

**REGD.**  
From

**SUPPLY ORDER**

The Director General, Supplies & Disposals, Haryana,  
S.C.O. No. 09 (1<sup>st</sup> & 2<sup>nd</sup> Floors), Sector-16, Panchkula.  
Tel. Nos. 0172-2570121-124.  
Fax No. 0172-2570121, E-mail: [supplies@hry.nic.in](mailto:supplies@hry.nic.in)

To

M/s United Manufacturing Co.  
Plot No. 191-192, Udyog Vihar,  
Vill- Sankhol, Bahadurgarh, Haryana  
E-mail: [unitedmanufacturingco.1987@gmail.com](mailto:unitedmanufacturingco.1987@gmail.com),

Memo No:- 52/HR/E-3/2021-22/  
Dated Panchkula the:-

**Subject:-** Purchase of 03 Nos. complete built-up Water Cannons (i.e. Purchase of Tata Chassis LTP 2818, BS-VI OBD-II alongwith fabrication work), invited on GeM Portal required by Police Department, Haryana.

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With reference to Gem Portal Bid I.D. No. GEM/2022/B/2724756 dated 17.11.2022, as per decision of HPPC meeting dated 31.03.2023 and this office Acceptance letter no. 487 dated 20.04.2023, on the subject noted above.

Please Supply the Complete built-up vehicles within 03 months from the date of issue of Supply Order.

The Complete built-up vehicles may please be sent direct to the D.G. Police, Haryana, Sector-6, Panchkula. For payment and the bill of the cost of store in triplicate be given to the D.G. Police, Haryana, Sector-6, Panchkula under advised to this office.

Sr. No.	Description of Stores	Qty. (in Nos.)	The Rates are in Rs. Per vehicle, inclusive of GST, freight charges & all other types of taxes/duties etc.
1.	Water Cannons complete built-up (i.e. Purchase of Tata Chassis LTP 2818, BS-VI OBD-II alongwith fabrication work) 12000 Ltrs. capacity.	03	Rs. 57,90,000/- each

**Specifications of Water Cannons 12000 Ltrs.**

Sr. No.	Specifications
1.	The vehicle mounted water cannon system shall have water tank capable of carrying 12000 ltrs of water. An indelible ink tank and an irritant tank, each capable of carrying 500 ltrs of indelible ink and irritant

	respectively.
2.	The vehicle is to be provided with a centrifugal pump capable of delivering 3200 lpm of water at 8.5 kg/cm <sup>2</sup> and 2400 lpm at 10.5 kg/cm <sup>2</sup> shall be mounted in a compartment just behind the drivers cabin coupled to a separator engine i.e. auxillary engine.
3.	The vehicle is to be provide with the engine used for driving the pump shall be Tata 697 TC Turbo charged engine developing about 135 HP at 2400 rpm as per DIN 6270 B for intermittent rating.
4.	The vehicle is to be provide with Diesel Tank shall be filled with sufficient quantity of explosion suppression material to avoid explosion in the tank.
5.	A variable round the pump proportionator shall be fitted between the suction and delivery of the pump. The propartioner shall have four position selector valve. (a) Position I shall be selected during operation of one cannon. (b) Position II shall be selected during operation of both cannon simultaneously, (c) Position III shall be selected during operations both cannons along with front and rear spray nozzles. (d) Position IV shall be selected during operation front and rear spray nozzle only. (e) The "OFF" position should isolate the proportionator so that the appliance could be used to deliver water only if required.
6.	Suitable lifting eyes with proper stiffeners shall be provided on the shell of the tank to enable the tank to be lifted of the vehicle for repairs/replacement as necessary.
7.	The tank shall be fitted with a filling orifice, a drain cock and one/two bolted man hole of 450 mm dia on top of the tank. The filling orifice shall not be less than 250 mm specification diameter and fitted with a removable, strainer and filler cap clearly marked "WATER". The drain cock and pipe shall not be less than 75 mm dia water way throughout. The drain cock and pipe shall be taken down to a point well below the chasis without reducing the effective ground clearance. When fully loaded and shall discharge away from the chassis.
8.	An overflow pipe of not less than 100 cm internal dia shall be fitted to the tank. The overflow pipe shall be taken down to a point well below the chassis discharge away from the wheels. The pipe shall be so designed and located to ensure that water will over flow through the pipe only while refilling the tank nut no water shall overflow, through this pipe when the appliance is in motion or is standing on an uneven ground or brakes are applied to the moving vehicle.
9.	Two No. of filling pipe (Hydrant connections) each with an internal dia of not less than 70 mm shall be fitted to the tank. Each of these shall. The inlet of the filling pipes shall be fitted at the pump control panel. Foolproof arrangement shall be made to prevent pressurization of water tank while refilling through these hydrant connections. Suitable arrangement should be provided to ensure that the water from the tank does not leak through the filling pipes.
10.	A tube type water level indicator for the water tank shall be provided and Calibrated as Empty. $\frac{1}{4}$ , $\frac{1}{2}$ , $\frac{3}{4}$ and full. In addition, water level indicator shall also be provided in the driver's cabin with the same calibration.

