INTERNATIONAL STANDARD

ISO 6621-1

Second edition
2007-11-01

Internal combustion engines — Piston rings —

Part 1: **Vocabulary**

Moteurs à combustion interne — Segments de piston —

Partie 1: Vocabulaire

Reference number
ISO 6621-1:2007(E)

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword ... iv

Introduction ... v

1 Scope ... 1

2 Normative references ... 1

3 Piston ring classification ... 2

4 Piston ring types ... 3
4.1 Cross section configuration ... 3
4.2 Peripheral surface configuration ... 4
4.3 Edge configuration ... 5
4.4 Coated, plated and nitrided surfaces configuration ... 6
4.5 Joint configuration ... 6

5 Piston ring nomenclature ... 7
5.1 Free (unstressed) ring ... 7
5.2 Closed ring ... 7
5.3 Assembled ring in closed condition ... 8
5.4 Edges, surfaces and faces ... 9
5.5 Chamfered edges ... 10
5.6 Scraper ring ... 10
5.7 Oil control ring ... 11

6 Terms and definitions ... 13
6.1 Types of piston ring ... 13
6.2 Physical characteristics of rings ... 14
6.3 Piston part ... 15
6.4 Measuring devices ... 15

Annex A (informative) **List of equivalent terms in English, French, Russian, German, Spanish, Portuguese, Italian and Japanese** ... 16

Alphabetical index ... 22

Bibliography ... 29

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 6621-1 was prepared by Technical Committee ISO/TC 22, *Road vehicles*.

This second edition cancels and replaces the first edition (ISO 6621-1:1986) which has been technically revised.

ISO 6621 consists of the following parts, under the general title *Internal combustion engines — Piston rings*:

— *Part 1: Vocabulary*

— *Part 2: Inspection measuring principles*

— *Part 3: Material specifications*

— *Part 4: General specifications*

— *Part 5: Quality requirements*

Introduction

ISO 6621 is one of a series of International Standards dealing with piston rings for reciprocating internal combustion engines. Others are ISO 6622 [1],[2], ISO 6623 [3], ISO 6624 [4],[5],[6],[7], ISO 6625 [8], ISO 6626 [9],[10],[11] and ISO 6627 [12].

Internal combustion engines — Piston rings —

Part 1: Vocabulary

1 Scope

This part of ISO 6621 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 part of ISO 6621 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.

NOTE 2 In addition to terms given in the three official ISO languages (English, French and Russian), this part of ISO 6621 gives the equivalent terms in the German, Spanish, Portuguese, Italian and Japanese languages. However, only the terms given in the official languages can be considered as ISO terms.

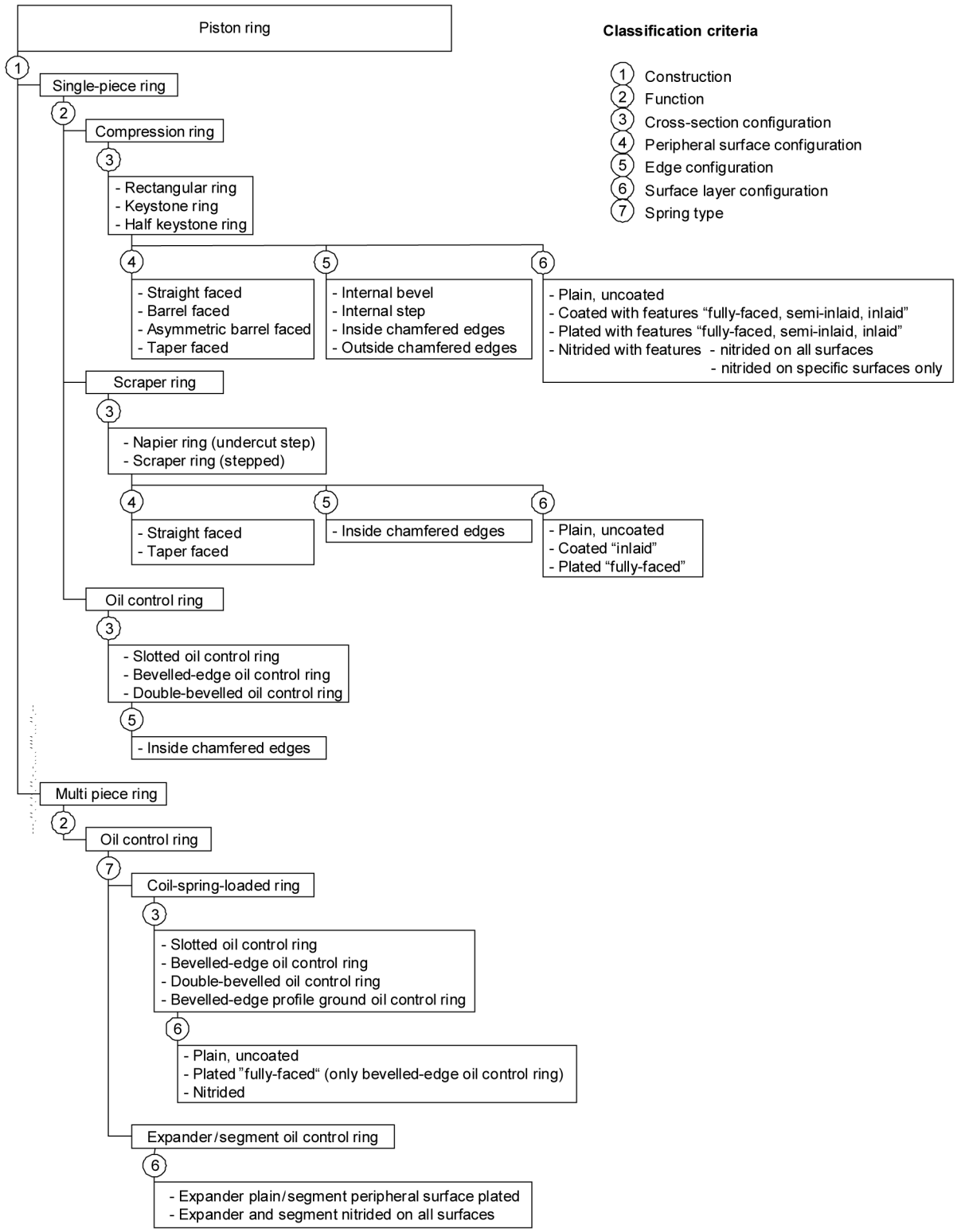
These have been included at the request of Technical Committee ISO/TC 22 and are published under the responsibility of the member bodies for Germany (DIN), Spain (AENOR), Portugal (IPQ), Italy (UNI) and Japan (JIS).

2 Normative references

The following referenced documents are indispensable for the application 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 286-1*, Geometrical product specifications (GPS) — ISO code system for tolerances of linear sizes — Part 1: Basis of tolerances, deviations and fits*

3 Piston ring classification



4 Piston ring types

4.1 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 ISO Standard referenced in each table.

