

Internal Combustion Engines—Piston Rings—Rectangular Rings

This SAE Standard is equivalent to ISO Standard 6622/1.

1. Scope and Field of Application—Differences, where they exist, are shown in Appendix A.

This SAE Standard specifies the essential dimensional features of R, B, and M rectangular piston ring types.

Dimensional Tables 8 and 9 offer the choice of two radial wall thicknesses:

- a. Radial wall thickness "regular" (Table 8)
- b. Radial wall thickness "D/22" (Table 9)

The requirements of this document apply to rectangular rings for reciprocating internal combustion piston engines up to and including 200 mm diameter. They may also be used for piston rings of compressors working under similar conditions.

1.1 Rationale—SAE J1997 is being discontinued because the content of this standard is also contained in ISO 6622-1. Therefore, to eliminate duplication and confusion in coordinating the standards between ISO and SAE, this document will be discontinued. The SAE Piston and Ring Standards Committee will now continue to support ISO in updating the standards as appropriate.

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2. References

2.1 Applicable Publications—The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE DESIGNATION	ISO ¹ EQUIVALENT	
		INTERNAL COMBUSTION ENGINES—PISTON RINGS
J1588	6621/1	Vocabulary
J1589	6621/2	Measuring principles
J1590	6621/3	Material specifications
J1591	6621/4	General specifications
J1996	66621/5	Quality requirements
		INTERNAL COMBUSTION ENGINES—PISTON RINGS
J1997	6622/1	Rectangular rings
J1998	6622/2 TR	Rectangular rings with narrow ring width
J1999	6623	INTERNAL COMBUSTION ENGINES—PISTON RINGS— SCRAPER RINGS
		INTERNAL COMBUSTION ENGINES—PISTON RINGS
J2000	6624/1	Keystone rings
J2001	6624/2 TR	Half keystone rings
J2002	6625	INTERNAL COMBUSTION ENGINES—PISTON RINGS— OIL CONTROL RINGS
J2003	6626	INTERNAL COMBUSTION ENGINES—PISTON RINGS— COIL SPRING LOADED OIL CONTROL RINGS
J2004	6627 TR	INTERNAL COMBUSTION ENGINES—PISTON RINGS— EXPANDER/SEGMENT OIL CONTROL RINGS
J2226		INTERNAL COMBUSTION ENGINES—PISTON RINGS— STEEL RECTANGULAR RINGS
	1101	TECHNICAL DRAWINGS—GEOMETRICAL TOLERANCING—TOLERANCING OF FORM, ORIENTA- TION, LOCATION AND RUN-OUT—GENERALITIES, DEFINITIONS, SYMBOLS INDICATIONS ON DRAWINGS

1. TR refers to Technical Report

3. Ring Types and Designation Examples

3.1 Type R—Straight Faced Rectangular Ring

3.1.1 GENERAL FEATURES

NOTE—See Table 8 or 9 for dimensions and forces.

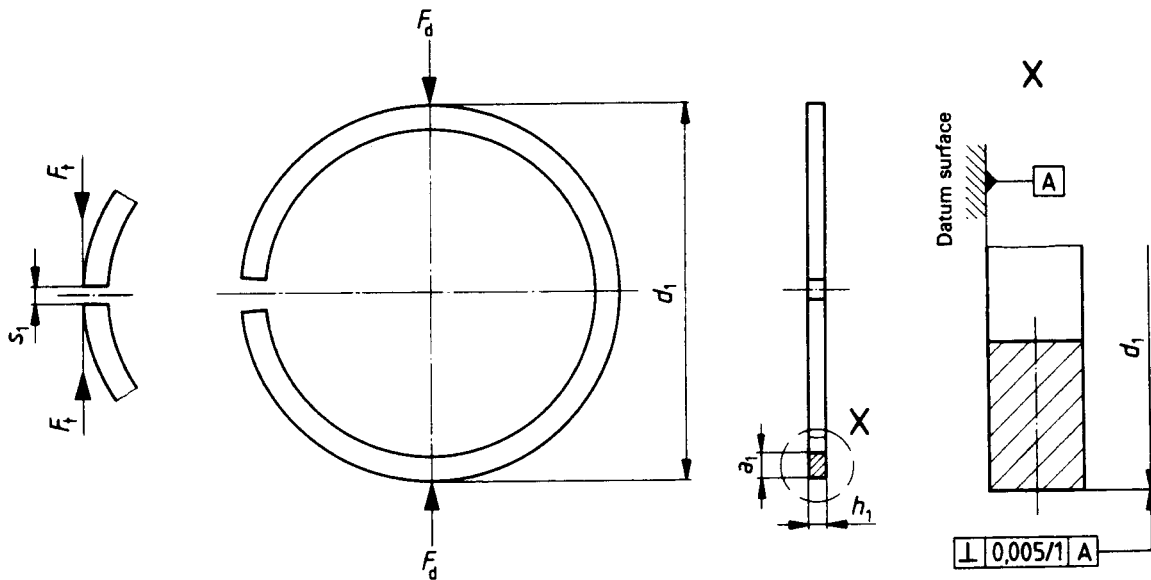


FIGURE 1—TYPE R

3.1.2 DESIGNATION EXAMPLE—Designation of a straight faced rectangular ring of $d_1 = 90$ mm nominal diameter, radial wall thickness "regular", $h_1 = 2.5$ mm ring width, made of grey cast iron, nonheat-treated (material subclass 12), general features as shown in Figure 1, and phosphated all over.

