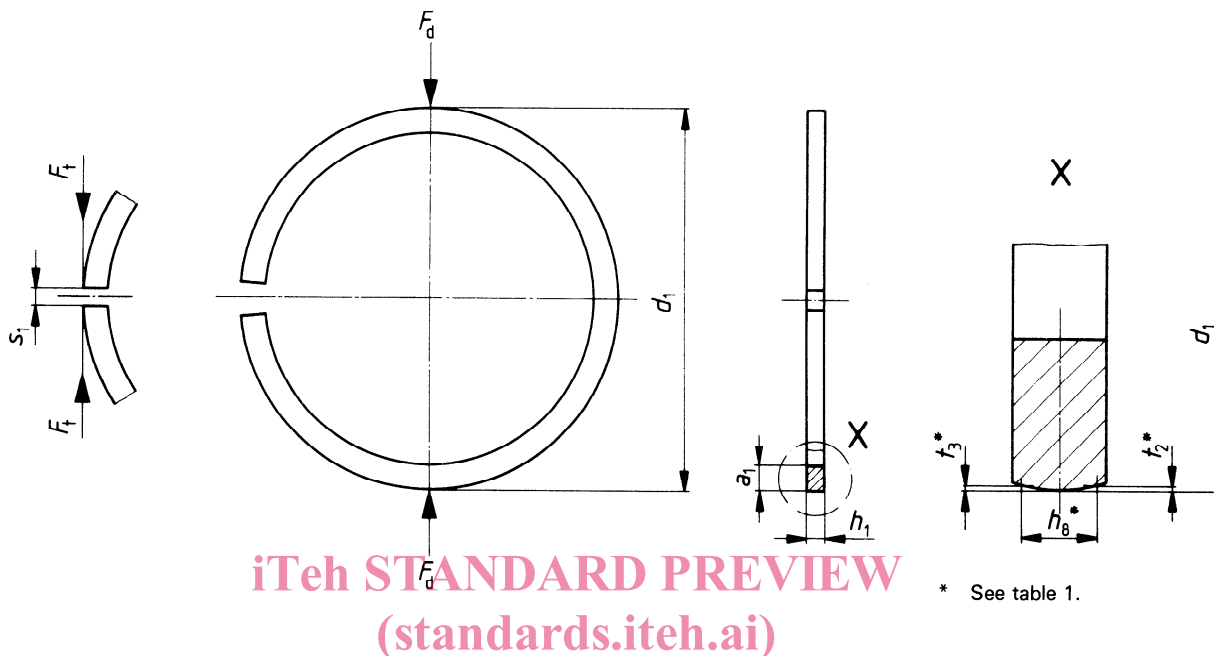
Designation of a straight-faced rectangular ring of  $d_1 = 90$  mm nominal diameter, radial wall thickness "regular",  $h_1 = 2,5$  mm ring width, made of grey cast iron, non-heat-treated (material subclass 12), general features as shown in figure 1, and phosphated all over:

**Piston ring ISO 6622/1 - R - 90 × 2,5 - MC12 PO**

3.2 Type B — Barrel-faced rectangular ring

3.2.1 General features

NOTE — See table 8 or 9 for dimensions and forces.



\* See table 1.

Figure 2 — Type B

<https://standards.iteh.ai/catalog/standards/sist/9aac22da-ab21-45b0-b161-0fca42b854a/iso-6622-1-1986>

Table 1 — Gauge width ( $h_8$ ) and barrel dimensions

Dimensions in millimetres

$h_1$	$h_8$	$t_2, t_3$	Maximum peak off centre
1,5	0,8	0,003   0,015	0,25
1,75	1,0		0,3
2,0	1,2		0,4
2,5	1,6		0,5
3,0	2,0	0,005   0,020	0,5
3,5	2,4		0,6
4,0	2,8	0,005   0,023	0,6
4,5	3,2		0,6

