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Indian Standard

SPECIFICATION FOR
HAND-OPERATED CONCRETE MIXERS

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Indian Standard

SPECIFICATION FOR HAND-OPERATED CONCRETE MIXERS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 26 October 1970, after the draft finalized by the Construction Plant and Machinery Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Proper and efficient mixing of concrete is an important factor affecting the quality of concrete and the progress of concrete operations. Thorough mixing of the concrete ingredients would depend to a large extent on the efficiency of mixer. Batch type concrete mixer which is one of the most common type of mixers has been covered by IS:1791-1968* and IS:4634-1968†. Hand-operated concrete mixer may be used with advantage as an efficient substitute for platform mixing on small building works and on construction jobs where small quantity of concrete is required at a place, such as pedestal foundations for pipe lines and minor repairs in concrete. This equipment has considerably improved performance compared to hand mixing on platform.

0.2.1 This standard covering hand-operated concrete mixers has been prepared mainly with the following objectives:

- a) To guide the purchasers in obtaining machine with some minimum guaranteed performance,
- b) To help the manufacturers and purchasers by laying down working limits for capacity and other features of machine, and
- c) To aid in production by limiting the number of standard sizes.

0.3 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 requirements regarding materials, construction, capacity and performance of free-fall barrow tipping type hand-operated concrete mixers.

*Specification for batch type concrete mixers (*first revision*).

†Method for testing performance of batch-type concrete mixer.

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

2. TERMINOLOGY

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

2.1 Body—The mixer drum and its components.

2.2 Chassis—The structural frame supporting the body, along with driving handle and its components excepting the wheels and axles.

2.3 Datum Ground Level—The level on which wheels stand.

2.4 Free-Fall Mixer (Drum Type)—A free-fall mixer having a drum with series of blades fitted internally, which rotates about a horizontal or inclined axis. The mixing action is achieved by causing each part of the mix to be lifted in turn as the drum rotates and at a certain point in each revolution allowing it to be dropped or directed towards the bottom of the drum where it combines with other parts of the mix in continuously changing sequence to form a homogeneous mix. The revolution of mixing drum is achieved by rotating the handle which in turn rotates the mixing drum by a suitable gear arrangement.

2.4.1 Free-Fall Barrow Tipping Mixer—The free-fall mixer in which the drum rotates about an inclined axis. The drum is mounted on a wheel barrow which can be tilted forward to discharge the mixed concrete from the drum.

2.5 Discharge Point—In a tilting mixer, the lowest point of drum opening, when the drum is tilted to the highest position at which it will effectively discharge its batch.

2.6 Loading Point—The loading point is used to establish the loading height above the datum ground level and is that point to which the material shall be raised in order to commence charging the mixer.

2.7 Nominal Batch Capacity—The volume in cubic metre of mixed concrete which can be held and mixed satisfactorily in one batch.

2.8 Transportability

2.8.1 Stationary Mixer—A mixer not provided with wheels and usually built into a mixing plant.

2.8.2 Portable Mixer—A mixer fitted with a simple form of wheels.

2.8.3 Trailer Mixer—A mixer fitted with road wheels so that it can travel or be towed efficiently and safely at maximum statutory speed.

3. DESIGNATION OF SIZE AND TYPE

3.1 The size of hand operated concrete mixer shall be designated by the number representing its nominal batch capacity in litres together with the letter BTT to indicate the barrow tipping type. Thus a mixer having a nominal batch capacity of 100 litres will have the designation 100 BTT.

4. SIZES

4.1 Concrete mixers shall be of the following two sizes:

- a) 50 BTT, and
- b) 100 BTT.

4.1.1 *Margin of Capacity*—Mixer, when operating on level, shall be capable of holding and mixing an actual mixing batch 10 percent in excess of the nominal mixed batch capacity laid down in 4.1.

4.2 Sizes other than those specified in 4.1 may be supplied by mutual agreement between the purchaser and the supplier.

5. CONSTRUCTION

5.1 The mixer shall be free-fall, barrow tipping type, and shall consist of chassis on which is mounted a hand-operated drum. The entire mixer shall be mounted on wheels.

5.2 *Chassis*—The chassis shall be fabricated either from a single length mild steel tube of 25 mm nominal bore conforming to suitable grade of IS:1161-1968* or mild steel sections of adequate strength conforming to IS:1977-1969† or IS:226-1969‡. The tube shall be suitably bent or mild steel sections shall be suitably welded to shape to support the wheels and body. Chassis shall be suitably provided with legs fabricated to form a part of the chassis. Suitable guard shall be provided, so that while tipping the mixer, the edge of the drum shall not touch the ground or the emptying surface.

5.3 *Drum*—The quality of material used in construction of mixing drum and minimum thickness of various portions of drum shall be as follows:

<i>Portion of Mixer Drum</i>	<i>Minimum Thickness of Shell and Quality of Material</i>
a) Upper conical portion of drum	3·15 mm thick steel sheet conforming to grade St-34-1079 of IS: 1079-1968§ or equivalent
b) Middle belt	4 mm thick steel sheet conforming to grade St-34-1079 of IS: 1079-1968§ or equivalent
c) Lower conical portion of drum	4 mm thick steel sheet conforming to grade St-34-1079 of IS:1079-1968§ or equivalent
d) Bottom plate	5 mm thick steel sheet conforming to grade St-34-1079 of IS: 1079-1968§ or equivalent

*Specification for steel tubes for structural purposes (*second revision*).

