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**Internal combustion engines —  
Piston rings —**

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

*Moteurs à combustion interne — Segments de piston —*

*Partie 1: Segments trapézoïdaux en fonte*  
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## 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](http://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](http://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](http://www.iso.org/iso/foreword.html). (standards.iteh.ai)

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 34, *Propulsion, powertrain and powertrain fluids*. ISO 6624-1:2017

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This third edition cancels and replaces the second edition (ISO 6624-1:2001), which has been technically revised.

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

- PVD coating thickness has been included with a new [Table 8](#);
- updates have been made regarding technology improvements.

## Introduction

ISO 6624 belongs to the series of International Standards dealing with piston rings for reciprocating internal combustion engines. Others are ISO 6621, ISO 6622, ISO 6623, ISO 6625, ISO 6626 and ISO 6627 (see Bibliography for details).

The common features and dimensional tables presented in this document constitute a broad range of variables and, in selecting a particular ring type, the designer must 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<sup>[4]</sup> and ISO 6621-4 before completing a selection.

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# Internal combustion engines — Piston rings —

## Part 1: Keystone rings made of cast iron

### 1 Scope

This document specifies the essential dimensional features of keystone rings made of cast iron, types T, TB, TBA, TM, K, KB, KBA and KM, having diameters from 70 mm up to and including 200 mm, used in reciprocating internal combustion piston engines.

### 2 Normative reference

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

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### 3 Terms and definitions (standards.iteh.ai)

No terms and definitions are listed in this document.

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>

### 4 Overview

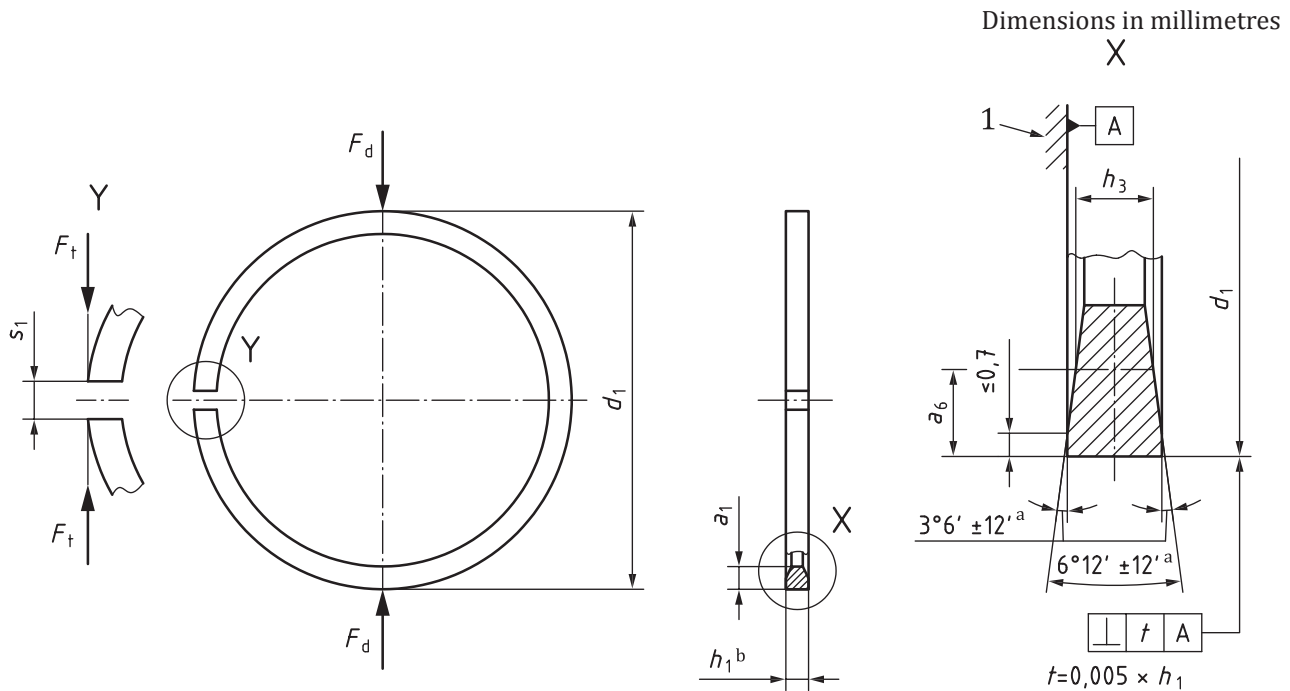
The keystone ring types are specified in [Tables 1 to 3](#) and [Figures 1 to 8](#). Their common features and the dimensions of those features are specified in [Tables 4 to 8](#) and [Figures 9 to 16](#). [Tables 9 and 10](#) give the force factors for the different types of ring, while [Table 11](#) and [Table 12](#) give the dimensions and forces of keystone rings 6° and 15°, respectively.

