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भारतीय मानक प्रारूप

आईसी इंजन के लिए पिस्टन रिंग्स के लिए विशिष्टता: भाग 8 संकीर्ण ग्राउंड स्लॉटेड ऑयल कंट्रोल रिंग्स 50 से 200 मिमी नाममात्र व्यास डी - रिंग्स

Draft Indian Standard

SPECIFICATION FOR PISTON RINGS FOR IC ENGINES: PART 8 NARROW GROUND SLOTTED OIL CONTROL RINGS 50 TO 200MM NOMINAL DIAMETER D – RINGS

(First Revision)

ICS: 43.060.10

commentsor used as standard

Last date for receipt of
is 16/11/2022

Automotive Primemovers, Transmission Systems and Internal Combustion Engine Sectional Committee, TED 2

FOREWORD
(Formal Clause to be added later)

This standard is one of a series of Indian Standards on the Specification for piston rings for IC engines. Other standards in this series are:

IS 8422 (Part 1) : 1977	Specification for piston rings for IC engines: Part 1 plain compression rings from 30 up to 200 mm nominal diameter R – Rings
IS 8422 (Part 2) : 1977	Specification for piston rings for IC engines: Part 2 taper faced compression rings from 30 up to 200 mm nominal diameter M – Rings
IS 8422 (Part 3) : 1977	Specification for piston rings for IC engines: Part 3 keystone rings from 82 up to 200 mm nominal diameter T - Rings 15
IS 8422 (Part 4) : 1977	Specification for piston rings for IC engines: Part 4 napier oil scraper rings from 30 up to 200 mm nominal diameter N – Rings
IS 8422 (Part 5) : 1977	Specification for piston rings for IC engines: Part 5 stepped oil scraper rings from 30 up to 200 mm nominal diameter Z – Rings
IS 8422 (Part 6) : 1977	Specification for piston rings for IC engines: Part 6 slotted oil control rings from 50 up to 200 mm nominal diameter S – Rings
IS 8422 (Part 7) : 1977	Specification for piston rings for IC engines: Part 7 double bevelled slotted oil control rings from 50 up to 200 mm nominal diameter G – Rings

This standard is one of the series of Indian Standards on piston ring dimensions, tangential force, etc. IS 5791: 2006 is a necessary adjunct to this standard which gives details of materials, surface finish, gap types and sizes, surface coatings, manufacturing processes, etc.

In this draft for first revision of this standard, the referencing standards have been updated. A separate clause for references has also been introduced for ease of interpretation. However, wherever a reference to any Indian Standard appears in this specification, it shall be taken as a reference to the latest version of the standard.

In the preparation of this standard due consideration has been given to the prevalent sizes in the industry. It is recommended that for new designs, only the sizes given in this standard be used.

In the preparation of this standard assistance has been derived from DIN 70947 ‘Piston rings for automotive engineering, D-rings, narrow land drain oil control rings, 50 up to 200 mm nominal diameter, issued by DIN Deutsches lnstitutfur Normung.

The composition of the Committee responsible for the formulation of this standard is given at **Annex A (Will be added later).**

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of test or analysis, shall be rounded off in accordance with IS 2: 2022 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Draft Indian Standard

SPECIFICATION FOR PISTON RINGS FOR IC ENGINES: PART 8 NARROW GROUND SLOTTED OIL CONTROL RINGS 50 TO 200MM NOMINAL DIAMETER D – RINGS

(*First Revision*)

1 SCOPE

Specifies the dimensions, tolerances, tangential loads and other details of D-rings (narrow land slotted oil control rings) from 50 up to 200 mm nominal diameter for internal combustion engines.

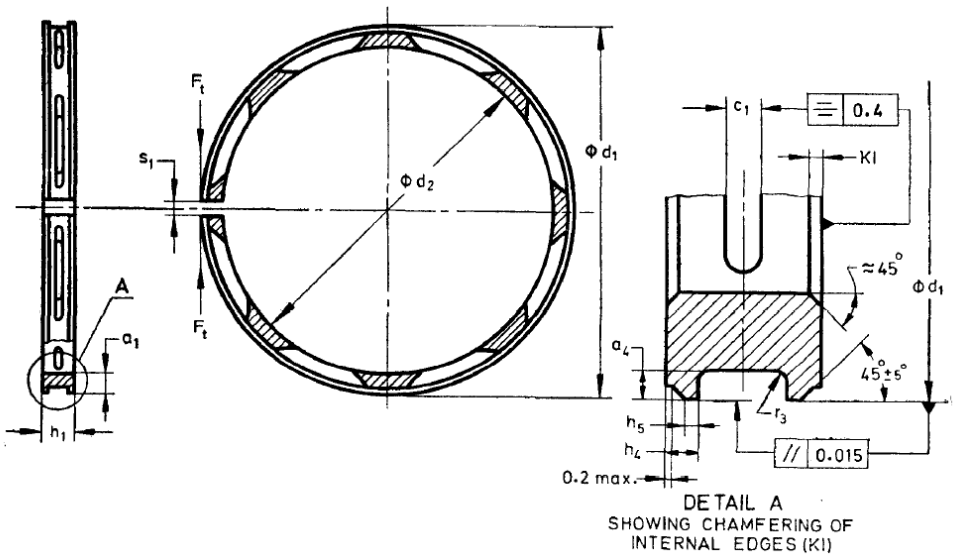
2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
5791: 2006	Internal combustion engines - Piston rings - Material specifications (*Third Revision*)

