

Internal Combustion Engines—Piston Rings—Scraper Rings

This SAE Standard is equivalent to ISO Standard 6623.

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

This SAE Standard specifies the essential dimensional features of N, NM, E, and EM scraper piston ring types.

Dimensional Tables 7 and 8 offer the choice of two radial wall thicknesses:

- a. Radial wall thickness "regular" (Table 7)
- b. Radial wall thickness "D/22" (Table 8)

The requirements of this document apply to scraper 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 J1999 is being discontinued because the content of this standard is also contained in ISO 6623. 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	6621/5	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

1. TR refers to Technical Report

3. Ring Types and Designation Examples

3.1 Types N, NM, E, and EM—Scraper Rings—Common General Features

NOTE—See Table 7 or Table 8 for dimensions and forces.

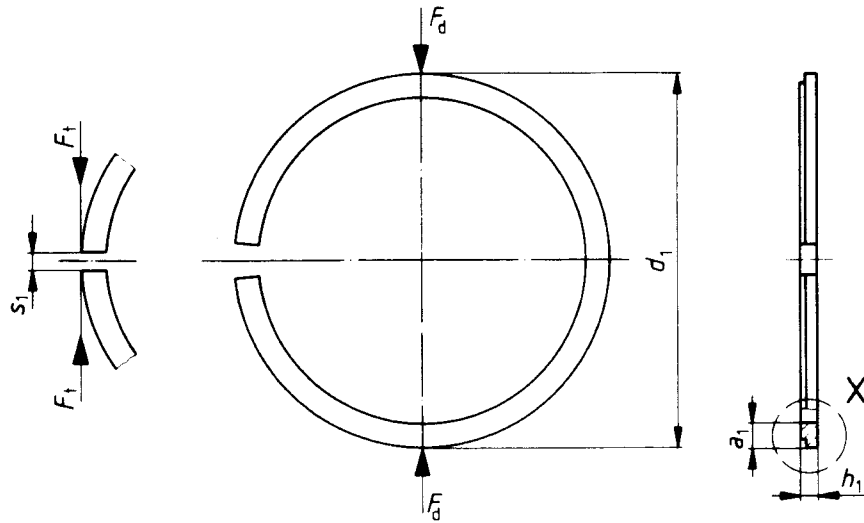


FIGURE 1—TYPES N, NM, E, AND EM

3.2 Type N—Scraper Ring (Napier)

3.2.1 GENERAL FEATURES

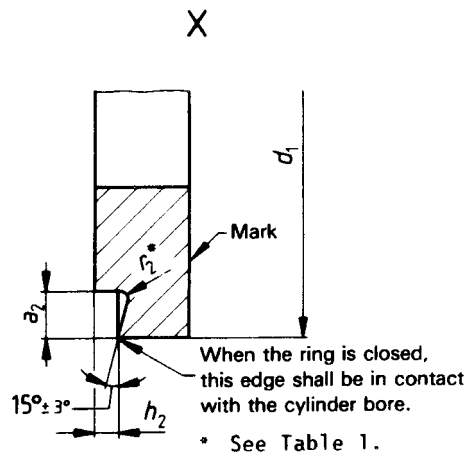


FIGURE 2—TYPE N—DETAIL OF Figure 1

TABLE 1— r_2 DIMENSIONS

Dimensions in millimeters	
d_1	r_2 max
$30 \leq d_1 < 175$	0.3
$175 \leq d_1 \leq 200$	0.7

3.2.2 DESIGNATION EXAMPLE—Designation of a Napier 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 Figures 1 and 2, and inside chamfered edges.

3.3 Type NM—Scraper Ring (Napier), Taper Faced

3.3.1 GENERAL FEATURES

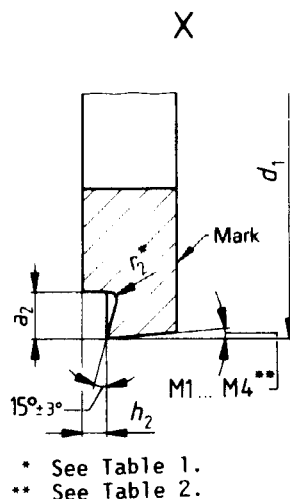


FIGURE 3—TYPE NM—DETAIL OF Figure 1

TABLE 2—TAPER

Taper	Uncoated and coated rings (molybdenum)	Uncoated and coated rings (molybdenum) Tolerance
M1	10'	+60' 0
M2	30'	+60' 0
M3	60'	+60' 0
M4	90'	+60' 0

3.3.2 DESIGNATION EXAMPLE—Designation of a Napier ring, taper faced M4 = 90', 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 21), general features as shown in Figures 1 and 3, and phosphate all over:

Piston ring SAE J1999 or ISO 6623 - NM4 - 90 x 2.5 - MC21 PO

3.4 Type E—Scraper Ring (Stepped)

3.4.1 GENERAL FEATURES

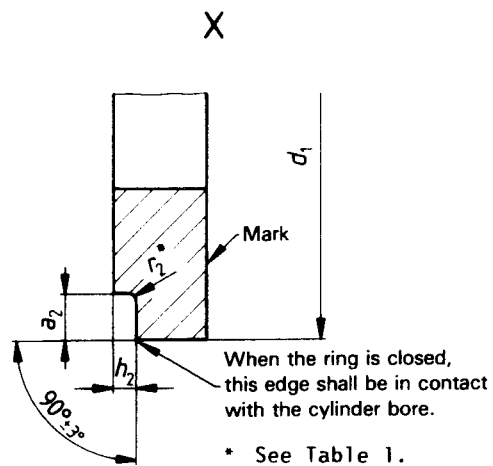
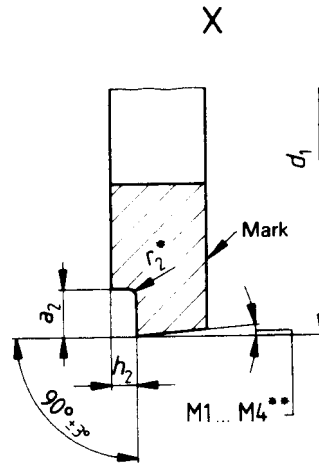


FIGURE 4—TYPE E—DETAIL OF Figure 1

3.4.2 DESIGNATION EXAMPLE—Designation of a scraper 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 Figures 1 and 4, and periphery molybdenum coated inlaid design, 0.10 mm minimum thickness.

3.5 Type EM—Scraper Ring (Stepped) Taper Faced

3.5.1 GENERAL FEATURES



- * See Table 1.
- ** See Table 2.

FIGURE 5—TYPE EM—DETAIL OF Figure 1

3.5.2 DESIGNATION EXAMPLE—Designation of a scraper ring taper faced $M2 = 30^\circ$, 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 22), general features as shown in Figures 1 and 5, and inside chamfered edges.