

Piston rings up to 200 mm diameter for reciprocating internal combustion engines —

**Part 6: Vocabulary, inspection methods
and generic specifications —**

**Section 6.2 Inspection measuring
principles**

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Machinery and Components Standards Policy Committee (MCE/-) to Technical Committee MCE/14, upon which the following bodies were represented:

- Association of Consulting Engineers
- British Railways Board
- Ministry of Defence
- Society of Motor Manufacturers and Traders Limited

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National foreword

This Section of BS 5341 has been prepared under the direction of the Machinery and Components Standards Policy Committee and is identical with ISO 6621-2:1984 *“Internal combustion engines — Piston rings — Part 2: Inspection measuring principles”* published by the International Organization for Standardization (ISO).

Full requirements for piston rings for internal combustion engines are given in the following Parts and Sections of BS 5341 which are identical with ISO standards as indicated:

Part 6. Vocabulary, inspection methods and generic specifications

- Section 6.1 *Vocabulary*
(Identical with ISO 6621-1)
- Section 6.2 *Inspection measuring principles*
(Identical with ISO 6621-2)
- Section 6.3 *Material specifications*
(Identical with ISO 6621-3)
- Section 6.4 *General specifications*
(Identical with ISO 6621-4)
- Section 6.5 *Quality requirements*
(Identical with ISO 6621-5)

Part 7. Designs, dimensions and designations for single piece rings

- Section 7.1 *Rectangular compression rings*
 - Subsection 7.1.1 *Specification for rectangular rings*
(Identical with ISO 6622-1)
 - Subsection 7.1.2^a *Specification for rectangular rings with narrow ring width*
- Section 7.2 *Specification for scraper rings*
(Identical with ISO 6623)
- Section 7.3 *Keystone and half keystone compression rings*
 - Subsection 7.3.1 *Specification for keystone rings*
(Identical with ISO 6624-1)
 - Subsection 7.3.2^b *Specification for half keystone rings*
- Section 7.4 *Specification for oil control rings*
(Identical with ISO 6625)

Part 8. Designs, dimensions and designations for multi-piece oil control rings

- Section 8.1 *Specification for coil-spring-loaded oil control rings*
(Identical with ISO 6626)
- Section 8.2^c *Specification for expander/segment oil control rings*

^a It is envisaged that this Subsection will be identical with ISO 6622-2 when the International Standard is published. The technical report ISO/TR 6622-2 is published in the UK as a Draft for Development, DD 208.

^b It is envisaged that this Subsection will be identical with ISO 6624-2 when the International Standard is published. The technical report ISO/TR 6624-2 is published in the UK as a Draft for Development, DD 209.

^c It is envisaged that this Section will be identical with ISO 6627 when the International Standard is published. ISO/TR 6627 will shortly be published in the UK as a Draft for Development.

BS 5341-6 to BS 5341-8 supersede BS 5341-1:1976, BS 5341-2:1977, BS 5341-3:1976 and BS 5341-4:1976 which are withdrawn.

Cross-references (additional to those listed above)

International Standard Corresponding British Standard

ISO 1302:1978	BS 308 <i>Engineering drawing practice</i> Part 2:1985 <i>Recommendations for dimensioning and tolerancing of size</i> (Technically equivalent)
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The Technical Committee has reviewed the provisions of ISO 468, to which normative reference is made in the text, and has decided that they are acceptable for use in conjunction with this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 22, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

0 Introduction

ISO 6621 is one of a series of International Standards being prepared that deal with piston rings for reciprocating internal combustion engines:

ISO 6621, *Internal combustion engines — Piston rings* —

- *Part 1: Vocabulary;*
- *Part 2: Measuring principles;*
- *Part 3: Material specifications;*
- *Part 4: General specifications;*
- *Part 5: Quality requirements.*

ISO 6622, *Internal combustion engines — Piston rings* —

- *Part 1: Rectangular rings;*
- *Part 2: Rectangular rings with narrow ring width.*

ISO 6623, *Internal combustion engines — Piston rings — Scraper rings.*

ISO 6624, *Internal combustion engines — Piston rings* —

- *Part 1: Keystone rings;*
- *Part 2: Half keystone rings.*

ISO 6625, *Internal combustion engines — Piston rings — Oil control rings.*

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

1 Scope and field of application

This part of ISO 6621 defines the measuring principles to be used for measuring piston rings; it applies to piston rings up to and including 200 mm diameter for reciprocating internal combustion piston engines.

This part of ISO 6621 may be used for piston rings for compressors working under analogous conditions.

2 References

ISO 468, *Surface roughness — Parameters, their values and general rules for specifying requirements.*

ISO 1302, *Technical drawings — Methods of indicating surface texture on drawings.*

ISO 6624-1, *Internal combustion engines — Piston rings — Part 1: Keystone rings*¹⁾.

3 Measuring principles

3.1 General measuring conditions

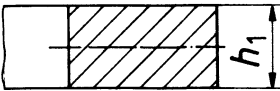
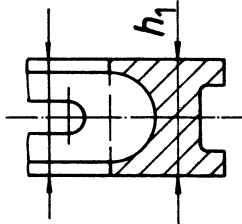
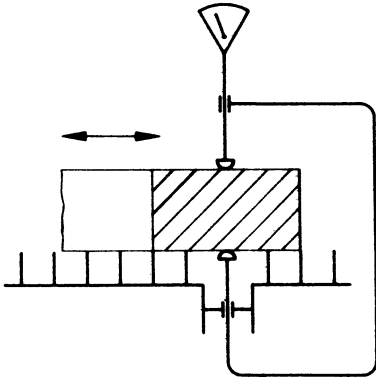
The following general notes are applicable to all measuring principles unless otherwise specified:

- a) the ring shall rest on the datum surface in the free or open condition. No additional force shall be applied to load the ring on the datum surface;
- b) certain measurements are made with the ring in the closed condition in a gauge of nominal cylinder bore diameter. When orientated rings are measured in this way, they shall be so placed that the top is towards the datum surface;
- c) measurements shall be made using instruments with a resolution not to exceed 10 % of the tolerance of the dimension being measured.

¹⁾ At present at the stage of draft.

3.2 Characteristics and measuring principles

Sub-clause	Characteristics of the ring	Symbol
	Principal characteristics of the ring	
3.2.1	Ring width	
	a) parallel sided rings	h_1
	b) keystone rings	h_3, a_6
3.2.2	Radial wall thickness	a_1
3.2.3	Total free gap	m, p
3.2.4	Closed gap	s_1
3.2.5	Tangential force	F_t
3.2.6	Diametral force	F_d
	Characteristics of ring shape	
3.2.7	Ovality or circularity	U
3.2.8	Point deflection	W
3.2.9	Light tightness	—
	Associated with peripheral surface	
3.2.10	Taper on periphery	—
3.2.11	Barrel on periphery	t_2, t_3
3.2.12	Land width	h_4, h_5
3.2.13	Land offset	—
3.2.14	Coating/inlay thickness	—
	Associated with sides	
3.2.15	Keystone angle	—
3.2.16	Obliqueness	—
3.2.17	Twist	—
3.2.18	Unevenness	Te_r, Te_u
	Other	
3.2.19	Wind (axial displacement of butt ends)	—
3.2.20	Free flatness	—
3.2.21	Surface roughness	R_a, R_z

Term	Definition	Measuring principles	Illustration of measuring principles
3.2.1 Ring width (in millimetres) a) Parallel sided rings, h_1	The distance between the sides, at any particular point perpendicular to the datum surface (see Figure 1 and Figure 2).	Measure with spherical measuring probes each of radius $1,5 \pm 0,05$ mm, exerting a measuring force of approximately 1 N (see Figure 3). In the case of slotted oil rings, the measurement shall be made between the slots and not across them (see Figure 2).	 Figure 1  Figure 2  Figure 3