Table 1 — Cross section configuration

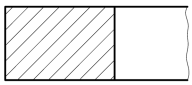
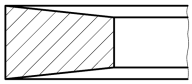
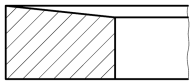
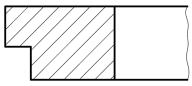
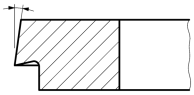
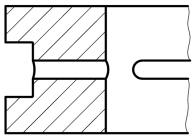
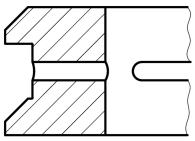
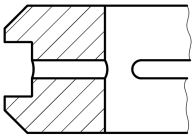
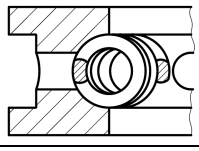
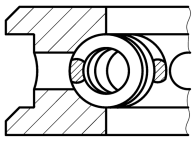
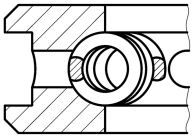
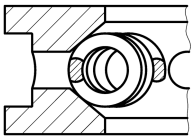
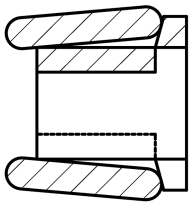
Type	Cross section	Relevant International Standard
Rectangular ring		6622-1 6622-2
Keystone ring		6624-1 6624-3
Half keystone ring		6624-2 6624-4
Scraper ring (stepped)		6623
Napier ring (undercut stepped)		6623
Slotted oil control ring		6625
Double-bevelled-edge oil control ring		6625
Bevelled-edge oil control ring		6625
Coil-spring-loaded slotted oil control ring		6626 6626-2
Coil-spring-loaded double-bevelled-edge oil control ring		6626 6626-2

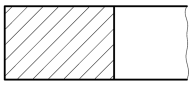
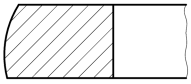
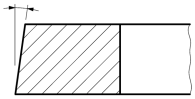
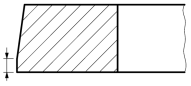
Table 1 (*continued*)

Type	Cross section	Relevant International Standard
Coil-spring-loaded bevelled-edge oil control ring		6626 6626-2
Steel oil control ring with V-groove		6626-3
Expander/segment oil control ring		6627

4.2 Peripheral surface configuration

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

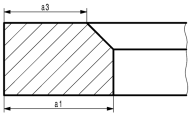
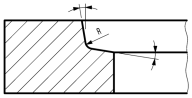
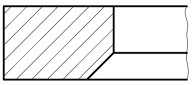
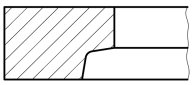
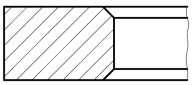
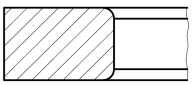
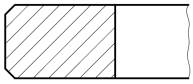
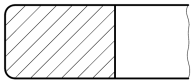
Table 2 — Peripheral surface configuration

Configuration	Cross section	Relevant International Standard
Peripheral surface straight faced		6622-1/6622-2 6623 6624-1/6624-2 6624-3/6624-4
Peripheral surface barrel faced		6622-1/6622-2 6624-1/6624-2 6624-3/6624-4
Peripheral surface asymmetrical barrel faced		6622-1/6622-2 6624-1/6624-3
Peripheral surface taper faced		6622-1/6622-2 6623/6624-1 6624-3
Peripheral surface taper faced partially cylindrical machined or lapped		6622-1/6622-2 6623/6624-1 6624-3

4.3 Edge configuration

The more common edge configurations in general use are shown in Table 3.

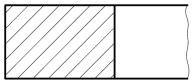
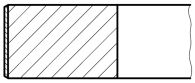
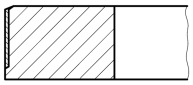
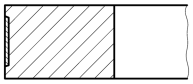
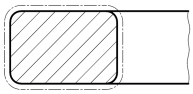
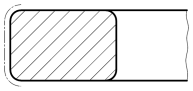
Table 3 — Edge configuration

Configuration	Cross section	Relevant International Standard
Internal bevel top side (positive twist type)		6622-1/6622-2 6624-1/6624-3
Internal step top side (positive twist type)		6622-1 6624-1
Internal bevel bottom side (negative twist type)		6622-1 6622-2
Internal step bottom side (negative twist type)		6622-1
Inside edges chamfered		6622-1/6623 6624-1/6624-2 6625
Inside edges rounded		6622-2 6624-3/6624-4
Outside edges chamfered		6622-1 6624-2
Outside edges rounded		6622-2 6624-3/6624-4

4.4 Coated, plated and nitrided surfaces configuration

The more common coated, plated and nitrided surface configurations in general use are shown in Table 4.

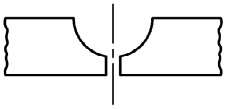
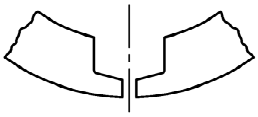
Table 4 — Surface layer configuration

Configuration	Cross section	Relevant International Standard
Peripheral surface plain, i.e., uncoated, unplated and not nitrided		6622-1/6623 6624-1/6624-2 6625 6626/6626-2
Peripheral surface coated or plated “fully-faced configuration”		6622-1/6622-2 6623/6624-1 6624-2/6624-3 6624-4/6626 6626-2/6627
Peripheral surface coated or plated “semi-inlaid configuration”		6622-1 6624-1/6624-2
Peripheral surface coated or plated “inlaid configuration”		6622-1/6622-2 6623/6624-1 6624-2/6624-3 6624-4
Piston ring nitrided on all surfaces		6622-2/6624-3 6624-4/6627/6626-3
Piston ring nitrided on specific surfaces only (e.g., “peripheral surface only”)		6624-3/6624-4

4.5 Joint configuration

The more common joint configurations in general use are shown in Table 5.

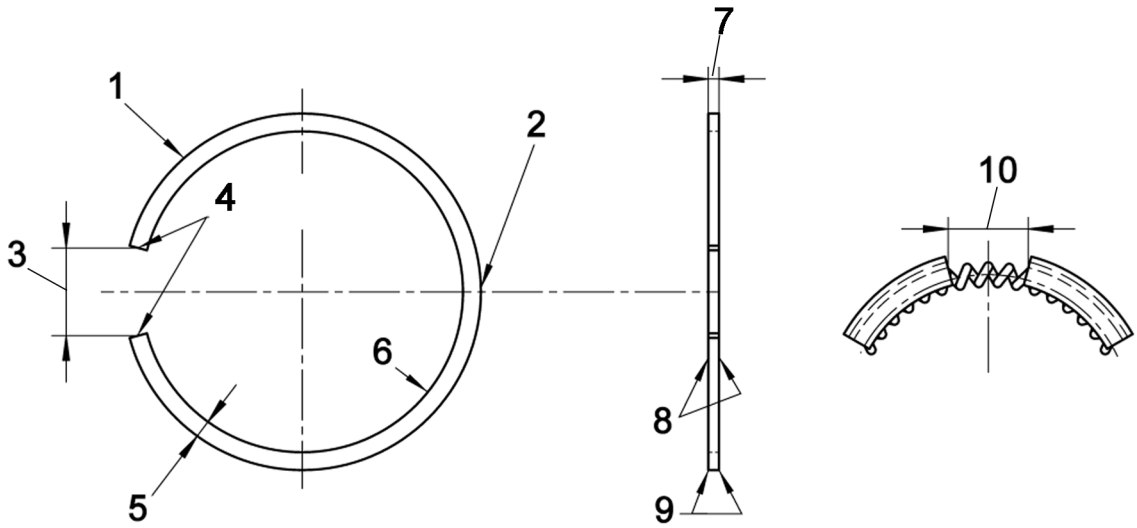
Table 5 — Joint configuration

Configuration	Joint configuration	Relevant International Standard
Joint with side notch		6621-4
Joint with internal notch		6621-4

5 Piston ring nomenclature

5.1 Free (unstressed) ring

Terms commonly used to describe free (unstressed) rings are shown in Figure 1.



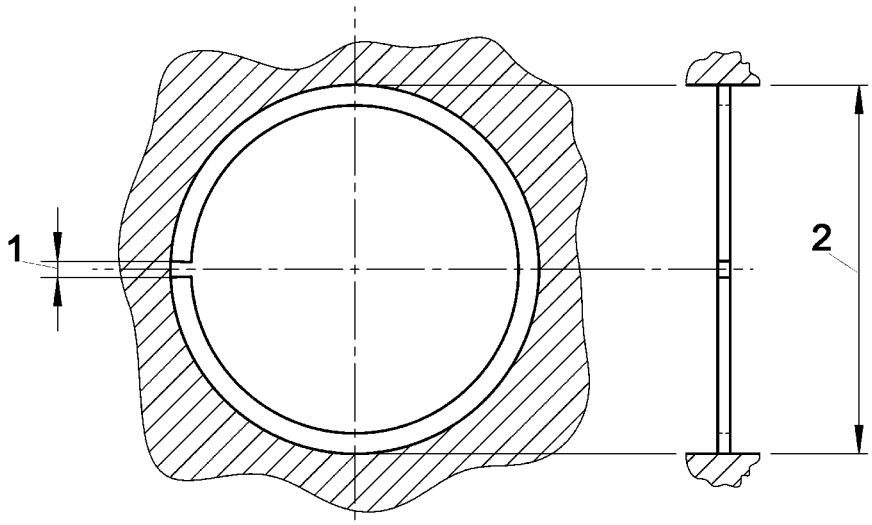
Key

1	peripheral surface	6	inside surface
2	back of the ring	7	ring width, h_1
3	free gap, m	8	side faces
4	butt ends	9	peripheral edges
5	radial wall thickness, a_1	10	coil spring excursion, f_1

Figure 1 — (Unstressed) ring

5.2 Closed ring

Additional terms commonly used to describe closed rings are shown in Figure 2.