3.2.2 Designation example

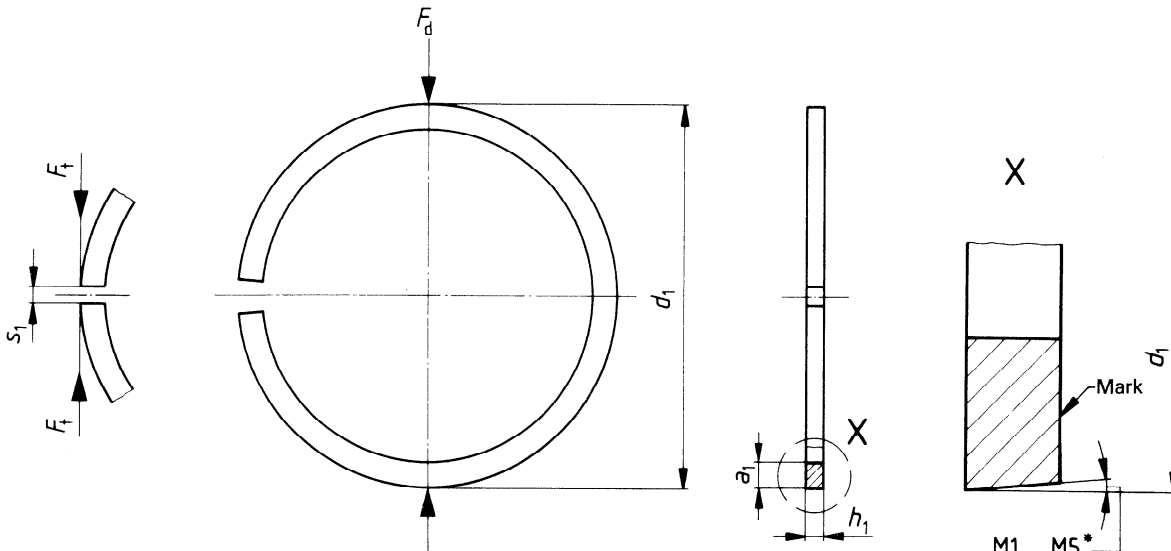
Designation of a barrel-faced rectangular ring of  $d_1 = 90$  mm nominal diameter, radial wall thickness “regular”,  $h_1 = 2,5$  mm ring width, made of spheroidal graphite cast iron (material subclass 51), general features as shown in figure 2, and periphery chromium-coated fully faced design, 0,15 mm minimum thickness:

Piston ring ISO 6622/1 - B - 90 × 2,5 - MC51 CR3

3.3 Type M — Taper-faced rectangular ring

3.3.1 General features

NOTE — See table 8 or 9 for dimensions and forces.



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\* See table 2.

Figure 3 — Type M

Table 2 — Taper

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Taper	Uncoated and coated rings (molybdenum or chrome with tapered periphery ground)					
			with IF or IW <sup>1)</sup> (top side)		with IFU or IWU <sup>1)</sup> (bottom side) <sup>2)</sup>	
		Tolerance <sup>3)</sup>		Tolerance <sup>3)</sup>		Tolerance
M1	10'	+ 40' 0	10'	+ 60' 0	—	—
M2	30'	+ 50' 0	30'		—	—
M3	60'		60'		60'	+ 60' 0
M4	90'		90'		90'	
M5	120'		120'		120'	

1) IF, IW, IFU and IWU are explained in figures 16 to 19.

2) For M-rings (negative twist type) M3, M4 and M5, the twist angle should not exceed 90 % of the minimum taper angle.

3) For coated rings with tapered periphery *not* ground, the tolerance shall be increased by 10' (e.g. M3 = 60' : +60' / 0 for M-rings or +70' / 0 for M-rings with IF or IW).

3.3.2 Designation example

Designation of a taper-faced rectangular ring 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 23), general features as shown in figure 3, with taper M1 = 10', and periphery molybdenum-coated inlaid design, 0,10 mm minimum thickness:

