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"पुराने को छोड नये के तरफ"
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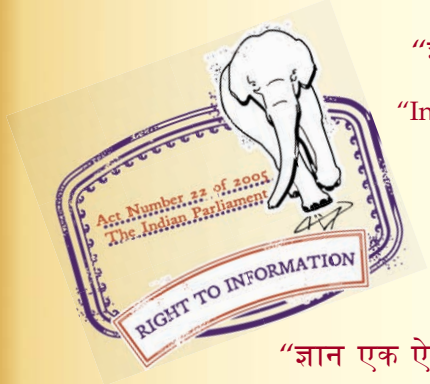
"Step Out From the Old to the New"

IS 3564 (1995): Hydraulically Regulated Door Closers -Specification [CED 15: Builder Hardware]



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"Knowledge is such a treasure which cannot be stolen"

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IS 3564 : 1995
Reaffirmed 2002

भारतीय मानक

द्रव चालित डोर क्लोजर – विशिष्टि

(चौथा पुनरीक्षण)

Indian Standard

HYDRAULICALLY REGULATED DOOR CLOSERS — SPECIFICATION

(Fourth Revision)

UDC 683·374·24

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

April 1995

Price Group 5

Builders Hardware Sectional Committee, CED 15

FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Builders Hardware Sectional Committee had been approved by the Civil Engineering Division Council.

Automatic door closers are being increasingly used at present in buildings. They are particularly needed in air-conditioned buildings, restaurants, hospitals and other public buildings where doors are frequently used and keeping them in closed position after usage is considered essential to reduce outside noise, to maintain inside temperature condition and privacy.

Door closers are made in several designs and types; some are made to be fixed in concealed positions while others are made to function in exposed positions; some work only on spring action while others require hydraulic check to arrest motion/speed in closing the door and to avert banging. This standard covers the hydraulic door closers of exposed type which are being widely used in the country and lays down the requirements for their manufacture and performance.

This Standard was first published in 1966 and subsequently revised in 1970, 1975 and 1986. The present revision has been taken up with a view to incorporating the modifications found necessary as a result of experience gained in the use of this standard. The major changes in the revision include:

i) Tubular type door closer and requirements thereof,

ii) Modification of endurance test procedure, and

iii) Method of test for checking the performance of the door closer at —10°C and 50°C.

Technical Committee responsible for the formulation of this standard is given at Annex C.

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 '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.

Indian Standard

HYDRAULICALLY REGULATED DOOR CLOSERS — SPECIFICATION

(Fourth Revision)

1 SCOPE

1.1 This standard covers the requirements for exposed type hydraulically regulated door closers for vertical hinge type doors opening to one side only and not weighing more than 80 kg.

1.2 This standard does not cover the requirements for concealed type hydraulic door closers and also the pneumatic or mechanical type of door closers.

2 REFERENCES

The Indian Standards listed at Annex A, are necessary adjuncts to this standard.

3 TERMINOLOGY

3.0 For the purpose of this standard, the following definitions shall apply.

3.1 Door Closer (Hydraulically Regulated)

A hydraulic door closer (hereinafter called closer) is an equipment for automatic closing of doors by the help of spring control valve such that the phase of closing is slowed down by the hydraulic damper.

3.2 Anti-Clockwise Door (Right-Hand Door)

A door which, when viewed from above, rotates in an anti-clockwise direction about its hinges while opening.

3.3 Clockwise Door (Left-Hand Door)

A door which, when viewed from above, rotates in a clockwise direction about its hinges while opening.

3.4 A Right Closer

A closer which is required to be used on an anti-clockwise door.

3.5 A Left Closer

A closer which is required to be used on a clockwise door.

3.6 A Universal Closer

A closer which is suitable for both anti-clockwise and clockwise doors without any change in the parts of closer.

4 TYPES

Hydraulically regulated door closers shall be of the following types:

a) Bottle type (*see* Fig. 1 and 2) (Type A), and

b) Tubular type (*see* Fig. 3 and 4) (Type B)

5 COMPONENTS

The main components of a hydraulic door closer for bottle and tubular types are shown in Fig. 1, 3 and 4.

6 NOMINAL SIZES

The nominal sizes of door closers in relation to the mass and the width of the door size, to which it is intended to be fitted, shall be as given in Table 1.

7 MATERIALS

The materials to be used for main component parts of door closers are given in Table 2.

