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“The Right to Information, The Right to Live”

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Jawaharlal Nehru
“Step Out From the Old to the New”

IS 6571 (1991): Rehabilitation equipment - Wheelchairs, non-folding, adult size, institutional model [MHD 10: Medical Laboratory Instruments]

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartrhari—Nitisatakam
“Knowledge is such a treasure which cannot be stolen”
REHABILITATION EQUIPMENT —
WHEELCHAIRS, NON-FOLDING, ADULT SIZE,
INSTITUTIONAL MODEL — SPECIFICATION

(First Revision)

First Reprint MARCH 2001

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

October 1991
FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Artificial Limbs, Rehabilitation Appliances and Equipment for the Disabled Sectional Committee had been approved by the Medical Equipment and Hospital Planning Division Council.

The wheelchair is basically used for transportation of patients with varying physical impairment. To meet the requirement of different categories of patients, different features are required to be provided in the wheelchair. These features are as given below:

a) Armrest  
   1) Fixed  
   2) Detachable

b) Legrest  
   1) Fixed  
   2) Swinging and detachable  
   3) Swinging, detachable and elevating

c) Footrest  
   1) Swinging without height adjustment  
   2) Swinging with height adjustment

The various combinations of above features will make a totally different wheelchair suitable for a particular category of patients. Thereby, a large number of models can be obtained.

The purchaser should, therefore, mention the model with combination of these features/facilities. However, if not mentioned, the basic model shall be a(1), b(1) and c(1).

This standard was first published in 1972. The significant changes in this revision ensure that the chair is built in such a manner as to adopt various commonly used accessories. This standard permits the use of high strength, low weight steel tubing, shouldering action and an inclined seat. The load test has been incorporated in the revised version.

The requirements of stability test are under consideration and will be included when they are finalized.

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 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.
AMENDMENT NO. 1 NOVEMBER 1992
TO
IS 6571 : 1991 REHABILITATION EQUIPMENT —
WHEELCHAIRS, NON-FOLDING, ADULT SIZE,
INSTITUTIONAL MODEL — SPECIFICATION
(First Revision)

(Page 1, Table 1, tenth row) — Substitute the following for the existing entry:
‘Clearance of frame from floor 90, Min’

(Page 5, clause 9.3) — Insert the following new clause after 9.3:
‘9.4 Stability Test
The wheelchair must resist toppling. All wheels must remain in contact with the surface of a 9° slope when the wheelchair is loaded with a 100 kg test load and positioned on the 9° slope with the front of the chair, pointed up-slope and the locks on the drive wheels engaged.’
AMENDMENT NO. 2 FEBRUARY 1993
TO
IS 6571:1991 REHABILITATION EQUIPMENT —
WHEELCHAIRS, NON-FOLDING, ADULT SIZE,
INSTITUTIONAL MODEL — SPECIFICATION

(First Revision)

(Page 3, clause 6.6) — Substitute the following for the existing clause:

"6.6 The solid tyres used in castors shall be made of non-marking resilient rubber
with a minimum hardness of 60 to 70 shore 'A' with smooth treads."

(Page 3, clause 6.7.1, second sentence) — Substitute the following for the existing sentence:

"The solid tyres used in castors shall be made of non-marking resilient rubber
with a minimum hardness of 60 to 70 shore 'A' with smooth treads."

(Page 4, clause 7.7.1) — Substitute the following for the existing clause:

"7.7.1 The wheelchair shall have two castors which shall be able to swivel through
360° in both directions, firmly secured to the frame in the front with either of the
following combinations of bearings for smooth and silent performance:

a) Two ball/thrust bearings, or

b) One ball/thrust bearing and a pair of swivelling bush bearings."

(Page 4, clause 7.7.3) — Substitute the following for the existing clause:

"7.7.3 The tyre shall be not less than 150 mm in diameter. The tyre shall be
snap-on type and it shall not roll on the wheel rim under normal loads."

(Page 4, clause 7.8) — Substitute the following for the existing clause:

"7.8 Wheels

The wheels shall be fixed to the frame in such a manner that the fitting shall be
rugged enough to withstand the shocks during normal use. The wheels shall not
rotate in more than one plane when the chair loaded with 100 kg is propelled. The
wheels shall be removable from the chair without disturbing the bearing
assembly."

