

SPECIFICATION OF TRUCK MOUNTED COMBINATION MACHINE
JETSUC® 7000 Lts. (Sewage 3000 lts. – Water 4000 lts.)

GENERAL :-

The vehicle mounted combined unit for jetting/suction shall be able to create vacuum required for siphoning of mud, slurry, grit and other materials from sanitary, storm and combined sewerage system and high velocity jetting to remove and dislodge obstructions, soluble grease, grit and other materials from sanitary storm and combined sewerage system. The unit shall be especially being required to clean out the non-man entry drain and deep wet wells of sewage pumping stations.

The unit shall be multi-purpose vehicle designed to collect sludge & sewage from catchpits. It shall also be used for flushing the silted storm water drain lines.

The vehicle mounted combined unit having suction lift of at least 8 m. The unit shall consist of:

- (a) Drive System
- (b) Tank
- (c) High Pressure jetting pump
- (d) Vacuum Pump (Exhauster/Compressor)
- (e) Derrick Arm (Hydraulic Syphon Boom).
- (f) Suction Hose
- (g) Hose Reel Drum
- (h) Sewer Hose
- (i) Lateral cleaning system. (Including handgun arrangement)
- (j) Hydraulic Plant.
- (k) Piping
- (l) Control Panel.
- (m) Accessories.
- (n) Vehicle chassis with cabin & PTO

The above equipment shall be mounted on chassis like TATA / ASHOK Leyland / Eicher or equivalent. Bidder shall furnish full details of vehicle chassis. Bidder shall also make arrangements to procure the vehicle with cabin from the manufacturer. The client will make direct payment to the chassis manufacturer/their dealer against their proforma invoice to avail Govt. rates. The standard tools accessories and spares supplied with the chassis shall be handed over to the client at the time of delivery of the unit.

The Bidder shall make arrangements for mounting equipment on the chassis according to the rules laid down by the Regional Transport Office, and loads recommended by the chassis manufacturer on the front and rear axles. The Client shall make arrangements for registration of the complete unit with the Regional Transport Office. The Government fees required for registration of the units shall be paid by the client.

a) PRIME MOVER:-

The jetting unit (jetting pump, vacuum pump, hydraulic pump etc.) shall be run on the power transmitted from vehicle engine through split shaft P.T.O. (Power Take Off Unit). The P.T.O shall be of sturdy design of reputed make (PZB, SEW, equivalent make) and should be able to provide sufficient power to run the system.

P.T.O. SPECIFICATIONS: (Power Take-Off Unit):-

The P.T.O. Unit shall be split shaft horizontal type, fitted with Nickel Chrome Alloy Steel Gears on Heavy Duty Ball Roller bearings in accurately machined housing. The unit shall be designed for horizontal drive. The RPM and direction of rotation of output shaft shall be the same as that of the input shaft. Foot mounting arrangement shall be provided for mounting the P.T.O. Unit.

Shift mechanism with (a) Vehicle Drive (b) Neutral and (c) Pump Drive shall be provided and the same can be operated from inside the cab. The P.T.O. Unit shall be capable of transmitting adequate torque generated by the engine.

b) TANK:-

The twin tank shall have a capacity of at least 7000 litres (3000 lts-sewage & 4000 lts for water). The tank shall be mounted on the chassis. The tank shall be fabricated from corrosion and abrasion resistant welded steel having minimum thickness of 5 mm and it shall have provision to take care of any surges that might occur in the tank. The inside of the tank shall be coated with anti-corrosive paint.

The tank shall be welded with torispherical dished ends at the front and the rear. The vacuum compartment shall be provided with hydraulically operated rear door opening facility. The tank shall be mounted on hinge supports for tilting about the rear end, while the front end shall have rest pads for seating on the chassis of the vehicle in the horizontal position.

The tank shall be provided with emptying rear cover at the rear, which shall be opened and closed on hinges, hydraulic system. The locking of the rear cover shall be effected by robust hand wheels. The rear cover shall be free from any mounting except,:

1. Suction cum Drain off valve Ø 4" for discharge of all the sucked material from the tank. This shall be located at the bottom of the door, and
2. Drain off valve Ø 2" for only water separated in the sludge section, which shall be located above the upper half of the door.

Tank shall also be provided with tipping arrangement. The tipping angle shall be minimum 20° to the horizontal and shall be effected using hydraulic system (hydraulic plant).

The water and sludge tanks shall be provided with sight glasses so that the levels of water and sludge in the respective tanks may be seen. The sight glass of the sludge tank shall not be tube type but shall be of 100 mm wide acrylic sight glass. Both the tanks shall be fitted proper fittings and valves like hydrant hose connection for water tank filling, drain valves off, jetting pump suction - shut off, boom shut off valve, etc.

