

QUALITATIVE REQUIREMENTS (QRs) OF HYDRAULIC PLATFORM 32 MTRS

Sl	Parameter	Qualitative Requirement/ Specification
1	SCOPE	1.1 This specification covers hydraulic platform unit with a working height of 32M working height shall be measured as the height from ground level to cage base plus 1.5 M. The operational stability shall be safe on an inline of 7°. The structural strength of booms shall be secure and designed for 1.5 times rated load at prescribed reach. The manufacturer of the hydraulic platform shall be an ISO: 9001 certified Company who meets the eligibility conditions. 1.2 The scope of the contract includes the manufacture of the hydraulic platform step by step mounting of the same on purchaser's chassis, bodywork and fitment of accessories. Inspection, supply and training of operators nominated by purchaser as well as rendering warranty services. 1.3 The Hydraulic Platform shall be designed as per the designed, operational stability and structural strength based on the criteria laid in International/National norms and other norms and standards applicable for elevated raised platforms used for Fire Fighting and rescue operations. 1.4 The manufacturer/supplier should have supplied similar Hydraulic Platforms of minimum 32M height and above in past to the emergency/fire services with satisfactory performance. 1.5 The manufacturer/supplier should have the facility of trained manpower for repair and maintenance of Hydraulic platform through its authorized sales/service agents in India. Or they should confirm in writing that they will establish service center in India and shall provide support to the vehicle for the period of warranty and extended support for further period thereafter, either in the form of AMC (Annual Maintenance Contract) or paid service.
2	Chassis	2.1 The Chassis shall be 6x4, having approx., 5000 mm Wheel Base (as per Central Motor Vehicle Rules 1989) with fully factory built cabin and suitable capacity PTO. The Vehicle Chassis shall be a Right Hand Drive and shall comply emission norms in force. 2.2 The Chassis shall be homologated from the appropriate authority in India. 2.3 The engine shall be six cylinders, inline, Diesel with direct injection, turbo charges with intercooler. 2.4 The engine-developing minimum 250 HP (184KW) at 2000 rpm approx. or higher capacity, which will meet operating parameters. 2.5 The clutch shall be single plate, dry type, and power assistant. 2.6 The gearbox shall be synchromesh type with crawler gear manual gearbox or automatic gearbox. 2.7 Rear Axle shall be Tandem Bogie type with Hub reduction and differential lock between the wheels and axles. 2.8 Chassis frame shall be 'C' Channel section made of high strength steel with cross members. 2.9 The Steering shall be integral power steering with collapsible steering wheel and column. 2.10 The Front Suspension shall be leaf spring type and the rear suspension shall be reverse scamel type with shock absorber in the front or equivalent. 2.11 The Brakes shall be dual circuit airbrakes, with parking brakes acting on rear wheels.

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3	Main Frame	The main frame shall be a fully welded rectangular steel structure fixed on to the chassis frame with bolts and springs so as to allow performance and durability of the chassis without causing stress concentration in the chassis beam. The hydraulic tank of suitable capacity shall be integrated into the main frame with proper heat decapitation facilities.
4	Stabilizing System	4.1 The stabilizing and levelling system of the unit should consist of four vertical/horizontal jacks, which allow safe levelling of the whole unit and maximum stability in all permitted working conditions (operating on a slope of 7 degrees). The four welded box section outrigger beams slide

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inside the outrigger housings and extend and retract by means of four double acting hydraulic cylinders placed inside the beam housing.

4.2 The following jacking positions shall be feasible:

a) Outrigger beams fully extended on both sides:

This is normal working position, which allows maximum outreach at full working load over 360° continuous unlimited turntable/turret rotations and the use of the monitor within its full capacity and working range.

b) Outrigger beams fully extended only on one side with turntable rotation interlock:

In order to reduce the jacking width in narrow spaces, outrigger beams should be extended only on one side, either left or right in working direction. A safety system on the turntable should allow only 180° rotation over the working direction and automatically stop its motion once the center line of the chassis has been reached, preventing rotation of the turntable over the not extended side. Outreach and height over the working side should not be affected.

4.3 Vertical jacks with positive safety lock valves and self-aligning feed plates:

Each outrigger beam should be equipped at its end with a hydraulic jacking cylinder with self-aligning ground contact foot plate (by means of movable joint) capable of lifting the unit completely off the ground, level the machine and keep it in its position even under continuous load conditions. Each jacking cylinder should be attached to a lock valve that prevents creeping in case of pressure failure.

