INTERNATIONAL STANDARD

ISO 6624-3

Second edition
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Internal combustion engines — Piston rings —

Part 3: Keystone rings made of steel

Moteurs à combustion interne — Segments de piston —

Partie 3: Segments trapézoïdaux en acier

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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. www.iso.org/directives

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

For an explanation on 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 the following URL: 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 6624-3:2001), which has been technically revised. The main changes compared to the previous edition are as follows:

— PVD rings were included; and

— updates were made regarding technology improvements.

A list of all the parts in the ISO 6624 series can be found on the ISO website.

Introduction

ISO 6624 is one of a number of series of International Standards dealing with piston rings for reciprocating internal combustion engines. Others are ISO 6621[2],[3],[4],[5], ISO 6622[6],[7], ISO 6623[8], ISO 6625[9], ISO 6626[10],[11], [12] and ISO 6627[13].

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 must 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[4] and ISO 6621-4 before completing a selection.

Internal combustion engines — Piston rings —

Part 3:
Keystone rings made of steel

1 Scope

This document specifies the essential dimensional features of keystone rings made of steel, types T, TB, TBA, TM, K, KB, KBA and KM, having diameters from 70 mm up to and including 160 mm, used in reciprocating internal combustion piston engines.

2 Normative reference

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

4 Overview

The keystone ring types are specified in Tables 1 to 3 and Figures 1 to 8. Their common features and the dimensions of those features are specified in Tables 4 to 9 and Figures 9 to 15. Tables 11 and 12 give the force factors for the different types of rings, while Table 13 and Table 14 give the dimensions and forces of keystone rings 6° and 15°, respectively.

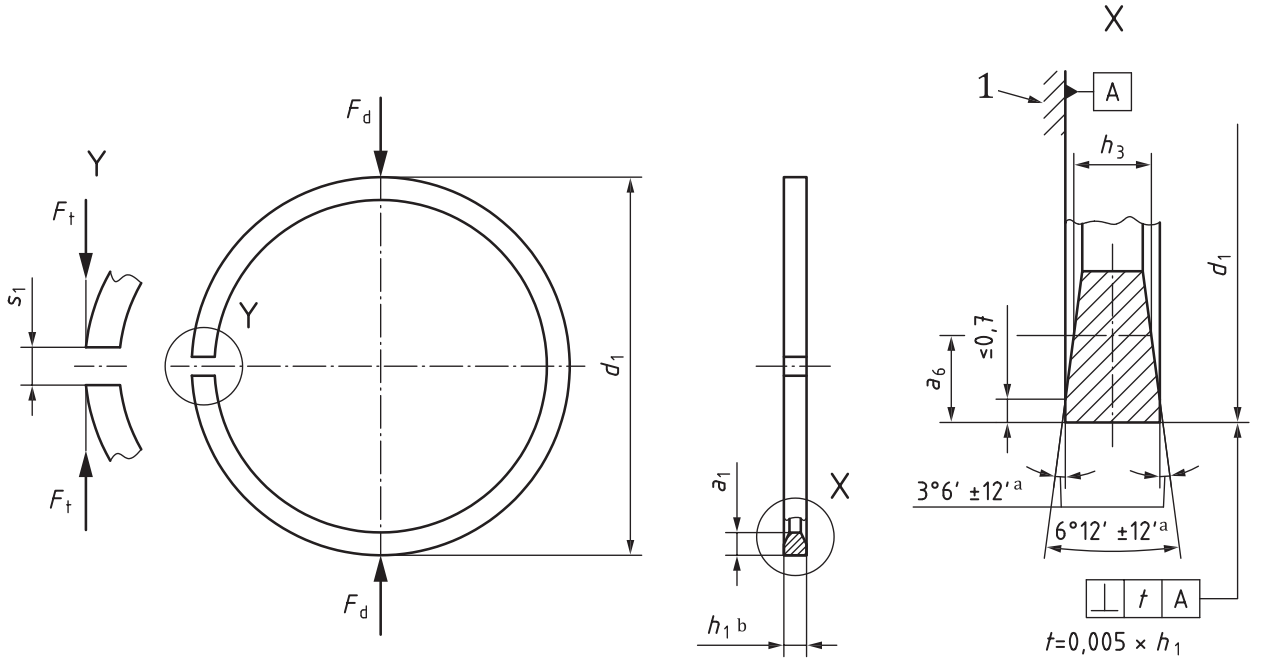
5 Ring types and designation examples

5.1 Type T — Straight faced keystone ring 6°

5.1.1 General features

See Table 13 for dimensions and forces.