The tank shall be provided with manhole at the water compartment for attending to the maintenance operations/repainting of the tank. The tank shall be provided with suitable suction line strainer and filler hose connection. The tank shall be finished with two coats paint of suitable enamel paint with primer on the outside. The entire tank shall be fabricated and finished to the best of quality standards and as per the standard engineering practice.

c) HIGH PRESSURE JETTING PUMP:-

The high pressure triplex jetting pump of imported make and shall be a fully variable unit with a heavy duty, positive displacement, reciprocating plunger and having a discharge capacity of 245 l.p.m., 140 bar pressure to perform the jetting function with a high degree of efficiency and reliability.

The pump shall be of Myers, USA imported make with proven performance.

The pump shall be suitably located on the chassis with provision for stopping the jetting pump without stopping the prime mover.

The pump shall be equipped with pressure relief valve for protection and life extension of jetting pump

d) VACUUM PUMP:-

A rotary positive displacement type dual cooled (air + water cooled combined system) vacuum pump (Battioni, Italy or reputed imported equivalent make) having displacement capacity of minimum 720 cubic metre/hr at about 1400-1500 r.p.m. and capable of producing 630 mm of Hg. Vacuum and 1.5 bar max discharge pressure shall be provided. Basically, the vacuum pump shall be designed to create vacuum, as well as work as air compressor for blow back during discharge. The vacuum pump shall be capable to produce 95% vacuum in the tank. The pump shall be driven through Power Take-Off unit.

The vane blades for the vacuum pump shall be of heat / spark resistant material. The pump shall incorporate dual cooling system (air-cooled + water-cooled), to avoid overheating in tropical conditions. The vacuum pump shall be designed for 30 min. continuous running without interruption, manufacturer certificate to this effect must be enclosed with the offer.

The vacuum pump shall be suitably located on the chassis with provision for stopping the vacuum pump without stopping the prime mover. A hand operated manifold Valve for switching from suction to pressure shall be provided at the discharge of the vacuum pump and the valve shall be suitably located for ease of operation. Corrosion resistant ball float valve shall be provided to prevent over-filling. A safety pot with lateral cleaning flap and outlet valve shall be provided.

The Vacuum Pump shall be equipped with overpressure relief valve for protection, cooling and life extension of vacuum pump.

e) DERRICK ARM (HYDRAULIC SYPHON BOOM) :-

Hydraulically operated derrick arm (boom) shall be capable of rotating in 300° with a lift of 1 mtr. On panel board there shall be a provision for 'lifting' and 'lowering' of the boom. All these operations except swivelling of boom shall be done by means of hydraulic plant with suitable controls.

A hydraulic operated shut-off valve shall be provided on suction hose line to the boom.

f) SUCTION HOSE:-

3 Nos. of non-collapsible, flexible suction hoses of 100 mm. Internal dia. and 3 mts in length shall be provided with the unit. Quick-fix "Muller" design coupling (male-female) shall be provided for these hoses. One end suction hose of 100 mm internal dia and 2 mts. long with 1 mtr. long steel pipe at one end and quick fix coupling (female part) at the other end shall be provided with each unit.

g) HOSE REEL DRUM:-

The hose reel drum shall be of sturdy design and shall be designed to take a minimum of 120 mts. of 25mm internal diameter high pressure jetting hose.

The hose reel drum shall be driven through a hydraulic motor preferably of Eaton, USA make to effect the wind and unwind operations.

The hydraulic motor shall be designed for withdrawing the hose at its full length inside the sewer lines against the friction and jetting reaction forces. A manual cranking facility shall be provided.

The high pressure water supply to the jetting hose shall be given through a special rotary swivel arrangement provided at the hose reel drum end.

h) SEWER HOSE:**DESIGN:-**

Subject hose shall be of 25 mm ID of 120 m length and designed in such a manner so as to facilitate replacement on a powered hose reel without interfering with the original manufacturer's intended minimum bend radius.

CONSTRUCTION:-

Subject hose shall be constructed to the following exact specifications. Exception to the following will render alternate hoses not acceptable. The hose shall be Trelleborg, Sweden / Piranha, USA or reputed imported make.

INNER CORE:-

Inner core shall be constructed of a special water and grease resistant Styrene-Butadiene Rubber Polymers (SBR) / Polyolefin thermoplastic material.

REINFORCING MATERIAL:-

Special synthetic textile braided.

COVER:-

A smooth Styrene-Butadiene Rubber Polymers (SBR) / Natural Rubber. (NR) / Polyether-urathene of 1.3 – 1.4 mm thick cover shall be provided.

MINIMUM BEND RADIUS:-

110 - 150 mm approx.

STRENGTH OF HOSE:-**TENSILE STRENGTH:-**

Shall be around 45 KN.

FITTING PULL OFF:-

Permanently attached fitting shall be a minimum of 35 KN.

PRESSURE RATINGS:-**BURST PRESSURE:-**

Shall be minimum of 7500 psi (520 bar)

WORKING PRESSURE:-

Shall be minimum of 3000 psi (200 bar).

DIMENSIONS:-

Outside diameter for hose shall be minimum approximately:
37 mm for 25 mm inside dia. hose.

