

IS : 7245 - 1974

Indian Standard
SPECIFICATION FOR CONCRETE PAVERS

UDC 666.972.053



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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110001

Price Rs. 4.00

Gr 3

August 1974

Indian Standard

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Indian Standard

SPECIFICATION FOR CONCRETE PAVERS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 8 February 1974, after the draft finalized by the Construction Plant and Machinery Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Rapid industrialization has necessitated far reaching improvements in the techniques of construction of concrete roads and air-fields. Machinery is playing an ever increasing role in the speedy and efficient construction of concrete roads and air-field pavements capable of carrying heavy loads and very high speed traffic; and the use of concrete pavers, spreaders and finishers for this purpose is becoming popular. This standard is intended to deal with the essential features of concrete pavers to serve as guidance to both manufacturers and purchasers. Concrete spreaders and finishers are covered in IS : 7242-1974* and IS : 7251-1974† respectively.

0.3 Concrete pavers are used primarily to move along the side of the road or runway under construction and either to supply concrete into the trough hopper of a concrete spreader or to distribute concrete on the formation for final spreading thereafter by concrete spreader. The paver can also be used for other purposes for which the reach and height of discharge of its boom make it suitable, such as placing concrete for culverts, charging hoppers of concrete pumps and loading open haulage trucks.

0.4 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, design, construction, capacity and performance of concrete pavers.

*Specification for concrete spreaders.

†Specification for concrete finishers.

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

2. MATERIALS

2.1 The materials for different components of the paver shall conform to the requirements of appropriate Indian Standards.

3. SIZE

3.1 The size of the paver shall be designated by the capacity of its concrete mixer expressed in litres. Common sizes of the pavers are 800 litres and 1 000 litres; other sizes may be supplied if agreed to between the purchaser and the supplier.

4. CONSTRUCTION

4.1 General — The concrete paver shall be complete self-contained, self-propelled machine, designed to progressively distribute concrete between the forms while moving by the side of forms. It shall consist of a non-tilting concrete mixer mounted on a crawler tracked chassis with a long boom projecting from the front of the machine. The boom shall carry a bottom opening bucket for receiving the mixed concrete from the mixer. The bucket shall be capable of travelling along the length of the boom and thus placing the mixed concrete in the desired position.

4.1.1 The paver shall have a control station from which one man can control and view all operations.

4.2 The various components shall conform to the requirements given in **4.3** to **4.10**.

4.3 Chassis — The chassis shall be of structural steel construction and shall be mounted on a crawler tractor so that the maximum pressure exerted on the ground in the fully loaded condition does not exceed the required bearing capacity (to be specified by the purchaser depending upon the situation of use) and the machine is stable while resting or travelling for any position of the boom and the fully loaded bucket.

4.4 Concrete Mixer — The concrete mixer shall be of non-tilting type and shall be suitably mounted on the chassis.

4.4.1 Loading Skip — A suitable sized skip capable of receiving the pre-batched dry materials at ground level and then discharging them into the mixer drum shall be provided at the rear of the machine. The loaded skip may be operated manually or from the main power unit.

4.4.2 If agreed to between the purchaser and the supplier, the mixer drum may be divided into two halves arranged so that the first half can be recharged while the second half is completing the mix of the previous batch.

4.4.3 The concrete mixer shall generally be of the following nominal mixed batched capacities:

- 800 litres
- 1 000 litres

NOTE — In case of mixer conforming to **4.4.2** each half of the mixer shall have a capacity of 800 or 1 000 litres.

4.4.3.1 Sizes other than 800 and 1 000 litres may be provided if agreed to between the purchaser and the supplier.

4.4.3.2 The mixer drum shall be designed to hold an overload of 10 percent of the nominal mixed batch capacity while standing on a reasonably level ground (that is on gradient of less than 1 in 16).

4.4.4 *Speed of the Mixer Drum* — The speed of the drum shall be 15 to 16 revolutions per minute. Independent clutches shall be provided for engaging or disengaging the drum from the power unit.