### 5 Ring types and designation examples

#### 5.1 Type T — Straight faced keystone ring 6°

##### 5.1.1 General features

See [Table 10](#) for dimensions and forces.



**Key**

- 1 reference plane
- a Due to manufacturing processing, side angle tolerances are not cumulative.
- b Nominal.

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**Figure 1 — Type T**

<https://standards.iteh.ai/catalog/standards/sist/35ce98ba-f6a8-4641-825d-050f279b658f/iso-6624-1-2017>

**5.1.2 Designation**

**EXAMPLE** Designation of a piston ring complying with the requirements of ISO 6624-1, being a cast iron,  $6^\circ$  keystone ring with a straight faced peripheral surface (T), of nominal diameter  $d_1 = 90$  mm (90) and nominal width  $h_1 = 2,5$  mm (2,5), made of grey cast iron, subclass 12 (MC12), 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:

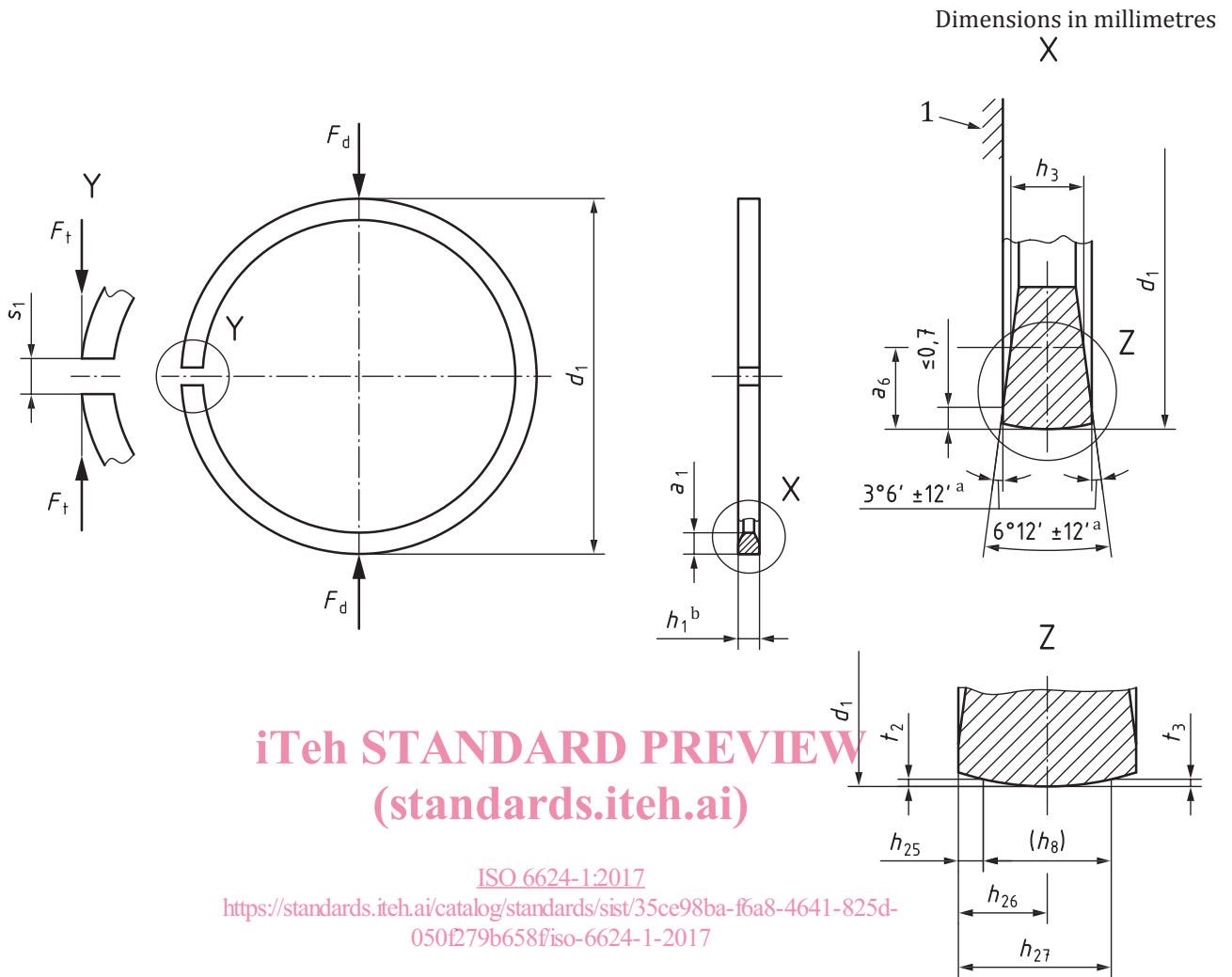
**Piston ring ISO 6624-1 T-90 × 2,5-MC12/CR2**