Key

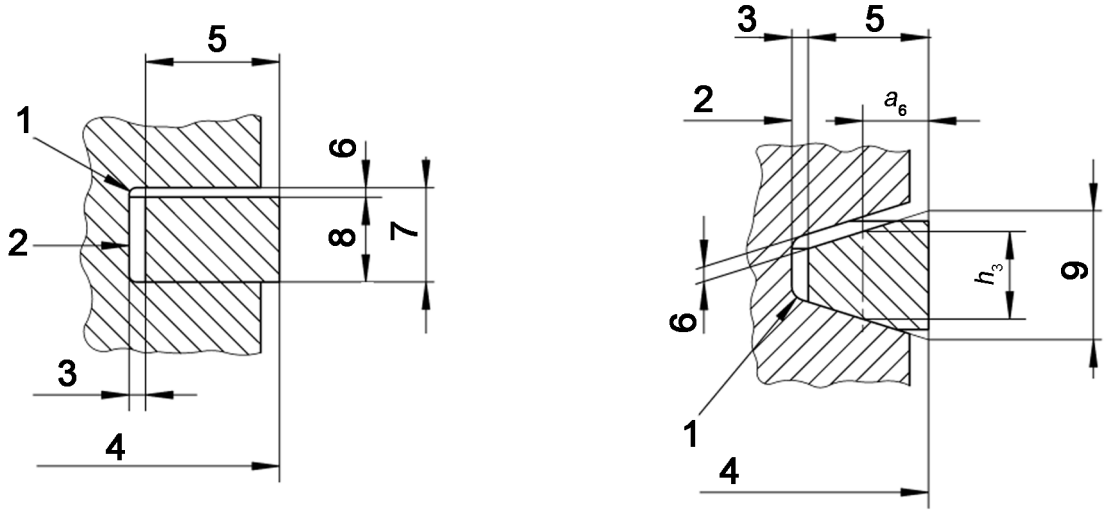
1 closed gap, s_1

2 cylinder bore/nominal ring diameter, d_1

Figure 2 — Closed ring

5.3 Assembled ring in closed condition

Terms commonly used to describe piston rings assembled in the piston groove are shown in Figure 3.



a) rectangular ring **b) keystone ring**

Key

1	groove root radius	4	nominal diameter, d_1	7	groove width
2	groove root diameter	5	radial wall thickness, a_1	8	ring width, h_1
3	radial clearance	6	side clearance	9	nominal ring width, h_1

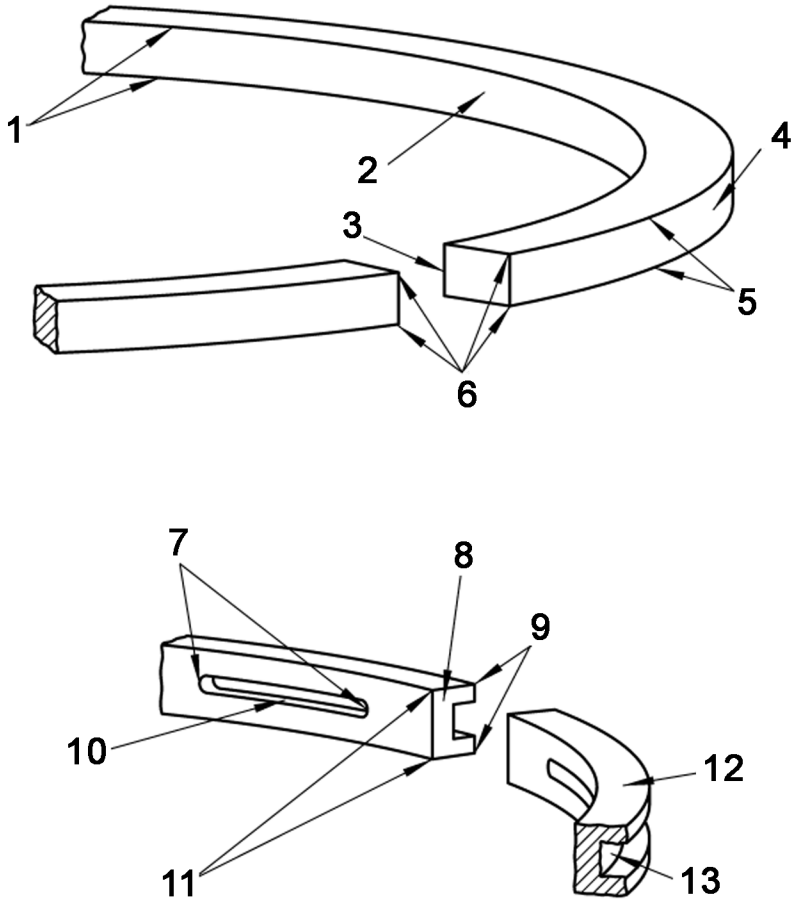
Method A: $a_6$ref…$h_3$measured

Method B: $h_3$ref…$a_6$measured

Figure 3 — Ring clearances

5.4 Edges, surfaces and faces

Terms commonly used to describe edges, surfaces and faces on the rings are shown in Figure 4.



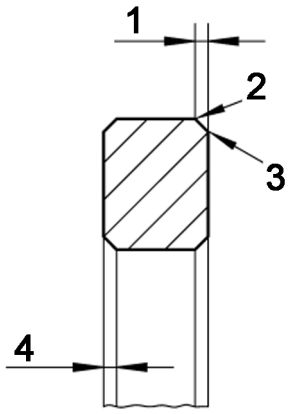
Key

1	inside edges	6	opposite gap corners	11	inside gap corners
2	inside surface	7	inside edge of slot	12	side face
3	inside edge of gap	8	gap face	13	outside groove face
4	peripheral surface	9	outside gap corners		
5	peripheral edges	10	slot face		

Figure 4 — Edges, surfaces and faces

5.5 Chamfered edges

Terms commonly used to describe edge chamfers on rings are shown in Figure 5.



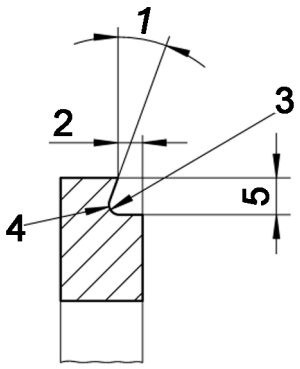
Key

1 outside chamfered edge
2 peripheral edge
3 side face edge
4 inside chamfered edge

Figure 5 — Chamfered edges

5.6 Scraper ring

Terms commonly used to describe scraper and Napier rings are shown in Figure 6.