8 ESSENTIAL REQUIREMENTS

8.1 The closer shall be manufactured in three sizes conforming to the requirements given in Table 1, in accordance with the direction of the opening of the door either clockwise or anti-clockwise.

8.2 The closing time shall be easily adjustable between 5 and 20 seconds by means of regulating screw.

8.3 Hydraulic oil filling shall work satisfactorily at all temperatures between 50°C and—10°C without requiring any change except adjustment of the regulating screw. The closer shall be tested as given in **8.3.1**.

NOTE — Necessary instructions shall be furnished by the manufacturer for this purpose at the time of supply.

8.3.1 The closer before testing shall be conditioned to a temperature of 50°C ± 2°C and −10°C ± 2°C for not less than 3 hours separately. The conditioned closer shall be tested for its

performance requirements as given in **8.2** and **B-1.4** The above performance requirements shall be checked within 15 minutes of its conditioning. At the end of the test the closer shall show no defects or leakage of oil.

8.4 The main arm shall be securely fitted to the shaft by a square or hexagonal profile or profile of any other suitable shape or by any other suitable means, and a nut and a washer.

8.5 Provisions shall be made for securely fixing the door closer to the door frame and to the door panel.

8.6 The nut/top lid of the assembly shall be fixed firmly on to the body and it shall be possible to remove the same whenever necessary for carrying out repairs, such as replacement of broken spring, oil seal, etc.

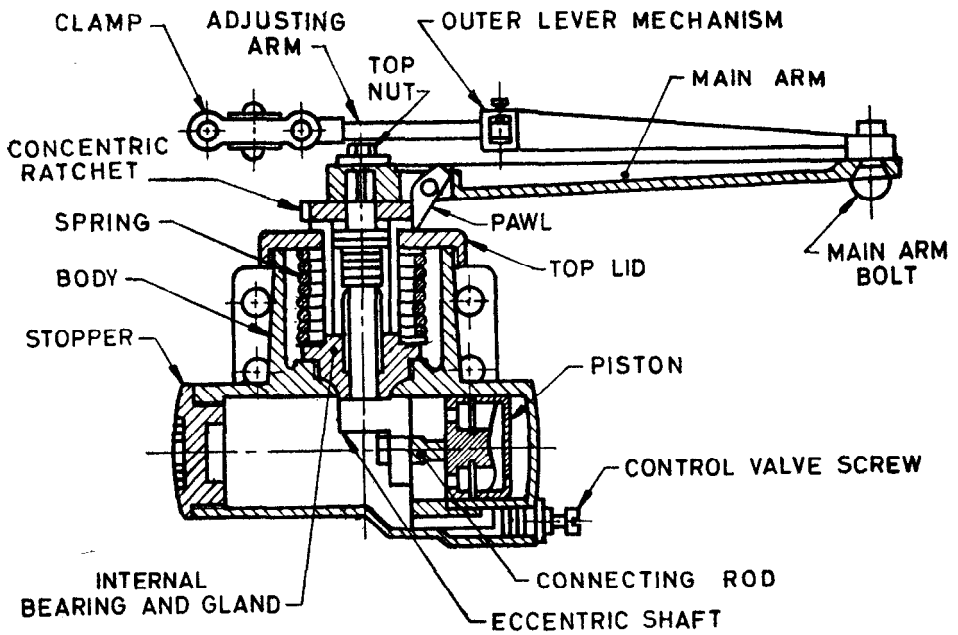

FIG. 1 TYPICAL SKETCH OF HYDRAULIC DOOR CLOSER SHOWING MAIN COMPONENTS
(BOTTLE TYPE)

Table 1 Designation of Door Closers

(*Clause* 6)

Sl No.	Designation of Closer	Mass of the Door	Width of the Door	Remarks
(1)	(2)	(3) (kg)	(4) (mm)	(5)
i)	1	Up to 35	Up to 700	For light doors, such as double leaved and toilet doors
ii)	2	36 to 60	701 to 850	Interior doors, such as of bedrooms, kitchen and store
iii)	3	61 to 80	851 to 1 000	Main doors in a building, such as entrance doors

Table 2 Materials for Component Parts of Hydraulically Regulated Door Closer

(*Clause 7*)

