IS 13496 : 1992
(Reaffirmed 1998)

भारतीय मानक

सीवर साफ करने तथा सीवर लाइन और वर्षा जल के बंद नालों पर ढके जाने वाले मेन होल तथा सहायक संरचनाओं के लिए चूषण मशीन की सामान्य अपेक्षाएं

Indian Standard

GENERAL REQUIREMENTS OF SUCTION MACHINE FOR CLEANING SEWERS, MANHOLES AND ANCILLARY STRUCTURES PROVIDED ON SEWER LINE AND CLOSED STORM WATER DRAINS

UDC 628·28

BUREAU OF INDIAN STANDARDS
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November 1992

Price Group 1

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Public Health Engineering Equipment Sectional Committee had been approved by the Civil Engineering Division Council.

Keeping the sewers clean is an important obligation of the civic authorities. If this is not done or improperly done, there will be unsightly overflows of sewage which are not only aesthetically most repulsive, but also a source of danger to the health of the community.

The suction machine is used to syphon the mud, sand and other debris along with the sewage from deep sewerlines, manholes, gulley sewer trap and other such ancillary structures through negative pressure.

This standard is intended to cover essential features of the machine to serve as a guidance to the manufacturers and the users.

Indian Standard

GENERAL REQUIREMENTS OF SUCTION MACHINE FOR CLEANING SEWERS, MANHOLES AND ANCILLARY STRUCTURES PROVIDED ON SEWER LINE AND CLOSED STORM WATER DRAINS

1 SCOPE

This standard covers the general requirements of suction machine used for cleaning deep sewer lines, stagnant manholes, gulley sewer trap, cess pools, septic tanks and other such ancillary structures provided in the sewer and storm water system.

2 REFERENCE

The Indian Standard IS 10002 : 1981 'Performance requirements for constant speed compression ignition (diesel) engines for general purposes (above 20 kW)' is a necessary adjunct to this standard.

3 DIMENSIONS

The overall dimensions of the machines/equipments should be such that it should remain within the requirements of *Motor Vehicles Act* and should not unduly obstruct traffic and movement on the road, while the equipment is operating.

4 CONSTRUCTION

4.1 Prime Mover

The prime mover shall be a standard commercial chassis with at least 25 percent overloading capacity and shall conform to IS 10002 : 1981.

4.2 Vacuum Pump

The pump shall be of a simple design and shall be easy to maintain. Vacuum pump shall be run through arrangements. Rotary Vane type pumps are recommended to be used. It should be able to develop sufficient vacuum to suck slurry which consist of grit and other solid materials from a depth of 8 m up to depth of 12 m with deep suction device.

4.3 Suction Pipe

The minimum dia of suction pipe shall be 100 mm and a Quick Acting Valve will be provided for loading. This valve and pipe should be so designed as not to allow tank contents to leak. A replaceable wear plate should be provided above the top end of the suction pipe. Proper hoses for loading should be provided. All pipes will have quick-coupling devices. Hose pipe shall be so designed and the material used shall be such that it can withstand 90 percent vacuum, and corrosion and abrasion resistant. Shut off valve is so designed and manufactured that it shall be quick acting, corrosion and abrasion resistant and shall be able to pass sewage containing grit, floating fibre material up to 50 mm dia.

4.4 Loading Arm

The gulley arm shall be fully counter balanced and shall be easy to manipulate by hand. It should be easy to rotate it by hand around the pivot by 270°. The lowering and lifting operation of the gulley arm into and out of the pit can be performed manually or hydraulically.

4.5 Tank

The tanks shall be built from steel. It shall be designed at a safety factor of 4 times the operating pressure.

Two-thirds volume of the tank at the rear will carry solid contents. This portion again shall be divided into one-third and two-thirds by a sludge screen. The sludge screen will separate water from solids. Water can be drained back into the manhole. The bottom portion of the sludge screen shall be tilting while doing tipping operation in vacuum and the tank should be provided with a back door which can be opened and closed manually or hydraulically for tipping or transporting as the case may be. The door should be clamped to the rear portion of the tank through reliable clamping system.

4.6 Tipping Gear

There should be a Front End Tipping Gear provided in the front portion of the tank. The hydraulic pump for operating the tipping gear shall draw power from the vehicle drive only. Control valves shall be provided to tip, hold and lower the tank. The operating levers shall be provided in the driver's cab at convenient place.

4.7 Discharge Pipe

A discharge pipe of 100 mm minimum diameter with a quick-acting valve of sufficient bore should be provided on the rear side or rear door of the tank for pressure discharge of the liquid. Proper hoses for discharge at a point away from the vehicle should be provided. All pipes will have quick coupling devices.

4.8 Accessories

It should be fitted with necessary accessories such as Full Bore Quick Acting Valves in the sewage paths so that the bores do not offer any resistance or blockage to the flow 2 Nos. Pressure Relief Valves, one at the Air Pump to safeguard the pump from overload and another on the sewage portion of the tank to safeguard the tank from excessive pressure due to effervescence of gases, 1 No. Vacuum Relief Valve on the Air Pump Suction line to limit the vacuum level, a compound valve pressure/vacuum gauge to be provided on the tank in an easy to see position. A sludge trap shall be provided between the air pump and the tank to trap solid particles and prevent them from entering the pump.

A float cut-out valve to be provided on the tank so that the pump suction line is sealed off once the liquid level crosses the specified limit. This will work as a safeguard against liquid entering the air pump. A lubricating system for the air pump to be provided in order to reduce friction losses in the pump.

A rotary control valve to be provided between the Air Pump and the Tank so that the tank can be pressurised while discharging screened water to Gulley pits. Level gauges transparent pipe should be provided so that the levels of contents of the tank can be visually noted in the fresh water tank and also in the sludge compartment.

An overhead filling, suction filling, hydrant filling or a combination of two or more methods for filling the fresh water tank shall be provided.

An inter-connecting valve to be provided between the front and rear compartment for flushing the left overs after completion of the pressure/tipping discharge.

5 PAINTING AND FINISHING

5.1 As the contents are corrosive, following treatments are recommended.

5.1.1 The interior of the tank shall be cleaned by sand blasting and treated with epoxy/bitumestic paint.

5.1.2 Finish paint on the external side may be done as per the choice of the buyer.

5.2 Side racks shall be provided on both sides of the sludge tank to store hose pipes.

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Doc : No. CED 40 (4690)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Printed at New India Printing Press, Khurja, India