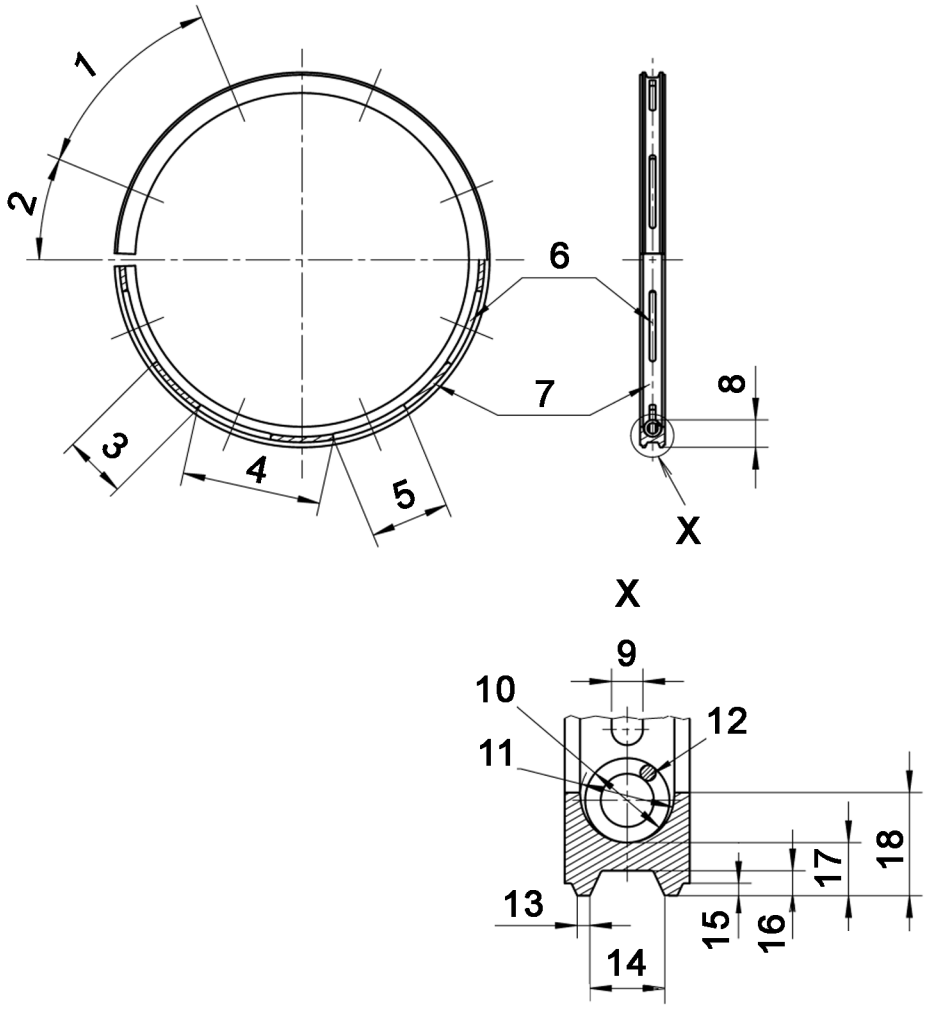
Key

1 Napier angle
2 step width, h_2
3 undercut radius, r_2
4 Napier undercut and step
5 step depth, a_2

Figure 6 — Section of Napier ring

5.7 Oil control ring

Terms commonly used to describe coil-spring-loaded slotted oil control rings are shown in Figure 7.

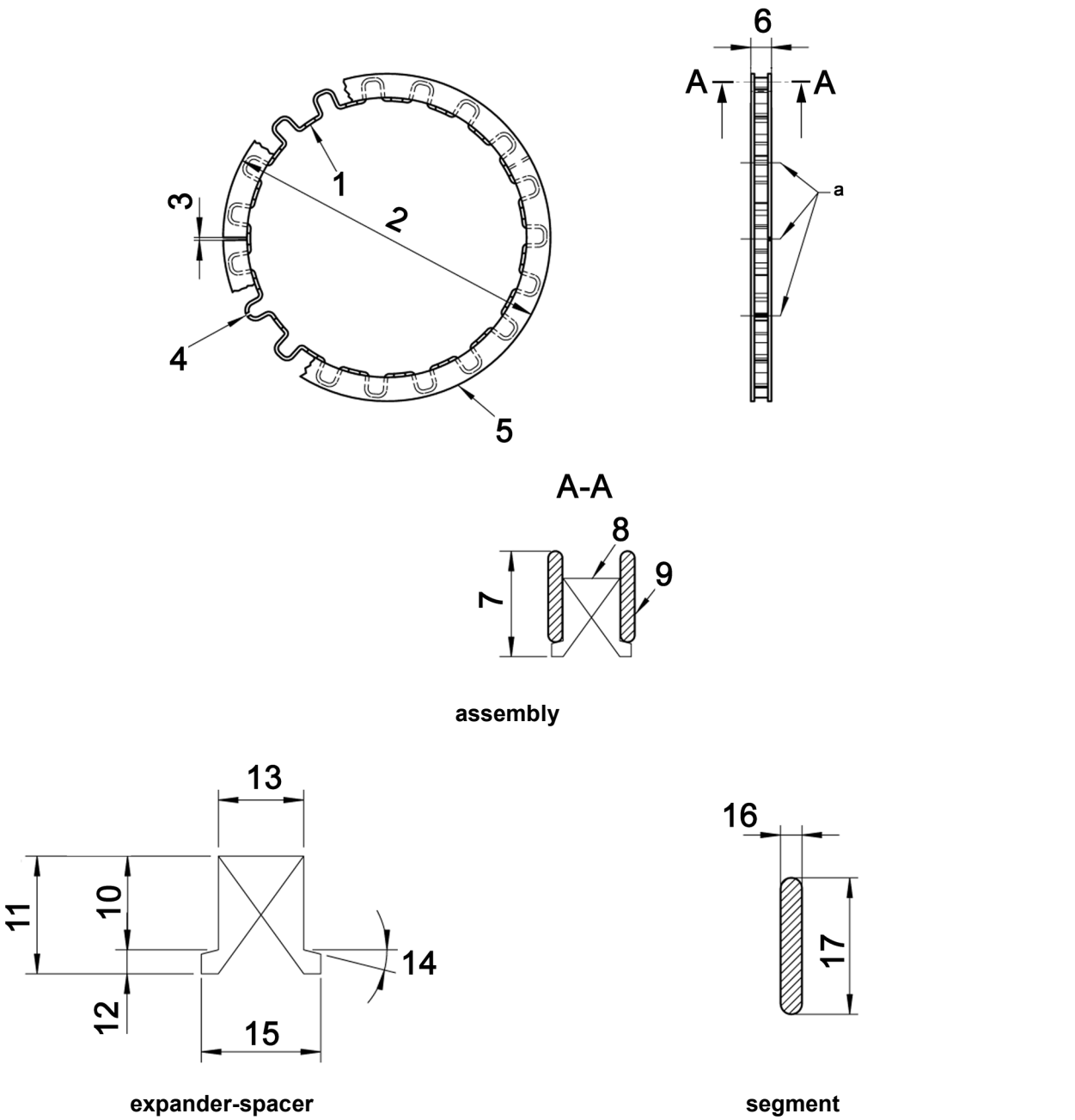


Key

1	angular slot spacing	7	bridge	13	land width, h_5
2	angular pitch at gap	8	radial thickness with coil spring, a_{12}	14	land spacing, B_3
3	bridge length, w_2	9	slot width, c_1	15	external land depth, a_{17}
4	slot spacing, w_3	10	coil spring diameter, d_1	16	groove depth, a_4
5	slot length, w_1	11	coil spring groove diameter, d_{14}	17	groove depth and bridge, a_{13}
6	slot	12	coil spring	18	radial wall thickness, a_1

Figure 7 — Coil-spring-loaded slotted oil control ring

Terms commonly used to describe expander/segment oil control rings are shown in Figure 8.



Key

1	seating tab	7	assembly radial thickness, a_{11}	13	spacer width, h_{13}
2	nominal ring assembly diameter, d_1	8	expander-spacer	14	seating tab angle, θ
3	segment closed gap, s_1	9	segment	15	expander width, h_9
4	expander-spacer ends	10	spacer radial thickness, a_8	16	segment width, h_{12}
5	peripheral surface	11	expander radial thickness, a_9	17	segment radial wall thickness, a_1
6	nominal assembly width, h_1	12	seating tab thickness, a_{14}		

[a] Stagger segment gaps and expander ends (all three components).

Figure 8 — Expander/segment oil control ring

6 Terms and definitions

For the purpose of this document the following terms and definitions apply.