Sl No.	Component Part	Suitable Material	Ref to IS No.
(1)	(2)	(3)	(4)
i)	Non-porous body and back plate	Cast iron/Aluminium alloy/Zinc alloy	210 : 1978/617 : 1975/ 742 : 1981
ii)	Torsion spring helical spring	Steel	4454 (Part 2) : 1975/ 2507 : 1975
iii)	Nuts	Cast iron/Steel/Brass	210 : 1978/7283 : 1992/ 292 : 1983
iv)	Piston or Rack-piston/pinion	Cast iron/Steel aluminium alloy/ Zinc alloy	210 : 1978/7283 : 1992/ 617 : 1975/742 : 1981
v)	Packing/washers	Cork sheet/Nylon/Neoprene rubber	4253 (Part 1) : 1980
vi)	Control valve screw	Brass/Bronze/Aluminium alloy/ Steel/Zinc alloy	292 : 1983/28 : 1985/ 617 : 1975/ Grade A of 2062 : 1992/742 : 1981
vii)	All weather resistant homogeneous high viscosity hydraulic fluid	Hydraulic oil	3098 : 1983
viii)	Adjusting arm	Aluminium alloy/Steel/Zinc alloy/ Forged steel	617 : 1975/7283 : 1992/ 742 : 1981/1875 : 1992
ix)	Main arm	Aluminium alloy/Steel/Zinc alloy/ Forged steel	617 : 1975/7283 : 1992 742 : 1981/1875 : 1992
x)	Clamp	Cast iron/Steel/Forged steel	210 : 1978/7283 : 1992/ 1875 : 1992
xi)	Concentric ratchet (For bottle type)	Steel/Aluminium alloy/Zinc alloy	7283 : 1992/617 : 1975/ 742 : 1981
xii)	Eccentric shaft	Steel	7283 : 1992
xiii)	Internal bearing and gland	Cast iron/Brass/Steel/with washer made out of mineral oil resistant material	210 : 1978/292 : 1983/ 7283 : 1992
xiv)	Main arm bolt	Steel	7283 : 1992
xv)	Top nut	Steel	7283 : 1992
xvi)	Pawl	Steel/Brass	7283 : 1992/292 : 1983
xvii)	Top lid	Steel sheet/Aluminium alloy sheet/Cast iron/Zinc alloy/ Aluminium alloy	513 : 1994/737 : 1986 210 : 1978/742 : 1981/ 617 : 1975

8.7 The closer shall be capable to regulate the speed by extending spring or adjustment in control valve screw, as the case may be.

8.8 Typical illustrations of bottle and tubular type door closers are given in Fig. 2 and 3, respectively.

9 FINISH

9.1 The door closer may be polished or painted and finished with lacquer in colours as agreed to between the purchaser and the manufacturer. In case of aluminium body, it may be anodized. In case anodizing is done, the thickness of the anodic coating shall not be less than Grade AC 15 of IS 1868 : 1982.

9.2 Mild steel parts shall be given the treatment as given in **9.2.1** and **9.2.2**.

9.2.1 All dents, burrs and sharp edges shall be removed from various components and they shall be pickled, scrubbed and rinsed to remove grease, rust, scale or any other foreign element.

9.2.2 After pickling, all the mild steel parts shall be given phosphating treatment in accordance with IS 3618 : 1966.

NOTE — Filler shall be applied to all surfaces requiring filling and shall conform to IS 110 : 1983.

10 TESTS

The tests on closers shall be carried out at ambient temperature as given in Annex B.

11 MARKING

11.1 Each closer shall be marked with the following information:

a) Manufacturer's name or trade-mark;

b) Right closer, left closer or universal closer or 'R', 'L' or 'U', respectively;

c) Size of the closer;

d) Type of the closer; and

e) Serial number.

11.2 Each door closer may also be marked with the Standard Mark.

11.2.1 The use of the Standard Mark is governed by the provisions of Bureau of Indian Standard Act 1986 and the rules and regulations made thereunder. Details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

12 PACKING

12.1 The door closer shall be packed in individual cardboard/wooden boxes, with reinforcing boards or straw to prevent damage to painting. Packing shall be of such type and quality that it prevents ingress of the moisture during storage.

12.2 Each door closer shall be supplied with a list of accessories mentioned in **13** along with a leaflet furnishing instructions for its installation, use and maintenance.