11.	Suitable arrangements shall be provided for self filling of water tank directly from the pump using a 50 mm pipe line. Suitable controls for this operation shall be provided at the pump panel and also in the driver's cabin control panel.
12.	<p><b>Pump:-</b></p> <ul style="list-style-type: none"> <li>• (I)The Pump shall be capable of giving its rated output of 3200 lmp at 8.5 kg/cm<sup>2</sup>. The pump shall also be capable of giving the performance given in the table below when working with all internal and external strainer (except basket strainer) at sea level and upto 35 deg. C water temperature.</li> <li>• (II) The pump shall be connected with the water tank. Water cannon and spray nozzles. The various controls for operating the pump unit, Cannons, Spray nozzles etc. shall be located in the drivers cab and duplicated a the side pump control panel.</li> </ul>
13.	<p><b>Primer:-</b></p> <p>The primer shall be capable of lifting water at least from a depth of 7 m at a rate not less than 30cms/sec through a suction bore of 100mm diameter and shall preferably and shall preferable be of the water ring/exhaust ejector type.</p>
14.	<p><b>Engine for driving pump:-</b></p> <p>Tata model 697 turbo charged s 6 cylinder water, cooled diesel engine developing 135 HP at 2400 rpm shall be used for driving the pump. The engine pump assemble shall be mounted in a compartment behind the driver's cabin. Adequate louvers shall be provided in the locker for ventilation.</p>
15.	<p><b>Cooling System:-</b></p> <p>In addition to the radiator cooling, an indirect cooling system of the open circuit type shall be provided with the pump engine, discharging water to the waste. This shall enable full power output to be maintained during continuous stationary running of the engine without over heating. The operating temperature of the engine cooling water shall be thematically controlled.</p> <p>The oil in the oil pump shall be prevented from overheating.</p>
16.	<p><b>IRRITANT AND INDELIBLE INK TANKS:-</b></p> <p>(i)Two Stainless steel tanks each of 500 ltr. Capacity shall be suitable mounted on the chassis. The tank shall be separate and distinct units which can be removed fabricated out of minimum 2mm thick stainless steel and shall be of and welded construction reinforced suitably. Its shall be withstand a hydraulic pressure of 0.3 kg sq cm.</p> <p>(II)Each tank shall have a filling orifice of not less than 150 mm dia with a removable strainer fitted on it. A drain cock and pipe of not less than 50 mm dia shall also be provided.</p>
17.	<p><b>Water Cannons:</b> Two Nos. Electro hydraulic operated water Cannons shall be mounted on the roof of the cab in such a manner that these can be operated by means of separate joysticks suitably located in the driver's cabin. Each cannon shall be capable of traversing through 0 deg to 210 Deg. In azimuth and from- 15 deg to +60 deg in elevation.</p>
18.	<p><b>Ground SPRAY NOZZLES:-</b> To protect the vehicles during the operation it shall be provided with two nos spray nozzles in front of the vehicle between the front wheels. The spray nozzles shall have wide jet pattern</p>

	to cover an area, at least twice the width of the vehicle.
19.	<b>REAR SPRAY NOZZLES:</b> Two Nos. rear spray nozzles shall be provided to project the vehicles from the rear so that the mob does not come near the vehicle from rear. Wide pattern spray nozzle shall be located suitable having a minimum throw of minimum 6m.
20.	<b>VIDEO CAMERA AND T.V.</b> A TFT monitor (14) shall be provided and suitably located in the driver's cabin to view the activities of the mob at rear of the vehicles. The video camera shall be mounted on a stand provided inside the rear door of the vehicle. The video camera and TFT shall be capable of operation through 12 VDC vehicle battery.
21.	<b>Compressed Air Cylinder:-</b> An additional compressed air cylinder shall be provided for pneumatic system.

**Specifications for the fabrications of vehicle mounted water cannon system:-**

1. **INTRODUCTION:**

This system provides an effective, on-lethal means for dispersal of violent mob. The system can-deliver continuous / pulsating water jet through rotatable cannons mounted on the top of the vehicle. Provision to mix irritant / indelible ink has also been incorporated. The equipment has been integrated on TATA LPT 2818 chassis BS-VI OBD-II for capacity 12000 ltrs of water. The system is so designed that the commander sitting inside the driver cabin can control each and every operation. The features such as each cannon water discharge rate 1100 LPM at 10.5 kg/cm<sup>2</sup>, water jet throw up to 50 m distance, pulse jet arrangement, electro, hydraulically operated cabin mounted joysticks as remote controls for cannon with manual over ride and cannon motion from 15 to 60 degree in vertical direction and 0 to 210 degree in azimuth direction have been provided.

2. **SCOPE OF WORK**

Manufacture integration and supply of vehicle mounted water cannon system 12000 ltrs capacity, Qty. one number as per the technical specifications & drawings enclosed. The system will be directly handed over to the users after satisfactory trials / training to the users at firm's premises. The scope of work is as follows:

- i. Vehicle body building and structural fabrication.
- ii. Procurement of bought out items as per appendix A, B, C, D & E
- iii. Procurement & Integration of auxiliary / engine and water pump.
- iv. Fabrication and integration of water, irritant & indelible ink tanks.
- v. Manufacturing & integration of cannon & cannon mechanism.
- vi. Procurement, integration, commissioning & assembly of oil hydraulic system (Ref, Appendix 'D')
- vii. Procurement, Integration, commissioning & assembly of pneumatic system. (Ref Appendix 'E')
- viii. Manufacturing and Integration of water piping.
- ix. Procurement, Integration of electrical & electronic system. (Ref, Appendix 'C' and Appendix 'B')
- x. Testing and trials as per acceptance test plan.

3. **FEATURES**

- i. An effective, non-lethal, means for dispersal of violent mob.
- ii. Two rotatable platform mounted cannons.
- iii. Two modes of operations continuous/pulsating.
- iv. Throw 50 meters in still air.

- v. Searchlight provided with cannons to facilitate night operations.
- vi. Additional flood light with 60 mtr cable.
- vii. Suitable for firefighting also.
- viii. Separate engine to drive the pump.
- ix. Hydraulically operated, cabin mounted joystick remote controls for cannons with manual override facility
- x. Provision for mixing irritant/indelible ink with water stream as desired.
- xi. Cabin mounted public address system.
- xii. Rotating warning lights on top of driver's cabin.
- xiii. In service with several state police organization.
- xiv. Ideal mob dispersal system.
- xv. Pneumatically controlled valve operation.