3 DIMENSIONS AND TOLERANCES

Shall be as given in Table 1 read along with Fig. 1



All dimensions in millimetres.

FIG. 1 NARROW LAND SLOTTED OIL CONTROL RING (D-RING)

3.1 Arrangement of Slots — Shall be according to Fig. 2.

4 DESIGNATION

Shall include:

a) Type of ring;
b) Nominal diameter; d_1
c) Axial width, h_1;
d) Number of this standard;
e) Material symbol;
f) Manufacturing process;
g) Whether internally bevelled (IF); and
h) Type of coating.

Example:

A narrow land slotted oil control ring (D-ring) having nominal diameter d_1=90 mm, axial width h_1=5 mm, made of alloyed cast iron (A4) and phosphated on all sides (P) shall be designated as:

D-Ring 90 × 5 IS: 8422 (Part 8) A4 P

Nom Dia. d_1	Inside Dia. d_2	Radial Wall Thickness		Axial Width of Ring hi		Closed Gap	Cham-fering of Inside Edges	Radius	Land h_4 for h_1 Shown in Column		Land h_5; for h_1 Shown in Column		Depth of Groove	No. of Slots	Width of Slots c_1 for h_1 Shown in Column		Tangential Force Ft* in N ±20% for h_1 Shown in Column	
		a_1	Tol	1	2				1	2	1	2			1	2	1	2
50 52 53	45.8 47.6 48.5	21 2.2 2.25	+0.10 -0.20 with a maxi-mum variation of 0.15 in a ring	$4^{-0.010}_{-0.022}$	$4.5^{-0.010}_{-0.022}$	$0.15^{+0.25}_{0}$	0.2 ± 0.1	0.5	$0.7^{+0.10}_{-0.05}$	$0.8^{+0.10}_{-0.05}$	0.25± 0.07	0.25± 0.07	0.6 ± 0.1	6	1 ± 0.1	1.2 ± 0.1	9 9.8 10.2	9.7 10 6 11
54 55 56 58	49-4 50.4 51.3 531	2.3 2.3 2.35 2.45															10.6 10.2 9.7 10.4	11.5 11 10.5 11.3
60 62 63 64	54.9 56.8 57.7 58.6	2.55 2.6 2.65 2.7				$0.20^{+0.25}_{0}$							0.8 ± 0.1	8			11.2 11.2 11-5 11.9	12.1 12.1 13.7 14.2
65 66 67	59.5 60.4 614	2.75 2.8 2.8															12.3 12.7 12.3	14.6 15.1 14.7
68 70 72 74	62.3 64.1 65.9 67.8	2.85 2.95 3.05 3.1															12.7 12.6 13.3 13.3	151 15 15.9 15.9
75 76 78	68.7 69.6 71.4	3.15 3.2 3.3				$0.25^{+0.25}_{0}$				$0.9^{+0.10}_{-0.05}$							13.7 14.1 14.8	16.4 16.8 17.8
80 82 84	73'3 751 76.9	3.35 3.45 3.55	+0.10 -0.25 with a maxi-mum variation of 0.18 in a ring		$5^{-0.010}_{-0.022}$		0.3 ± 0.15						1 ± 0.1				148 15.6 16.4	178 18.8 19.7
85 86 88	77.8 78.8 80.6	3.6 3.6 3.7															16.8 16.3 17.2	20.2 19.7 20.7
90 92 94	82.4 84.2 86.1	3.8 3.9 3.95				$0.30^{+0.30}_{0}$							1.2 ± 0.1				17 17.8 17.8	20.5 21.4 21.5
95 96 98	87 87.9 89.7	4 4.05 4.15															181 18.5 19.3	21.9 22.4 23.4
100 102	91.6 93.4	4.2 4.3		$5^{-0.010}_{-0.022}$	$6^{-0.010}_{-0.022}$				$0.9^{+0.10}_{-0.05}$	$1.1^{+0.10}_{-0.05}$		0.3+0-07			1.2 ± 0.1	1.4 ± 0.1	19.3 24.3 23.2	23.4 28.7 27.5

