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REQUIREMENTS FOR HIGH PRESSURE JETTING MACHINE FOR SEWER CLEANING

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REQUIREMENTS FOR HIGH PRESSURE JETTING MACHINE FOR SEWER CLEANING

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Indian Standard

REQUIREMENTS FOR HIGH PRESSURE JETTING MACHINE FOR SEWER CLEANING

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 August 1985 after the draft finalized by the Public Health Engineering Equipment Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 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 through manholes which are not only aesthetically most repulsive, but also a source of danger to the health of the community.

0.3 One of the ways of removing obstinate chocks and cleaning the sewers is through the use of a high pressure jetting machine.

0.3.1 For cleaning the chocked sewer, a hose is introduced in the sewers through the manhole and the water is forced under high pressure through the nozzle provided at the head of the hose. The silt and debris so removed, are lifted manually or through the suction unit. A typical sketch of the working of the high pressure jetting machine with suction unit is shown in Fig. 1.

0.4 The object of this standard is to give the purchaser some guidelines when buying a high pressure jetting machine.

0.5 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 the standard.

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1. SCOPE

1.1 This standard covers the requirements of high pressure jetting machine for sewer cleaning.

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

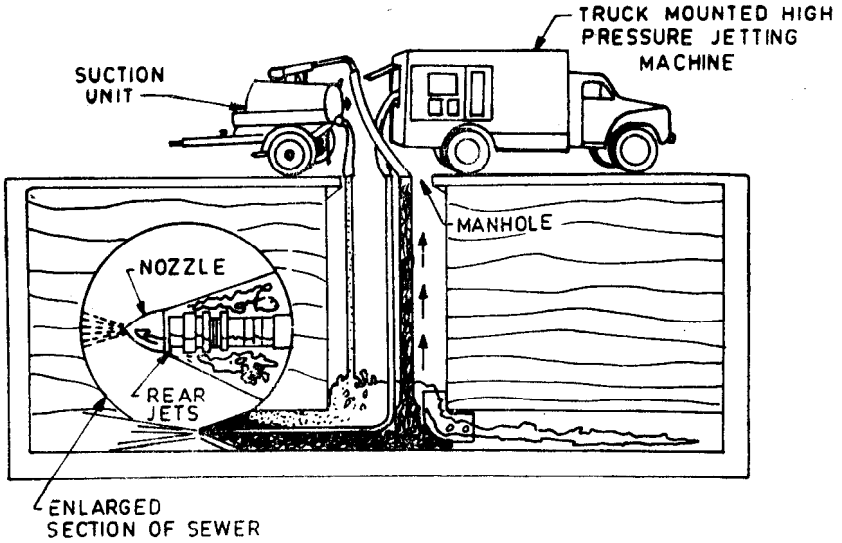

FIG. 1 TYPICAL SKETCH OF WORKING OF HIGH PRESSURE JETTING MACHINE

2. COMPONENTS OF A HIGH PRESSURE JETTING MACHINE

2.0 A high pressure jetting machine comprises of :

a) Prime mover, (b) High pressure pump with pressure regulating arrangement, (c) Hose reel, (d) Hydraulic drive to operate hose reel, (e) Control panel, (f) Water tank, (g) Chassis, and (h) Cover.

2.1 Prime Mover — The prime mover shall be:

a) Water cooled diesel engine of a minimum rating of 65 kW or 20 percent more than the connected load, whichever is higher.

Provision of a separate prime mover is however not necessary if the unit is a truck mounted one (*see* Fig. 2), and a power take off from the truck engine is provided.

2.2 High Pressure Pump — The pump shall be a heavy duty positive displacement pump or some other type of high pressure pump capable of delivering at least 200 l/m at a pressure of about 10 to 14 N/mm^2 at vehicle end with suitable controls incorporated to enable the pressure to be regulated.