WEIGHT OF HOSE:-

Weight of subject hose shall be approximately for 100 mtr. length.

60 - 88 kg for 25 mm dia. hose.

TEMPERATURE LIMITS:-

-40° C to 50° C.

i) LATERAL CLEANING SYSTEM: -

The lateral cleaning hand gun, complete with 25 mtrs. long, 12.5 mm dia. hose and quick coupling connector shall be provided. The washing down shall be facilitated by two conveniently located connection points. The water shall be made available from the water pump at a reduced pressure to ensure operator's safety.

This will be used for:-

- (i) Cleaning the side gullies of the road.
- (ii) Cleaning the manhole area inside and outside.
- (iii) Servicing the vehicle chassis and unit. Besides, this system has various other uses.
- (iv) Fire fighting, general purpose cleaning and maintenance.
- (v) Street cleaning maintenance.

This system will not only enhance the machine's capability but also increase the efficiency of sewer cleaning process.

j) HYDRAULIC PLANT:-

A Hydraulic Pump shall be of Dowty make and capable of developing a pressure of about 120 -150 bar approx, powered by P.T.O. The entire hydraulic plant will consist of oil reservoir, pipeline with connected hoses, filter, control valve for operation of hydraulic function, etc. It shall be suitably laid along the entire length of the tank and cabin thereby avoiding additional space for the plant.

k) PIPING:-

All piping subjected to high pressure shall be fabricated from extra strong pipes and all fittings shall be forged steel. All pipings shall be laid out such that they can drain by gravity or through suitable plugged openings to drain water, when purged with air.

I) CONTROL PANEL:-

A control panel shall be provided and located conveniently. All gauges, switches, acceleration lever, jetting/bypass valve lever, control panel lamp, Industrial Socket for flash lamp. (Including appropriate wiring) Low water alarm with indicator necessary for the operation of the unit shall be grouped in this control panel so that the operator can have complete control of the operation.

The following controls should be provided:

- (i) Tank Tipping
- (ii) Door Open / close
- (iii) Boom up / down
- (iv) Boom valve open / close
- (v) Hose reel rotation
- (vi) Jetting / Bypass valve lever
- (vii) Directional control valve lever
- (viii) Acceleration lever
- (ix) Compound Pressure gauge (for vacuum)
- (x) Pressure gauge (for jetting)
- (xi) Control panel lamp
- (xii) Low level water indicator
- (xiii) Industrial socket for flash lamp
- (xiv) Toggle switch for beacon
- (xv) Toggle switch for socket
- (xvi) Toggle switch for control panel lamp
- (xvii) Toggle switch for low water level alarm

m) ACCESSORIES:-

The following accessories shall be supplied alongwith each unit.

- i) Set of Nozzles.
 - a) 15° Bullet Nozzle (5 rear jet jets 1 forward)
 - b) 25° Radial Nozzle (5 rear jets 1 forward)
 - c) 35° Tangential Nozzle (6 rear jets)
 - d) 35° Piercing Nozzle (5 rear jets 1 forward)
 - e) 15° Bullet Nozzle (6 rear jets)
- i) Al chequered plate special maintenance platform with railing between cabin and tank – 1 No.
- ii) Al chequered plate catwalk with ladder – 1 No.
- iii) Al chequered plate lockable tool box – 1No.
- iv) Float switch with indicator and hooter for low water level – 1 no.
- v) Rotating beacon with cabling – 1 No
- vi) Flash lamp – 1 No
- vii) Reverse audio visual horn – 1No.
- viii) Mud guards – 2 Nos.
- ix) Mud flaps – 4 Nos.
- x) Visual indicating light for PTO – 1No.
- xii) Oil puddle sucker for removal of oil puddles from road, open gutters, etc.-1 No.
- xiii) Filler hose - 10 mts.

n) VEHICLE CHASSIS:-

The complete equipment shall be mounted on a suitable chassis with standard day cabin and side PTO to be supplied by the purchaser (Ashok Leyland / TATA / Eicher). The chassis should be provided with front and rear shock absorbers with five forward and one reverse constant mesh gear box, complete original front show with headlights, starter, dynamo with batteries and fuel tank.

The truck chassis shall have the following approximate specifications:

Wheel Base	4855 mm
Overall length	7710 mm
Max. Width	2310 mm
Max. GVW	16200 Kgs

PAINTING:-

The entire unit shall be painted with two coats of superior quality anti-corrosive primer with two coats of approved quality paint. The bidder shall get the paints and shades approved from the Engineer.

TRAINING:-

The successful bidder shall arrange at his own cost to train client's operators for operating and maintaining the unit. The training period shall be 1 week.

TESTING AND INSPECTION:-

- (i) Tests on equipment at manufacturer's premises as required will be carried out in accordance with the manufacturer's standard. All inspection, examination and testing shall be carried out in presence of the Engineer's representative in accordance with the specification.
- (ii) If the Engineer's Representative witnesses a test he shall be given a copy of the test results and certificates, upon request.