4. **General Requirements:**

- (i) The vehicle mounted Water Cannon system shall have water tank capable of carrying 12000 ltrs of water. An indelible ink tank and an irritant tank, each capable of carrying 500 ltrs of indelible ink and irritant respectively.
- (ii) A centrifugal pump capable of delivering 3200 lpm of water at 8.5 kg/cm<sup>2</sup> and 2400 lpm at 10.5 kg/cm<sup>2</sup> shall be mounted in a compartment just behind the driver's cabin coupled to a separate engine i.e. auxiliary engine.
- (iii) The engine Used for driving the pump shall be TATA 697 TC Turbo charged engine developing about 135HP at 2400 rpm as per DIN 6270B for intermittent rating .
- (iv) Diesel tank shall be filled with sufficient quantity of explosion suppression material to avoid explosion in the tank.
- (v) A variable round the pump proportionator shall be fitted between the suction and delivery of the pump. The proportionator shall have four-position selector valve.
  - (a) Position I shall be selected during operation of one cannon.
  - (b) Position II shall be selected during operation of both cannons simultaneously.
  - (c) Position III shall be selected during operation of both cannons along with front and rear spray nozzles.
  - (d) Position IV shall be selected during operation front and rear spray nozzles only.
  - (e) The OFF position should isolate the proportionator so that the appliance could be used to deliver water only if required.

5. **Material Selection**

- |                         |                                                         |
|-------------------------|---------------------------------------------------------|
| (a) Water Tank          | M.S (For detail refer drg. RDE/ WC/12000/003)           |
| (b) Indelible ink Tank  | SS ( For detail refer drg. RDE/ WC/ 12000/004)          |
| (c) Irritant Tank       | SS ( For detail refer drg. RDE/ WC/ 12000/004)          |
| (d) Body Building       | MS , Aluminum ((For detail refer drg. RDE/WC/12000/002. |
| (e) Engine Skid         | MS (For detail refer drg. RDE / WC/ 12000/005)          |
| (f) Paneling            | Aluminum                                                |
| (g) Piping for:-        |                                                         |
| (i) Water Tank          | Galvanized pipe as per IS:1239 Grd. B                   |
| (ii) Indelible ink Tank | SS                                                      |
| (iii) Irritant Tank     | SS                                                      |
| (iv) Pneumatic          | SS                                                      |
| (v) Hydraulic           | CDS                                                     |

Note:- Timber shall not be used in body construction

6. **Treatment:**

All parts which forms water ways or come in contact with indelible ink and irritant shall be of corrosion resistant material or suitably treated to prevent corrosion. All water pipelines shall be hot dipped galvanized. The water tank shall be painted internally with epoxy paint after a shot/sand blasting and all metal parts exposed to atmosphere shall either be corrosion resistant material or treated suitably to resist corrosion.

7. **Construction:** (Refer drawing no- RDE/WC/12000/003)

**Water Tank-** The water tank mounted on the chassis shall be capable of carrying 12000 liters of water. It shall be of welded construction and fabricated out of mild steel sheet. The tank shall be suitably baffled in both the directions to prevent surge when the vehicle is accelerating, cornering or braking. The baffles shall be of welded construction for side section and bolted for middle section provided with the opening in the baffles. The tank shall be semi elliptical in shape and so designed and mounted as to bring the center of gravity of the appliance as low as possible. The mounting shall permit full rated contents of the tank to flow into the pump. The water tank with all its fitment shall withstand a hydraulic pressure of 0.3 kg/Cm<sup>2</sup> (gauge).

- (i) Suitable lifting eyes with proper stiffeners shall be provided on the shell of the tank to enable the tank to be lifted off the vehicle for repairs/ replacement as necessary.
- (ii) The tank shall be fitted with a filling orifice, a drain cock and one/two bolted man hole of 450 mm dia on top of the tank. The filling orifice shall not be less than 250 mm diameter and fitted with a removable strainer and filler cap. The drain valve and pipe shall not be less than 75 mm dia water way through cut. The drainpipe shall be taken down to a point well below the chassis without reducing the effective ground clearance. When fully loaded and shall discharge away from the chassis.
- (iii) An overflow pipe of not less than 100 mm internal dia shall be fitted to the tank. The overflow pipe shall be taken down to a point well below the chassis without reducing effective ground clearance. when fully loaded and shall discharge away from the wheels. The pipe shall be so designed and located to ensure that water will overflow through the pipe only while refilling the tank but no water shall overflow through this pipe when the appliance is in motion or is standing on an uneven ground or brakes are applied to the moving vehicle.
- (iv) Two nos. of filling pipes (hydrant connections) each with an internal dia of not less than 70 mm shall be fitted to the tank. Each of these shall be fitted with 63mm instantaneous male couplings incorporating a strainer. The inlet of the filling pipes shall be fitted at the pump control panel. Full proof arrangement shall be made to prevent pressurization of water tank while refilling through these hydrant connections. Suitable arrangement should be provided to ensure that the water from the tank does not leak through the filling pipes.
- (v) Tube type water level indicator calibrated as empty,  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$  and full shall be provided for the water tank in addition to digital water level indicator, which is fitted on the control panel in the driver's cabin.
- (vi) Suitable arrangements shall be provided for self-filling of water tank directly from the pump using a 50mm pipe line. Suitable controls for this

operation shall be provided at the pump panel and also in the driver's cabin control panel. All plumbing shall be reasonably accessible for maintenance purpose. Necessary drain cocks shall be provided and control for these shall be readily accessible and arrangement for the same is such as to prevent the cocks from being opened by vibrations. The direction in which the valves/cocks open/close shall be clearly marked near each valve/cock

### 8. PUMP

A two stage centrifugal pump shall be connected to a separate TATA 697 TC engine for driving the pump. The pump engine assembly shall be mounted on a sub frame and fitted on the chassis in a compartment just behind the driver's cabin. The pump casing and impeller shall be of gunmetal. The pump shaft shall be of stainless steel supported by anti friction bearing.

The gland shall preferably be of self-adjusting type. The impeller neck rings in the pump casing shall be replicable and manufactured from high quality bronze. The Impeller must be balanced to reduce end thrust. A drain plug shall be provided at the bottom of the casing.