Dimensions in millimetres



Key

1 reference plane

a Due to manufacturing processing, side angle tolerances are not cumulative.

b Nominal.

Figure 1 — Type T

5.1.2 Designation

EXAMPLE Designation of a piston ring complying with the requirements of ISO 6624-3, being a steel, 6° keystone ring with straight-faced peripheral surface (T), of nominal diameter d_1 = 90 mm (90) and nominal ring width h_1 = 2,5 mm (2,5), made of CrSi alloyed steel, subclass 62 (MC 62), and having a fully faced chromium plated peripheral surface with a minimum thickness of 0,1 mm (CR2). Parameters in parenthesis are used in the ISO ring designation:

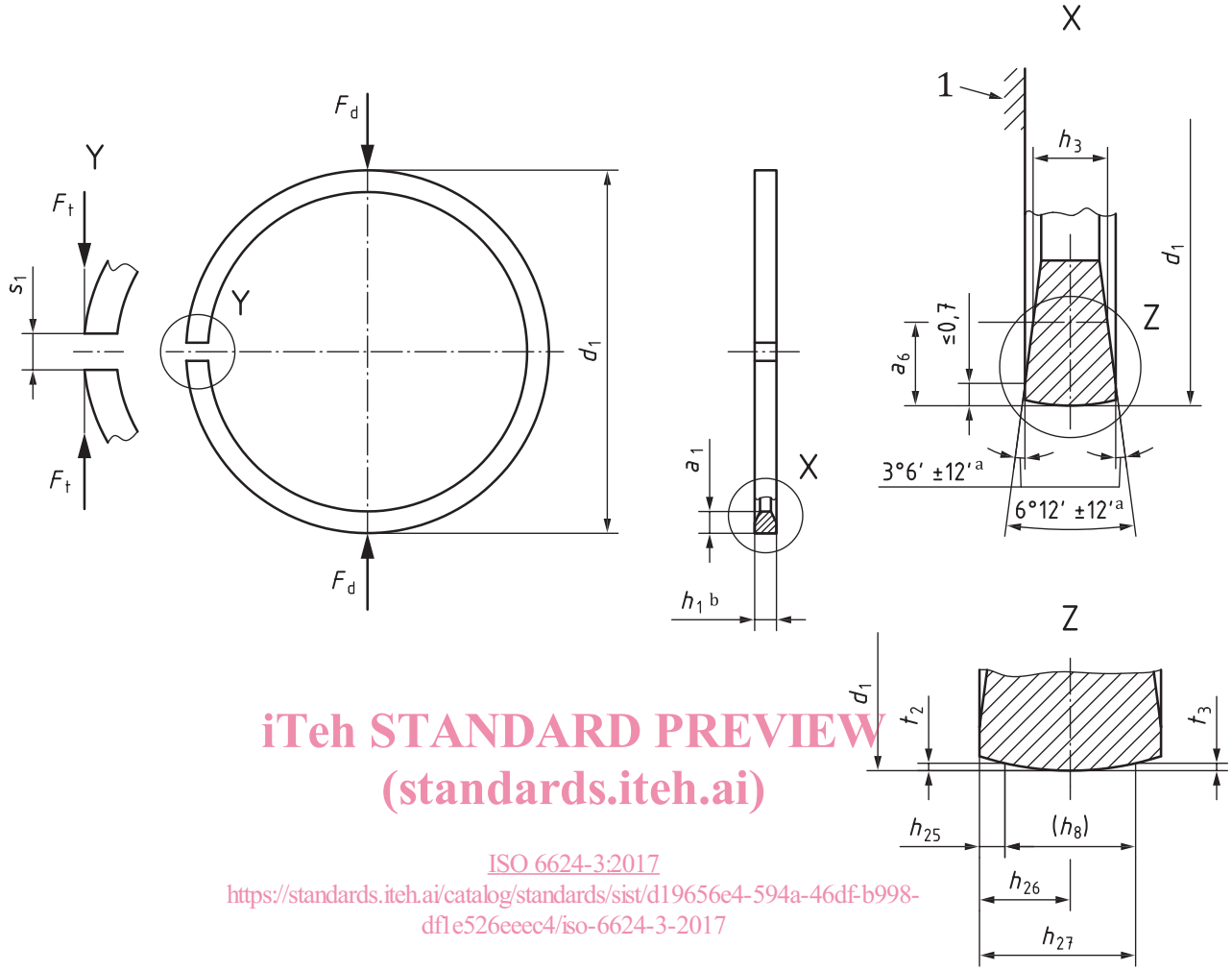
Piston ring ISO 6624-3 T - 90 x 2,5-MC 62/CR2