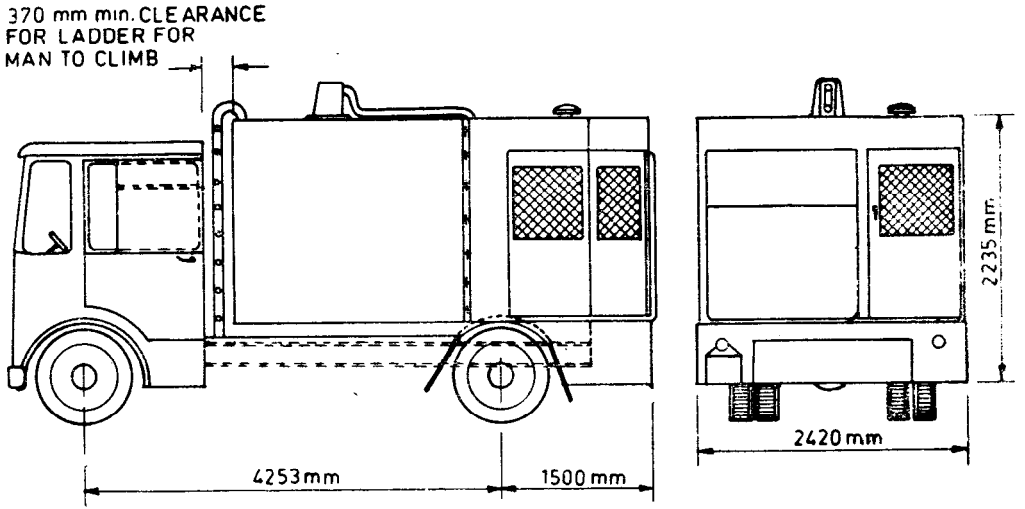

FIG. 2 TYPICAL TRUCK MOUNTED HIGH PRESSURE JETTING MACHINE

2.3 Hose and Hose Reel — The water under high pressure has to be delivered to the nozzel placed in the sewer line to be cleaned, through a high pressure hose. This hose shall be at least 25 mm inside diameter and capable of withstanding 1·5 times the maximum pressure generated by the pump. The hose shall be of about 100 metres length. The hose can be single piece or of standard lengths of minimum 40 m and in multiple of 20 m with proper adopter or coupling. The flusher hose should be led through or over a hose guide. The hose should be wound on a reel 450 mm in diameter. The quality of the material used in making the hose and the workmanship shall satisfy the following parameters:

i) It should withstand the maximum working pressure and shock loads, without distortion.

ii) It should not crack even when repeatedly wound and unwound from the reel.

iii) It should withstand the corrosive action of sewage and gases in the sewers, and the abrasive action of sand and silt in sewers.

2.4 Hydraulic Drive — The reel on which the hose is wound should be provided with a hydraulic drive to wind or unwind the hose, either while the high pressure pump is in operation or otherwise. A manual rewind crank shall also be provided for emergency operation.

NOTE — The hose shall be guided to push forward slowly in the sewer either hydraulically or manually.

2.5 Control Panel — All gauges, switches, levers, etc, required for operation of the unit thall be grouped together on a control panel located adjacent to the hose reel for easy and convenient control of the operations in cleaning of a sewer. The following instruments shall be provided on the control panel:

i) Engine ignition switch, oil pressure gauge, temperature gauge, throttle and glow plug button;

ii) Sight glasses to show the level in the water tank, and a low level warning light;

iii) Water system pressure gauge;

iv) Water flow control valve;

v) Combination control lever to control the speed and direction of rotation of the hose reel;

vi) Low water level safety switch; and

vii) Low oil pressure safety switch.

All piping system to and from the control panel, which are likely to be subjected to high pressure shall be manufactured from a high pressure quality tubing and shall have steel forged fittings.

2.6 Water Tank — The capacity of the water tank shall be adequate for at least 30 minutes operation of the high pressure pump. The tank may be constructed of mild steel coated with epoxy on the inside and outside surfaces. It shall be provided with the following:

i) Necessary openings for inspection and access,
ii) A strainer on the outlet going to the high pressure pump,
iii) A clean-out valve, and
iv) Level indicator.

2.7 Cover — The engine, pump and hose reel compartment shall be enclosed in a stream-lined cover made of 16 mm thick galvanized iron sheet.

2.8 Chassis — In the case of a trolley mounted unit, the chassis shall be fabricated from mild steel sections, and provided with two pneumatic wheels, a jacking arrangement to be used when in stationary position on a towing arrangement. As an alternative, the whole unit may be mounted on a truck chassis.

In either case, seating arrangement should be provided for four workers, excluding the driver. The dimensions of the entire unit should be suitable for easy manoeuvrability in narrow lanes, and should also be within the limits specified by the Regional Transport Authority.

2.9 Suction Device — Suction device is provided with the machine to suck the sludge from the manholes and transfer it to the container.

3. ACCESSORIES

3.1 The following items shall be provided with each unit, as standard accessories:

i) Three sewer cleaning nozzles with varying rearward angles,
ii) One nozzle extension for easy fixing of the hose and the nozzle,
iii) Two top tank strainer elements,
iv) Two sets of operation and service manuals and spare parts lists,
v) Hose guide, and
vi) Counter.

3.2 Spares — The following items shall be supplied with each unit:

i) Four reels of hose pipe, each of 100 m length.
ii) Set of spares for 3-year operation.

4. OPERATING INSTRUCTION

4.1 The jetting machines shall be accompanied by a detailed instructions manual explaining how they are to be operated. In these instructions it should be pointed out, among others, that flushing hose should be wound by power operation and the pressure water system should be emptied after the work is done.

5. PAINTING

5.1 The entire unit shall be painted with anti-corrosive primer and two coats of acrylic or any other suitable paint.

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