3.2 Type B—Barrel Faced Rectangular Ring

3.2.1 GENERAL FEATURES

NOTE—See Table 8 or 9 for dimensions and forces.

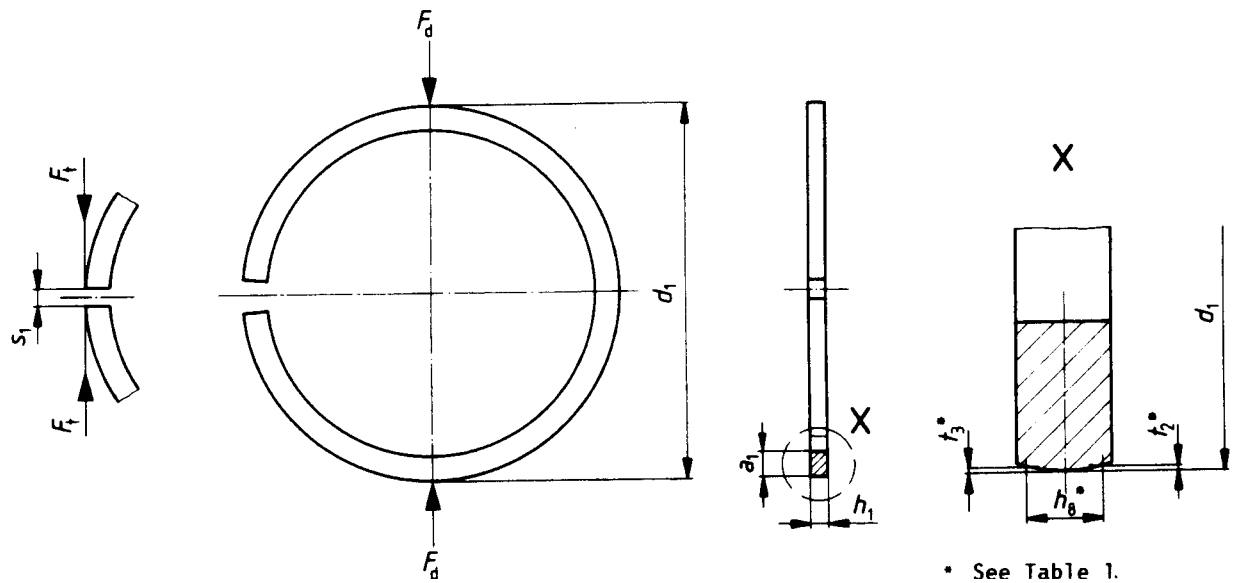


FIGURE 2—TYPE B

TABLE 1—GAUGE WIDTH (h_s) AND BARREL DIMENSIONS

Dimensions in millimeters			
h_1	h_8	t_2, t_3	Maximum Peak Off Center
1.5	0.8		0.25
1.75	1.0	0.002/0.016	0.3
2.0	1.2		
2.5	1.6		
3.0	2.0	0.005/0.020	0.5
3.5	2.4		
4.0	2.8		
4.5	3.2	0.005/0.023	0.6

3.2.2 DESIGNATION EXAMPLE—Designation of a barrel faced rectangular ring of $d_1 = 90$ mm nominal diameter, radial wall thickness "regular", $h_1 = 2.5$ mm ring width, made of spheroidal graphite cast iron (material subclass 51), general features as shown in Figure 2, and periphery chromium coated fully faced design, 0.15 mm minimum thickness.

3.3 Type M—Taper Faced Rectangular Ring

3.3.1 GENERAL FEATURES

NOTE—See Table 8 or 9 for dimensions and forces.

