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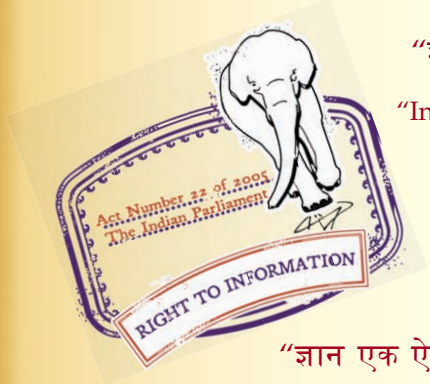
IS 6433 (1972): Specification for guniting equipment [MED 18: Construction Plant and Machinery]



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"Knowledge is such a treasure which cannot be stolen"

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IS : 6433 - 1972
(Reaffirmed 2005)

Indian Standard
SPECIFICATION FOR GUNITING EQUIPMENT

(First Reprint DECEMBER 1978)

UDC 666.97.033.14.002.5

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

July 1972

Indian Standard

SPECIFICATION FOR GUNITING EQUIPMENT

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Indian Standard
SPECIFICATION FOR GUNITING EQUIPMENT

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 14 February 1972, after the draft finalized by the Construction Plant and Machinery Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 The guniting equipment is quite often used for specialized reinforced concrete works, such as lining of pressure mains and tunnels, resurfacing of reservoirs and river and sea walls. It is also used for repair and maintenance work, such as the restoration of reinforced concrete and masonry structures and repair of reinforced concrete bridges.

In view of the increasing use of guniting equipment and also in view of the fact that the manufacture of guniting equipment has already been started in the country by some manufacturers, it has been considered necessary to lay down standard specifications for guniting equipment.

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 the requirements for sizes, dimensions and performance of concrete guniting equipment.

2. MATERIALS

2.1 All materials used in the construction of guniting equipment shall conform to the requirements of relevant Indian Standards.

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

3. CONSTRUCTION

3.1 General — The guniting equipment shall consist of the following:

a) Cement gun,

b) Water tank,

c) Material hose pipe, and

d) Accessories.

3.2 Cement Gun — It shall be of two interconnecting circular vessels fixed one above the other and having airlock valves operated by hand. The whole equipment when assembled shall be airtight and shall be mounted on wheels to make it mobile (*see* Fig. 1). The top vessel shall be suitable for feeding of sand-cement mix and shall work as tank storage. The bottom vessel shall have a valve at the top and feeder at the bottom rotated by means of a worm and worm wheel drive attached to the lower part of the bottom vessel. The bottom vessel shall be fitted with a 30 mm material hose of sand blasting quality conforming to IS : 5894-1970* or IS : 6417-1971†. At the discharge end of the material hose, a nozzle made of gunmetal with arrangement for water mixing with cement-sand mix shall be provided.

3.2.1 *Vessels* — The vessels shall be made from mild steel conforming to IS : 226-1969‡. The minimum thickness of the vessel shell shall be 5 mm. The top vessel shall be provided with a hopper on the top of a capacity of about 55 litres when filled up to heaping and shall have a disc valve closely fitting on to the rubber packing fitted to the bottom of the hopper and operated by means of a lever. The capacity of the top vessel shall be 140 litres. The bottom of the upper vessel shall fit tight on the top of the bottom vessel and fixed by means of bolts with a rubber packing in between and shall have a disc valve also firmly fitting on to the same. The valves shall be operated by levers mounted on the top and bottom vessels. The lever operation shall be done by means of handles fixed on to shafts which pass through the vessels and shall be made airtight by providing rope glands. The bottom vessel shall be mounted on wheels so that the base of the bottom vessel is sufficiently above ground level to enable it to move and to remove it without touching the ground.

3.2.1.1 The top vessel shall be provided with the following:

a) Pressure gauge to indicate the pressure of the air in the vessel;

b) Safety valve, tested to 10·5 kg/cm² and capable of blowing off at 7 kg/cm²;

c) Blow off valve;

*Specification for rubber sand blast hose with braided textile reinforcement.

†Specification for rubber sand blast hose with woven textile reinforcement.