Piston ring ISO 6622/1 - M1 - 90 × 2,5 - MC23 MO2F



4 Common features

4.1 Type R – Straight-faced rectangular ring

4.1.1 Uncoated rings

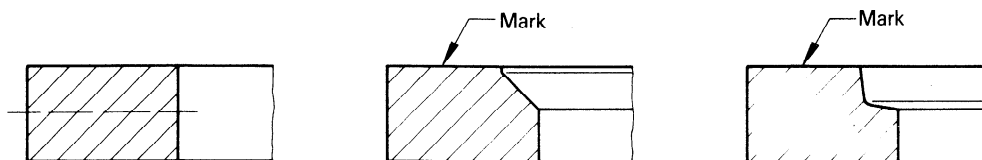


Figure 4 – Uncoated type R rings

4.1.2 Coated rings (chromium or molybdenum)

4.1.2.1 Fully faced

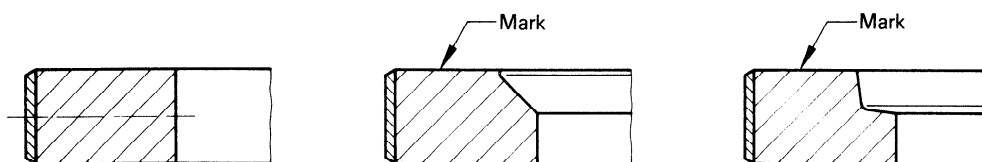


Figure 5 – Fully faced coated type R rings

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4.1.2.2 Semi-inlaid

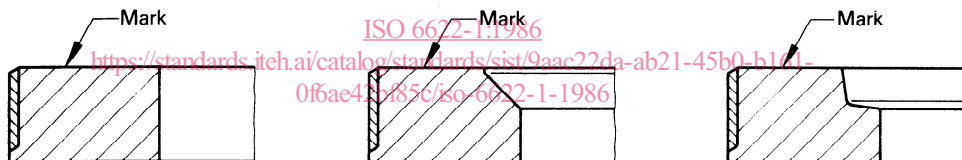


Figure 6 – Semi-inlaid coated type R rings

4.1.2.3 Inlaid

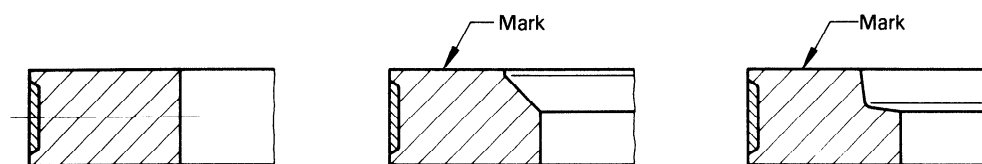


Figure 7 – Inlaid coated type R rings

4.2 Type B — Barrel-faced rectangular ring

4.2.1 Uncoated rings

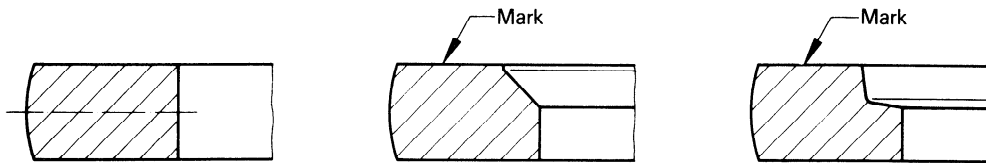


Figure 8 — Uncoated type B rings

4.2.2 Coated rings (chromium or molybdenum)