The pump shall be capable of giving its rated output of 3200 lpm at 8.5 kg/cm<sup>2</sup>. The pump shall also be capable of giving the performance given in the table below when working with all internal and external strainer (except basket strainer) at sea level and upto 35deg.C water temperature.

Sr.no	Output discharge (lpm)	Pressure (kg/cm <sup>2</sup> )	Suction lift (measured vertically from water level to the suction eye in meter)	rpm	Remarks
1	3200	8.5	3	2400	When working through two 2.5m length of specified suction hose
2	2400	10.5	3	2400	-do-

#### Allowances for output

(a) One percent for every 2.8 deg. rise in water temp above 35 deg.

(b) Four percent for every 300 m elevation above mean sea level.  
The suction eye of the pump shall be provided with standard 100 mm suction hose connection with internal strainer and gun material blank cap. The strainer shall be retained firmly when in use but shall be readily removable. The pump shall be provided with two delivery outlets at the pump panel fitted with globe valves with standard 63mm delivery hose connection and gunmetal blank caps fastened with chains.

The pump casing and impeller shall be free from casting defects such as blow holes etc. Pump shall be tested to a hydraulic pressure of 28 kg/cm<sup>2</sup> to detect any leakage, perforation etc.

The pump shall be connected with the water tank, water cannon and spray nozzles. The various controls for operating the pump unit, cannons, spray nozzles etc. shall be located in the driver's cab and duplicated at the side pump control panel.

### 9. PRIMER

The primer shall be capable of lifting water at least from a depth of 7m at a rate not less than 30CC/sec through a suction bore of 100mm diameter and shall preferably be of the water ring/exhaust ejector type.

10. **ENGINE FOR DRIVING PUMP**

Tata modal 697 turbo charged 6 cylinder water, cooled diesel engine developing 135 HP at 2400 rpm shall be used for driving the pump. The engine pump assembly shall be mounted in a compartment behind the driver's cabin. Adequate driver's shall be provided in the locker for ventilation.

11. **COOLING SYSTEM**

In addition to the radiator cooling, open circuit type cooling system shall be provided with the pump engine, discharging water to the waste, this shall enable full power output to be maintained during continuous stationary running of the engine without overheating. The operating temperature of the engine cooling water shall be thermostatically controlled. The oil in the oil sump shall be prevented from overheating.

12. **IRRITANT AND INDELIBLE INK TANKS:**

Two stainless steel tanks each of 500 ltr capacities shall be suitably mounted on the chassis. The tanks shall be separate and distinct units, which can be removed separately for replacement. The tanks shall be fabricated out of minimum 2mm thick stainless steel sheets of welded construction reinforced suitably. Its shall withstand a hydraulic pressure of 0.3 kg/cm<sup>2</sup>.

Each tank shall have a filling orifice of not less than 150 mm dia with a removable strainer fitted on it. A drain cock and pipe of not less than 50 mm dia shall also be provided.

The draw off tube shall be suitably located and fitted with a gauge strainer of suitable material mesh size and of adequate straining area. The tank top shall be removable and the joint between top and body of tank shall be leak proof. Suitable venting arrangement shall also be provided.

The draw off tube from each tank shall be connected to the proportionator / inductor and the pump as necessary. The plumbing for this shall have a clear passage of 1-1/2 through out without any obstruction. Tube type level indicator for ink and irritant tanks shall be provided the driver's cabin calibrated as empty 1/4, 1/2, 3/4 and full. In addition to this digital level indicators shall also be provided on the control panel in the driver's cabin calibrated to read as empty 1/4, 1/2, 3/4 and full.

13. **PROPORTIONATOR**

A round the pump inductor should be fitted between the suction and the delivery of the pump that will induct irritant or indelible ink as required in to the water stream with no loss in delivery pressure from the pump. The proportionator shall comprise of an inductor and one selector valve calibrated to ensure correct intake of irritant / indelible ink from 0 to 8%.

14. **WATER CANNONS**

Two nos. Electro hydraulically operated water Cannons shall be mounted on the roof of the cab in such a manner that these can be operated by means of separate joysticks suitably located on the control panel in the drivers cabin. Each cannon shall be capable of traversing through 0 deg to 210 Deg. in azimuth and from -15 deg to +60 deg in elevation. A powerful searchlight shall be suitably fitted with each cannon so as to adequately illuminate the area of operation. All



Electro-hydraulic/ Pneumatic controls shall be provided with manual override controls so that in case of failure of electrical or pneumatic systems, it should be possible to operate the cannons manually from the driver's compartment. The output from each cannon shall be 1100 liter / minute at a pressure of 10.5 kg/cm<sup>2</sup> and a throw not less than 50 m in still air.

**15. PULSE JET ARRANGEMENT:**

The Water Cannon shall also be fitted with pulse jet arrangement so as to discharge water in the form of pulses of short duration i.e. 2 Sec. 'ON' and 2 Sec. 'OFF' in addition to continuous jet throw arrangement. The switch over from continuous stream to pulse jet arrangement shall be affected by simple timer system.

**16. FRONT AND REAR GROUND SPRAY NOZZLES:**

To protect the vehicle tyres during the operation, two spray nozzles at front and two at rear side shall be provided on the vehicle as shown on the drg. These spray nozzles shall have wide jet pattern to cover an area at least twice the width of the vehicle.

**17. BODY WORK AND STOWAGE:**

Enclosed sitting arrangement for driver, leader and four crew shall be provided in driver's cabin. The design of the cab shall be such that it shall afford maximum possible vision for the crew and shall ensure adequate ventilation. Hinged doors shall be provided on both sides. The doors should open outward and these shall hung forward and have locks. All glasses fitted on doors / windows shall be fitted with polycarbonate sheets and should have winding type regulators. Windscreen of splinter proof safety type shall be provided. All glasses including windshield shall be provided with removable protective wire mesh screen of 10 gauge wire dia and 25 mm openings. Wire mesh guard is also to be provided on head lights & other lights of the vehicle.