**5.2 Type TB — Symmetrical barrel faced keystone ring  $6^\circ$**

**5.2.1 General features**

See [Table 10](#) for dimensions and forces.





**Key**

- 1 reference plane
- a Due to manufacturing processing, side angle tolerances are not cumulative.
- b Nominal.

**Figure 2 — Type TB**

**Table 1 — Symmetrical barrel dimensions**

Dimensions in millimetres

$h_1$	$h_{25}$	$h_{26}$		$h_{27}$	$t_2, t_3$	$h_8^a$
		Tolerance				
2,0	0,40	1,00	±0,30	1,60	0,003...0,015	1,2
2,5	0,45	1,25	±0,40	2,05		1,6
3,0	0,50	1,50	±0,50	2,50	0,005...0,020	2,0
3,5	0,55	1,75		2,95		2,4
4,0	0,60	2,00	±0,60	3,40	0,005...0,023	2,8
4,5	0,65	2,25		3,85		3,2

<sup>a</sup> Gauge width  $h_8$ , informative only, shall be used only if agreed between manufacturer and customer.

5.2.2 Designation

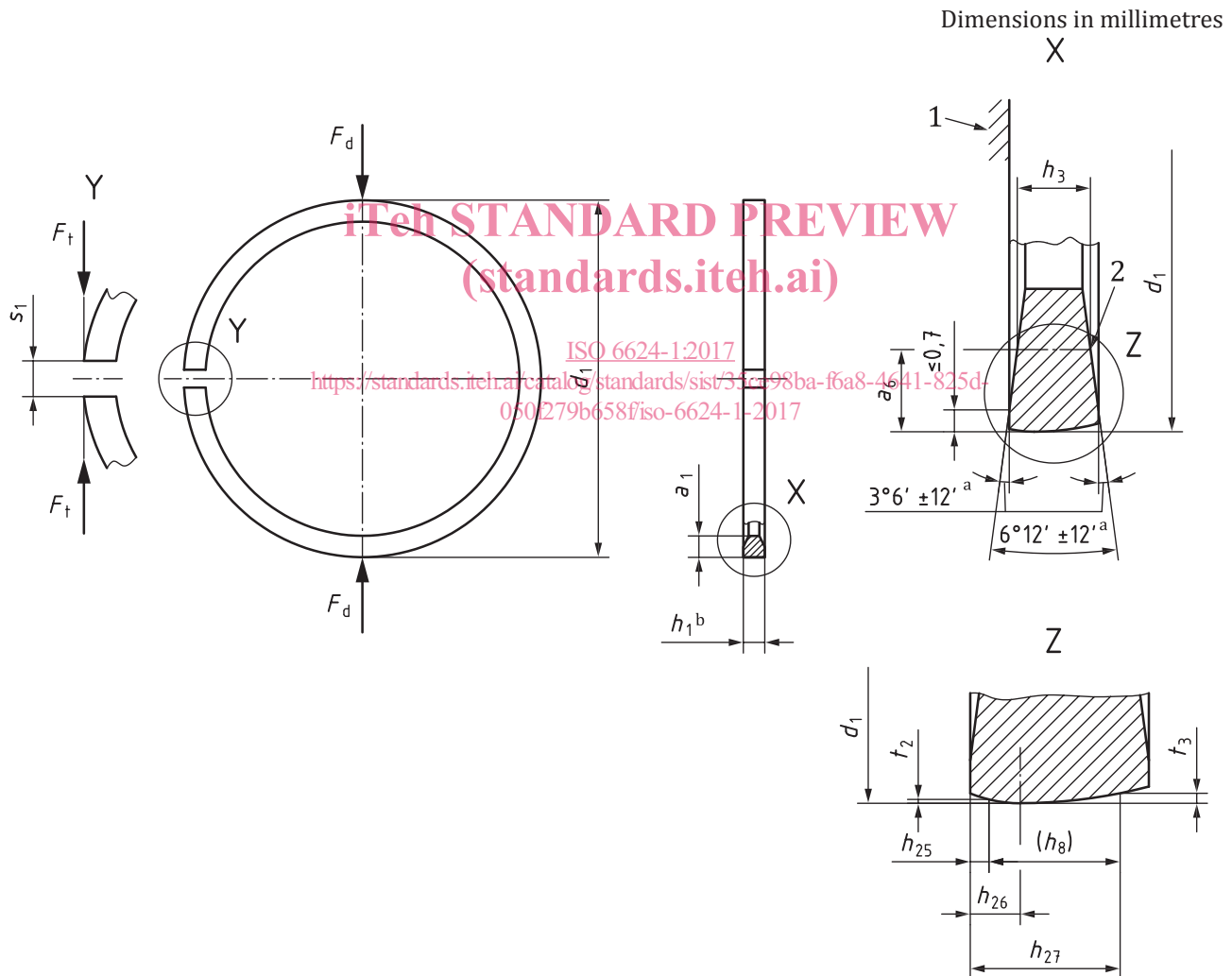
EXAMPLE Designation of a piston ring complying with the requirements of ISO 6624-1, being a cast iron, 6° keystone ring with a symmetrical barrel faced peripheral surface (TB), of nominal diameter  $d_1 = 90$  mm (90) and nominal ring width  $h_1 = 2,5$  mm (2,5), made of heat-treated martensitic spheroidal graphite cast iron, subclass 53 (MC53), and having a semi-inlaid spray coating on the peripheral surface with a minimum thickness of 0,2 mm (SC4E). Parameters in parenthesis are used in the ISO ring designation:

