INTERNATIONAL STANDARD

ISO 6621-1

Third edition
2018-02

Internal combustion engines — Piston rings —

Part 1: Vocabulary

Moteurs à combustion interne — Segments de piston —

Partie 1: Vocabulaire

Reference number
ISO 6621-1:2018(E)

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

Published in Switzerland

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 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 third edition cancels and replaces the second edition (ISO 6626-1:2007), which has been technically revised. The main changes compared to the previous edition are as follows:

— Annex A was updated with improved translations in Portuguese, Japanese and Russian and a new term “witness line” was added; and

— Figure quality was improved.

Introduction

ISO 6621 is one of the series of International Standards dealing with piston rings for reciprocating internal combustion engines. Others are ISO 6622[6][7], ISO 6623:2013[8] , ISO 6624[9][10][11][12], ISO 6625:1986[13], ISO 6626[14][15][16][17] and ISO 6627:2011[18].

Internal combustion engines — Piston rings —

Part 1: Vocabulary

1 Scope

This document defines the most commonly used terms for piston rings. These terms designate either types of piston rings or certain characteristics and phenomena of piston rings.

The terms and definitions in this document apply to piston rings for reciprocating internal combustion engines. They may also be used for piston rings of compressors working under analogous conditions.

NOTE 1 Further terms and definitions covering measuring principles are given in ISO 6621-2:2003.

NOTE 2 This document gives the equivalent terms in the Chinese, English, French, German, Italian, Japanese, Portuguese, Russian and Spanish language.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

3.1 Types of piston ring

3.1.1
piston ring
outward expanding annular ferrous spring, fitting into a piston groove, sealing against pressure differential of gases or liquids between the peripheral and side faces of the ring and the bore and piston groove respectively

3.1.2
single-piece ring
piston ring (3.1.1) formed from only one part that is intended for installation in a single ring groove

3.1.3
multi-piece ring
piston ring (3.1.1) comprising two or more component parts that are intended for installation in a single ring groove

3.1.4
compression ring
piston ring (3.1.1) whose primary purpose is to prevent leakage of gas past the piston

3.1.5
oil control ring
piston ring (3.1.1) with oil return slots or an equivalent whose primary purpose is to scrape oil from the cylinder wall

3.1.6
rectangular ring
compression ring (3.1.4) with a rectangular cross-section whose geometrically simple form provides an adequate seal under normal engine operating conditions

3.1.7
keystone ring
compression ring (3.1.4) with both sides tapered

Note 1 to entry: The keystone ring is used in those cases when the ring sticking can be expected. Due to its wedge shape, any radial movement of the ring will alter its axial clearance and thus minimize the build-up of combustion residues.

3.1.8
half keystone ring
compression ring (3.1.4) with one side face tapered

Note 1 to entry: Usually, the tapered side face is the one that faces the combustion chamber.

3.1.9
scraper ring
ring with a rectangular shaped step on the lower peripheral edge to scrape oil from the cylinder wall

Note 1 to entry: It can also act as a lower *compression ring* (3.1.4).

3.1.10
Napier ring
scraper ring (3.1.9) with a radiused undercut step

3.1.11
slotted oil control ring
oil control ring (3.1.5) with parallel side faces and two contact lands

Note 1 to entry: Due to the narrow lands of this type of ring, a high unit pressure is achieved.

3.1.12
bevelled-edge oil control ring
slotted oil control ring (3.1.11) with lands that are chamfered on their outer edges

Note 1 to entry: The peripheral edges of both lands are chamfered in order to achieve a further increase in unit pressure and thereby a better oil scraping effect.

3.1.13
double-bevelled oil control ring
slotted oil control ring (3.1.11) with lands that are chamfered on their upward facing edges

Note 1 to entry: By chamfering the edges of both lands in the same direction, the oil scraping effect is even further improved.

3.1.14
coil-spring-loaded slotted oil control ring
slotted oil control ring (3.1.11) whose radial pressure is increased by means of a cylindrical coil spring

Note 1 to entry: This spring acts equally in all directions against the inside of the ring.

3.1.15
coil-spring-loaded bevelled-edge oil control ring
coil-spring-loaded slotted oil control ring (3.1.14) with lands that are chamfered on their outer edges

3.1.16
coil-spring-loaded double-bevelled oil control ring
coil-spring-loaded slotted oil control ring (3.1.14) with lands that are chamfered on their upward facing edges

3.1.17
coil-spring-loaded bevelled-edge chromium-plated oil control ring
coil-spring-loaded slotted oil control ring (3.1.14) with lands that are chromium-plated and chamfered on their inner and outer edges

Note 1 to entry: May or may not be profile ground.

3.1.18
expander/segment oil control ring
multi-piece (3.1.3) oil control ring comprised of an expander-spacer and two segments

Note 1 to entry: Expander-spacer design will vary with manufacturer.

3.2 Physical characteristics of rings

3.2.1
nominal ring diameter
nominal diameter, d_1, identical to the nominal cylinder bore, in accordance with ISO 286-1

3.2.2
witness line
narrow continuous line of contact lapped on the peripheral surface of the ring which can be seen around the circumference with normal vision

3.2.3
joint
location on a *piston ring* (3.1.1) where the butt ends come together

3.2.4
butting
touching of the two ring gap faces

3.2.5
effective free gap
free gap, m, minus the measured closed gap, s_1

Note 1 to entry: See Figure 2 for m; see Figure 3 for s_1.

Note 2 to entry: Free gap used in the formulae for calculation of E value, tangential force, F_t, diametral force, F_d, and stresses.

3.2.6
pressure pattern
contact pressure distribution around the circumference of the ring when closed in its nominal cylinder bore

3.2.7
contact pressure
pressure that a ring exerts radially against the cylinder wall

Note 1 to entry: Pressure is expressed in N/mm^2.

3.2.8
pin point
burry light
intermittent pinpoints of bright light or hazy light, but not bright direct light, observed in the test for light-tightness

3.3 Piston part

3.3.1
ring groove
groove in the piston in which the *piston ring* (3.1.1) is fitted

3.4 Measuring devices

3.4.1
ring gauge
solid annular gauge having an inside diameter of the nominal cylinder bore

3.4.2
reference plane (datum surface)
plane on which the *piston ring* (3.1.1) is placed for measurements, except where otherwise specified

4 Piston ring classification

See Figure 1 for piston ring classification.

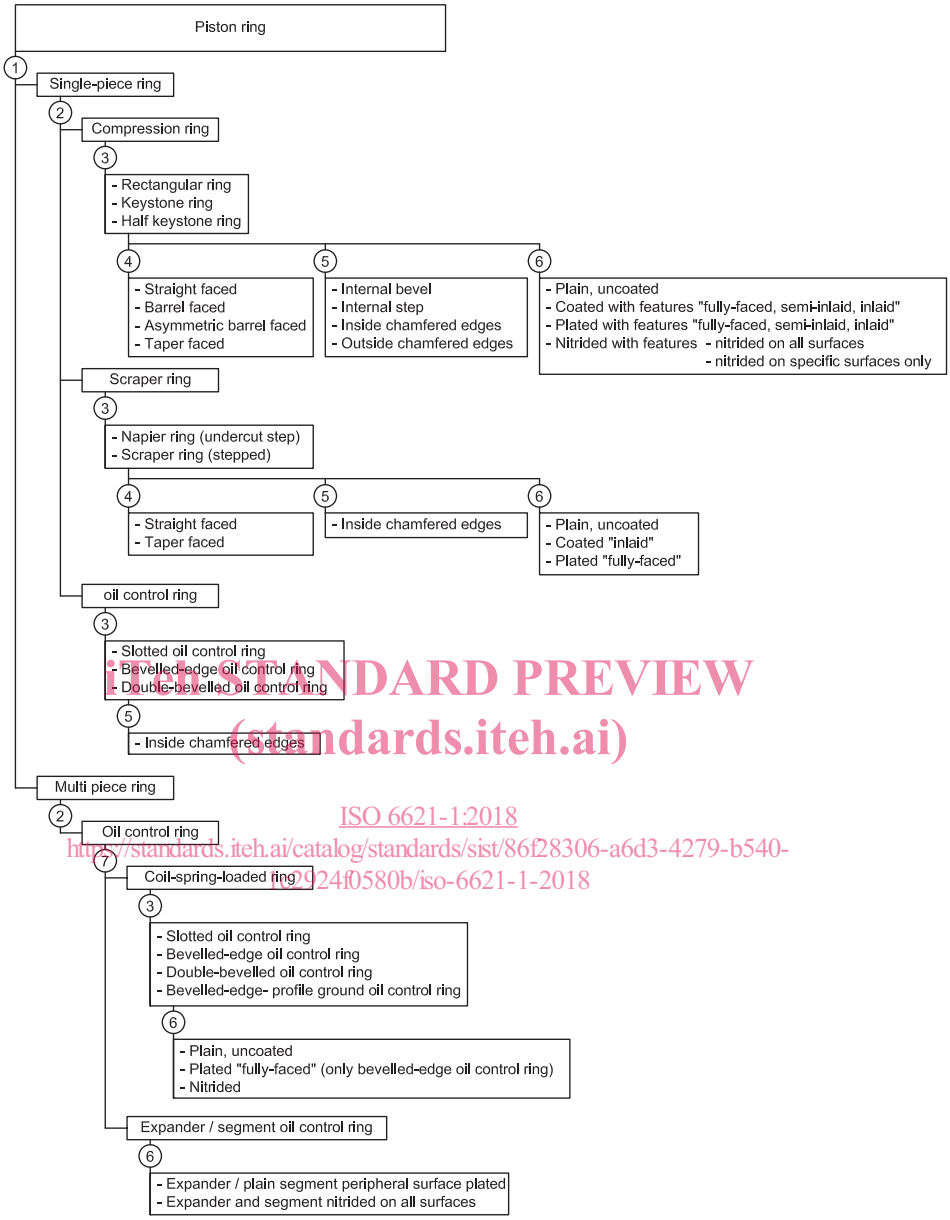


Figure 1 — Piston ring classification

Key

1 construction
2 function
3 cross-section configuration
4 peripheral surface configuration
5 edge configuration
6 surface layer configuration
7 spring type

5 Piston ring types

5.1 Cross-section configuration

The more common cross-section configurations in general use are shown in Table 1. Combinations of configurations listed in Tables 2 to 5 along with those in Table 1 are shown as “common features” in the relevant International Standards referenced in each table.

Table 1 — Cross-section configuration

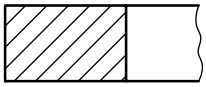
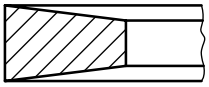
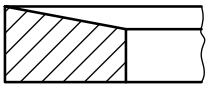
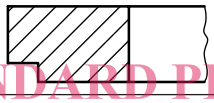
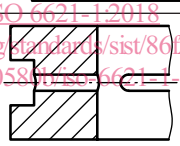
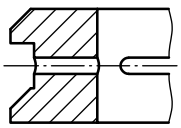
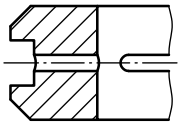
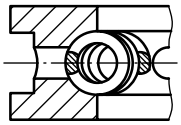
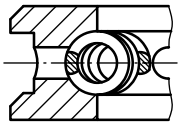
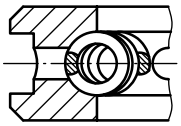
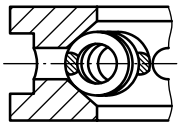
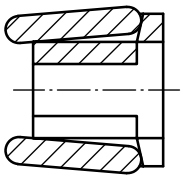
Type	Cross-section	Relevant International Standards
Rectangular ring		ISO 6622-1:2003 ISO 6622-2:2013
Keystone ring		ISO 6624-1:2017, ISO 6624-3:2017
Half keystone ring		ISO 6624-2:2016 ISO 6624-4:2016
Scraper ring (stepped)		ISO 6623:2013
Napier ring (undercut stepped)		ISO 6623:2013
Slotted oil control ring		ISO 6625:1986
Double-bevelled-edge oil control ring		ISO 6625:1986
Bevelled-edge oil control ring		ISO 6625:1986
Coil-spring-loaded slotted oil control ring		ISO 6626-1, ISO 6626-2
Coil-spring-loaded double-bevelled-edge oil control ring		ISO 6626-1, ISO 6626-2

Table 1 *(continued)*

Type	Cross-section	Relevant International Standards
Coil-spring-loaded bevelled-edge oil control ring		ISO 6626-1, ISO 6626-2
Steel oil control ring with V-groove		ISO 6626-3:2008
Expander/segment oil control ring		ISO 6627:2011

5.2 Peripheral surface configuration

The more common peripheral surface configurations in general use are shown in Table 2.