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

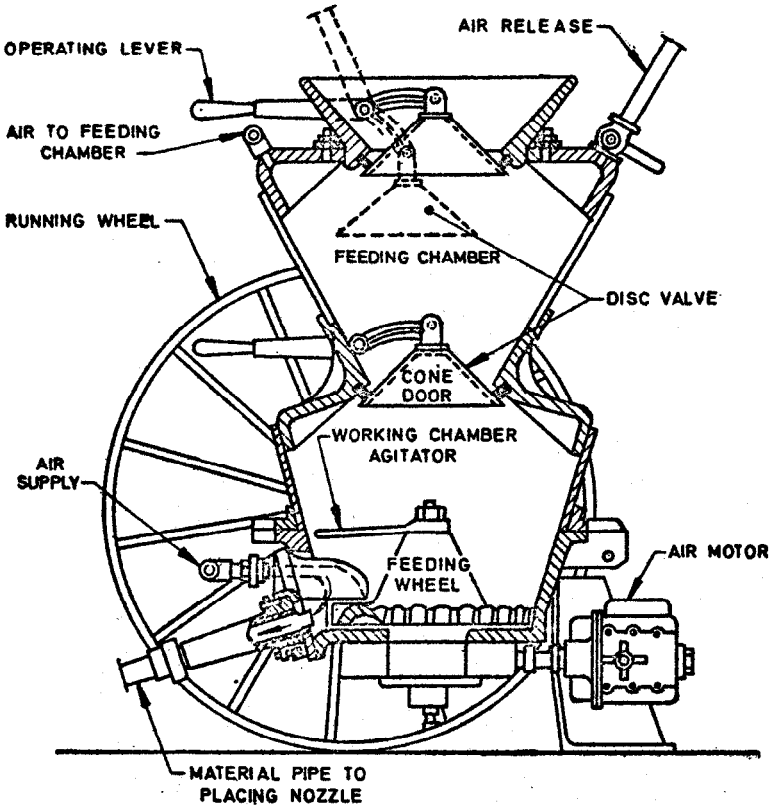

FIG. 1 GENERAL ARRANGEMENT FOR GUNITING MACHINE

d) Cleaning valve;
e) Air inlet valve;
f) Air connection to the air motor; and
g) Moisture and oil separator.

3.2.1.2 The bottom vessel shall be provided with the following:

a) An inlet valve for the air.
b) An outlet valve for the material hose pipe which should have an airtight coupling on it.
c) A fan mounted at the bottom of the inside of the vessel which shall be operated through a reduction gear. The fitting between the reduction gear and the fan shall also be made tight against leakage

of air and sand. The fan and the reduction gear shall be operated by means of an air motor so that the speed of the fan is about 10-15 rev/min.

d) Hand hole for cleaning of the inside of the gun.

e) Air inlet point or the outlet point to put the material into the material hose.

3.2.1.3 All valves shall be tested to a pressure of 20 kg/cm^2.

3.2.2 *Air Motor* — The air motor shall be connected to the reduction gear and the capacity of the same shall be sufficient to throw material at the rate of 2 l/h at a distance of 30 m and head of 3 m (*see* **4.2**).

3.3 Water Tanks — Twin cylindrical water tanks connected in parallel with arrangement for feeding water to the material hose pipe of one tank at a time shall be provided. The water tank shall be fabricated out of steel plates conforming to IS : 226-1969* and shall be tested against a pressure of 15 kg/cm^2. Each water tank shall have an inlet water pipe at the top and a cleaning mouth at the bottom both made watertight by stoppers.

3.4 Hose Pipes — A material hose pipe of sand blasting quality of diameter 30 mm and of length 15 m with couplings at two ends shall be provided with each machine along with an air hose and a water hose of 15 m length each and diameter 20 mm and 12 mm respectively.

3.5 Accessories — Accessories shall include the following:

a) Twenty-five millimetres air hose with clamps to take compressed air to the gun;

b) Two nozzle bodies complete with 25 mm internal dia tip (to suit 20 mm internal dia, rubber liner);

c) Two nozzle tips 20 mm (to suit 12 mm inside dia rubber liner);

d) One dozen tip liners 20 mm (inside dia 12 mm);

e) One dozen tip liners 25 mm (inside dia 20 mm);

f) Two cone valve gaskets;

g) Two air hose couplings;

h) Two extra rubber liners for water outlet valves;

j) Three gun operating keys;

k) One socket wrench;

m) One oil can; and

n) One grease gun.

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

4. PERFORMANCE REQUIREMENTS

4.1 General — The design of the delivery equipment shall be such that it shall be capable of discharging the sand-cement mixture into the delivery hose and shall deliver a continuous smooth stream of uniformly mixed material at a proper velocity to the discharge nozzle.

4.2 Discharge Nozzle — The discharge nozzle shall be equipped with a manually operated water injection system (water ring) for directing an even distribution of water through the sand-cement mixture. The water valve shall be capable of ready adjustment to vary the quantity of water, and shall be convenient to the nozzleman.

4.2.1 The nozzle shall be capable of delivering a conical discharge stream of uniform appearance throughout. Distortion of this stream or any non-uniform appearance, indicates a worn nozzle liner or mal-functioning of water injection system.

NOTE — The delivery equipment shall be thoroughly cleaned at the end of each shift. Equipment parts, especially the nozzle liner and watering, shall be regularly inspected and replaced as required.

5. MARKING

5.1 The following information shall be permanently and conspicuously marked on the machine:

a) Manufacturer's name or trade-mark and serial number of the machine,

b) Year of manufacture,

c) Rating of the power unit, and

d) Total weight of the machine (empty and filled with materials).

5.1.1 The machine 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.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Conversion*
Force	newton	N	1 N = 0·101 972 kgf
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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