4.4.5 *Water Storage Tank* — A suitable water measuring and storage tank shall be provided for automatic feed of a predetermined (but adjustable) quantity of water to the mixer. Arrangements shall also be provided for pumping water from the water mains or water truck into the water tank.

4.4.6 *Discharge Chute* — The discharge chute shall be so placed that the mixed concrete can be directly discharged into the bucket. The chute alignment shall be such that the centre line of the chute plate is at an angle of not less than 50° to the horizontal when in discharge position.

4.4.7 In addition to the requirements specified in 4.4 to 4.4.6 the concrete mixer shall conform to the appropriate requirements of IS: 1791-1968* and IS: 4634-1968†.

4.5 Boom — The boom shall be of structural steel construction and shall be capable of 90° swing on either side of the axis of the machine. It shall be capable of delivering the bucket load at any height between 650 mm to 3 m above ground level at any radius up to 10 m.

4.5.1 The boom shall also be capable of being elevated for a high discharge if required.

4.6 Bucket — The bucket shall have bottom opening discharge gates which shall be hydraulically as well as manually operated with a control on the degree of opening.

4.6.1 The bucket shall be moved along the boom by a power winch or other suitable arrangement which shall have adequate capacity to raise the fully loaded bucket even when the boom is raised to the steepest angle.

4.6.2 The maximum capacity of the bucket shall normally be 1550 litres. Any other sizes may be provided by mutual agreement between the purchaser and the supplier.

4.7 Operator's Station — The operator's station shall have a deck made of non-skid steel sheet of the raised pattern or expanded metal type. Steps

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

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

and walkways made of non-skid steel sheet and grab rails shall be attached on each end of the paver to provide access to the operators' station. All controls shall be grouped at a single centrally located operating station and assembled so that the entire range of performance is in view of and conveniently and simultaneously controllable by one operator. The range of control shall include, but not be limited to complete control of concrete maker engine speed, travelling speed of the paver, forward and reverse speed ratios, clutches, brakes, the swing of the boom and travelling of the bucket, the control of the bucket gates and the concrete mixer.

4.8 Steering — A steering mechanism shall be provided to permit moving the paver within the full range of grades and curves encountered in paving operations. The steering mechanism shall be arranged so that disengagement of the traction drive shall simultaneously apply the brakes, thus stopping and holding the paver at any point along its path. The paver shall be capable of negotiating curves from a minimum radius of 30 m on any grade encountered in paving operations.

4.9 Power Unit — The paver shall be powered by a suitable diesel or petrol engine conforming to relevant appropriate Indian Standards. The engine power and speed required by the paver while working at maximum capacity shall not exceed the net continuous output power rating of the engine at the applicable speed. The engine shall be furnished complete with the accessories necessary for operation. Such accessories shall conform to the engine specification and shall include the following:

- a) A fuel tank of sufficient capacity for not less than eight hours rated load operation.
- b) A housing.
- c) An instrument panel with the following instruments:
 - 1) Lubricating oil pressure gauge,
 - 2) Cooling liquid temperature indicator,
 - 3) Battery charging indicator,
 - 4) An hour meter, and
 - 5) The instrument shall be so located that they are visible to the operator in his normal operating position except the hour meter may be mounted on the engine accessory housing.
- d) Unless otherwise specified, an electrical and manual cranking system shall be furnished.

When specified, a hydraulic cranking system consisting of a hydraulic cranking mortar, a piston type accumulator, an oil reservoir, an engine driven pump, a hand-operated pump, and all connecting

lines, valves, and fittings to make a complete installation shall be furnished in lieu of the electrical cranking system.

- e) When electric cranking system is furnished, an 18-ampere charging generator shall be provided.

4.9.1 Batteries — Unless otherwise specified, the paver shall be provided with the batteries conforming to IS: 985-1962*.