104	95.4	4.3																
105 106 108	96.1 97 99	4.45 4.5 4.5	+0.10 -0.25 with a maxi-mum variation of 0.18 in a ring	$5^{-0.010}_{-0.022}$	$6^{-0.010}_{-0.022}$	$0.30^{+0.30}_{0}$	0.3 ± 0.15	0.5	$0.9^{+0.10}_{-0.05}$	$1.1^{+0.10}_{-0.05}$	0.25 ± 0.07	0.3 ± 0.07	1.2 ± 0.1	10	1.2 ± 0.1	1.4 ± 0.1	25.7 26.2 25.1	30.4 31 29.7
110 112 114	100.8 102.6 104.6	4.6 4.7 4.7															26 26.9 25.9	30.8 31.9 30.6
115 116 118	105.4 106.4 108.2	4.8 4.8 4.9											1.4 ± 0.1				26.1 25.5 26.4	30.8 30.2 31.3
120 122 124	110 112 114	5 5 5															27.3 26.3 25.3	32.3 31.1 30
125 126 128	1146 115.6 117.6	5.2 5.2 5.2				$0.40^{+0.30}_{0}$	0.4 ± 0.15										28,5 28 27	33.8 33.2 32.1
130 132 134	119.2 121.2 123.2	5.4 5.4 5.4		$6^{-0.010}_{-0.022}$	$7^{-0.010}_{-0.022}$				$1.1^{+0.10}_{-0.05}$	$1.3^{+0.10}_{-0.05}$	0.3 ± 0.07	0.35 ± 0.07	1.6± 0.1	12	1.4 ± 0.1	1.6 ± 0.1	35.4 34.1 32.9	40.6 39.2 37.9
135 136 138	124 125 127	5.5 5.5 5.5															33.2 32.6 31.5	38.2 37.6 36.3
140 142 144	128.6 130.6 132.6	5.7 5.7 5.7															34.6 33.4 32.4	39.8 38'5 37'3
145 146 148	133.2 134.2 136.2	5.9 5.9 5.9															36 35.4 34.3	41.5 40.8 39.6
150 152 154	138 140 142	6 6 6				$0.50^{+0.30}_{0}$											35.3 34.2 33.2	40.7 39.5 38.3
155 156 158	142.6 143.6 145.6	6.2 6-2 6.2											1.8 ± 0.1				35.4 34.9 33.8	40.9 40.2 39.1
160 162 164	147.2 149.2 151.2	6.4 6.4 6.4															36.6 35.7 34.7	42.4 41.2 40
165 166 168	152 153 155	6.5 6.5 6.5															36.1 35.6 34.6	41.6 41.1 39.9

170	156.6	6.7															37.4	43.2
172	158.6	6.7															36.4	42
174	160.6	6.7															35.4	40.9

Nom Dia.	Inside Dia.	Radial Wall Thickness		Axial Width of Ring hi		Closed Gap	Cham-fering of Inside Edges	Radius	Land h_4 for h_1 Shown in Column		Land h_5; for h_1 Shown in Column		Depth of Groove	No. of Slots	Width of Slots c_1 for h_1 Shown in Column		Tangential Force Ft* in N ±20% for h_1 Shown in Column	
d_1	d_2	a_1	Tol	1	2		KI	r3	1	2	1	2			1	2	1	2
175 176 178	161.2 162.2 164.2	6.9 6.9 6.9	+0.15 -0.30 with a maxi-mum variation of 0.18 in a ring	$7^{-0.013}_{-0.028}$	$8^{-0.013}_{-0.028}$	$0.60^{+0.30}_{0}$	0.6 ± 0.2	0.5	$1.3^{+0.10}_{-0.05}$	$1.6^{+0.10}_{-0.05}$	0.35 ± 0.07	0.5± 0.1	2 ± 0.15	12	1.6± 0.1	1.8± 0.1	43.3 42.7 41.6	50.6 49.9 48.6
180 182 184	165.8 167.8 1698	7.1 7.1 7.1															44.8 43.6 42.5	52.3 50.9 49.6
185 186 188	1706 171.6 1736	7.2 7.2 7.2															44.1 43.5 42.4	51.4 50 8 49.4
190 192 194	1752 1772 179.2	7.4 7.4 7.4															45.5 44.4 43.3	53 51.7 50.4
195 196 198 200	180 181 183 184.6	7.5 7.5 7.5 7.7															44.7 44.2 43.1 46.2	52.2 51.6 50.3 53.8

NOTES — Tangential force F_t values in col 1 and 2 correspond to the values of axial width h_1 shown in col 1 and 2.

*Tangential load values are applicable for material Al only [see IS: 5791 - 1977 Technical supply conditions for piston rings for IC engines (first revision)]. For other materials load factors given in IS: 5791 - 1977 shall be used.