The cab and body should be of composite construction with sufficient rigidity and strength. Square tube (MS) shall be used for the super structure members, It shall be of all steel construction. Pressed section of sufficient strength shall be used for the super structure. Aluminum sheets of 16 gauge shall be used for paneling & lockers. Checkered plate shall be provided on top of the entire vehicle.

Lockers shall be provided for the stowage of all the accessories, spares / tools. The locker shall be provided with internal automatic lighting arrangement with master switch in the cab. The locker shall be of weather proof and self-draining to release all water following a wash down etc.

**18. VIDEO CAMERA AND TFT:**

A TFT monitor (14") shall be provided and suitably located in the driver's cabin to view the activities of the mob at the rear of the vehicle. The video camera shall be mounted on a stand provided inside the rear door of the vehicle. The video camera and TFT shall be capable of operation through 12 V DC vehicle battery.

**19. COMPRESSED AIR CYLINDER:**

An additional compressed air cylinder shall be provided for pneumatic system.

**20. STABILITY:**

The stability of the appliance shall be such that no over turning occurs beyond 27-degree slope from the horizontal. Under fully equipped and loaded conditions (equivalent weight of crew to be loaded in lieu of the crew).

**21. WORKMANSHIP AND FINISH:**

The standard of workmanship and finish of all mechanical and other parts shall be such that the parts normally required to be replaced can be supplied and should fit correctly. The appliance shall be suitably painted as per the requirements. The color in which the vehicle is to be painted will be intimated at the time of delivery. Under chassis shall be painted black.  
Note-Necessary anti corrosion and priming coat shall be applied before painting.

**22. INSTRUMENTS AND CONTROLS**

The controls shall be provided on Electrical & Electronic control panel in front of commander seat, inside drivers cabin as per Appendix 'B'

The controls for following shall be provided on the control panel for the crew (i.e. manual override) behind driver's seat inside cabin.  
Pneumatic:

- (a) Water supply On / Off control for cannon -1.
- (b) Water supply On / Off control for cannon -2.
- (c) Water supply On / Off control for cooling system
- (d) Water supply On / Off control for inductor / proportionator
- (e) Water supply On / Off control for rear tyre saving spray nozzles
- (f) Water supply On / Off control for front tyre saving spray nozzles
- (g) Indelible ink supply On / Off control for mixing with water.
- (h) Irritant supply On / Off control for mixing with water. .
- (i) Selector valve control for mixing indelible ink / irritant (in percentage)
- (j) Control for air release

**Hydraulic:** Auto / Manual controls of oil hydraulic system for cannon movement

- (1) Elevation for Cannon-1
- (2) Azimuth for Cannon --1
- (3) Elevation for Cannon-2
- (4) Azimuth for Cannon-2

**Mechanical:** On / Off control lever for water supply from water tank to pump valve

The control for following shall be provided on outside control panel Suction (i.e priming control panel)

- (a) Calibrated pressure gauge (0 to 21 Kg / Cm<sup>2</sup>)
- (b) Calibrated vacuum gauge (0 to -1 Kg / Cm<sup>2</sup> or 0 to -30 mm Hg)
- (c) Control for engine throttle
- (d) Control lever for priming valve On / Off
- (e) Control lever for exhaust primer On / Off
- (f) Water supply On / Off control for cooling system
- (g) Water supply On / Off control from pump to water tank filling valve.
- (h) Suction Mouth - 1 No.
- (i) Delivery Valves - 2 Nos.

**23. ACCESSORIES FITTED TO THE SYSTEM: As per appendix 'C'**

**24. THE FOLLOWING ACCESSORIES SHALL BE SUPPLIED LOOSE**

- (a) Armored suction hose in 2.5 m length with Internal diameter - Four Nos.  
of 100 mm with standard round thread coupling. (IS:902 /2410) one no.
- (b) Low level suction strainer (IS:907) one no.
- (c) Basket strainer for above (IS:3582) one Pair
- (d) Suction wrenches (IS:4643) one no.
- (e) Suction collecting head 3-way

- (f) Suction adopter to hydrant 100 mmx 63 mm one no.
  - (g) RRI Hose 63mm diameter and 30m long with instantaneous IS-636II & IS-903 Two nos.
  - (h) Light alloy branch pipe with 19 and 25mm nozzles Two Sets
25. **TOOLS:** All tools required for normal maintenance of the vehicle and system shall be provided along with the system.

26. **DOCUMENTS:**

The following documents (hard copy two sets & soft copy) shall be provided along with the equipment.

- (a) **Users Hand Book and Technical/maintenance manual** with illustration both for operating and normal maintenance procedure for the appliance.
- (b) **Illustrated Part Identification List:-** ISPL should include each part and related sub assembly.
- (c) **Drawings** It must consists of part drawing, sub assembly & assembly drawings of the total system along with master list of drawings.
- (d) **CCES & Equipment Dossier**

27. **ACCEPTANCE TESTS:**

The following tests shall be carried out before accepting the vehicle. These shall be carried out at the manufacturer's premises or at a place to be mutually agreed upon.

Load Distribution:

		Not to exceed 25000 Kg
(i)	GVW	6000 Kg
(ii)	FAW	19000 Kg
(iii)	RAW	9350 mm
(iv)	Overall length	2470 mm
(v)	Overall width	336 mm
(vi)	Min. Road Clearance	

- (a) **Stability Test:** To check the fulfillment of requirement at clause 21.
- (b) **Pump Test:**
  - (i) The pump casing and impeller shall be subjected to a hydro test at a pressure of 28 kg/cm<sup>2</sup> to detect any leakage.
  - (ii) Performance test should be carried out as per para 9.2.
  - (i) The pump shall be run for a period of four hours non-stop to check the rated output at varying pump pressure with 3 m suction, using 100 mm dia suction hose. The test may be conducted after mounting the engine and pump on the chassis at firms premises. During the test the water shall not be replenished for the cooling system and the temperature of engine oil shall not exceed 115 deg. C or 90 % of the oil manufacturers rated temperature (whichever is less). Engine shall show no signs of defects during the test. The temperature of cooling water (radiator water) shall not exceed 85 deg C.
  - (ii) Tests shall be made to check the fulfillment of the requirement laid down in Para 9.2.
  - (iii) All pipe lines shall be subjected to a hydraulic pressure of 28 kg/sq cm
- (c) **Primer Test:** The lift for the primer test shall be measured from the center of suction eye to the water level and shall be carried out to check the fulfillment of requirement laid down in Para 10.