6.1 Types of piston ring

6.1.1
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

6.1.2
single-piece ring
piston ring formed from only one part that is intended for installation in a single ring groove

6.1.3
multi-piece ring
piston ring comprising two or more component parts that are intended for installation in a single ring groove

6.1.4
compression ring
piston ring whose primary purpose is to prevent leakage of gas past the piston

6.1.5
oil control ring
piston ring with oil return slots or an equivalent whose primary purpose is to scrape oil from the cylinder wall

6.1.6
rectangular ring
compression ring with a rectangular cross section whose geometrically simple form provides an adequate seal under normal engine operating conditions

6.1.7
keystone ring
compression ring with both sides tapered

NOTE The keystone ring is used in those cases when 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.

6.1.8
half keystone ring
compression ring with one side face tapered

NOTE Usually the tapered side face is the one that faces the combustion chamber.

6.1.9
scraper ring (stepped)
ring with a rectangular shaped step on the lower peripheral edge to scrape oil from the cylinder wall

NOTE It can also act as a lower compression ring.

6.1.10
Napier ring (undercut step)
scraper ring with a radiused undercut step

6.1.11
slotted oil control ring
slotted oil control ring with parallel side faces and two contact lands

NOTE Due to the narrow lands of this type of ring, a high unit pressure is achieved.

6.1.12
bevelled-edge oil control ring
slotted oil control ring with lands that are chamfered on their outer edges

NOTE 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.

6.1.13
double-bevelled oil control ring
slotted oil control ring with lands that are chamfered on their upward facing edges

NOTE By chamfering the edges of both lands in the same direction the oil scraping effect is even further improved.

6.1.14
coil-spring-loaded slotted oil control ring
slotted oil control ring whose radial pressure is increased by means of a cylindrical coil spring

NOTE This spring acts equally in all directions against the inside of the ring.

6.1.15
coil-spring-loaded bevelled-edge oil control ring
coil-spring-loaded slotted oil control ring with lands that are chamfered on their outer edges

6.1.16
coil-spring-loaded double-bevelled oil control ring
coil-spring-loaded slotted oil control ring with lands that are chamfered on their upward facing edges

6.1.17
coil-spring-loaded bevelled-edge chromium plated oil control ring
coil-spring-loaded slotted oil control ring with lands that are chromium plated and chamfered on their inner and outer edges

NOTE May or may not be profile ground.

6.1.18
expander/segment oil control ring
multi-piece oil control ring comprised of an expander-spacer and two segments

NOTE Expander-spacer design will vary with manufacturer.

6.2 Physical characteristics of rings

6.2.1
nominal ring diameter
nominal diameter, d_1, identical to the nominal cylinder bore, in accordance with ISO 286

6.2.2
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

6.2.3
joint
location on a piston ring where the butt ends come together

6.2.4
butting
touching of the two ring gap faces

6.2.5
effective free gap
free gap, m, minus the measured closed gap, s_1

See Figure 1 for m; see Figure 2 for s_1.

NOTE Free gap used in the formulae for calculation of E value, tangential force, F_t, diametral force, F_d, and stresses.

6.2.6
pressure pattern
contact pressure distribution around the circumference of the ring when closed in its nominal cylinder bore

6.2.7
contact pressure
pressure that a ring exerts radially against the cylinder wall

NOTE Pressure is expressed in N/mm^2.

6.2.8
pin point or burry light
intermittent pinpoints of bright light or hazy light, but not bright direct light, observed in the test for light-tightness

6.3 Piston part

6.3.1
ring groove
groove in the piston in which the piston ring is fitted

6.4 Measuring devices

6.4.1
ring gauge
solid annular gauge having an inside diameter of the nominal cylinder bore

6.4.2
reference plane (datum surface)
plane on which the piston ring is placed for measurements, except where otherwise specified

Annex A
(informative)

List of equivalent terms in English, French, Russian, German, Spanish, Portuguese, Italian and Japanese

English	French	Russian	German	Spanish	Portuguese	Italian	Japanese
barrel-faced	face bombée	с бочкообразной рабочей поверхностью	Balligkeit	bombeado	Face abaulada	Bombatura	バレルフェース
barrel on peripheral surface	bombé sur la périphérie	бочкообразность по рабочей поверхности	ballige Lauffläche	periferia bombeada	Abaulamento na face de contato	Bombatura sul diametro esterno	外周面バレル
bevelled-edge oil control ring	segment racleur régulateur d'huile chanfreiné symétrique	маслосъёмное кольцо со встречной фаской	Dachfasen-Ölabstreifring	segmento de engrase de patines achaflanados simétricos	Anel de óleo de chanfros simétricos com mola helicoidal	Anello raccogliolio con smussi convergenti	ベベルオイルコントロールリング
butting	arc-boutement	смыкание замка	Berührung der Stossflächen	contacto de las puntas	Batimento de pontas	Contatto delle estremità dell'anello	合い口突き当たり
cam turned	tourné en forme suivant une came	обточенный по копиру	formgedreht	torneado de forma	Torneamento de forma	Tornito di forma (con camma)	カム旋削加工
closed gap	jeu à la coupe	замкнутый тепловой зазор	Stossspiel	ajuste de puntas	Folga entre pontas	Gioco al taglio	合い口すきま
coating layer thickness	épaisseur du revêtement	толщина покрытия	Schichtdicke	espesor del recubrimiento	Espessura da camada de revestimento/ enchimento	Spessore rivestimento	コーティング厚さ
coil-spring-loaded oil control ring	segment racleur d'huile à ressort hélicoïdale	маслосъёмное кольцо с витым расширителем	Ölabstreifring mit Schlauchfeder	segmento de engrase con expansor helicoidal	Anel de óleo com mola helicoidal	Anello raccogliolio caricato con molla elicoidale	コイルエキスパンダ付きオイルコントロールリング

English	French	Russian	German	Spanish	Portuguese	Italian	Japanese
compression ring	segment de compression	компрессионное кольцо	Verdichtungsring	segmento de compresión	Anel de compressão	Anello di compressione	コンプレッションリング
(datum surface) see reference plane	voir plan de référence	базовая поверхность (для измерений)	Messebene	(superficie de referencia) ver : plano de referencia	(Superfície de referência) Veja plano de referência	Piano di riferimento	データム面
diametral force	force diamétrale	диаметральная сила	Diametralkraft	carga diametral	Forca diametral	Forza diametrale	直径張力
double-bevelled oil control ring	segment racleur régulateur d'huile chanfreiné parallèle	маслосъёмное кольцо с параллельными фасками	Gleichfasen-Ölabstreifring	segmento de engrase de patines achaflanados paralelos	Anel de óleo de chanfros paralelos com mola helicoidal	Anello raccogliolio con smussi paralleli	ダブルベベルオイルコントロールリング
effective free gap	ouverture libre effective	раствор замка минус тепловой зазор	tatsächliche Maulweite	abertura libre efectiva	Abertura livre efetiva	Apertura libera efficace	有効フリーギャップ
free flatness	planéité à l'état libre	отклонение от плскости кольца в свободном состоянии	Ebenheit im unbelasteten Zustand	planicidad en estado libre	Planicidade no estado livre	Planarità dell'anello libero	平面ひずみ
fully-faced	sur toute la face	с покрытием рабочей поверчности	Laufflächen-beschichtung	totalmente recubierto	Face de contato totalmente revestida	Superficie periferica interamente rivestita	外周全面
half keystone ring	segment semi-trapèze	кольцо трапецевидное одностороннее	einseitiger Trapezring	segmento semitrapecial	Anel semi-trapezoidal	Anello semi-trapezoidale	ハーフキーストンリング
heat-formed	mis en forme à chaud	с горячей формовкой	thermisch gespannt	abertura térmica	Conformação térmica	Formatura a caldo	ヒート・ホーム
helix/wind	voilage	смещение стыкования	Stossversatz	desalineación axial de las puntas	Hélice	Elica / ondulazione	ヘリックス
inlaid	encastré	с заполненной канавкой	Füllung	inserto/cajetin	Incrustado	Rivestimento esterno in cava	インレイド
inside edges chamfered	arêtes intérieures chanfreinées	с внутренними фасками	Innenkantenbruch	cantos interiores biselados	Arestas interiores chanfradas	Spigoli interni smussati	内周面取り
inside and peripheral edges chamfered	arêtes intérieures et périphériques chanfreinées	с фасками на внутренней и рабочей поверхностях	Innen- und Aussenkantenbruch	cantos interiores y exteriores biselados	Arestas interiores e exteriores chanfradas	Spigoli interni ed esterni smussati	内外周面取り
internal bevel bottom (negative twist type)	chanfrein sur le diamètre intérieur, flanc inférieur (type torsion négative)	кольцо с внутренней нижней фаской (обратное скручивание)	Innenfase an Unterflanke (negative Vertwistung)	chaflán interior, inferior (torsional negativo)	Chanfro de torção interior inferior (torção negativa)	Smusso sul diametro interno inferiore (tipo a torsione negativa)	下面インターナルベベル（逆ねじれタイプ）

English	French	Russian	German	Spanish	Portuguese	Italian	Japanese
internal bevel top (positive twist type)	chanfrein sur le diamètre intérieur, flanc supérieur (type torsion positive)	кольцо с внутренней верхней фаской (прямое скручивание)	Innenfase an Oberflanke (positive Vertwistung)	chaflán interior, superior (torsional positivo)	Chanfro de torção interior superior (torção positiva)	Smusso sul diametro interno superiore (tipo a torsione positiva)	上面インターナルベベル（正ねじれタイプ）
internal step bottom (negative twist type)	embrèvement sur le diamètre intérieur, flanc inférieur (type torsion négative)	кольцо с внутренней нижней выточкой (обратное скручивание)	Innenwinkel an Unterflanke (negative Vertwistung)	escalón interior, inferior (torsional negativo)	Rebaixo interior inferior (torção negativa)	Gradino sul diametro interno inferiore (tipo a torsione negativa)	下面インターナルステップ（逆ねじれタイプ）
internal step top (positive twist type)	embrèvement sur le diamètre intérieur, flanc supérieur (type torsion positive)	кольцо с внутренней верхней выточкой (прямое скручивание)	Innenwinkel an Oberflanke (positive Vertwistung)	escalón interior, superior (torsional positivo)	Rebaixo interior superior (torção positiva)	Gradino sul diametro interno superiore (tipo a torsione positiva)	上面インターナルステップ（正ねじれタイプ）
joint	coupe	замок	Stoss	corte	Corte	Estremità	回り止め形状
joint with internal notch	coupe avec encoche intérieure	замок с внутренней фиксацией	Stoss mit Innensicherung	entalla para fijo interior	Corte com entalhe interior	Gioco al taglio con arresto interno	内周回り止め
joint with side notch	coupe avec encoche frontale	замок с боковой фиксацией	Stoss mit Flankensicherung	entalla para fijo lateral	Corte com entalhe lateral	Gioco al taglio con arresto frontale	側面回り止め
keystone angle	angle du trapèze	угол трапеции (трапецивидности)	Trapezwinkel	ángulo trapecial	Ãngulo do trapézio	Angolo del trapezio	キーストン角度
keystone ring	segment trapèze	кольцо трапецевидное двустороннее	Trapezring	segmento trapecial	Anel trapezodial	Anello trapezoidale	キーストンリング
land offset	décalage des lèvres	смещение перемычки	Laufstegversatz	desalineación de los patines	Desalinhamento das faces	Disassamento pattino	当たり面段差
land width	hauteur de lèvre	высота перемычки	Laufsteghöhe	altura del patin de roce	Espessura da face de contato	Altezza pattino	当たり幅
light tightness	étanchéité à la boite lumière	плотность прилегания	Lichtspaltdichtheit	estanqueidad a la luz	Vedação à luz	Tenuta alla luce	ライトタイトネス
modulus of elasticity	module d'élasticité	модуль упругости	Elastizitätsmodul	módulo de elasticidad	Módulo de elasticidade	Modulo di elasticità	縦弾性係数

English	French	Russian	German	Spanish	Portuguese	Italian	Japanese
multi-piece ring	segment multi-pièces	составное кольцо (многоелементное)	mehrteiliger Ring	segmento de varias piezas	Anel de múltiplas peças	Anello multipezzo	組合せリング
Napier ring	segment bec d'aigle	скребковое кольцо с подвнутренней канавкой	Abstreifring mit hinterstochener Eindrehung	segmento rascador de uña	Anel raspador "Napier"	Anello raschiaolio (Napier)	ナピアリング
Napier ring, taper-faced	segment bec d'aigle, face conique	скребковое кольцо с подвнутренней канавкой и конической рабочей поверхностью	Abstreifring mit konischer Lauffläche und hinterstochener Eindrehung	Segmento rascador de uña con periferia cónica	Anel raspador "Napier" com face de contacto cônica	Anello raschiaolio (Napier) con superficie periferica conica	テーパフェースナピアリング
nominal ring diameter	diamètre nominal du segment	номинальный диаметр кольца	Nenndurchmesser	Diametro nominal del segmento	Diâmetro nominal do Anel	Diametro nominale dell'anello	リング呼び径
obliqueness	obliquité	коробление	Schieflage	Inclinación	Inclinação	Obliquità	傾き
oil-control ring	segment racleur d'huile	маслосъёмное кольцо	Ölabstreifring	Segmento control de aceite	Anel de óleo	Anello raccogliolio	オイルコントロールリング
ovality or circularity	ovalité	овальность	Ovalität oder Kreisförmigkeit	Ovalidad	Ovalização	Ovalità	オーバリティ又は真円度
peripheral edges chamfered	arêtes périphériques chanfreinées	с наружными фасками	Laufflächenkanten-bruch	Canto exteriores biselados	Arestas exteriores chanfradas	Spigoli esterni smussati	外周面取り
peripheral surface (ring face)	surface périphériques (portée du segment)	рабочая поверхность кольца	Lauffläche	Face de Contacto	Face de contato	Superficie di scorrimento	外周面
pin point or burry light	pointe d'épingle ou lumière irisée	мерцающий просвет	Lichtpunkte oder Lichtschimmer	Luz difusa	Passagem de luz difusa	Trafilamento luce puntinato o sfumato	かすかな断続的な光
piston ring	segment de piston	поршневое кольцо	Kolbenring	Segmento de pistón	Anel de pistão	Anello (segmento)	ピストンリング
point deflection	protusion	прогиб стыкования	Stosseinfall	Punto de flexion	Ponto de deflexão	Rientranza punte	ポイントデフレクション
pressure pattern	répartition de pression	эпюра рапределения давления	Radialdruckverteilung	Distribucioón de la presión	Distribuição da pressão	Distribuzione della pressione	面圧分布
radial wall thickness	épaisseur radiale	радиальная толщина	radiale Wanddicke	Espesor radial	Espessura radial	Spessore radiale	厚さ
reference plane	plan de référence	базовая поверхность	Messebene	Plano de referencia	Plano de referência	Piano di riferimento	基準面
rectangular ring	segment rectangulaire	прямоугольное кольцо	Rechteckring	Segmento rectangular	Anel regangular	Anello rettangolare	レクタンギュラリング