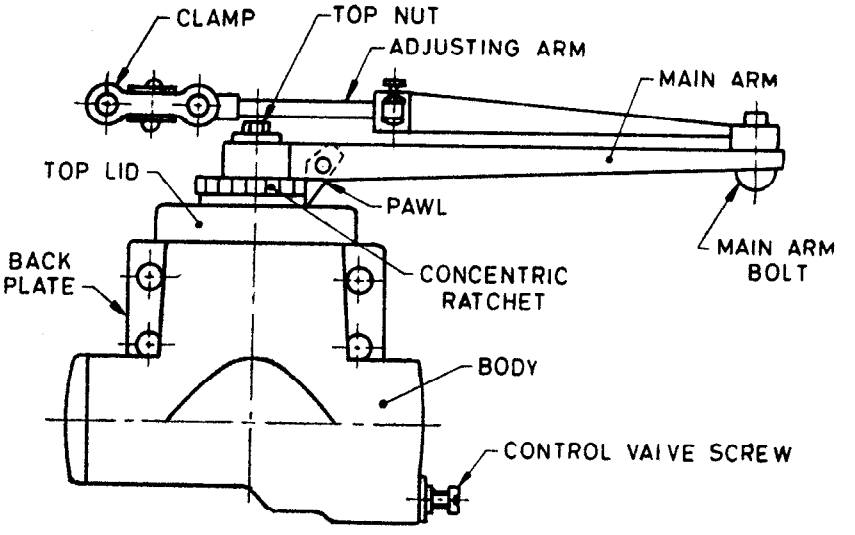

FIG. 2A TYPICAL ILLUSTRATION OF HYDRAULICALLY REGULATED DOOR CLOSER (BOTTLE TYPE)