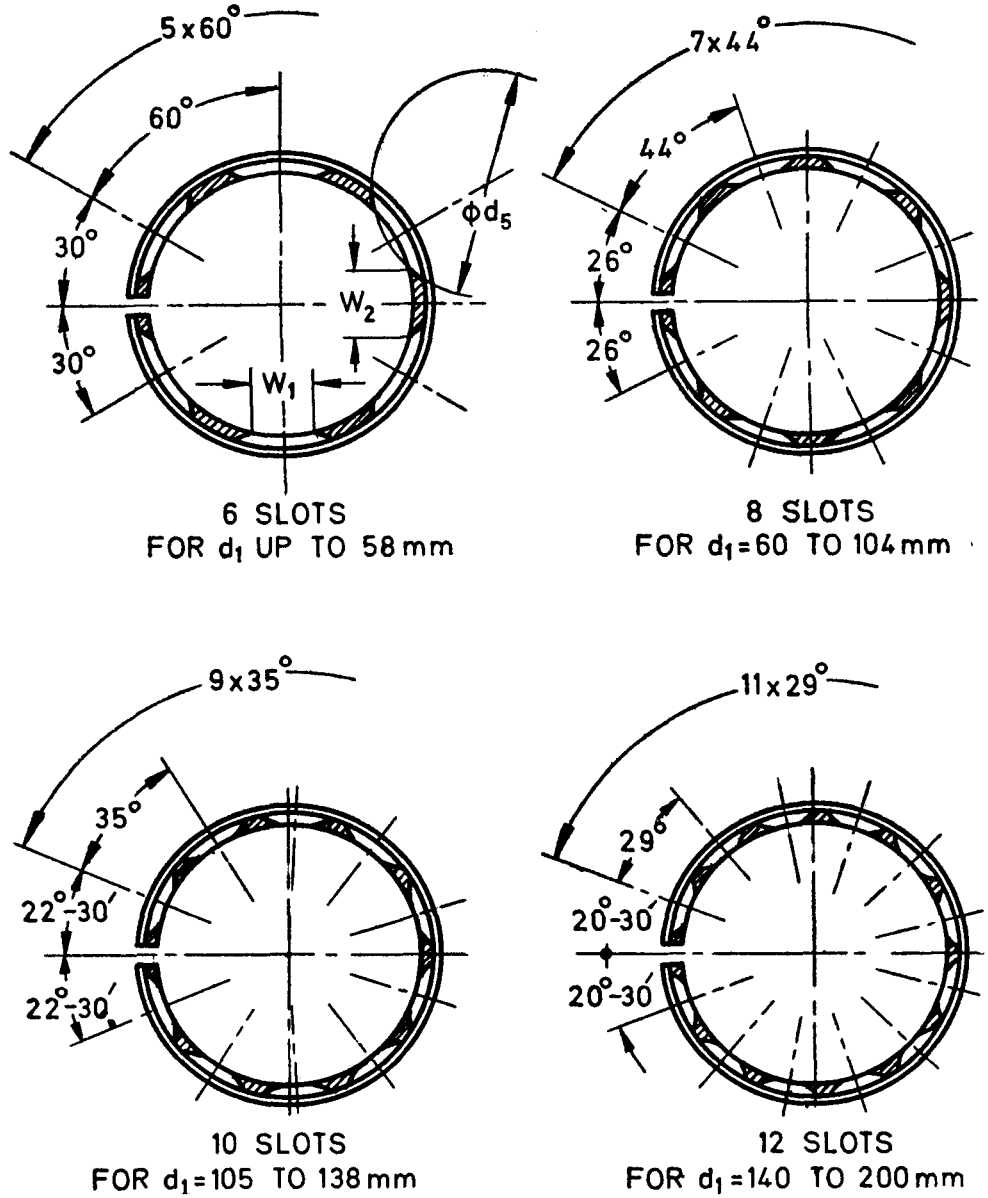


FIG. 2 ARRANGEMENT OF SLOTS

D1 mm	Outside Diameter of Cutter d_5 mm	Maximum Difference Between W_1 and W_2 mm
Up to 168	45 to 60	2
Above 170	55 to 75	4

5 GENERAL REQUIREMENTS

Shall be as given in IS 5791-1977.

6 MARKING

The rings which are to be fitted in a particular direction shall be marked with the word ‘TOP’

on the top-sides of the rings. For other markings reference should be made to IS: 5791-I 977.

6.1 BIS Certification Marking

Each piston rings for I.C engines may also be marked with the Standard Mark.

6.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

ANNEX A
(*Foreword*)

COMMITTEE COMPOSITION

AUTOMOTIVE PRIMEMOVERS, TRANSMISSION SYSTEMS AND INTERNAL COMBUSTION ENGINE SECTIONAL COMMITTEE, TED 02

Will be added later