English	French	Russian	German	Spanish	Portuguese	Italian	Japanese
ring gauge	bague de contrôle	кольцевой калибр	Kontrollring	Calibre para segmento	Calibre para Anel	Calibro circolare	リングゲージ
ring groove	gorge de segment	поршневая канавка	Ringnut	Ranura de pistón	Canaleta	Cava del pistone	リング溝
ring width	hauteur du segment	высота кольца	Ringhöhe	Alture de segmento	Altura do Anel	Altezza dell'anello	リング幅
scraper ring (stepped)	segment racleur mixte (épaulé droit)	скребковое кольцо (с канавкой)	Abstreifring	Segmento rascador	Anel raspador	Anello raschiaolio (con gradino)	スクレーパリング
scraper ring (stepped), taper-faced	segment racleur mixte (épaulé droit) à portée conique	скребковое кольцо (с канавкой) с конической рабочей поверхностью	Abstreifring mit konischer Lauffläche	Segmento cónico rascador	Anel raspador com face de contacto cônica	Anello raschiaolio (con gradino) a superficie periferica conica	テーパフェーススクレーパリング
semi-inlaid	semi-encastré	с полузаполненной канавкой	einseitige Füllung	Semi inserto	Semi incrustado	Riporto esterno in semi-cava	セミインレイド
single-piece ring	segment mono-pièce	одноэлементное кольцо	einteiliger Ring	Segmento de una sola pieza	Anel de uma só peça	Anello monopezzo	シングルピースリング
slotted oil-control ring	segment racleur d'huile avec lumières	маслосъёмное кольцо с прорезями	Ölschlitz-Ölabstreifring	Segmento de engrase con ventanas	Anel de óleo com fendas	Anello raccogliolio con feritoie scarico olio	窓付きオイルコントロールリング
straight-faced	cylindrique	С цилиндрической рабочей поверхностью	zylindrische Lauffläche	Cara recta	Face de contacto plana	Superficie di contatto cilindrica	ストレートフェース
tangential force	force tangentielle	тангенциальная (касательная) сила	Tangentialkraft	Carga tangencial	Força tangencial	Carico tangenziale	接線張力
taper-faced ring	segment conique	кольцо с конической рабочей поверхностью	Rechteckring mit konischer Lauffläche (Minutenring)	Segmento cónico	Anel com face de contacto cônica	Anello con conicità periferica	テーパフェースリング
taper-faced keystone ring	segment trapèze à face conique	кольцо трапецевидное двустороннее с конической рабочей поверхностью	Trapezring mit konischer Lauffläche	Segmento cónico trapecial	Anel trapezoidal com face de contacto cônica	Anello trapezoidale a superficie periferica conica	テーパフェースキーストンリング

English	French	Russian	German	Spanish	Portuguese	Italian	Japanese
taper on periphery	cône sur la périphérie	конусность по рабочей поверхности	Winkligkeit (Zylindrizität , Konizität)	Perfil cónico	Conicidade da face de contacto	Conicità sulla periferia	外周面テーパ
total free gap	ouverture libre totale	размер замка кольца в свободном состоянии	Maulweite	Abertura libre	Albertura livre total	Apertura totale anello libero	自由合い口すきま
twist	torsion	скручивание	Vertwistung	Torsión / torsional	Torção	Torsionale	ツイスト
uncoated ring	segment non-revêtue	кольцо без покрытия	unbeschichteter Ring	Segmento sin recubrimiento	Anel sem revestimento	Anello non rivestito	無処理リング
unevenness	inégalité	неровность	Unebenheit	Ondulación	Ondulação	Ondulazione	側面うねり
wind	voilage	смещение стыкования	Stossversatz (axial)	Giro	Desvio das pontas (empeno)	Svergolamento assiale	合口部の軸方向段差
witness line	ligne témoin	линия контакта	Tragspiegel	Linea de testimonio	Linha testemunha	Testimonio di contatto	当たり確認線

Alphabetical index

Characteristic/Term	Symbol	ISO Reference	Clause/Subclause
Assembly radial thickness	a_{11}	6627	5.7
Asymmetrical barrel-faced rings (see rectangular and keystone rings)		6622-1/6622-2 6624-1/6624-3	
Barrel face (barrel on peripheral surface)	t_2, t_3	6621-2 6622-1/6622-2 6624-1 ff. until 6624-4	
Barrel-faced rings, see rectangular, keystone and half keystone rings		6622-1/6622-2 6624-1 ff. until 6624-4	
Bevelled-edge oil-control ring		6625 6626	
Bridge length	w_2	6626-1 6626/6626-2/6626-3	5.7 4.2/5.2/5.5
Burrs		6621-5	
Casting skin		6621-5	4.5
Cavities		6621-5	4.2
Chamfering		6621-4	10
Chipping		6621-5	4.4
Chromium beads (nodules)		6621-5	4.5
Chromium plating hardness		6621-4	10.1
Classification of piston rings		6621-1	3
Closed gap	s_1	6621-1/6621-4	5.2/7.3
Coating configurations		6621-1	4.4
Coating thickness		6621-4/6622 ff	10
Coating thickness tolerance		6621-4	10
Coil spring diameter	d_7	6621-1/6626/6626-2	5.7/5.1
Coil spring types		6626	5.1
Coil spring excursion	f_1	6621-1/6626	5.1/5.2
Coil spring groove diameter	d_{14}	6621-1/6626/6626-2	5.7/7
Coil-spring-loaded double-bevelled oil-control rings		6626/6626-2	3.3/4.3
Coil-spring-loaded oil-control rings		6626/6626-2/6626-3	
Coil-spring-loaded slotted oil-control rings		6626/6626-2	
Contact pressure	p_o	6626/6626-2 6626-3/6627	6/7 5.7/8

Characteristic/Term	Symbol	ISO Reference	Clause/Subclause
Contact pressure classes		6626/6626-2 6627	7.4./6.4 8.2
Correction of F_t and F_d values		6621-4	7.4
Cracks		6621-5	4.3
Cross sectional configuration		6621-1	4
Cutter diameter	d_5	6625 6626/6626-2	4.1-Table 1 4.1-Table 1 / 5.2
Cylinder bore		6621-1	5.2
Datum surface (reference plane)		6621-1	6.4
Deburring		6621-5	4.4
Definitions (terms and definitions)		6621-1	6
Deposits (dirt)		6621-5	4.5
Depressions (dents)		6621-5	4.3
Designation of piston rings		6621-4	5
Diametral force	F_d	6621-2/6621-4 6622-1 ff. until 6625	4.2/7.4
Discoloration		6621-5	4.4.1
Double-bevelled oil control ring		6625	
Drag marks		6621-5	4.3
Edge chamfers (KA, KI)		6621-1/6621-5/6623 6624-1/6624-2/6625	
Edge features/configurations		6621-1	4.3
Edge radius outside, inside	h_x, h_y	6622-2 6624-3/6624-4	5.7 5.1/5.2
Edges (defects)		6621-5	4.4
Edges (CR, SC, nitrided)		6621-4	10
Expander/segment oil control rings		6627	
Expander radial thickness	a_9	6627	5.7
Expander width	h_9	6627	5.7
External land depth	a_{17}	6627	5.7
Ferroxide treatment		6621-4	10.4
Flatness of side faces (uneveness)		6621-2 6621-5	4.2 7.3
Force correction factors		6621-4 6622-1 ff. until 6626-2	7.4
Free gap (effective)		6621-1	6.2

Characteristic/Term	Symbol	ISO Reference	Clause/Subclause
Free gap (total)	m	6621-1/6621-2 6626/6626-2	5.1/4.2 3.2
Gap corners		6621-5	4.4
Gap edges chamfered		6621-4	10
Gas porosity		6621-5	4.2
Groove depth	a_4	6621-1 6626/6626-2/6626-3	5.7
Groove depth and bridge	a_{13}	6621-1 6626/6626-2/6626-3	5.7
Groove root diameter (piston)		6621-1	5.3
Groove root radius (piston)		6621-1	5.3
Groove width (piston)		6621-1	5.3
Half keystone rings		6624-2/6624-4	
Hardness (material)		6621-3	Table 1
Hardness test indentations		6621-5	4.3
Heat set behaviour		6626/6626-2	5.4/6.4
Heat set resistance		6621-5	5.2 (Table 10)
Helix (wind)		6621-2/6621-5	4.2/7.4
Inside chamfered edges, KI		6621-1/6622-1/6623 6624-1/6624-2/6625	
Inside rounded edges	h_y	6622-2 6624-3/6624-4	5.7 5.1/5.2
Inside surfaces		6621-1	5.4
Internal bevel, IF/IFU		6622-1/6622-2, 6624-1/6624-3	
Internal notch		6621-4	8.1
Internal step, IW/IWU		6622-1, 6624-1	
Joint configuration		6621-4	8
Keystone angle		6621-2/ 6624-1/6624-2, 6624-3/6624-4	
Keystone rings		6624-1/6624-3	
Land offset		6621-2/ 6626/6626-2/6626-3	4.2/ 4.4/Figures 2 to 6
Land spacing	B_3	6621-1 6626/6626-2/6626-3	5.7
Land width	h_4, h_5	6621-1/6625 6626/6626-2/6626-3	5.5/6 7/8/5.2
Light tightness		6621-2 6621-4	4.2/ 7.2

Characteristic/Term	Symbol	ISO Reference	Clause/Subclause
Macro-cracks (chromium)		6621-5	4.5
Macro cracks (nitrided surface)		6621-5	4.5
Marking		6621-4	6
Material removal		6621-5	4.4-Table 4
Materials		6621-3 6626/6626-2/6626-3 6627	 5.4/6.4/6.4 7
Measuring principles (inspection)		6621-2	
Modulus of elasticity, E		6621-3 6621-4	3 7.4
Napier rings (see scraper rings)		6623	
Negative twist		6621-1 6622-1/6622-2	4.3 5.6 / 5.7
Nitrided surfaces		6621-4 6622-2, 6624-3, 6624-4	10.3
Nitrided case depth		6621-2/6621-4/6622-2, 6624-3, 6624-4 6626-3/6627	4.2/10.3/5.9 5.4/5.4 5.6/5.2
Nomenclature piston rings		6621-1	5
Nominal diameter	d_1	6621-1	5.2/5.3/6.2
Notch against ring rotation		6621-4	8.1/8.2
Obliqueness		6621-2	4.2
Oil control rings		6621-1 6625 to 6627	5.7
Outside chamfered edges, KA		6621-1/6622-1 6624-2	5.5/5.8 5.2
Outside rounded edges		6622-2 6624-3/6624-4	5.7 5.1/5.2
Ovality, (see ring shape)	U	6621-2 6621-4	4.2 7.1
Packing		6621-4	11.3
Peripheral edges		6621-1 6621-4	5.4,5.5 10
Peripheral edges at gap		6621-1/6621-4 6621-5	5.4/Table 16, 20 22 4.4
Peripheral surface		6621-1	5.4
Peripheral surface coatings		6621-4	10

Characteristic/Term	Symbol	ISO Reference	Clause/Subclause
Peripheral surface configurations		6621-1	4.2
Peripheral surface machining		6621-4 6621-5	9 7
Peripheral surface profile (deviations)		6621-5	7.2
Phosphate treatment		6621-4	10.4.
Pin point or burry light		6621-1 6621-2	6.2 4.2
Piston ring classifications		6621-1	3
Piston ring codes and descriptions		6621-4	4-Table 1
Piston ring types		6621-1	4
Plain		6621-1	4.4
Point deflection		6621-2	4.2
Pores/porosities		6621-5	4.2/Table 1/4.5
Positive twist		6621-1 6622-1/6622-2 6624-1/6624-3	4.3 5.5 5.2
Pressure pattern		6621-1	6.2
Quality requirements (visual features)		6621-5	4.1
Radial thickness with coil spring	a_{12}	6621-1	5.7
Radial wall thickness	a_1	6621-1/6621-2 6622 ff.	5.1/5.3
Rail (see segment)		6621-1/6627	5.7/5.2
Raised material (marking)		6621-5	6
Rectangular rings		6621-1 6622-1/6622-2	6.1
Reduced m/d_1 ratio		6621-4	7.4
Reference plane (see Datum surface)		6621-1	6.4
Ring back (back of the ring)		6621-1	5.1
Ring gap (closed gap)	s_1	6621-1/6621-4	5.2/7.3
Ring gauge		6621-1	6.4
Ring groove (piston)		6621-1	6.3
Ring rotation (prevent of)		6621-4	8
Ring shape (see ovality)		6621-2 6621-4	4.2 7.1
Ring width	h_1	6621-1/6621-2 6622-1 ff.	5/4.2.1
Roughness (see surface roughness)		6621-2/6621-4	4.2/9
Sand inclusions		6621-5	4.2-Table 1

Characteristic/Term	Symbol	ISO Reference	Clause/Subclause
Scraper rings (Napier rings)		6623	
Scratches		6621-5	4.3
Seating tab angle	θ	6627	5.7
Seating tab height	a_{14}	6627	5.7
Segment		6621-1/6627	5.7/5.2
Segment width	h_{12}	6627	5.2
Side faces		6621-1/6621-4	5/9.2
Side machining		6621-4	9
Side notch		6621-4	8.2
Slot arrangement		6625 6626/6626-2/6626-3	4.1 4.1/5.1/5.5
Slot length	w_1	6621-1 6625 6626/6626-2/6626-3	5.7 4.1 4.2/5.2
Slot spacing	w_3	6621-1/6626-3	5.7/5.5
Slot width	c_1	6621-1 6625 6626/6626-2/6626-3	5.7 6 7/8/5.5
Slotted oil-control rings		6621-1 6625/6626/6626-2	
Spacer radial thickness	a_8	6627	4.2
Spacer width	h_{13}	6627	4.2
Spray coating		6621-4/6622-1/6622-2 6624-1/6624-2/ 6624-3/6624-4	10.2/5.11/5.8 5.4/5.3/5.4/5.3
Spray coatings (defects)		6621-5	4.4/4.5
Spray coating hardness		6621-4	10.2
Spring excursion		6626/6626-2/6626-3	5.2/6.2/6.2
Steel segments (see segment)			
Step depth	a_2	6623	Table 8/Table 9
Step width	h_2	6623	Table 8/Table 9
Strength properties (mechanical properties)		6621-3	3
Surface machining, coating		6621-4	9
Surface roughness		6621-2/6621-4	4.2/9
Surface treatment		6621-4	10.4
Tangential force	F_t	6621-2 6621-4 6622-1 ff.	4.2 7.4/7.5/7.6
Tangential force loss (heat set)		6621-5	5.2

Characteristic/Term	Symbol	ISO Reference	Clause/Subclause
Taper-faced rings		6621-1 ff. until 6624-4	
Tapered peripheral surface		6621-1 ff. until 6624-4	
Temperature influence (heat set)		6621-5	5.2
Torsion/twist		6621-2 6622-1/6622-2 6624-1/6624-3	4.2 5.7/5.5-5.6 5/5
Total free gap (see free gap)	m	6621-1 6621-2	5.1 4.2.3
Undercut radius	r_2	6621-1	5.6
V-groove (oil-control-ring)		6626-3	3.4
Visual defects (features)		6621-5	4
Wall thickness (see radial wall thickness)	a_1	6621-1/6621-2 6622-1 ff.	5.3/4.2.2
Witness line		6621-1	6.2.2

Bibliography

[1] ISO 6622-1, *Internal combustion engines — Piston rings — Part 1: Rectangular rings made of cast iron*

[2] ISO 6622-2, *Internal combustion engines — Piston rings — Part 2: Rectangular rings made of steel*

[3] ISO 6623, *Internal combustion engines — Piston rings — Scraper rings made of cast iron*

[4] ISO 6624-1, *Internal combustion engines — Piston rings — Part 1: Keystone rings made of cast iron*

[5] ISO 6624-2, *Internal combustion engines — Piston rings — Part 2: Half keystone rings made of cast iron*

[6] ISO 6624-3, *Internal combustion engines — Piston rings — Part 3: Keystone rings made of steel*

[7] ISO 6624-4, *Internal combustion engines — Piston rings — Part 4: Half keystone rings made of steel*

[8] ISO 6625, *Internal combustion engines — Piston rings — Oil control rings*

[9] ISO 6626, *Internal combustion engines — Piston rings — Coil-spring-loaded oil control rings*

[10] ISO 6626-2, *Internal combustion engines — Piston rings — Part 2: Coil-spring-loaded oil control rings of narrow width made of cast iron*

[11] ISO 6626-3, *Internal combustion engines — Piston rings — Part 3: Coil-spring-loaded and nitrided oil control rings made of steel*

[12] ISO 6627, *Internal combustion engines — Piston rings — Expander/segment oil-control rings*

ICS 01.040.43; 43.060.10

Price based on 29 pages