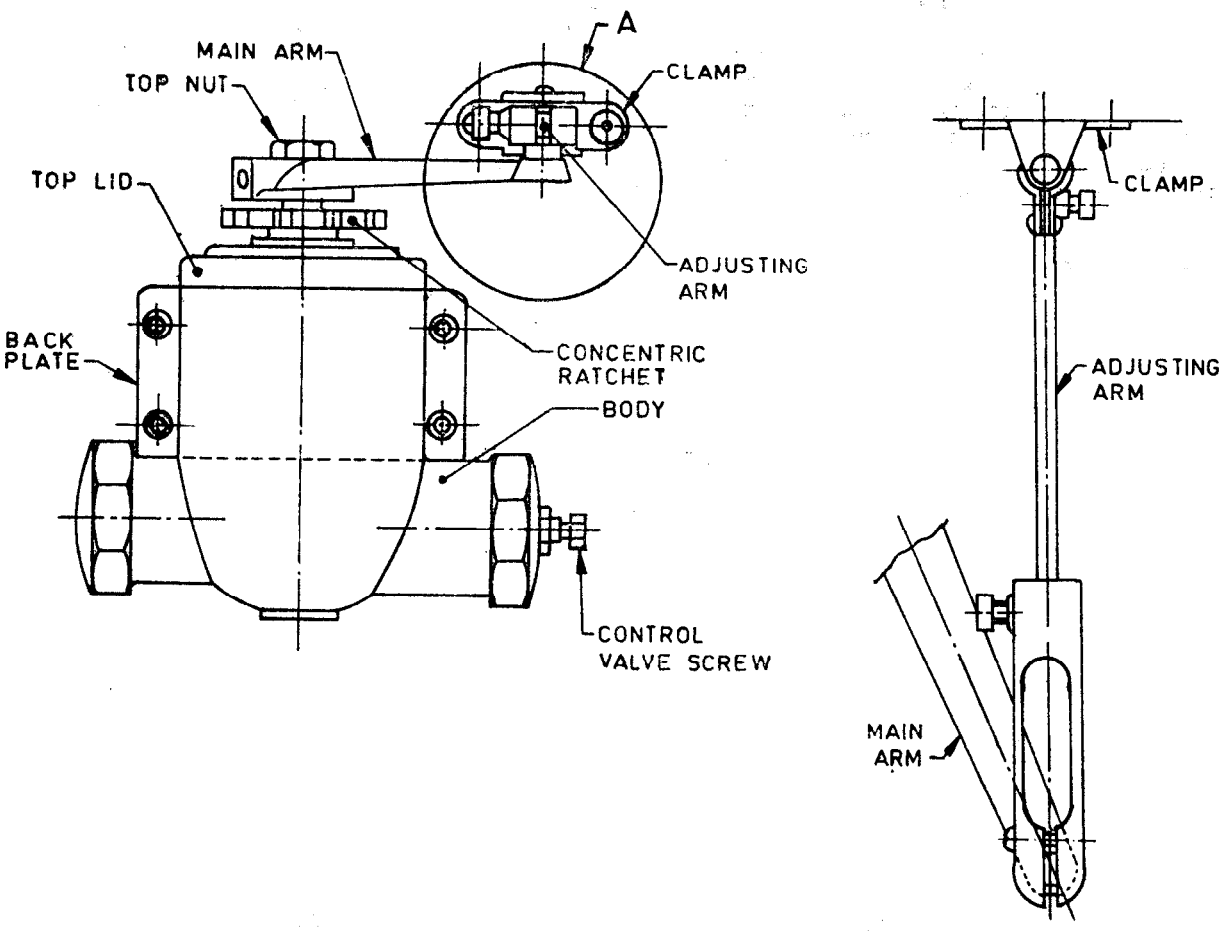

FIG. 2B TYPICAL ILLUSTRATION OF HYDRAULICALLY REGULATED DOOR CLOSERS (BOTTLE TYPE)

13 ACCESSORIES

Each closer shall be supplied with one fitting key or a suitable spanner for adjusting the spring valve and regulating screw.

14 SAMPLING AND CRITERION FOR CONFORMITY

14.1 Lot

All the door closers of the same nominal size and shape and from the same batch of manufacture, in one consignment, shall constitute a lot.

14.2 Sample Selection

14.2.1 The number of door closers to be selected at random from a lot shall depend upon the size of the lot and shall be in accordance with col 1 to 4 of Table 3.

14.2.2 The door closers shall be selected at random from the lot. For random selection of the door closers, the procedures for simple random sampling or systematic sampling as given in IS 4905 : 1968 may be adopted.

14.3 Number of Tests and Criteria for Conformity

14.3.1 *For Construction, Finish, Dimensions, Interchangeability of Parts and Performance Tests*

All the door closers drawn in accordance with **14.2.1** and Table 3 shall be examined for construction, finish, dimensions and interchangeability of parts and tested for performance. Any door closer failing in any one or more of these characteristics shall be considered as defective. If in the first sample, the number of defective door closers is less than or equal to the corresponding acceptance number, the lot shall be declared as conforming to the requirements of these characteristics. If the number of defective door closers is greater than or equal to the rejection number, the lot shall be deemed as not meeting with the requirements of these characteristics. If the number of defectives is greater than the acceptance number but less than the rejection number, a second sample of the size equivalent to that of the first shall be

taken to determine the conformity or otherwise of the lot. The number of defective door closers found in the first and the second sample shall be combined and if the combined number of defectives thus obtained is less than or equal to the corresponding acceptance number, the lot shall be declared as conforming to the requirements of these characteristics

14.3.2 *Endurance Test*

Two door closers in case of lot size 280 or less and five door closers in case of lot size more than 280 shall be selected from those already found satisfactory under **14.3.1**. These door closers shall be tested for the endurance test (*see* **B-1.5**). If all the door closers tested for the endurance test satisfy the requirements of the standard, the lot shall be deemed as having satisfied the requirements of the endurance test, otherwise not.