4.4 Automatically switched on jack blinking lights:

Each vertical jacking cylinder should be equipped, at its upper front side, with a grill protected red blinking light, which is automatically switched on when the PTO control in the truck cab is engaged.

4.5 Additional square spreader plates:

In order to reduce the specific ground pressure of the jacks without exceeding the vehicle width when in stowed transport position, four separate foot plates of adequate size will have to be provided and stowed near outrigger. A handle on each plate allows for immediate and easy positioning under the jacks.

4.6 Rear center mounted outrigger control box:

The outrigger control should include 2 systems: manual and automatic. When in automatic control mode, one button controls to automatically stabilize vehicle in safe working condition. When in manual control mode, the vertical jacks and outriggers can be controlled, one by one, independently or simultaneously.

The lockable outrigger control box should be located at the rear of the vehicle. The control box should include a spirit levelling gauge, a green indicator light 'platform system on', a pushbutton control for the activation of the stand-by electro-hydraulic pump, engine start/stop button, Emergency stop button, Hour meter.

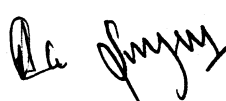
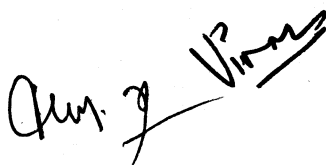
A display unit shall be installed at the outrigger control panel, showing the operator the maximum outreach system at the particular setup position. This system is to include normal jacking and one sided jacking.

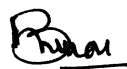
4.7 Outrigger stowed indicator light in truck cab:

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		In order to control the transport stowage of the outriggers from the cab before departure, an indicator light should be provided on the cab dashboard, which indicates to the driver that the outrigger beams and jacks have been retracted and are in the transport position. 4.8 Outrigger safety interlocks: A safety system inhibits any operation of the platform before the outriggers have been set. Outrigger controls are isolated and cannot be moved if the boom is not in transport position and has not activated the boom rest switch. Reciprocally, the boom movement should not be activated until and unless the outriggers have been activated and properly deployed. 4.9 Level sensor with audible alarm: A level sensor measures both the fore and aft and sideways inclination of the unit and gives audible warning if the permitted level tolerance is exceeded.
5	Bodywork and equipment locker	A steel framework structure panelled by steel/aluminium should be provided. The entire framework should be treated for corrosion resistance before panelling. Two lockers on each side of the vehicle with low and easy access should be provided. The doors/shutters to lockers must be dust and water-resistant. They shall have drain holes to drain away water from the stowed equipment. Lockers shall be equipped with lights so that the operator can have better visibility while stowing the equipment. There shall be two side ladders, one on either-side to provide access to the main work deck.
6	Booms	6.1 The hydraulic platform shall be of telescopic cum-articulated design. So as to meet operating parameters such as safe working load, working height and outreach as well as 'up, over and down' access at building. All booms should be made from high strength welded box section in steel construction-with-internal treatment against corrosion. One Amber light at joint of main boom and tip boom should be provided. The cage pivot should be mounted at the top end of the tip boom and at the top of the cage for inherent tilt safety, which allows for 45° right/left cage swivelling. A well visible matching sign on the cage support should indicate when the cage is horizontally aligned for its stowing position. The cage shall be stowed between the cabin and turn table. An indicator light on both control stations should be provided to indicate when the boom is horizontally aligned and in matching position above the boom rest for its stowage. 6.2 The booms shall be box/trapezoidal section type, welded construction; welding method shall be of latest technology to provide high durability and extreme accuracy. For high strength and minimum flexing of the boom sections only high tensile strength steels shall be used for load bearing structure. 6.3 The main boom elevation and lowering shall be controlled by two hydraulic cylinders that both have their separate safety devices and can alone carry the entire load in case of failure of any one of the cylinders. The first boom shall be able to elevate in the range of 00 to 83° angle approx. 6.4 All telescopic sections of the first boom shall move in a synchronized way and there shall not be any intermediate jerks during extension/retraction. Automatic slowdown mechanism at the beginning of the movement as well as end of the movement shall be provided to all boom movements. All the moving sections shall be fitted with adjustable