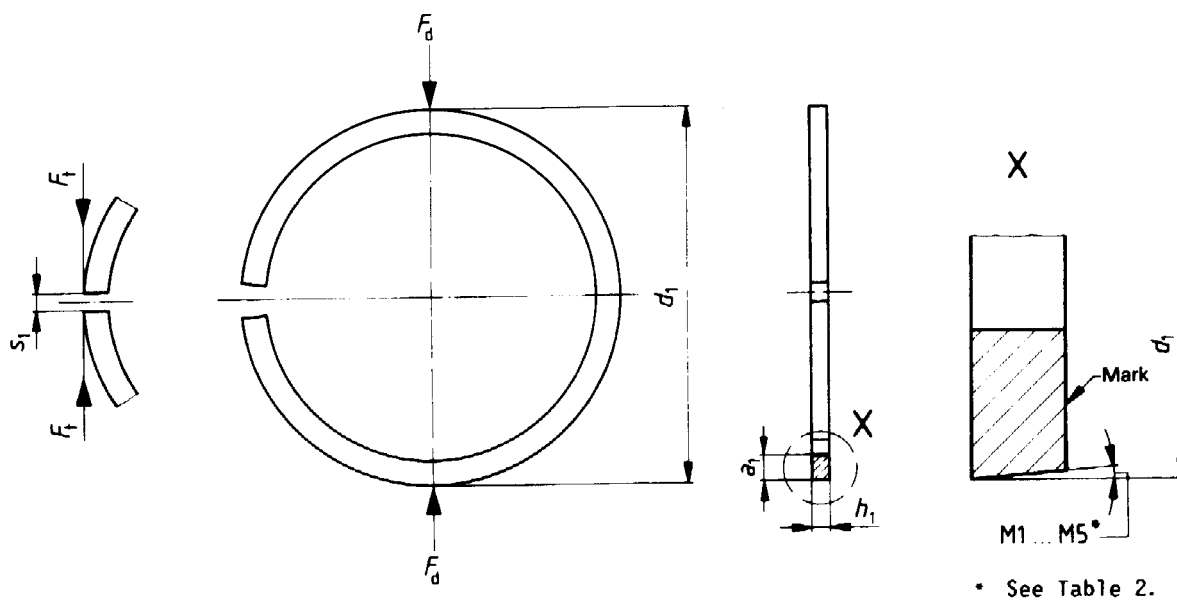


FIGURE 3—TYPE M

TABLE 2—TAPER

Taper	Uncoated and Coated Rings (Molybdenum or Chrome With Tapered Periphery Ground)	Uncoated and Coated Rings (Molybdenum or Chrome With Tapered Periphery Ground) Tolerance ⁽¹⁾	Uncoated and Coated Rings (Molybdenum or Chrome With Tapered Periphery Ground) With IF or IW ⁽²⁾ (Top Side)	Uncoated and Coated Rings (Molybdenum or Chrome With Tapered Periphery Ground) With IF or IW ⁽²⁾ (Top Side) Tolerance ⁽¹⁾	Uncoated and Coated Rings (Molybdenum or Chrome With Tapered Periphery Ground) With IFU or IWU ⁽²⁾ (Bottom Side) ⁽³⁾	Uncoated and Coated Rings (Molybdenum or Chrome With Tapered Periphery Ground) With IFU or IWU ⁽²⁾ (Bottom Side) ⁽³⁾ Tolerance
M1	10'	+40' 0	10'		-	-
M2	30'		30'		-	-
M3	60'		60'		60'	
M4	90'	+50' 0	90'	+60' 0	90'	+60' 0
M5	120'		120'		120'	

- For coated rings with tapered periphery not ground, the tolerance shall be increased by 10' (for example, M3 = 60': $\begin{smallmatrix} 60' \\ + \\ 0 \end{smallmatrix}$ for M-rings or $\begin{smallmatrix} 70' \\ + \\ 0 \end{smallmatrix}$ for M-rings with IF or IW).
- IF, IW, IFU, and IWU are explained in Figures 16 to 19.
- For M-rings (negative twist type) M3, M4, and M5, the twist angle should not exceed 90% of the minimum taper angle.

3.3.2 DESIGNATION EXAMPLE—Designation of a taper faced rectangular ring of $d_1 = 90$ mm nominal diameter, radial wall thickness "regular", $h_1 = 2.5$ mm ring width, made of grey cast iron, heat-treated (material subclass 23), general features as shown in Figure 3, with taper M1 = 10', and periphery molybdenum coated inlaid design, 0.10 mm minimum thickness.

4. Common Features

4.1 Type R—Straight Faced Rectangular Ring

4.1.1 UNCOATED RINGS

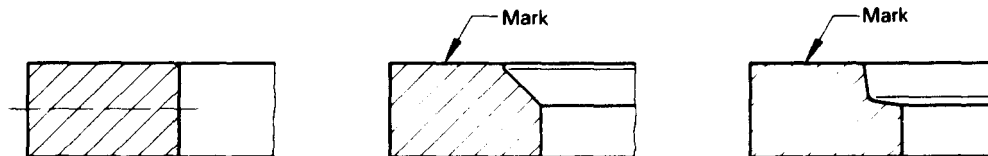


FIGURE 4—UNCOATED TYPE R RINGS