Piston ring ISO 6624-1 TB-90 × 2,5-MC53/SC4E

5.3 Type TBA — Asymmetrical barrel faced keystone ring 6°

5.3.1 General features

See Table 10 for dimensions and forces.



Key

- 1 reference plane
- 2 top side identification mark
- a Due to manufacturing processing, side angle tolerances are not cumulative.
- b Nominal.

Figure 3 — Type TBA

Table 2 — Asymmetrical barrel dimensions

Dimensions in millimetres

$h_1$	$h_{25}^a$	$h_{26}$		$h_{27}$	$t_2^b$	$t_3^b$
		Tolerance				
2,00	0,40	0,60	$\pm 0,20$	1,50	0...0,007	0,009...0,030
2,50	0,45	0,70	$\pm 0,25$	1,80	0...0,008	0,011...0,035
3,00	0,55	0,80		2,10		0,012...0,038
3,50	0,60	0,90	$\pm 0,30$	2,40	0...0,009	0,012...0,040
4,00	0,65	0,95		2,80		0,013...0,045
4,50	0,70	1,05	$\pm 0,35$	3,20	0...0,010	0,015...0,050
<sup>a</sup> $h_{25}$ may be lowered for rings with reduced edge dimensions.						
<sup>b</sup> $t_2$ or $t_3$ or both may be varied as agreed between manufacturer and customer.						

### 5.3.2 Designation

EXAMPLE Designation of a piston ring complying with the requirements of ISO 6624-1, being a cast iron, 6° keystone ring with an asymmetrical barrel faced peripheral surface (TBA), of nominal diameter  $d_1 = 90$  mm (90) and nominal ring width  $h_1 = 2,5$  mm (2,5), made of heat-treated martensitic spheroidal graphite cast iron, subclass 53 (MC53), and having a semi-inlaid spray coating on the peripheral surface with a minimum thickness of 0,2 mm (SC4E). Parameters in parenthesis are used in the ISO ring designation:

