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IS 452 (1973): Door Spring, Rat-Tail Type - Specification
[CED 15: Builder Hardware]



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Indian Standard
SPECIFICATION FOR
DOOR SPRING RAT-TAIL TYPE
(*Second Revision*)

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

Indian Standard

SPECIFICATION FOR DOOR SPRING RAT-TAIL TYPE (*Second Revision*)

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Indian Standard
SPECIFICATION FOR
DOOR SPRING RAT-TAIL TYPE
(*Second Revision*)

0. FOREWORD

0.1 This Indian Standard (Second Revision) was adopted by the Indian Standards Institution on 22 March 1973, after the draft finalized by the Builder's Hardware Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 This standard was published in 1953 and subsequently revised in 1963. A second revision of the standard has been issued to make improvements in the same in the light of the experience gained by the manufacturers and users since 1963. The second revision also makes reference to the recent Indian Standards on materials of construction.

0.3 This standard contains clause 7.2 which permits the purchaser to use his option for selection to suit his requirements.

0.4 While issuing this standard, the Sectional Committee took note of the acute scarcity of non-ferrous materials like copper, zinc and other alloys in the country and the need for conservation of the same in the national interest. However, in view of the demand for hardware items made of these materials in overseas markets, the Sectional Committee has retained them specifically to meet the requirements of export trade. For all indigenous use, it is recommended that hardware items made out of these materials should not be used.

0.5 In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

0.6 This standard is one of a series of Indian Standards on builder's hardware.

0.7 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 a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard lays down the requirements for materials, dimensions, manufacture, finish and tests for door springs, rat-tail type commonly used in building construction.

2. TYPES

2.1 Door springs, rat-tail type, shall be of the following two types according to the material used:

- a) Mild steel door springs, and
- b) Brass door springs.

3. MATERIAL

3.1 Mild Steel Sheets — Mild steel sheets and plates used in the manufacture of mild steel door springs, rat-tail type shall conform to Grade 0 of IS : 1079-1968† and shall satisfy the following bend test:

‘Suitable test pieces when cold shall withstand without fracture, being doubled over, either by pressure or by blows from a hammer, until the internal diameter is equal to twice the thickness of the test piece and the sides become parallel.’

3.2 Mild Steel Rods — Mild steel rods used shall conform to Grade St-42-S of IS : 226-1969‡.

3.3 Brass Rods — Brass rods used in the manufacture of door springs shall have copper content not less than 60 percent and tensile strength 40 kgf/mm² and shall conform to IS : 319-1968§.

3.4 Rivets — Rivets used shall be of mild steel and shall conform to IS : 2998-1965||.

*Rules for rounding off numerical values (*revised*).

†Specification for hot rolled carbon steel sheet and strip (*second revision*).

‡Specification for structural steel (standard quality) (*fourth revision*).

§Specification for free cutting brass rods and sections (*second revision*).

||Specification for cold forged steel rivets for cold closing.

3.5 Steel Wire — Steel wire for springs shall conform to Grade 1 or Grade 2 of IS : 4454-1967*.

3.6 Phosphor Bronze Wire — Phosphor bronze wire for springs shall conform to grade PCu Sn4 of IS : 1385-1968†.

3.7 Cast Brass — Cast brass used in the manufacture of brass door springs shall conform to Grade 3 of IS : 292-1961‡.

3.8 Brass Sheets — Brass sheets used in the manufacture of brass door springs shall conform to alloy designation CuZn 40 of IS : 410-1967§.

4. SIZES

4.1 Door spring of rat-tail type shall be of the following sizes:

300 mm and 375 mm

NOTE — The size of the door spring shall be denoted by the distance from the centre of the spindle to the centre of the roller.

5. DIMENSIONS

5.1 The leading dimensions of door springs shall conform to those specified in Fig. 1.

6. MANUFACTURE

6.1 Mild Steel Door Springs — The cylindrical casing shall be made either from mild steel sheet of 1.60 mm thickness, lap-jointed, welded, brazed or riveted; or made from steel tube of not less than 1.25 mm thickness. The casing shall be fitted at both ends with pressed mild steel caps with a round hole of 9.5 mm to pass the spindle. The spindle shall be of mild steel and 8 mm square in section. It shall be face-fitted at both ends into the spindle holders made from 2.00 mm thick mild steel sheet riveted to the base plate of 2.50 mm thickness as shown in Fig. 1. One end of the spring shall be securely fitted to the inside of the casing and the other end to the spindle. The tail rod shall be of mild steel and 10 mm in diameter. One end of the tail rod shall be forged, welded or riveted to the cylinder as shown in Fig. 1. To the other end of the tail rod a mild steel roller of 22 mm diameter shall be fitted as shown in Fig. 1. The rotation of the rod shall be smooth and square. The roller shall rotate freely without appreciable friction. The bearing portion of the roller and the roller plate shall be reasonably smooth. The roller plate shall be of mild steel sheet 1.60 mm in thickness.