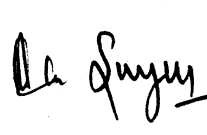
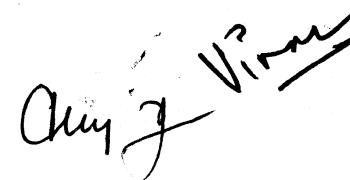





		guides/rollers to provide smooth and accurate movement. Various maintenance points shall be located well at hand either outside the boom or behind easily removable covers. 6.5 All booms shall be internally and externally primed and painted for long life span, treated against rust and corrosion.
7	Turntable	7.1 The turntable should be powered by a hydraulic motor. The 360° continuous endless clockwise and anti-clockwise rotating turntable should be mounted over sub-frame at chassis rear so as to keep overall transport height of the folded platform to minimum. The turntable should be bolted to a slew ring with High tensile bolts. 7.2 The hydraulic motor driving the slew system connected either directly or through suitable reduction gearbox should have adequate power to rotate the turntable in any position with full payload in the Cage. The slew brake should always be in permanently and automatically applied until the slew motion control of the turntable is activated, thus releasing the brake with hydraulic pressure. The fail safe brake should be able to hold the turntable in locked position, with any boom position when hydraulic power is removed. 7.3 A well designed rotary connector mounted under the platform turntable should convey water through 80mm stainless steel or equivalent water way, hydraulic and electric power from the truck chassis to the turntable and up to the cage at boom end, While allowing for endless unrestricted rotation of the turntable over 360° in both directions. 7.4 There shall be provision for the manual rotation of turntable in case of failure of hydraulic system. 7.5 Pins securing the hydraulic cylinders to boom and turntable shall be properly installed and secured. 7.6 The hydraulic hoses, tubings and connections provided in the turntable shall be free from kinks, chaffing or leaks.
8	Working Cage	8.1 The robust and spacious fire fighting cage made of tubular steel/aluminium profiles should have approx. 2 sq.mtr floorspace offering ample room for up to four fully equipped fire men (two operating with monitor). 8.2 Minimum safe cage working load should be 400 kg and minimum safe cage working load with monitor operational should be 200kg. 8.3 It should be approximately 2m long, 1m wide and 1.1m high. A 1.1m high handrail around the cage should be provided to protect people in the cage. The cage should be equipped with a closed footboard all around the cage floor to prevent objects lying on the cage floor to fall from the cage. 8.4 One- side and one front entrance to the cage are to be provided. The front entrance should comprise of an inwards opening gate with spring closing system, whereas the side entrance comprise of full width opening with fall bar protection. The cage floor should be covered with non-slip steel/aluminum plates with draining holes or small mesh expanded grill floor plates. 8.5 A front drop down platform (1.45m x 0.45m) with quick release and 180 kg capacity is to be provided to form a bridge between the cage and building for firefighting or rescue purpose. 8.6 The water line with shut valve and a flange for the installation of the 63 mm manual control water monitor should end at the bottom front inside center of the cage. A second 63 mm outlet with shut valve is to be

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provided under the monitor for an additional hose with hand branch or a second 'clamp-on' monitor. A multiple water spraying nozzles with shut valve from the cage should be provided at the bottom of the cage for self-protection of the crew from excessive heat and smoke, by acting as a water curtain heat protection 'shield'.

8.7 Direct access to the cage from ground or the vehicle deck without auxiliary ladder:

The two entrances provided should allow for a direct and immediate access to the cage with full equipment without the help of an auxiliary ladder from ground level (with lowered tip boom) or from the vehicle deck (with boom in stowed position).

8.8 Automatic cage levelling with emergency over-ride:

Cage levelling system should be fully automatic. The cage should remain constantly in a levelled horizontal position referred to the ground, irrespective of boom position and load in cage. In the unlikely event of failure of automatic cage levelling system, an emergency lever, manually controlled, should actuate a hydraulic mechanism to enable crew in cage to level cage directly.

8.9 Independent horizontal cage rotation:

The slew unit of the cage should be set for a rotation of min, 45° left and 45° right directions. This rotation is to be independent of the turntable slew. The cage rotation control should be available from the cage and turntable control. The rotation balconies, windows, roof etc. from the front cage gate, irrespective of the boom position, in case of fire fighting and rescue operations

8.10 Cage control box:

The cage control should be similar to turn table control. It should also include the same LCD display as main control. The dust and water resistant control box in the cage should contain all necessary control elements. A cover made from weather resistant material is to be provided for protection of the control box when not being used.