5.2 Type TB — Symmetrical barrel faced keystone ring 6°

5.2.1 General features

See Table 13 for dimensions and forces.

Dimensions in millimetres



Key

1 reference plane

a Due to manufacturing processing, side angle tolerances are not cumulative.

b Nominal.

Figure 2 — Type TB

Table 1 — Symmetrical barrel dimensions

Dimensions in millimetres

h_1	h_{25}	h_{26}	Tolerance	h_{27}	t_2, t_3	h_8[a]
2,0	0,40	1,00	±0,30	1,60	0,003...0,015	1,2
2,5	0,45	1,25	±0,40	2,05		1,6
3,0	0,50	1,50	±0,50	2,50	0,005...0,020	2,0
3,5	0,55	1,75		2,95		2,4
4,0	0,60	2,00	±0,60	3,40	0,005...0,023	2,8

a Gauge width h_8, informative only, shall be used only if agreed between the manufacturer and customer.

5.2.2 Designation

EXAMPLE Designation of a piston ring complying with the requirements of ISO 6624-3, being a steel, 6° keystone ring with barrel faced peripheral surface (TB), of nominal diameter d_1 = 90 mm (90) and nominal ring width h_1 = 2,5 mm (2,5), made of martensitic steel (11 % Cr min.), subclass 65 (MC 65), nitrided on the peripheral surface and side faces (NT) to a depth of 0,070 mm min. on the peripheral surface (070), and with an associated side face depth of a minimum of 0,020 mm. Parameters in parenthesis are used in the ISO ring designation:

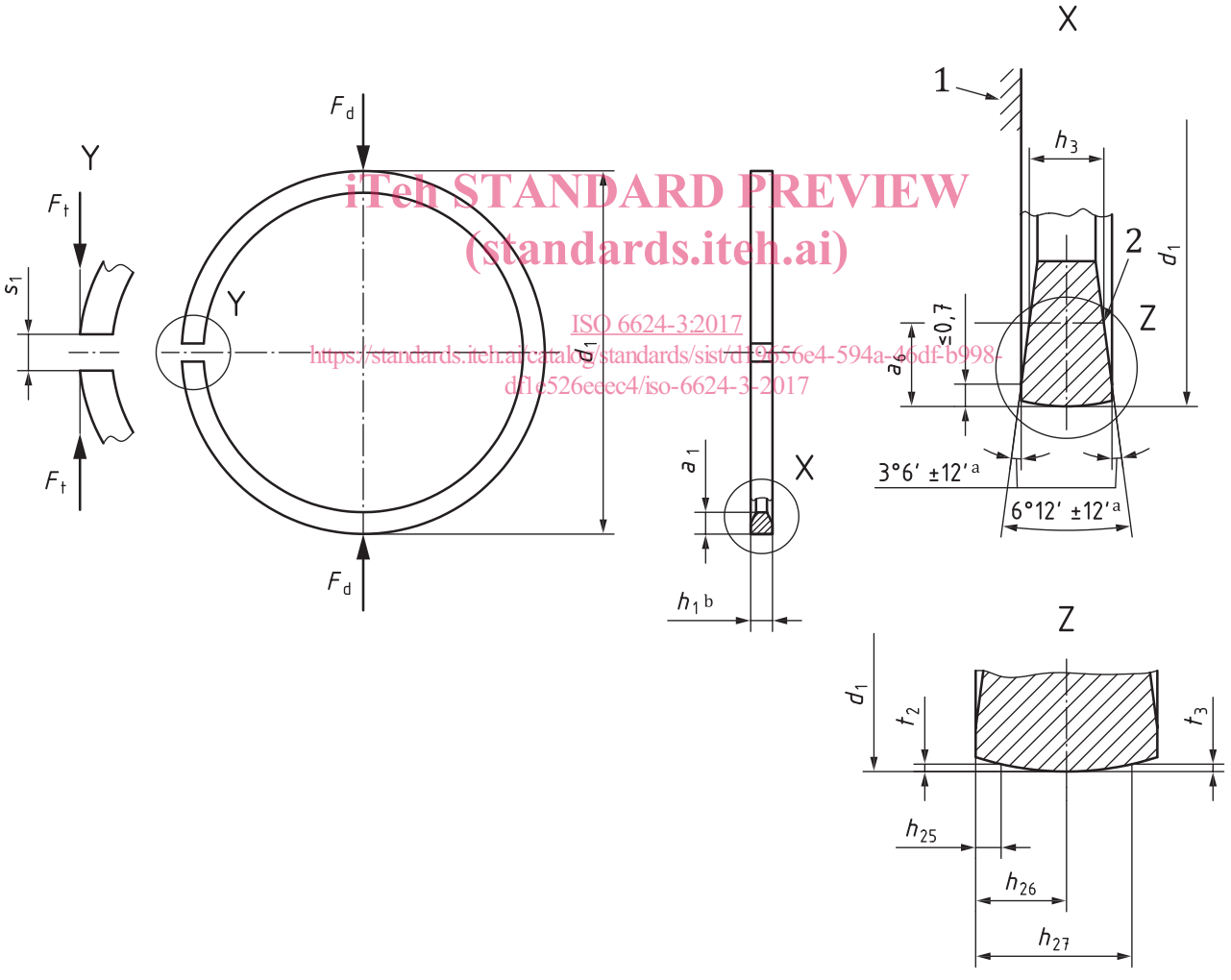
Piston ring ISO 6624-3 TB - 90 x 2,5-MC 65/NT070

5.3 Type TBA — Asymmetrical barrel faced keystone ring 6°

5.3.1 General features

See Table 13 for dimensions and forces.

Dimensions in millimetres



Key

1 reference plane
2 top side identification mark
a Due to manufacturing processing, side angle tolerances are not cumulative.
b Nominal.

Figure 3 — Type TBA

Table 2 — Asymmetrical barrel dimensions

Dimensions in millimetres

h_1	h_{25} [a]	h_{26}		h_{27}	t_2 [b]	t_3 [b]
			Tolerance			
2,00	0,40	0,60	±0,20	1,50	0...0,007	0,009...0,030
2,50	0,45	0,70	±0,25	1,80	0...0,008	0,011...0,035
3,00	0,55	0,80		2,10		0,012...0,038
3,50	0,60	0,90	±0,30	2,40	0...0,009	0,012...0,040
4,00	0,65	0,95		2,80		0,013...0,045

[a] h_{25} may be lowered for rings with reduced edge dimensions.

[b] t_2 or t_3 or both may be varied as agreed between the manufacturer and customer.

5.3.2 Designation

EXAMPLE Designation of a piston ring complying with the requirements of ISO 6624-3, being a steel, 6° keystone ring with asymmetrical barrel faced peripheral surface (TBA), of nominal diameter d_1 = 90 mm (90) and nominal ring width h_1 = 2,5 mm (2,5), made of martensitic steel (17 % Cr min.), subclass 66 (MC 66), nitrided on the peripheral surface and side faces (NT) to a minimum depth of 0,070 mm on the peripheral surface (070), and with an associated side face depth of a minimum of 0,020 mm. Parameters in parenthesis are used in the ISO ring designation:

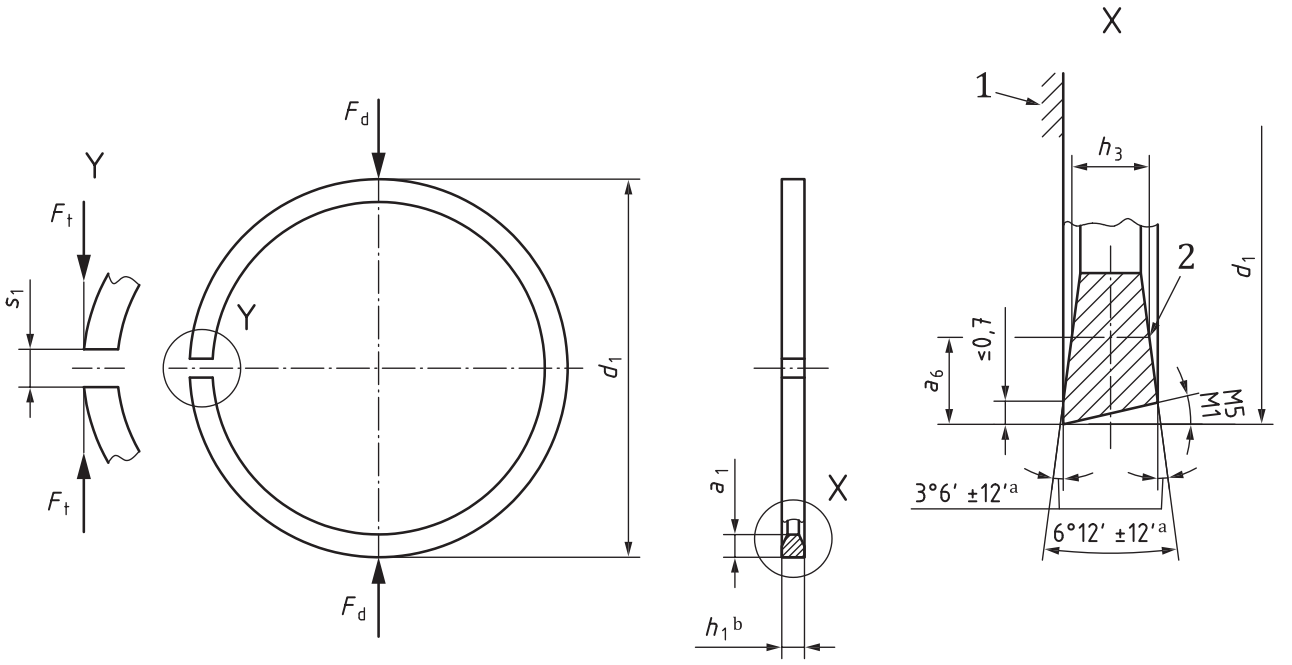
Piston ring ISO 6624-3 TBA - 90 x 2,5-MC 66/NT070

5.4 Type TM — Taper faced keystone ring 6°

5.4.1 General features

See Table 13 for dimensions and forces.

Dimensions in millimetres



Key

1 reference plane

2 top side identification mark

a Due to manufacturing processing, side angle tolerances are not cumulative.

b Nominal.

Figure 4 — Type TM

Table 3 — Taper

Dimensions in minutes

Code	Taper	Tolerance[a]	Internal twist feature designs Tolerance[a]
M1[b]	10	$^{+50}_{0}$	$^{+60}_{0}$
M2	30	$^{+60}_{0}$	$^{+70}_{0}$
M3	60		
M4	90		
M5	120		

a For chromium plated rings with a tapered peripheral surface that is not ground, the tolerance shall be increased by 10 (e.g. M3 = 60 tolerance: $^{+70}_{0}$; M3 with internal features = 60 tolerance: $^{+80}_{0}$).

b M1 not for rings with partly cylindrical peripheral surface.