*Specification for steel wires for cold formed springs.

†Specification for phosphor bronze rods and bars, sheet and strip, and wire (first revision).

‡Specification for brass ingots and castings (revised).

§Specification for rolled brass plate, sheet, strip and foil (second revision).

6.2 Brass Door Springs — The cylindrical casing shall be made either from brass sheet of 1.60 mm thickness or from seamless brass tube of 1.25 mm thickness. The casing shall be fitted at both ends with cast brass caps with a round hole of 9.5 mm diameter to pass the spindle. The tail rod shall be of rolled brass and shall be 10 mm in diameter. The base plate shall be made from brass sheet of 2.50 mm thickness and roller plate from brass sheet of 1.60 mm thickness. In all other respects brass door springs shall conform to the requirements specified for mild steel door springs.

7. FINISH

7.1 In the case of mild steel door springs, casing, tail rod, spindle cap and base plate shall be stove enamelled black or copper oxidized. Spindle, roller plate and roller shall be bright finished and the spring if made of steel wire shall be copper oxidized or electro galvanized.

7.2 In the case of brass door springs, casing, tail rod, spindle cap and base plate shall be bright finished or copper oxidized as required by the purchaser. Spindle, roller plate and roller shall be bright finished and the spring if made of mild steel wire shall be copper oxidized or electro-galvanized.

8. PERFORMANCE TESTS

8.1 Each door spring shall withstand the following tests which shall be carried out after fitting the spring to the door frame:

- a) The tail rod when pushed through to the maximum possible limit and released 100 times in quick succession the spring shall show no sign of damage or any permanent set during or on completion of the test.
- b) The torque required to push open the door through 90° shall not exceed 4 kg m.

9. MARKING

9.1 Each door spring shall have clearly and permanently marked on its casing name or trade-mark of the manufacturer and the size of door springs.

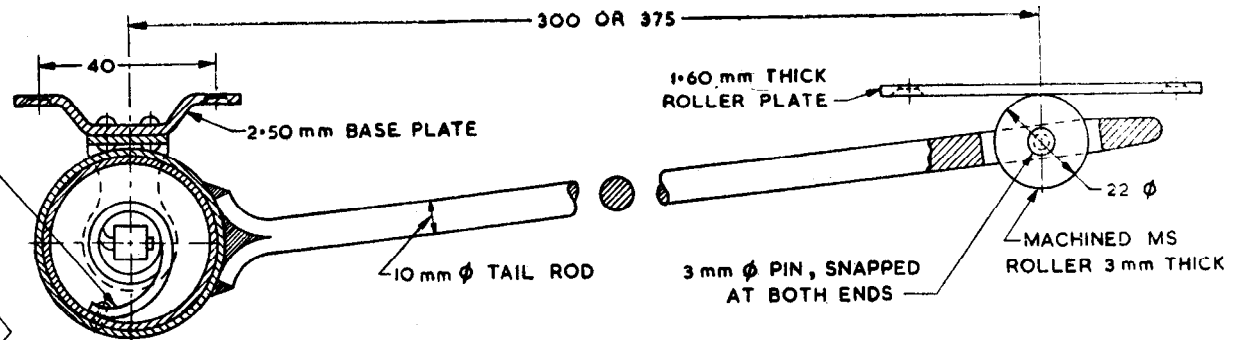
9.1.1 The door spring may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