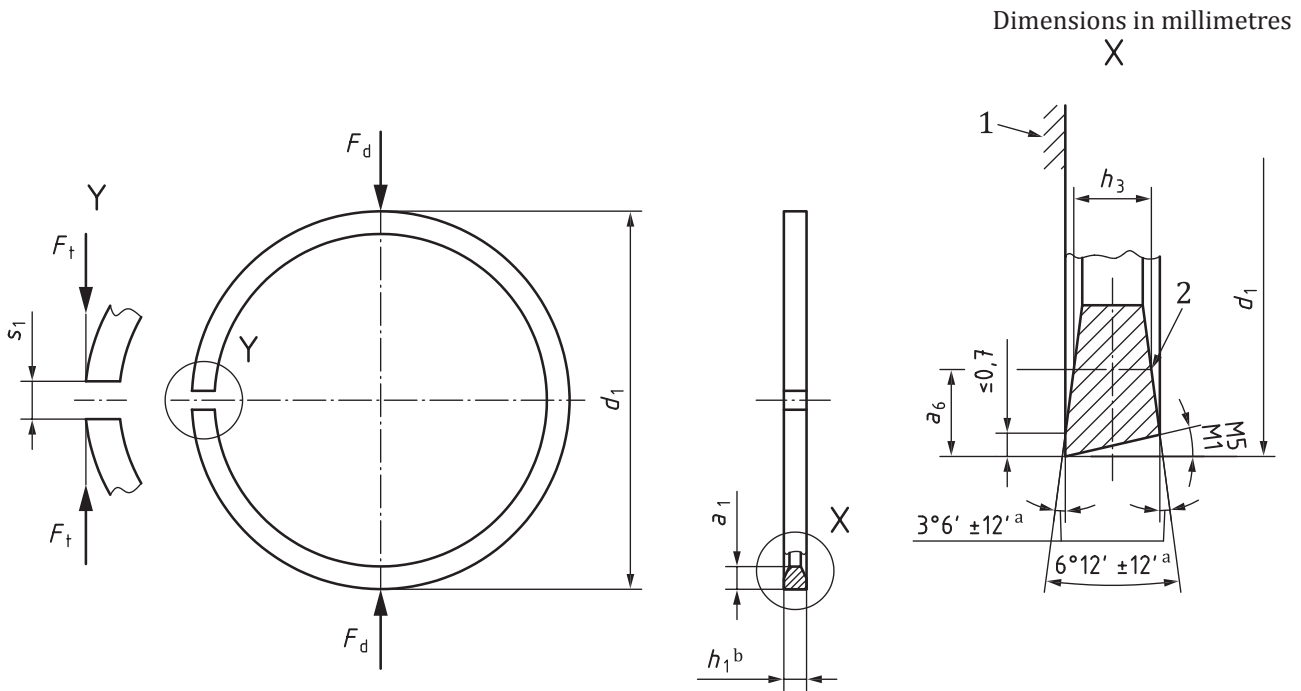
Piston ring ISO 6624-1 TBA-90 × 2,5-MC53/SC4E

## 5.4 Type TM — Taper faced keystone ring 6°

### 5.4.1 General features

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See [Table 10](https://standards.iteh.ai/catalog/standards/sist/35ce98ba-f6a8-4641-825d-030279b658f/iso-6624-1-2017) for dimensions and forces.



**Key**

- 1 reference plane
- 2 top side identification mark
- a Due to manufacturing processing, side angle tolerances are not cumulative.
- b Nominal.

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**Figure 4 — Type TM**

**Table 3 — Taper**

Dimensions in minutes

Code	Taper	Tolerance <sup>a</sup>	Internal twist feature designs Tolerance <sup>a</sup>
M1 <sup>b</sup>	10	+50 0	+60 0
M2	30		
M3	60	+60 0	+70 0
M4	90		
M5	120		

<sup>a</sup> For chromium plated rings with a tapered peripheral surface that is not ground, the tolerance shall be increased by 10 (e.g. M3 = 60 tolerance:  $\begin{matrix} +70 \\ 0 \end{matrix}$ ; M3 with internal features = 60 tolerance:  $\begin{matrix} +80 \\ 0 \end{matrix}$ ).

<sup>b</sup> M1 not for rings with partly cylindrical peripheral surface.

**5.4.2 Designation**

**EXAMPLE** Designation of a piston ring complying with the requirements of ISO 6624-1, being a cast iron, 6° keystone ring with a 10' taper faced peripheral surface (TM1), of nominal diameter  $d_1 = 90$  mm (90) and nominal ring width  $h_1 = 2,5$  mm (2,5), made of heat-treated grey cast iron, subclass 22 (MC22), and phosphate-coated all over (PO). Parameters in parenthesis are used in the ISO ring designation: