DRAFT INTERNATIONAL STANDARD

ISO/DIS 6627

ISO/TC **22**/SC **34**

Secretariat: **ANSI**

Voting begins on:
2021-04-05

Voting terminates on:
2021-06-28

Internal combustion engines — Piston rings — Expander/ segment oil-control rings

Moteurs à combustion interne — Segments de piston — Segments racleurs régulateurs d'huile/Ressorts d'expansion

ICS: 43.060.10

This document is circulated as received from the committee secretariat.

Reference number
ISO/DIS 6627:2021(E)

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

Published in Switzerland

Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Symbols and abbreviated terms **1**
5 Ring types and designations **3**
5.1 Types of expander/rail oil-control rings 3
5.2 General features 3
5.3 Designation examples 5
6 Common features **5**
6.1 Expander 5
6.1.1 Design considerations 5
6.1.2 Without surface treatment 6
6.1.3 Nitrided surface (NX) 6
6.1.4 Tab angle 6
6.1.5 Expander dimensions 7
6.2 Rail features 7
6.2.1 Chromium-plated peripheral surface 7
6.2.2 Nitrided surface codes NS010 to NS050 7
6.2.3 PVD coated peripheral surface 8
6.2.4 Rail dimensions 8
6.3 Expander/rail assembly 10
7 Dimensions **11**
8 Materials **11**
9 Tangential force and nominal unit pressure **11**
9.1 Tangential force, F_t 11
9.2 Nominal Unit Pressure 11
9.3 Classes of nominal unit pressure 12
Bibliography **13**

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 6627:2011), which has been technically revised.

The main changes compared to the previous edition are as follows:

— Previous nomenclature referred to the rails as segments.

— Barrel faced rail was added.

— PVD specification for rails was added.

— Figures and tables were revised.

— New dimension introduced for expander.

— Applicable bore diameter range increased to 135mm.

A list of all parts in the ISO 6627 series can be found on the ISO website.

Introduction

ISO 6627 is one of a series of International Standards dealing with piston rings for reciprocating internal combustion engines. Others are ISO 6621, ISO 6622, ISO 6623; ISO 6624, ISO 6625 and ISO 6626 (see Clause 2 and the Bibliography).

The common features and dimensional tables included in ISO 6627 represent a broad range of variables. In selecting a ring type, the designer will above all need to consider the particular operating conditions. Moreover, it is essential that the designer refer to the specifications and requirements of ISO 6621-3 and ISO 6621-4 before completing the selection.

Internal combustion engines — Piston rings — Expander/ segment oil-control rings

1 Scope

This International Standard specifies the essential dimensional features of expander/rail oil-control rings, without providing a complete product description (because expander-rail designs vary from piston-ring manufacturer to piston-ring manufacturer, the interaction between the manufacturer and the client will determine specific design details).

This International Standard applies to expander/rail oil-control rings of nominal diameters ranging from 40 mm to 135 mm for reciprocating internal combustion engines for road vehicles and other applications. It also applies to piston rings for compressors working under analogous conditions.

2 Normative references

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 6621-2, *Internal combustion engines — Piston rings — Part 2: Inspection measuring principles*

ISO 6621-3, *Internal combustion engines — Piston rings — Part 3: Material specifications*

ISO 6621-4, *Internal combustion engines — Piston rings — Part 4: General specifications*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO6621-1 apply.

4 Symbols and abbreviated terms

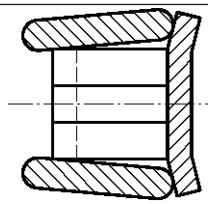
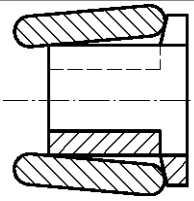
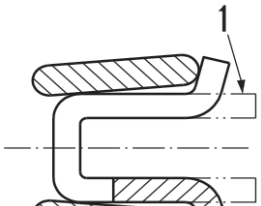
For the purposes of this International Standard, the symbols and abbreviated terms in Table 1 apply.

Table 1 — Symbols and abbreviated terms

Symbol abbreviated terms	Description
a_1	Rail radial wall thickness
a_8	Expander radial thickness excluding tab
a_9	Expander radial thickness
a_{11}	Assembly radial thickness
a_{14}	Tab radial thickness
a_{15}	Pad radial thickness
d_1	Nominal ring assembly diameter (nominal bore diameter)
h_1	Nominal assembly axial width
h_{24}	Rail face contact width
h_8	Barrel gauge width
h_9	Expander axial width
h_{10}	Rail axial width near inside diameter (ID), after coiling
h_{11}	Rail axial width near outside diameter (OD), after coiling and surface treatment or plating
h_{12}	Nominal rail axial width
h_{13}	Expander axial width over pads
h_{14}	Pad height
h_{28}	Axial distance between height of expander tab and height of expander pad
p_o	Nominal unit pressure
p_{ou}	Unit contact pressure
s_1	Rail closed gap
t_2, t_3	Barrel face drop (barrel drop on peripheral surface)
F_t	Tangential force
F_{tc}	Specific tangential force
θ	Tab angle
CR1…CR2	Chromium-plating thickness
ES1…ES3	Types of expander/rail oil-control rings
PNH	High nominal unit pressure
PNL	Low nominal unit pressure
PNM	Medium nominal unit pressure
PNR	Reduced nominal unit pressure
PNV	Very high nominal unit pressure
TT00…TT30	Nominal tab angle
NS010…NS050	Nitrided surface (rail)
NX003…NX025	Nitrided surface (expander)
PC001…PC020	PVD coating thickness

5 Ring types and designations

5.1 Types of expander/rail oil-control rings

ES1	
ES2	
ES3	

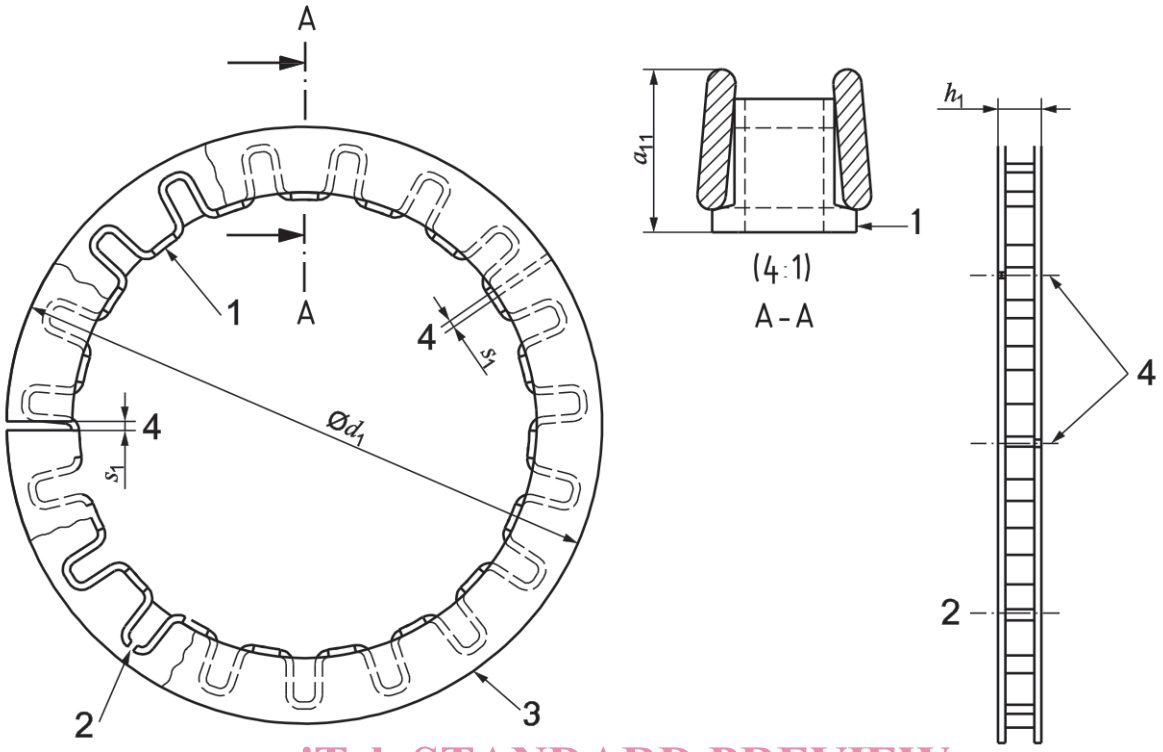
Key

1 centring pad (optional)

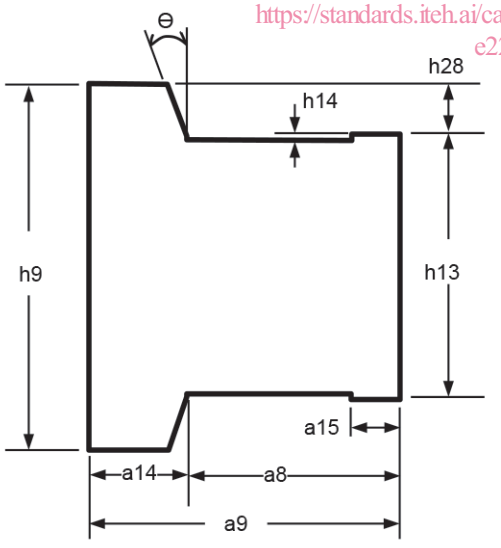
Figure 1 — Expander/rail oil-control ring designs

5.2 General features

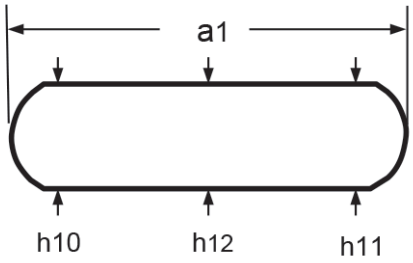
The expander/rail assembly shall be in accordance with Figure 2.



a) Assembly



b) Expander



c) Rail