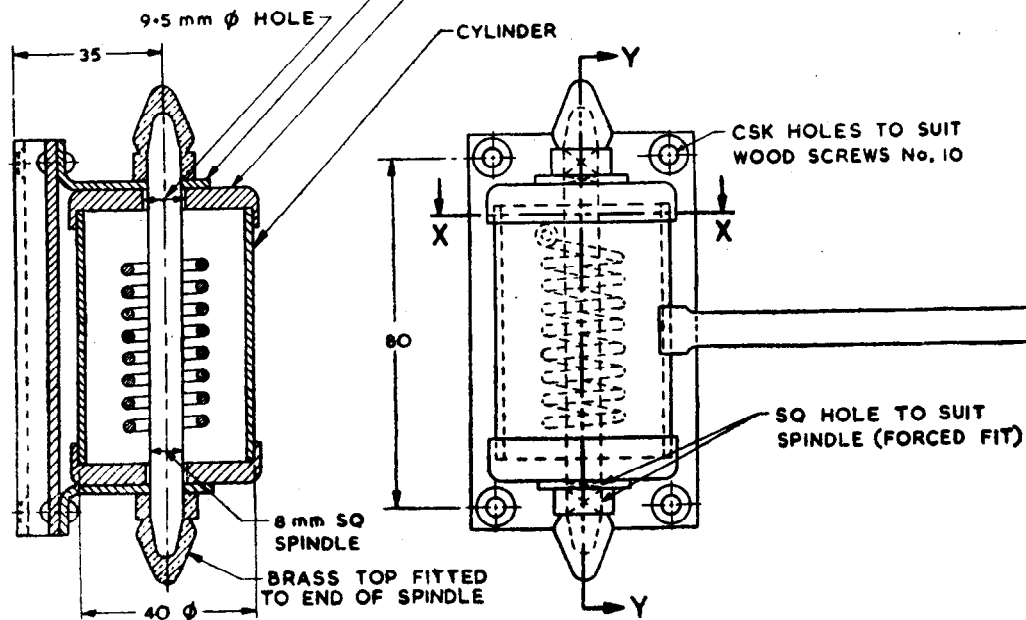
3.55 mm ϕ SPRING, ONE
END RIVETED TO THE CYLINDER AND
THE OTHER END INSERTED INSIDE
THE SPINDLE

CAP FOR CYLINDER

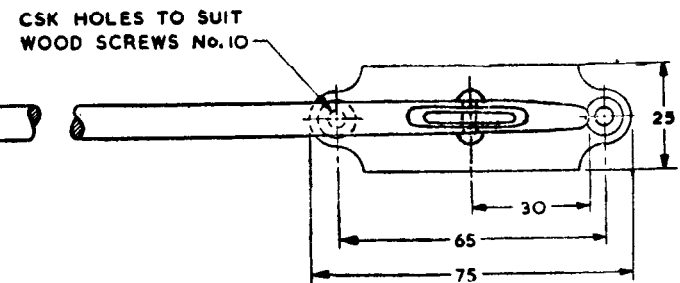
SPINDLE HOLDER RIVETED TO
BASE PLATE



SECTION XX



SECTION YY



All dimensions in millimetres.

FIG. 1 TYPICAL DESIGN OF RAT-TAIL TYPE DOOR SPRING

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10. PACKING

10.1 Door spring shall be wrapped in strong kraft paper and packed in carton or other approved packing, each containing six door springs. When packed in wooden boxes, each box shall contain twelve door springs.

10.2 Each package shall be labelled with the name or trade-mark of the manufacturer, particulars of the quantity, description of the contents and size of door springs.

11. SAMPLING AND CRITERION FOR CONFORMITY

11.1 The scale of sampling and criterion for conformity, for door spring rat-tail type shall be as given in Appendix A.

A P P E N D I X A

(Clause 11.1)

SAMPLING AND CRITERION FOR CONFORMITY

A-1. LOT

A-1.1 In any consignment, all the door springs of the same type and size and manufactured at the same time shall be grouped together to constitute a lot.

A-2. SAMPLE SIZE

A-2.1 The number of door springs to be selected from the lot shall depend upon the size of the lot and shall be in accordance with col 1 and 2 of Table 1.

A-2.1.1 Door springs shall be selected at random from at least 10 percent of the packages subject to a minimum of 3, equal number of springs being selected from each package.

A-3. TESTS

A-3.1 All door springs selected as in **A-2.1** shall be checked for dimensional requirements (*see 5*), manufacturing defects (*see 6*) and finish (*see 7*). Any spring which fails to satisfy the requirements of any one or more of the characteristics shall be considered as a defective spring.

TABLE 1 SCALE OF SAMPLING AND CRITERION FOR CONFORMITY(*Clauses A-2.1 and A-4.1*)

LOT SIZE	SAMPLE SIZE	PERMISSIBLE NO. OF DEFECTIVE DOOR SPRINGS
(1)	(2)	(3)
Up to 200	15	0
201 „ 300	20	1
301 „ 500	30	2
501 „ 800	40	2
801 and above	55	3

NOTE — The sampling plan given here is such that lots with 1.5 percent or less defectives will be accepted most of the times.

A-4. CRITERION FOR CONFORMITY

A-4.1 The lot shall be considered as conforming to the requirements of this standard if the number of defective springs among those inspected does not exceed the corresponding number given in col 3 of Table 1; otherwise it shall be considered as not conforming to the requirements of this standard. For conformity to the requirements of the material, the manufacturer shall provide a certificate of compliance to the requirements of the corresponding Indian Standards (*see 3*).

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