(MHD 10)
AMENDMENT NO. 3 APRIL 1995

TO

IS 6571 : 1991 REHABILITATION EQUIPMENT —
WHEELCHAIRS, NON-FOLDING, ADULT SIZE,
INSTITUTIONAL MODEL — SPECIFICATION

(First Revision)

(Page 1, Table 1, eleventh row) — Substitute the following for the existing entry:

<table>
<thead>
<tr>
<th>Wheel diameter</th>
<th>40-534</th>
</tr>
</thead>
<tbody>
<tr>
<td>(24&quot; × 1 1/8&quot;)</td>
<td></td>
</tr>
</tbody>
</table>
Indian Standard

REHABILITATION EQUIPMENT — WHEELCHAIRS, NON-FOLDING, ADULT SIZE, INSTITUTIONAL MODEL — SPECIFICATION

(First Revision)

1 SCOPE

1.1 This standard specifies the requirements for institutional model, adult size, non-folding wheelchairs used in hospitals and similar institution.

1.2 This standard covers only the requirements of Type 1 and Type 2 wheelchairs (see 4.1). Types 3, 4, 5, 6, 7, 8, 9 and Type 0 wheelchairs (see 4.1) are not covered in this standard.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

<table>
<thead>
<tr>
<th>IS No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1068 : 1985</td>
<td>Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium on iron and steel (second revision)</td>
</tr>
<tr>
<td>1868 : 1982</td>
<td>Anodic coatings on aluminium and its alloys (second revision)</td>
</tr>
<tr>
<td>4827 : 1983</td>
<td>Electroplated coatings of nickel and chromium on copper and copper alloys (first revision)</td>
</tr>
<tr>
<td>5192 : 1975</td>
<td>Vulcanized natural rubber compounds (first revision)</td>
</tr>
</tbody>
</table>

3 TERMINOLOGY

3.1 The terminology for the wheelchairs is indicated in Fig 1.

4 TYPES

4.1 The type classification of the wheelchairs according to the means of propulsion/steering shall be as follows:

- **Type 1** Attendant controlled—non-powered
- **Type 2** Non-powered direct drive on rear wheels, bimanual
- **Type 3** Non-powered direct drive on front wheels, bimanual
- **Type 4** Non-powered lever drive, bimanual
- **Type 5** Non-powered single-sided drive
- **Type 6** Non-powered foot propulsion
- **Type 7** Attendant controlled—powered
- **Type 8** Electromotor for drive, manual steering
- **Type 9** Electromotor for drive, power steering
- **Type 0** Others

5 SHAPE AND DIMENSIONS

5.1 The typical shape of wheelchair is shown in Fig. 1. The overall dimensions shall be as given in Table 1.

### Table 1 Overall Dimensions of Wheelchairs

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Size, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall length</td>
<td>1 000 ± 100</td>
</tr>
<tr>
<td>Overall width</td>
<td>650 ± 20</td>
</tr>
<tr>
<td>Overall height</td>
<td>910 ± 50</td>
</tr>
<tr>
<td>Seat height from floor at the front</td>
<td>480 ± 10</td>
</tr>
<tr>
<td>Slope of the seat</td>
<td>1.3°</td>
</tr>
<tr>
<td>Distance between seat and footrest</td>
<td>400 ± 40</td>
</tr>
<tr>
<td>Armrest height from seat</td>
<td>220 ± 20</td>
</tr>
<tr>
<td>Seat depth</td>
<td>420 ± 40</td>
</tr>
<tr>
<td>Clearance of footrest from floor</td>
<td>90 ± 20</td>
</tr>
<tr>
<td>Clearance of frame from floor</td>
<td>100 ± 10</td>
</tr>
<tr>
<td>Wheel diameter</td>
<td>689.6 × 38.1 (24” × 1 1/4”)</td>
</tr>
<tr>
<td>Weight of the wheelchair (basic model)</td>
<td>25 kg, Max</td>
</tr>
</tbody>
</table>
Fig. 1 Wheelchair, Non-Folding, Adult Size, Institutional Model

- Hand Grip
- Armrest
- Clothing Guard
- Brake
- Castor
- Hand Rim
- Tyre
- Backrest
- Leg Guard
- Seat
- Footrest
6 MATERIALS

6.0 General

The following materials shall be used in the manufacture of wheelchairs. Alternate materials which are equivalent in performance may also be used.

Solid tyres made from non-marking quality rubber conforming to Type B, Grade 5 of IS 5192:1975 could also be used as an alternate to pneumatic tyres and tubes.

NOTE — In Type 1 wheelchairs, the rear wheels could be as small as the front wheels.

6.7.2 The wheels shall be firmly secured to the
7.3.4 The swinging detachable type of footrest shall be free from sticking of the pin in the spring lock.

7.3.5 The footrest shall be detachable by the user himself but shall be incapable of coming out inadvertently.

7.3.6 In case of adjustable footrest, the distance between the footrest and the seat shall be capable of adjustment (namely, telescopic adjustment) through not less than 100 mm in minimum four steps. The locking mechanism for each step shall be such that once locked, it will not permit the footrest being pushed down under the weight of the patient.