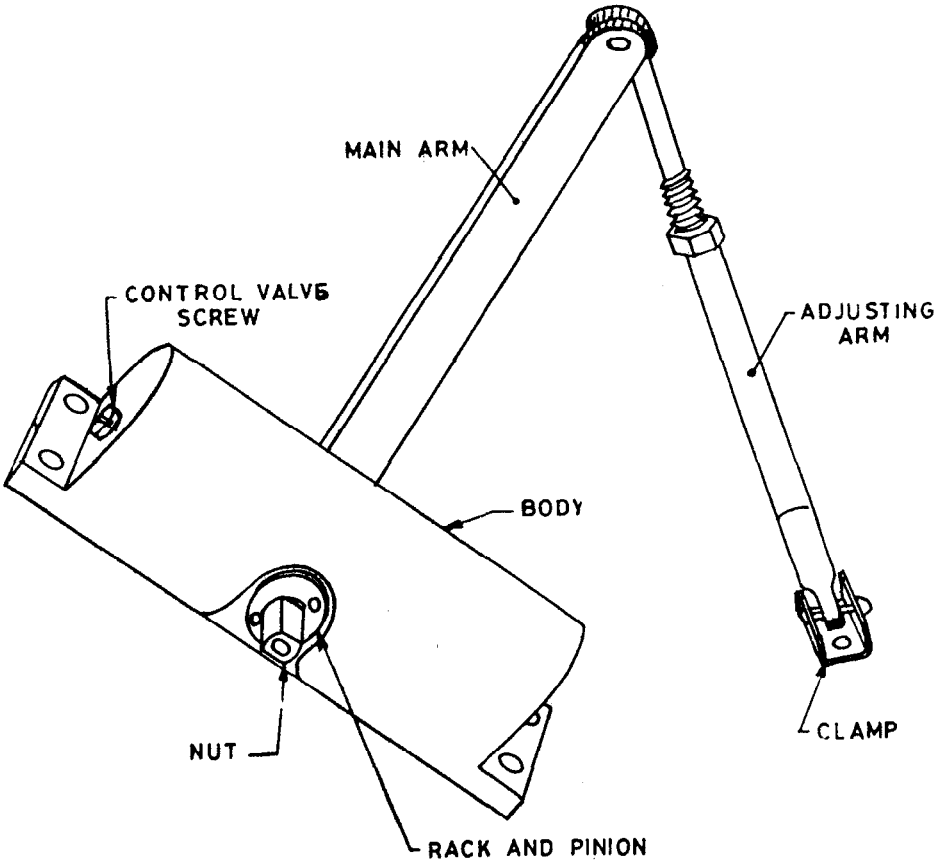

FIG. 3 TYPICAL ILLUSTRATION OF TUBULAR TYPE OF DOOR CLOSER

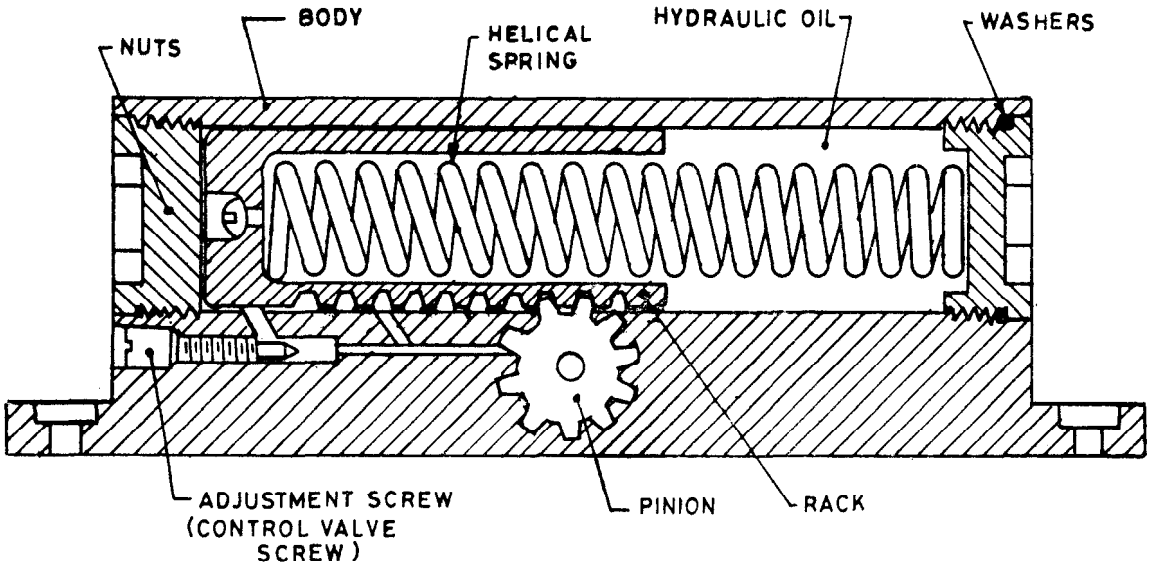

FIG. 4 TYPICAL SKETCH OF HYDRAULIC DOOR CLOSER (TUBULAR) SHOWING MAIN COMPONENTS

Table 3 Sample Size and Criterion for Conformity for Construction, Finish, Dimensions, Interchangeability of Parts and Performance Test

(*Clauses* 14.2.1 *and* 14.3.1)

