INTERNATIONAL STANDARD

ISO 6624-4

Second edition
2016-02-15

Internal combustion engines — Piston rings —

Part 4: Half keystone rings made of steel

Moteurs à combustion interne — Segments de piston —

Partie 4: Segments semi-trapézoïdaux en acier

Reference number
ISO 6624-4:2016(E)

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

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 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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 meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 34, *Propulsion, powertrain and powertrain fluids*.

This second edition cancels and replaces the first edition (ISO 6624-4:2003), which has been technically revised.

ISO 6624 consists of the following parts, under the general title *Internal combustion engines — Piston rings*:

— *Part 1: Keystone rings made of cast iron*

— *Part 2: Half keystone rings made of cast iron*

— *Part 3: Keystone rings made of steel*

— *Part 4: Half keystone rings made of steel*

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]

Internal combustion engines — Piston rings —

Part 4:
Half keystone rings made of steel

1 Scope

This part of ISO 6624 specifies the essential dimensional features of half keystone rings made of steel, types HK, HKB and HKBA, having nominal diameters from 50 mm up to, and including, 160 mm, used in reciprocating internal combustion piston engines for road vehicles and other applications.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 Overview

The half keystone ring types are specified in Tables 1 and 2 and Figures 1, 2 and 3. Their common features and the dimensions of those features are specified in Tables 3 to 6 and Figures 4 to 10. Table 7 gives the force factors for the different ring types, while Table 8 gives the dimensions and forces of half keystone rings.

The common features and dimensional tables presented in this part of ISO 6624 constitute a broad range of variables and, in selecting a particular ring type, the designer shall bear in mind the conditions under which it will be required to operate.

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

4 Ring types and designation examples

NOTE For the angle of half keystone rings, the same definition and measurement apply as for keystone rings (see ISO 6621–2).

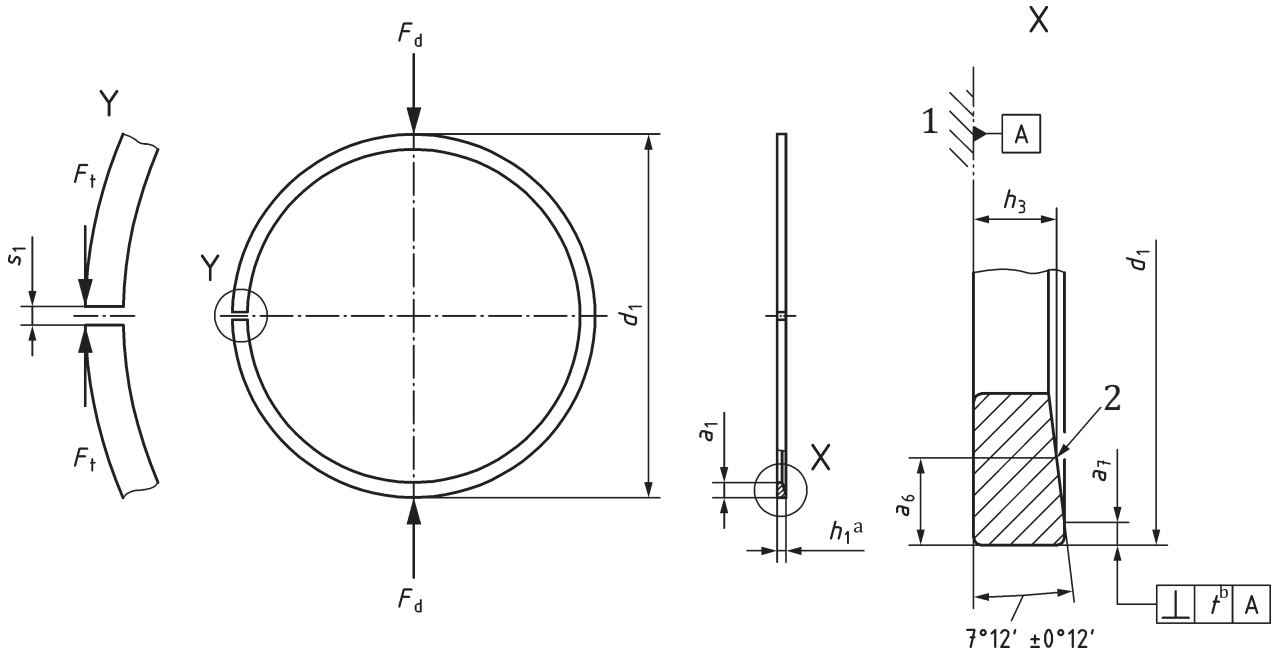
4.1 Type HK — Straight faced half keystone ring 7°

4.1.1 General features

Figure 1 shows the general features of piston ring type HK.

See Table 7 for dimensions and forces.

h_3 values are calculated based on Annex A.



Key

1 reference plane (ring is positioned flat against datum A)

2 top side identification mark

a Nominal.

b $t = 0{,}006 \times h_1$.

Figure 1 — Type HK

4.1.2 Designation

EXAMPLE Designation of a piston ring complying with the requirements of ISO 6624–4, being a 7° half keystone ring made of steel with a straight faced peripheral surface (HK), of nominal diameter d_1 = 60 mm (60), of nominal ring width h_1 = 1,2 mm (1,2), made of CrSi alloyed steel subclass 62 (MC62), and having a 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 6624-4 HK - 60 × 1,2 - MC62/CR2

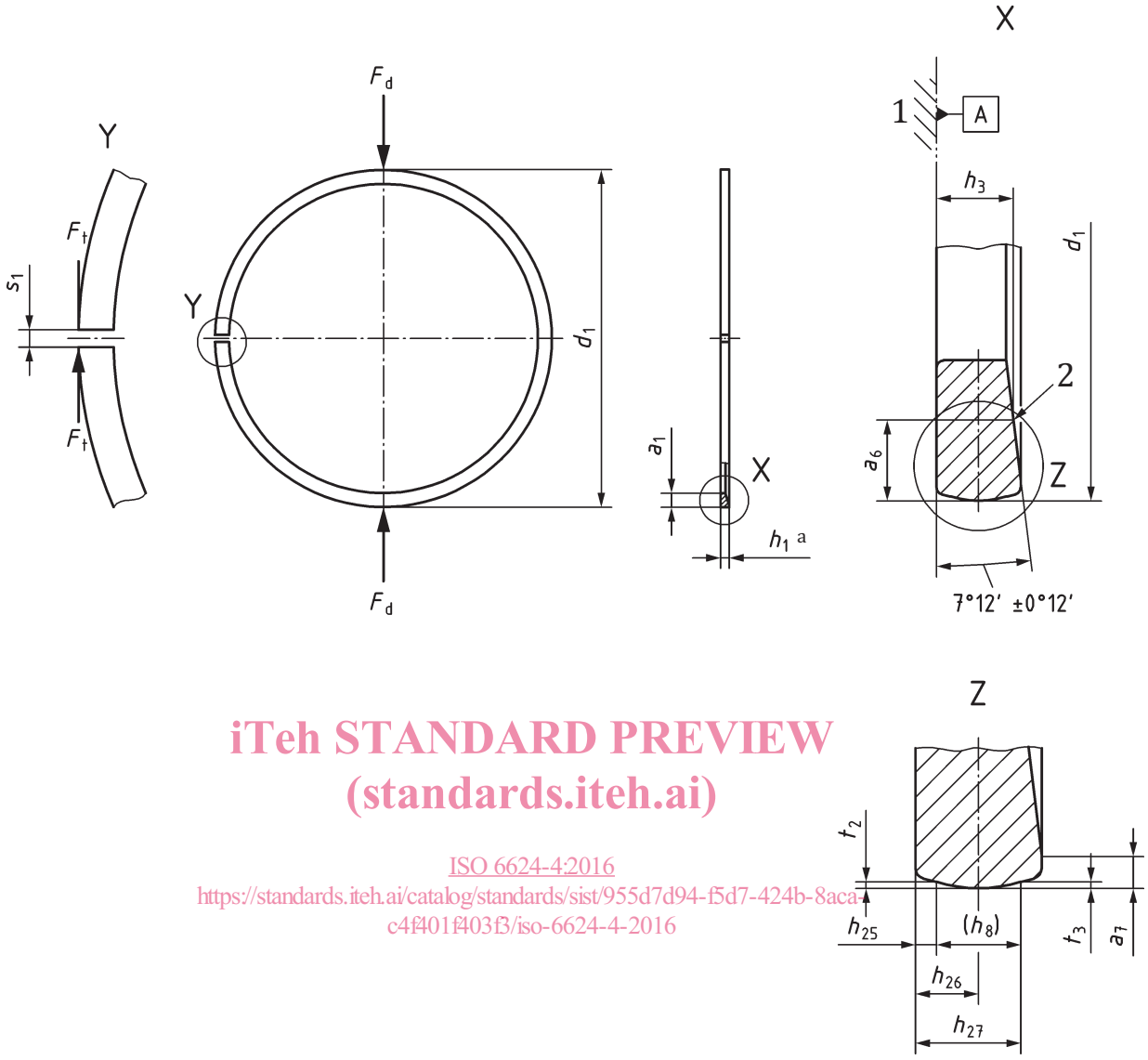
4.2 Type HKB — Barrel faced half keystone ring 7°

4.2.1 General features

Figure 2 shows the general features of piston ring type HKB.

See Table 7 for dimensions and forces.

h_3 values are calculated based on Annex A.



Key

1 reference plane (ring is positioned flat against datum A)

2 top side identification mark

a Nominal.

Figure 2 — Type HKB

Table 1 — Symmetrical barrel dimensions and gauge width (h_8)

Dimensions in millimetres

h_1	h_{25}	h_{26}	h_{26} tol.	h_{27}	t_2, t_3	h_8[a]
1,2	0,30	0,60	±0,20	0,90	0,002...0,012	0,60
1,5	0,35	0,75	±0,25	1,15	0,003...0,015	0,80
1,75	0,35	0,85	±0,30	1,35		1,00
2,0	0,40	1,00	±0,30	1,60		1,20
2,5	0,45	1,25	±0,40	2,05		1,60
3,0	0,50	1,50	±0,50	2,50	0,005...0,020	2,00
3,5	0,55	1,75	±0,50	2,95		2,40

[a] Gauge width (h_8) only informative; may be used only if agreed between manufacturer and customer.

4.2.2 Designation

EXAMPLE Designation of a piston ring complying with the requirements of ISO 6624–4, being a half keystone ring made of steel with a barrel faced peripheral surface (HKB), of nominal diameter d_1 = 60 mm (60), of nominal ring width h_1 = 1,5 mm (1,5), made of martensitic steel 11 %Cr (min.) subclass 65 (MC65), and nitrided on the peripheral surface and side faces (NT) to a depth of 0,050 mm min. on the peripheral surface (050), with an associated side face depth of 0,015 mm min. Parameters in parenthesis are used in the ISO ring designation:

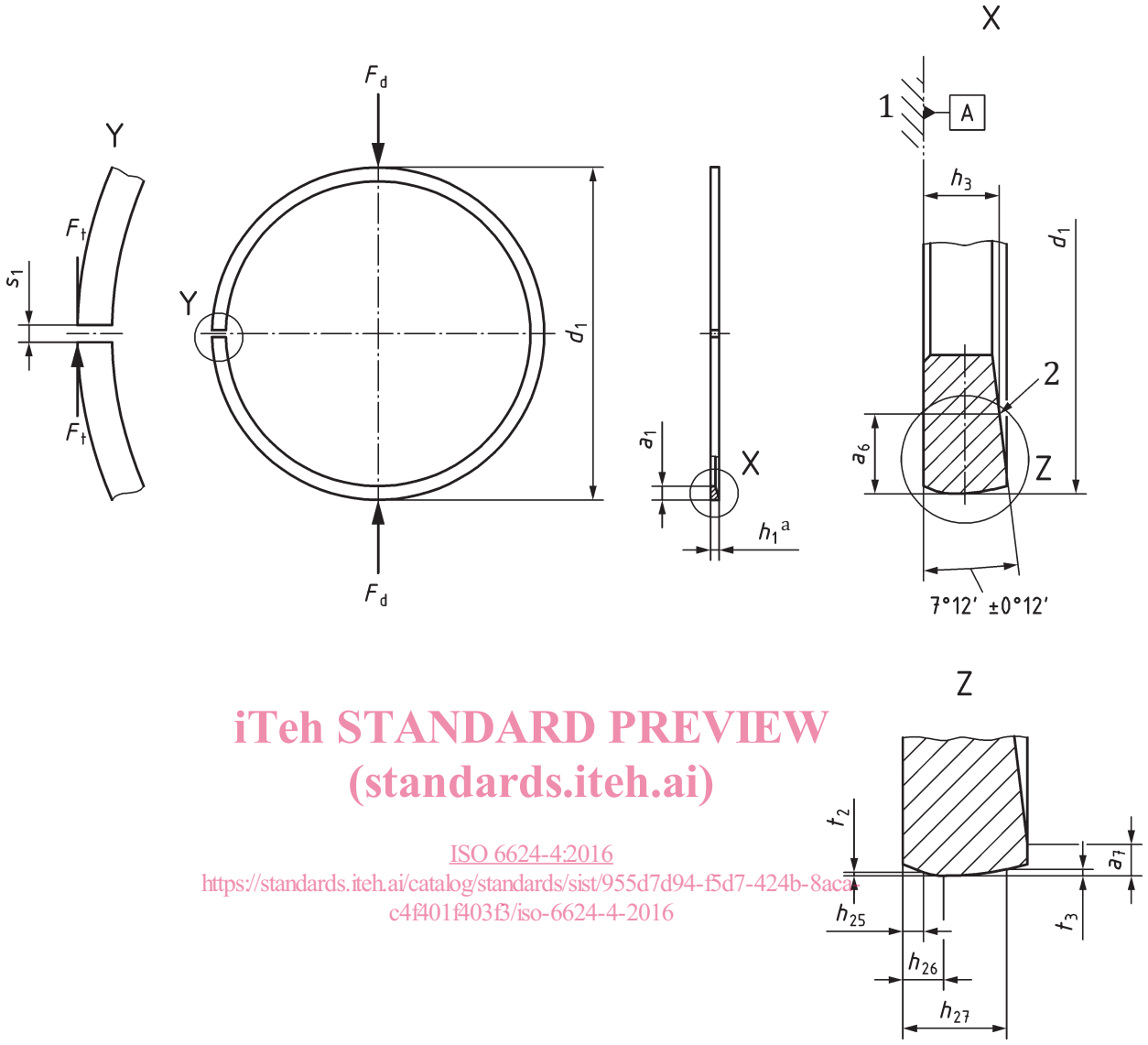
Piston ring ISO 6624-4 HKB - 60 × 1,5 - MC65/NT050

4.3 Type HKBA — Asymmetrical Barrel faced half keystone ring 7° (not recommended for nitrided rings of code NT)

4.3.1 General features

See Table 7 for dimensions and forces.

h_3 values are calculated based on Annex A.



Key

1 reference plane (ring is positioned flat against datum A)

2 top side identification mark

a Nominal.

Figure 3 — Type HKBA

Table 2 — Asymmetrical barrel dimensions

Dimensions in millimetres

h_1	h_{25}[a]	h_{26}	h_{26} tol.	h_{27}	t_2[b]	t_3[b]
1,75	0,35	0,55	±0,20	1,35	0...0,007	0,008...0,025
2,0	0,40	0,60		1,50		0,009...0,030
2,5	0,45	0,70	±0,25	1,80	0...0,008	0,011...0,035
3,0	0,55	0,80		2,10		0,012...0,038
3,5	0,60	0,90	±0,30	2,40	0...0,009	0,012...0,040

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

b t_2 and/or t_3 may be varied as agreed between manufacturer and customer.