7.3.7 A belt of minimum 75 mm width shall be provided at legrest level to restrict the leg from falling backward while in use. It shall be firmly secured to the wheelchair such that the fastening does not fail with the weight of the legs.

7.3.8 The footrest supports shall be of robust construction and shall be capable of swinging clear of the entrance passage of the patient.

7.4 Armrests
Armrest shall be fitted to each side of the chair and shall be of such a height and shape as to provide adequate security and prevent the patient from falling sideways out of the chair. In case of detachable armrest, it shall be detachable by the user himself but shall be incapable of coming out inadvertently. The fitting of the armrest to the frame shall be rigid and non-shaky to avoid any accident.

7.5 Hand Rims
The ends of the tubing shall be joined by welding. The fixation of hand rim to wheel rim (minimum four places) shall be such that it does not obstruct/injure the fingers while driving. The surface of hand rims shall be smooth in all respects.

7.6 Brakes
Two individual parking brakes (push/pull type), one on each wheel, shall be provided on wheelchairs. The brakes shall be capable of being locked in final position and shall be easy and compatible in operation. They shall not be loose to result into accidental locking in use.

7.7 Castors
7.7.1 The wheelchair shall have two swivelling castors firmly secured to the frame in the front with either of the following combination of bearings for smooth and silent performance:

a) Two ball/thrust bearings, or
b) One ball/thrust bearing and a pair of swivelling bush bearings.

7.7.1.1 The stem shall be of minimum 75 mm length.

7.7.2 The hub of wheel shall have either self-contained ball bearings or needle bearings or sintered bronze/brass bushes or nylon bushes.

7.7.3 The tyre shall be 175 to 200 mm in diameter with wheel tread of minimum 25 mm. The tyre shall be snap-on type.

7.7.4 The castor shall have a load rating of 50 kg, Min.

7.8 Wheels
The wheels shall be fixed to the frame in such a manner that the fitting shall be rugged enough to withstand the shocks during normal use. The wheels shall move freely and lightly to minimize physical exertion during driving. The wheels shall be removable from the chair without disturbing the bearing assembly.

7.9 Clothing Guards
Clothing guards shall be securely attached in between the front and the rear vertical members of the chair (see Fig. 1). The clothing guards shall have single or double hemmed/beaded edges for mild steel guards and single hemmed/beaded edges for aluminium guards to eliminate possibility of sharp projections which might catch and tear the clothing. The guards shall be sufficiently rigid and shall have a smooth surface.

7.10 Lubrication
Suitable provision shall be made to lubricate the various moving parts of the chair. The manufacturer shall provide complete information for the type of lubricant to be used and instructions for proper lubrication of the moving parts of the chair.

8 FINISH
8.1 Materials and finishes shall be non-toxic.

8.2 All exposed metallic parts shall be stove enameled (after primary coat) or plated as agreed to between the purchaser and the supplier. The resulting finish shall be hard and shall not readily chip or flake.
8.2.1 When plated, the plating on the mild steel components shall conform to Service Grade No. 2 of IS 1068 : 1985.

8.2.2 All aluminium components shall be anodized or buffed clean in case of die casted components. The anodizing of aluminium components shall conform to Grade B or Grade D of IS 1868 : 1982.

8.3 Welding shall fully penetrate and shall be sound in every respect. It shall be finished smooth and there shall be no exposed sharp edges in the framework or other unsealed formations which may harbour dust. All exterior surfaces shall be free from defects and protrusions to avoid hurting the patient or tearing his clothing.

9 TESTS

9.1 Test for Wheeling

The chair shall be subjected to a load of 100 kg. The chair shall be wheeled around on an even floor. The chair shall move smoothly and straight without any wobbling, rocking or rattling.

9.2.5 For the purpose of the above test, the chair may be mobile and mechanically pushed at points on the handle corresponding roughly to the position at which an attendant’s hands would be placed while wheeling the chair. Alternatively, the chair may be anchored to a stationary pillar at these points on the handle and the wheels made to contact an oscillating platform (running on rails) or a rotating drum to which the hazards are fixed.

9.3 Load Test

A load of 100 kg shall be applied gradually at the middle of the armrest while preventing the chair from toppling over. The load shall be maintained for 5 minutes. The wheelchair shall not be damaged after the test. The test shall be repeated on the other armrest also.

10 ATTACHMENTS AND ACCESSORIES

10.1 Various accessories are required to cater to the needs of different categories of patients. All the attachments incorporating such accessories shall be provided with the basic model and shall in no way become obstruction for its coverage under the Indian Standard. These
Bureau of Indian Standards

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Amendments Issued Since Publication

<table>
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<th>Amend No.</th>
<th>Date of Issue</th>
<th>Text Affected</th>
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</thead>
</table>

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