4.9.2 Battery Box — When an electrical cranking system is furnished, the paver shall be furnished with a weatherproof battery box with drain and shall be constructed of steel sheet not less than 2 mm in thickness. The box shall be designed for batteries conforming to IS: 985-1962*, and shall have a positive clamping device to hold the batteries in place. The battery hold-down arrangements shall be installed so that pressure will be exerted only on the ends or sides of the battery case. The box shall be located so that the batteries will be accessible for routine maintenance, removal, and replacement. The battery electrolyte level shall be visible when the battery filler caps are removed, and the batteries shall be accessible to conventional battery servicing aids such as a hydrometer and syringe. Grommets shall be provided to protect the battery lead cables.

4.10 Transmission — The transmission shall provide a maximum speed of 35 m/min in forward and reverse when all the components are running simultaneously under full load. The power unit shall also have sufficient reserve power to enable the paver to operate normally at high altitudes†.

4.10.1 Clutch — The engine shall be connected to the transmission through a manually operated clutch of the disc type. Clutch shall be capable of transmitting not less than 130 percent of the maximum torque developed by the engine.

4.11 Control Identification, Safety and Warning Plates — A plate shall be provided for each switch, gauge, and control, and at points which require special attention for safe and efficient operation of the paver. The plates shall be labelled by lettering or other appropriate marking with information as to function, direction the control is to be moved, neutral position, safety instructions, and warnings as necessary. Lettering on the plates shall be not less than 6 mm high and the plates shall be attached to the paver in a manner to ensure permanent affixing.

5. MAINTENANCE ACCESSIBILITY

5.1 The paver design shall provide convenient accessibility to all component subassemblies and parts for maintenance and repairs.

*Specification for lead acid storage batteries (heavy duty) for motor vehicles (*revised*).

†Limit to be specified by the purchaser.

6. INTERCHANGEABILITY

6.1 All replaceable parts shall be manufactured to definite standards, clearances and tolerances in order that any such parts of a particular type or model having the same functional and performance characteristics can be replaced or adjusted without requiring modification. When practicable, all such parts shall be permanently and legibly marked with the manufacturer's part number.

7. FINISHING

7.1 All exposed parts of the paver shall be cleaned, treated and painted with suitable anticorrosive protective paint.

7.2 Fungus Resistance — When specified, electrical connections including terminal and circuit connections, components, and circuit elements shall be coated with varnish except that:

- a) components and elements inherently inert to fungi or hermetically sealed need not be treated, and
- b) components and elements whose operation will be adversely affected by the application of varnish shall not be treated.

8. LUBRICATION

8.1 Means for lubrication shall be provided for all moving parts requiring lubrication. All lubrication fittings shall be accessible to a hand grease gun. Pressure lubrication fittings shall not be used where normal lubricating pressure may damage grease seals or other parts. The paver shall be lubricated prior to delivery with suitable specified lubricants designed for use in the specified temperature range. The paver shall be conspicuously tagged to identify the lubricants and their temperature range.

8.1.1 Enclosures with Integral Reservoir of Lubricant — Enclosures, such as gear cases and transmission housing, which contain a reservoir of lubricants for the lubrication of the parts enclosed shall be equipped with dip sticks, finger holes, or sight holes to determine the level of the lubricant. Such enclosures shall be equipped with a permanent magnetic type drain plug. Each enclosure shall be equipped with a means for fitting the enclosure with lubricant. The drain plug shall be located so that removal of the plug will result in complete drainage of the lubricant from the enclosure. Drainage shall be to the ground when the equipment is in its normal position. Integral tubes or troughs may be used to convey the lubricant from the drain to the ground. Accessibility to the drain plug, the filling means, and the lubricant level checking device shall be obtained without the removal or adjustment of accessories or parts. Engine housing side panels and plates equipped with hand-operable, quick-disconnect fasteners may be used.

9. SAFETY REQUIREMENTS

9.1 The design shall preclude or minimize hazards to the operator, rotating, reciprocating, and high temperature parts shall be fully enclosed, adequately guarded, or insulated.