4.2.2.1 Fully faced

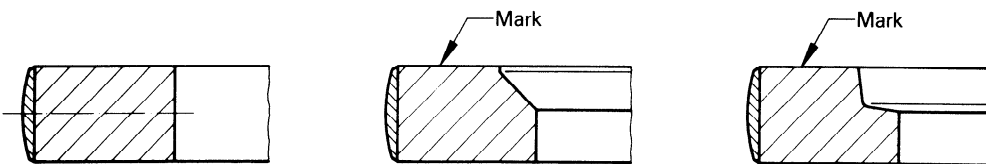


Figure 9 — Fully faced coated type B rings

4.2.2.2 Semi-inlaid

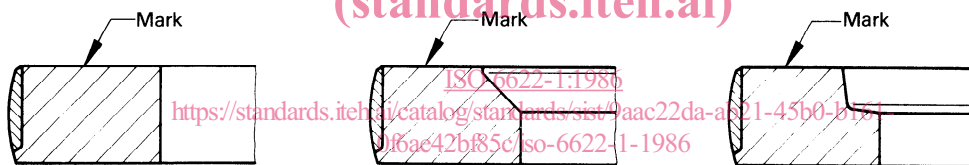


Figure 10 — Semi-inlaid coated type B rings

4.2.2.3 Inlaid

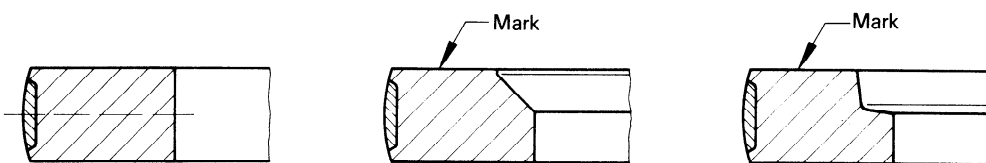


Figure 11 — Inlaid coated type B rings

4.3 Type M – Taper-faced rectangular ring

4.3.1 Uncoated rings

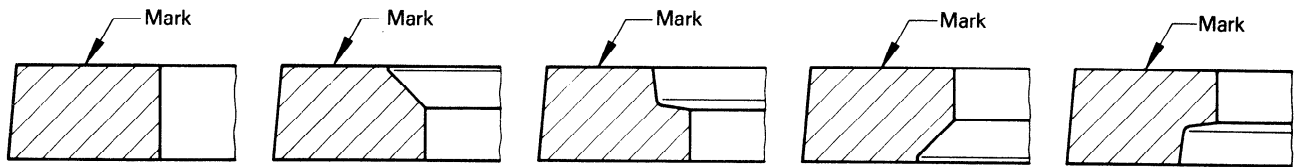


Figure 12 – Uncoated type M rings

4.3.2 Coated rings (chromium or molybdenum)

4.3.2.1 Fully faced

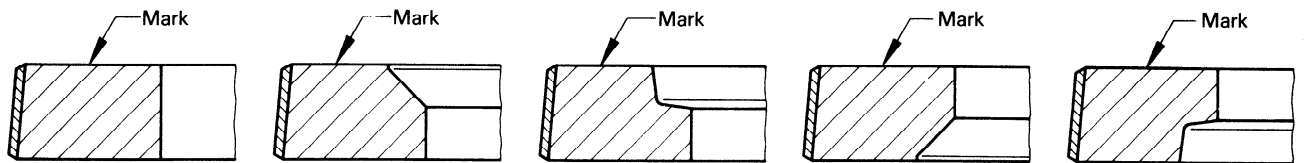


Figure 13 – Fully faced coated type M rings

4.3.2.2 Semi-inlaid

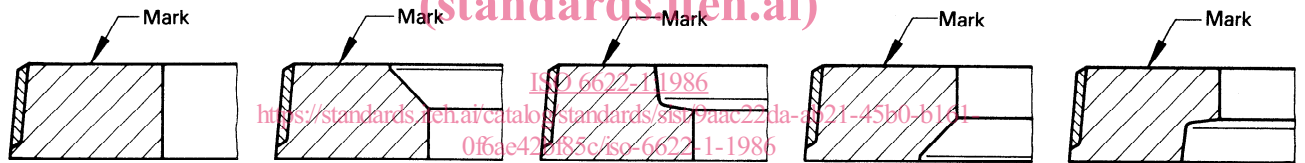


Figure 14 – Semi-inlaid coated type M rings

4.3.2.3 Inlaid

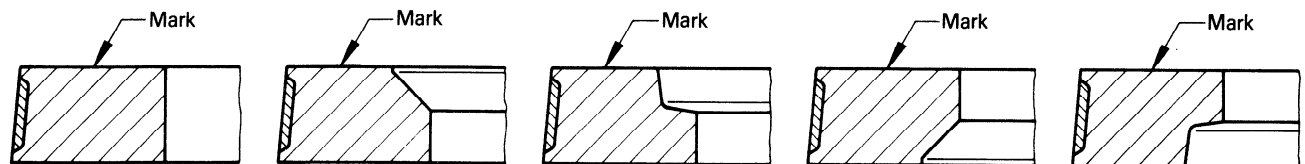


Figure 15 – Inlaid coated type M rings