†Specification for structural steel (*ordinary quality*).

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

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

5.3.1 The joints shall be secured by riveting, welding or bolting. The top edge of the mixing drum shall be reinforced by closely welding a mild steel band not less than 12.5×6 mm in cross-section.

5.4 Blades—Mixer drum shall be fitted with replaceable blades or 20×6 mm steel flats conforming to St-34-1079 of IS: 1079-1968* and shall be so designed as to ensure thorough and quick mixing of the aggregates.

5.5 Handle—The handle (or handles) for the mixing drum shall be suitable for firm, comfortable and non-slipping grip. The height of the handle (or handles) from the datum ground level shall not be less than 500 mm and not more than 600 mm.

5.6 Wheels—The wheels shall be of mild steel or cast iron. The wheels shall be so designed as to ensure adequate strength and easy movement. The minimum diameter and width of the wheels shall be 300 mm and 50 mm respectively.

5.7 Axle—The axle for the wheels shall be of suitable grade of wrought steel such as C40 of IS: 1570-1961† and shall be fixed to the chassis frame. The bearings shall be located inside the wheels hubs which shall revolve over the axle. The axle shall not be less than 25 mm in diameter and the bearings shall not be less than 25 mm in length for each wheel.

6. DRUM SPEED

6.1 Drum shall be rotated at a minimum speed of 15 rev/min. To achieve optimum results in terms of mixing of concrete, the drum shall be given a minimum of 30 revolutions.

7. SAFETY GUARDS

7.1 Safety guards shall be provided for moving parts in accordance with relevant safety regulations.

8. TOWING BARS

8.1 The mixer shall be provided with towing bar having circular eyes and suitable for motorized towing.

9. LIFTING ARRANGEMENTS

9.1 Each mixer shall be fitted with eyes, shackles or other suitable means for lifting by a slinging chain or chains.

10. TOOLS AND OPERATING INSTRUCTIONS

10.1 A strong tool box, with lock and key, containing the necessary tools

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

†Schedules for wrought steels for general engineering purposes.

for normal running adjustments and lubrication together with an inventory of the tools, shall be provided with each machine. Operating and maintenance instructions and a spare parts list shall also be provided.

11. MARKING

11.1 Each mixer shall have a rating plate firmly attached to some part not easily removable. The rating plate shall have clearly marked on it the following information:

- a) Manufacturer's name,
- b) Machine reference number,
- c) Size of mixer in litres,
- d) Total weight in kilograms, and
- e) Year of manufacture.

11.1.1 The mixer 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.

12. MIXING EFFICIENCY

12.1 The mixer shall be tested under normal working conditions in accordance with the method specified in IS:4634-1968* with a view to checking its ability to mix the ingredients to obtain a concrete having uniformity within the prescribed limits. The uniformity of mixed concrete shall be evaluated by finding the percentage variation in quantity (weight in water) of cement, fine aggregate and coarse aggregate in a freshly mixed batch of concrete.

12.1.1 The percentage variation between the quantities of cement, fine aggregates and coarse aggregates (as found by weighing in water) in the two halves of a batch and the average of the two halves of the batch shall not be more than the following limits:

Cement	8 percent
Fine aggregates	„
Coarse aggregates	„

*Method for testing performance of batch-type concrete mixer.

12.2 Where a prototype of a particular model of mixer has been tested in accordance with IS: 4634-1968* and has complied with the requirements of 12.1, other mixers of same basic design as the prototype and of the same dimensions within reasonable manufacturing tolerances shall be deemed to comply with the requirements of 12.1. Changes in the design which cannot influence the mixing performance, shall not be considered as changes in the basic design for the purpose of this clause. Where required by the purchaser, the manufacturer shall provide a certificate of compliance with the requirements of 12.1.

*Method for testing performance of batch-type concrete mixer.

AMENDMENT NO. 1 FEBRUARY 1980
TO
**IS : 5891-1970 SPECIFICATION FOR HAND-
OPERATED CONCRETE MIXERS**

Alterations

(Page 5, clause 5.2, line 4) — Substitute ' IS : 1977-1975† or IS : 226-1975‡ ' for ' IS : 1977-1969† or IS : 226-1969‡ '.

[Page 5, clause 5.3 (a), (b), (c) and (d)] — Substitute ' IS : 1079-1973§ ' for ' IS : 1079-1968§ ' at all the places.

(Page 5, foot-note with '†' '‡' and '§' marks) — Substitute the following for the existing foot-notes:

†Specification for structural steel (ordinary quality) (second revision).

‡Specification for structural steel standard quality (fifth revision).

§Specification for hot rolled carbon steel sheet and strip (third revision).

(Page 6, clause 5.4, line 2) — Substitute ' IS : 1079-1973* ' for ' IS : 1079-1968* '.

(Page 6, foot-note with "*" mark) — Substitute the following for the existing foot-note:

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