9.2 Automatic braking system shall be provided so that brakes are automatically applied when the power unit is stopped.

10. REPAIR PARTS, MAINTENANCE TOOLS AND ACCESSORIES

10.1 Such repair parts, maintenance tools, and accessories as are specified shall be furnished. A manual of instructions for maintenance and an illustrated list of spare parts required for replacement shall also be furnished.

10.2 Toolbox — The toolbox shall be made of metal not less than 2 mm in nominal thickness. The toolbox shall be complete with trunk drawbolt and a lid which shall open not less than 90 degrees. The drawbolt shall be of a type that will keep the lid closed when subjected to vibration or rough travel. The toolbox shall be securely fastened to the paver, and shall be of sufficient size to hold the tools specified.

11. INSTRUCTION PLATES

11.1 Each paver shall be equipped with instruction plates, including warnings and cautions, suitably located, describing any special or important procedures to be followed in operating and servicing the paver. Plates shall be of copper base alloy.

12. TRANSPORTATION AND POSITIONING EQUIPMENT

12.1 When so required by the purchaser suitable means for transporting the paver shall be provided. The transporting means shall be readily detachable from the paver.

13. PARTICULARS TO BE SUPPLIED BY THE PURCHASER

13.1 The purchaser shall supply the following particulars to the manufacturer or supplier while ordering:

- a) Type of mixer (*see* 4.4.2),
- b) Capacities of the mixer and bucket,
- c) Whether required to operate at high altitudes,
- d) Whether required to be dismantled into transport packs,

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- e) Whether the power unit shall be compression ignition type (diesel) or spark ignition type (petrol), and
- f) Any other special requirements.

14. MARKING

14.1 Each machine shall have an indentification plate permanently affixed to it with the following particulars conspicuously marked on it:

- a) Manufacturer's name or trade-mark,
- b) Manufacturer's reference number of the machine,
- c) Size and capacity of the machine,
- d) Capacity of bucket along with its traversing length on the boom,
- e) Type of mixer (*see 4.4.2*),
- f) Rating of the paver unit,
- g) Gross weight of the paver, and
- h) Year of manufacture.

**INDIAN STANDARDS
ON
CONSTRUCTION PLANT AND MACHINERY**

IS:

1791-1968	Batch type concrete mixers (<i>first revision</i>)
2093-1974	Distributors for hot tar and bitumen (<i>first revision</i>)
2094-1974	Heaters for tar and bitumen (<i>first revision</i>)
2505-1968	Concrete vibrators, immersion type (<i>first revision</i>)
2506-1964	Screed board concrete vibrators
2514-1963	Concrete vibrating tables
2722-1964	Portable swing weighbatchers for concrete (single and double bucket type)
2750-1964	Steel scaffoldings
3066-1965	Hot asphalt mixing plants
3251-1965	Asphalt paver finishers
3365-1966	Floor polishing machines
3366-1965	Pan vibrators
3558-1966	Code of practice for use of immersion vibrators for consolidating concrete
3559-1966	Pneumatic concrete breakers
4198-1967	Emulsion spraying machines for roads
4616-1968	Sheeps foot roller
4634-1968	Method for testing performance of batch type concrete mixer
4656-1968	Form vibrators for concrete
4925-1968	Concrete batching and mixing plant
4988 (Parts I to V)	Glossary of terms and classification of earth moving machinery
5435-1969	Cold asphalt mixing plant
5436-1969	Method of testing oil-fired rotary dryers for hot mix asphalt plant and bituminous macadam plants
5500-1969	Vibratory roller
5501-1969	Pneumatic tyred roller
5502-1969	Smooth wheeled diesel road roller
5889-1970	Vibratory plate compactor
5890-1970	Mobile hot mix asphalt plant, light duty
5891-1970	Hand operated concrete mixers
5892-1970	Concrete transit mixers and agitators
6426-1972	Pile driving hammer
6427-1972	Glossary of terms relating to pile driving equipment
6428-1972	Pile frame
6430-1972	Mobile air compressor for construction purposes
6433-1972	Guniting equipment
6717-1972	Mobile road cranes, fully slewing
6923-1973	Method of test for performance of screed board concrete vibrators

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