- (d) **Front & Rear Spray Nozzles:** The tests shall be conducted to check the requirement laid down in Para 17 to the satisfaction of the inspector.
- (e) **Water Tank, Ink and Irritant Tanks:** the tank shall be subjected to a hydraulic pressure of 0.3 kg/Cm<sup>2</sup>. The tanks should with stand the pressure without any leakage/ bulging.

28. **MANUFACTURERS CERTIFICATE AND GUARANTEE**

The manufacturer shall furnish guarantee for the material, workmanship and performance of the appliance for a period of one year or more from the date of receipt of equipment.

The manufacturer shall give a certificate regarding the fulfillment of the requirement laid down in this specification.

The manufacturer shall be responsible for replacing any part, which may become unserviceable due to use of defective or sub standard materials or bad workmanship during the period of guarantee free of all charges.

The manufacturer will provide free service anywhere in the country during Warranty.

The fabricator will provide maintenance training for period of 5 working days free of cost to the rep. of user.

29. **MARKING**

The appliance shall be clearly and permanently marked with the following preferably on a metal plate in the driver's cab and also at the pump operating control panel.

- (a) Manufacturers name or trade mark.
- (b) Year of Manufacturer
- (c) Capacity of pump (in lpm), water tank, irritant tank and indelible in tank (in liters).
- (d) Engine and chassis number
- (e) Pump number

An anodized plate with operating/maintenance instructions suitably printed on it should be provided on the pump-operating panel for easy reference to the operator.

The vehicle to display prominently the under mentioned words:-

'A PRODUCT FROM DRDO, R&DE (ENGRS), DIGHI, PUNE-15'

The name of the vehicle to be displayed in front as "VARUN"

NOTE:

- 1) FABRICATION OF THE COMPONENTS SHOULD START ONLY AFTER APPROVAL OF PARTS/MANUFACTURING DRAWINGS BY THE REP. DIRECTOR R&DE (E), DIGHI, PUNE-15.
- 2) FOR ANY FURTHER TECHNICAL CLARIFICATIONS PLEASE CONTACT SHRI SS KUMBHAR, TECHNICAL OFFICER 'B' / SHRI VR JALWADI TECHNICAL OFFICER 'A' OF THIS ESTABLISHMENT. CONTACT NO. 27150881 / Extn. No. 4753, 4750.
- 3) ALL THE DRGS MENTIONED IN THE SPECIFICATION ARE AVAILABLE WITH VENDOR.

**Appendix "A"**

**Valve Automation system for water Flow of Water Cannon  
( Ref Drg. No. RDE/WC/12000/007)**

Valve ( CL 150

System for (On/off)	Actuator		Direction Control Valve			Valve ( CL 150					Seat
	Make	Model	Make	Model	Solenoid Coil voltage	Make	Type	Size	Body	Ball /Disc	
Tank to Pump Suction Cannon (LH)	Rotex	EC 125	Rotex	VAD 213 NC	12 V	Alfa Laval/Sunder/Crane	BF	6"	CI	SS 316	EPDM
Cannon (RH)	Rotex	EC 63	Rotex	VAD 213 NC	12 V	Alfa Laval/Sunder/Crane	BFV	2-1/2"	CI	SS 316	EPDM
Inadmissible Ink Tank	Rotex	EC 63	Rotex	VAD 213 NC	12 V	Micro finish	BV	1-1/2"	SS 304	SS 316	PTFE
Irritant Tank	Rotex	EC 63	Rotex	VAD 213 NC	12 V	Micro finish	BV	1-1/2"	SS 304	SS 316	PTFE
High Pressure Line	Rotex	EC 50	Rotex	VAD 213 NC	12 V	Micro finish	BV	1"	SS 304	SS 316	PTFE
Front Nozzle	Rotex	EC 50	Rotex	VAD 213 NC	12 V	Micro finish	BV	1"	SS 304	SS 316	PTFE
Rear Nozzle	Rotex	EC 50	Rotex	VAD 213 NC	12 V	Micro finish	BV	1"	SS 304	SS 316	PTFE
Cooling System	Rotex	EC 50	Rotex	VAD 213 NC	12 V	Micro finish	BV	1"	SS 304	SS 316	PTFE
Manual Cooling						Micro finish	BV	1-1/2"	SS 304	SS 316	PTFE
Selector Valve							BV	2"	SS 304	SS 316	PTFE
Tank filling Primer						Micro finish	BV	1"	SS 304	SS 316	PTFE

## Appendix " B"

## Electrical &amp; Electronics system on Main Control Panel For Water Cannon ( Adroit make)

Sr. No.	Description	Make	Model	Specification	Qty.	Remarks
1	Ignition Key switch				1	For supply to Control Panel
2	Starter				1	For Aux Engine
3	Pressure Gauge	SONAL	0-21KG/cm <sup>2</sup>	3/8" BSP Black connection	1	For Pump delivery pressure
4	Amp Gauge	PRICOL	-50+50Amp		1	For vehicle battery
5	Temperature Gauge	PRICOL	40-120 DEG	Part no.3721	1	For Radiator water Temp.
6	Air Pressure Gauge	PRICOL	0-10 BAR	Part no.2458	1	For Pneumatic Air Tank
7	Oil Pressure Gauge	PRICOL	0-10 BAR	Part no.2676	1	For Aux Engine
8	Digital Level indicator	SPINK CONTROL			1	For water Tank
9	Digital Level indicator	SPINK CONTROL			1	For inedible ink Tank
10	Digital Level indicator	SPINK CONTROL			1	For irritant Tank
11	Digital RPM /Hour Meter	SPINK CONTROL			1	For Aux Engine
12	Water Cannon Position indicator	ADROT			1	For position indication
13	Joystick for LH Cannon				1	Movement of Azimuth/vertical
14	Joystick for RH Cannon				1	Movement of Azimuth/vertical
15	Timer for LH Cannon				1	Pulsetting of water jet
16	Timer for RH Cannon				1	Pulsetting of water jet
17	Switch for tank to pump Valve	Utilisation Category : AC11& DC as per IEC-337 Thermal Current :10Amp Operational Current : 6 Amp (Operational Contrat) Operational Voltage : 120 Volt Contact Combination : 1 NO+1 NC Bulb Rating : 6.3 Volt,1Watt.24 Volt Mounting arrangement : one hole mounting			1	For valve " ON/OFF"
18	Switch for ink tank Valve		(do)		1	For valve " ON/OFF"
19	Switch for irritant tank Valve		(do)		1	For valve " ON/OFF"
20	Switch for LH Cannon Valve		(do)		1	For valve " ON/OFF"
21	Switch for RH cannon Valve		(do)		1	For valve " ON/OFF"
22	Switch for High Pressure Line		(do)		1	For valve " ON/OFF"
23	Switch for Hydraulic Mains		(do)		1	For valve " ON/OFF"
24	Switch for Front Nozzle spray		(do)		1	For valve " ON/OFF"
25	Switch for Rear Nozzle spray		(do)		1	For valve " ON/OFF"
26	Switch for cooling system		(do)		1	ON/OFF
27	Switch for Blinker Light		(do)		1	ON/OFF

29	Switch for Revolving Light	(do)	1	ON/OFF
	Switch for cannon search Light	(do)	1	ON/OFF
30	Switch for Engine stop	(do)	1	To stop the Alex Engine

## Appendix "C"

## Electrical Components for Water Cannon ( Ref.Drg No. RDE/WC/12000/008)

Sr. No.	Description	Make	Model	Specification	Qty.
1	Battery Changer	Gec	MR 4B6/10	ACV-230 DCV-24 V 6/10AMPS 4 BAT 6 V	1
2	PA System	Boss/Ahuja	PA 200	12 V 30 W 150-10000 Hz 3 dB	1
3	Invertors	Eata Elect	12 Volt		1
4	Siren	Kheraj / jeekay	12 Volt	Dynamically balanced Range 2 Km	1
5	TFT ( LCD) 14"				1
6	Camera for rear view				2
7	Cannon Light	Dkmax	White	Bolt mounted 4" of Road lamp	2
8	Fog Lamp	JMI	Yellow	Bracket mounted 4 ½ " of road lamp	1
9	Revolving Light	Lumax	Red		1
10	Blinker Light	JMI	Yellow	Flashing Danger light big	2
11	Search Light		E90 light	9"	1
12	Cable 1.5mm2 660 V	Teleflex		2 core x 30 mtr.	
13	Reversing Light	JMI	White	Bracket mounted 4 ½" of road lamp	2
14	Cabin Light			108 No	1
15	Outside control panel Light			108 No	2
16	Elect. Bell	Edison	12 volt		1
17	Locker Light with Switch			108 No.	3
18	Lamp bt ink tanks			108 No.	1
19	Engine stop sol alve				
20	RPM meter				3
21	Door Switch				5
22	Push Pull Switch	Delux		Panel Switch 3119	
23	Fuse box 12 pole with Fuse	Delux		3133 assly fuse box 12 points	1
24	Potentiometer	Adroit systems			4



## Appendix "D"

## List of Hydraulic components for Water Cannon ( Ref.Drg No. RDE/WC/12000/006)

Sr. No.	Description	Specification	Make	Model	Qty.
1	Oil Reservoir	30 Ltrs	Reputed		1
2	Oil Level Indicator		Stauff	SNA-127-B-N-0-12	1
3	Suction Strainer		Hydroline	SC2-D07	1
4	Air Breather		Hydroline	FSB-05-M	1
5	Hydraulic Pump		Dowty/ Dynamitic	OP-3008	1
6	Flexible Hose Suction		Reputed		1
7	Flexible Hose Delivery		Reputed		1
8	Flexible Hose Return line		Reputed		1
9	Return Line Filter		Stauff	TIF-06-25	1
10	Check Valve	½" BSP	Rexroth		1
11	Gauge Isolator	¼" BSP	Tognella		1
12	Pressure Gauge	0-250Bar, Glycerin Filled	Waree		1
13	Unloading Relief Valve		Rexroth	DBD6 SK 1X/100	1
14	Flow control Valve		Rexroth/ Yuken	2 FRM 6 3Q	2
15	Direction Control Valve		Altos	DHI 071112 VDC	4
16	Manifold for DC Valve		Monton		1
17	Rotary Actuator		Monton		4
18	Shuttle Valve		Rexroth		4
19	Shut Off Valve		Rexroth/ Hydac/ Parker	3/8" BSP	4
20	Hydraulic Oil		IOCL		30 Ltrs
21	Tubing (CDS)		Gandhi		As required
22	Hyd. Fittings(Weld Nipple Type)		Hyloc		As required

## Appendix " E "

## PNEUMATIC SYSTEM FOR WATER CANNON ( REF.DRG NO. RDE/WC/12000/010)

Sr. No.	Description	Make	Model	Qty	Material	Remarks
1	Air Tank		600 x 250 x 3.15n with dish end	1		30 Ltrs Capacity
2	Drain Plug		½" Screwed	1		
3	Safety Valve/Unloader Valve	Sundaram	Part No.100301970	1		
4	Air Filter regulator	Rotecx	CKD W 4000-15G-G3"	1		
5	Manifold		O.D 2 x 500	1	SS 304	
6	Tubing				SS304	
7	Pneumatic Cylinder	Sundaram TVS	100250050	1		Engine Stop

## OUT SIDE CONTROL PANEL FOR WATER CANNON

1	Compound Gauge	Sonal /Waree	0-7Kg/CM2 3/8" BSP Back Connection			
2	Pressure Gauge	Sonal /Waree	0-21 Kg/CM2 3/8" BSP Back Connection			

## CANNON MECHANISM FOR WATER CANNON ( REF.DRG NO. RDE/WC/12000/009)

1	Universal Joint	Tata	Used in Tata 407 Steering Mechanism	1		
2	Bearing		Pedestal UCE 205	2		

## ENGINE &amp; PUMP SKID ( REF.DRG NO. RDE/WC/12000/005)

1	Bearing		Pedestal UCE 205	2		
2	Pulley A		8" B- Section	1		
3	Pulley B		4 ½" B Section	1		
4	Pulley CON HYD pump		3 ½" B- Section	1		
5	Belt for pulley A to Pulley B		To Suit	1		
6	Belt for Pulley B to Pulley C		To Suit	1		

## TERMS AND CONDITIONS:-

1. **F.O.R.:-** The above rates are FOR destination anywhere in Haryana at supplier's risk
2. **GST :-** Inclusive in above rates.
3. **FREIGHT CHARGES:-**Inclusive.
4. **DELIVERY PERIOD:-** within 03 months from the date of issue of supply order;
5. **PAYMENT TERMS :-** 30% Advance payment and 70% after satisfactory inspection of Water Cannons. The Indenting Department will have the option to release the payment in RTGS/NEFT/ECS mode also.

Delay in payments to the suppliers beyond the stipulated credit period indicated in the supply order, unless supported by cogent reasons and approved by a higher authority, will attract penal interest on the defaulting amount @ Rs. 25/- per rupees one lakh per day of delay beyond the stipulated credit period. Non provision of adequate budget will be no ground for delay in payments to the supplier.

6. **Warranty:-** Minimum 01 year Warranty for any manufacturing defects.
7. **INSPECTION:-** Police Department may carry out inspection by deputing one officer rank of SP, MTO and Water Cannon using team of Police Department alongwith Sr. Mechanical Engineer, Haryana Roadways Deptt. may be inspect the vehicles.


In case, the material offered for inspection by the firm fails to meet the specifications stipulated in NIT/Order/Contract and the samples are rejected by the Inspecting Committee, the Indenting Department will have the right to levy a penalty at 0.1% of the total order value. In case, the material offered for inspection fails during the 2nd inspection also, the Indenting Department will have the right to increase the penalty to 0.25% of the total order value. In case, the material offered fails during the 3rd and final inspection also, the firm will be liable for penal action including forfeiture of security, risk purchase, debarring/ blacklisting in future, and no further opportunity for inspection would be provided to the supplier firm.

8. **PENALTY CLAUSE :-** Penalty to firm on Delay in delivery: Should the contractor fail to deliver or dispatch any consignment within the period prescribed for such delivery or dispatch stipulated in the supply order, the delayed consignment will be subject to 2% penalty per consignment per month recoverable on the value of the stores supplied. The other details will be as per provision contained in Sr. No. 14 of "Schedule-'B' Condition of Contract".
9. **PRICE FALL CLAUSE:-** The price charged for the stores shall not exceed in any way the lowest price at which you quote/supply the stores of identical description of stores to State Govt./Central Govt./GeM Portal/Institutions/undertaking/any other person during the delivery period/currency period of the rate contracts. If at any time during the delivery/currency period, you reduce the rate, sale price of quoted stores to any person at the price lower than the price chargeable under this supply order/contract, you are required to inform this office and price payable under the supply order/contract for the stores supplied after the date of coming into force of such reduction of rates shall stand correspondingly reduced to that level. You shall promptly notify the reduction of rates to this office as well as to concerned Indenting Officers/ Consignees. You shall also give a certificate on your bills that the rates charged by you are not in any way higher to these quoted to the other State Govt. Central Govt. Institutions etc. during the corresponding period. The Indenting Officer

- shall be required to ensure that requisite certificate is given by the concerned firm on the bills before releasing their payments.
10. Failure the effect supply within the stipulated delivery period or repeatedly offering supply liable for rejection may render to forfeiture of Earnest Money / Security and other penal action as per terms & Conditions of the contract will also be taken.
  11. SCHEDULE "B":- One copy of the Schedule "B" i.e. conditions of contract applicable is sent herewith duly signed on behalf of Governor of Haryana.

Other Terms & Conditions will be as per NIT (Schedule-A).

Encls.a/a

  
Deputy Director,  
Supplies & Disposals, Haryana,  
For & On behalf of Governor of Haryana


Endst. No. 52/HR/E-3/2021-22/

Dated:

A copy of the above is forwarded to the Director General of Police, Haryana, Sector-6, Panchkula w.r.t. their indent no. 9990/P-1 dated 12.09.2022 for information and necessary action.

He is requested to point out deficiency, if any, in a week time otherwise it will be presumed that the supply order is correct in all respects.

Payment may please made to the supplier strictly as per approved payment terms and the instructions appearing at the end may also be complied with.


  
Deputy Director,  
For Director General, Supplies & Disposals,  
Haryana Panchkula

Endst. No. 52/HR/E-3/2021-22/ 6/4

Dated: 19/09/23

A copy is forwarded to the following for information and necessary action:-

1. The Principal Accountant General, Haryana, (Audit) Sector-33, Chandigarh.
2. The Deputy Excise & Taxation Commissioner, Jhajjar (Haryana).
3. ✓ Programmer O/o DGS&D, Haryana.
4. ✓ St. Section O/o DGS&D, Haryana.

  
Deputy Director,  
For Director General, Supplies & Disposals,  
Haryana Panchkula