No. of Door Closers in the Lot	Sample	Sample Size	Cumulative Sample Size	Acceptance Number	Rejection Number
(1)	(2)	(3)	(4)	(5)	(6)
Up to 50	First	8	8	0	2
	Second	8	16	1	2
51 to 90	First	13	13	0	2
	Second	13	26	1	2
91 to 150	First	20	20	0	3
	Second	20	40	3	4
151 to 280	First	32	32	1	4
	Second	32	64	4	5
281 to 500	First	50	50	2	5
	Second	50	100	6	7
501 to 1 200	First	80	80	3	7
	Second	80	160	8	9
1 201 to 3 200	First	125	125	5	9
	Second	125	250	12	13
3 201 and above	First	200	200	7	11
	Second	200	400	18	19

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
28 : 1985	Phosphor bronze ingots, and castings (*fourth revision*) (Reaffirmed 1991)
110 : 1983	Ready mixed paint, brushing, grey filler, for enamels for use over primers (*first revision*) (Reaffirmed 1990)
210 : 1978	Grey iron castings (*third revision*) (Amendments 2) (Reaffirmed 1991)
292 : 1983	Leaded brass ingots and castings (*second revision*) (Amendment 1) (Reaffirmed 1988)
513 : 1994	Cold rolled low carbon steel sheets and strips (*fourth revision*) (Reaffirmed 1992)
617 : 1975	Aluminium and aluminium alloy ingots and casting for general engineering purposes (*second revision*) (Amendments 3) (Reaffirmed 1991)
737 : 1986	Wrought aluminium and aluminium alloy sheet and strip for general engineering purposes (*third revision*) (Reaffirmed 1991)
742 : 1981	Zinc base alloy die castings (*second revision*) (Reaffirmed 1993)
1868 : 1982	Anodic coatings on aluminium and its alloys (*second revision*) (Reaffirmed 1991)
1875 : 1992	Carbon steel billets, blooms, slabs and bars for forging (*fifth revision*) (Amendment 1)
2062 : 1992	Steel forg eneral structural purposes (*fourth revision*) (Supersedes IS 226 : 1975)
2507 : 1975	Cold rolled steel strips for springs (*first revision*) (Amendments 2) (Reaffirmed 1992)
3098 : 1983	Specification for oil, hydraulic, mineral oil type (*second revision*) (Reaffirmed 1988)
3618 : 1966	Phosphate treatment of iron and steel for protection against corrosion (Reaffirmed 1991)
4253 (Part 1) : 1980	Cork composition sheets : Part 1 Plain cork (Amendments 2) (Reaffirmed 1989)
4454 (Part 2) : 1975	Steel wires for cold formed springs: Part 2 oil hardened and tempered spring steel wire and valve spring wire unalloyed (*first revision*). (Amendment 1) (Reaffirmed 1992)
4905 : 1968	Method for random sampling. (Amendment 1) (Reaffirmed 1991)
7283 : 1992	Hot rolled bars for production of bright bars and machined parts for engineering applications (*first revision*)

ANNEX B

(*Clause* 10)

TESTS ON CLOSERS

B-1 DETAILS OF TESTS

B-1.1 The closers shall be tested according to the sequence of instructions given in **B-1.2** to **B-1.5**.

B-1.2 Visual Inspection

The packing of the closers shall be inspected for conformity to **12**.

B-1.3 Surface

The surface of the closers shall be clean, without sharp edges, free from cracks, dents, burrs, or any other visible surface defect.

B-1.4 Performance Requirements

After being fitted in its position when the door is opened through 90°, the same should swing back to an angle of 20° ± 5° with normal speed, but thereafter the speed should get automatically retarded and in case of doors with latches, it should be so regulated that in its final position the door smoothly negotiates with the latch.

B-1.5 Endurance Test

The closer selected in accordance with **14** shall be fitted to the test piece which shall be subjected to total 50 000 operations against the maximum load specified for the type of closer. The number of operations that shall be carried out continuously at any time during the test shall not be less than 2 500 to 3 000. One opening and closing shall constitute one operation. The test shall be conducted at the rate of 4 to 6 operations per minute. At the end of the test, the closer shall show no defects, failure or leakage of oil, etc.

ANNEX C

(*Foreword*)

COMMITTEE COMPOSITION

Builders Hardware Sectional Committee, CED 15

Chairman

SHRI P. KRISHNAN
103 Charak Sadan Vikaspuri, New Delhi-110018

Members	*Representing*
SUPRINTENDING ENGINEER	Central Public Works Department, New Delhi
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SHRI J. VENKATARAMAN, Director (Civ Engg)	Director General, BIS (*Ex-officio Member*)

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HEMANT KUMAR
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Revision of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Addition'.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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