8.11 Proportional controls:

- a. The lever controls for boom and slew functions shall be joystick type proportional controls, ergonomically positioned in weatherproof and spray water resistant control box. Easy interpretable symbols identifying the function of each control lever/button, without language barrier shall be displayed on panel.
- b. A LCD display panel should be provided that permanently indicates the boom height and outreach on a clearly visible and rear-illuminated type display, with illumination adequate for night display. The main platform control levers should allow for a progressive control at infinite variable speed from creep to maximum and proportional to the lever position. All main controls should be capable of being operated with single motion or simultaneously. The system should be equipped with an automatic speed ramp that damps to sudden start or stop controls of the operator for relatively jerk-free operation, providing automatically for an adjustable, progressive acceleration or deceleration of the main platform movements.
- c. Other controls are to be controlled by an additional control lever or switch control. All controls should be of 'dead-man' type and return automatically to neutral position, stopping the motion, if the control is

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		abandoned. 8.12 A cage collision guard shall be provided and shall be integrated to cage load sensor to provide additional safety when operating in darkness or in dense smoke. The system shall stop all movements. 8.13 An emergency stop button shall be provided on both control panels to provide immediate and complete "freezing of all systems in case of an unexpected emergency. 8.14 There shall be a "bleed down" system, which can be operated from working cage and turntable control panel to lower the booms and bring the working cage down onto the ground even if hydraulic pressure or electric power is not available with rotation mechanism. 8.15 Electric sockets in cage: The following electric outlets/connections should be provided in the cage- • 1 No. 24V DC socket that is directly fed by the vehicle electric system. • 1 No. 220 V AC socket with connection line from slew unit up to cage • 2 Nos. 24 Volts X 70 Watts lights mounted on swivelling brackets should be fitted on the cage railing to provide sufficient lighting and safety to the crew during search and rescue operation at night. Two more floodlights will be installed at the rear of the body to provide ground lighting.
9	Intercommunication to the turntable control station	The hands free loudspeaker type intercom transmitter and receiver must be placed on the rear center of the cage and connected by a shielded cable with an identical second set placed on the turret of the turntable. The intercom system should allow, once switched on, loudness adjustment and free communication between base control and cage control positions.
10	Monitor	10.1 Water monitor shall be connected to the piping system and shall be mounted outside the cage in a suitable position so that the entire cage floor area can be fully utilized. 10.2 The monitor shall be made of light alloy and fitted with jet/ fog nozzle with maximum capacity of 2000 LPM at 8 kgf/cm². 10.3 The Monitor shall have Horizontal rotational movement to left and right of minimum 160° and also vertical 65° and 15° down movement minimum. 10.4 There shall be ball valve type control valve for the monitor and the monitor shall be manually operated.
11	Rescue Ladder	The unit must be equipped with a Telescopic type Aluminum rescue ladder; the width of top section shall be approx 490mm and approx 250 mm railing height. The distance between each rung should be 280mm minimum and shall not be more than 300 mm. To enable an easy access from ladder to the cage, there should be a suitable drop down platform at the cage. The step section should be made of special profile with non-slip external surfaces. The ladder system must be attached onto the side of the booms and shall give direct access from ground to the cage for rescue purposes. In case of platform of telescopic design, the ladder movement shall be synchronized with boom telescopic movement.
12	Hydraulic System	12.1 The Hydraulic power shall be provided by a reliable and adequate capacity variable displacement axial piston pump, which shall be driven by the vehicle power take off. 12.2 The filtration system of the hydraulic oil shall consist of suction strainer in the suction line, pressure filters in each pressure circuit, return filter in return line and air filter on the reservoir. All the pressure filters shall have blockage indicator.

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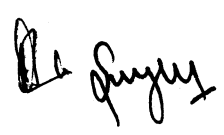
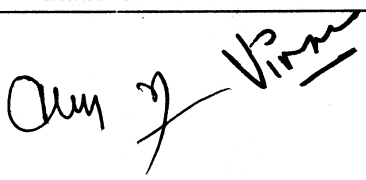
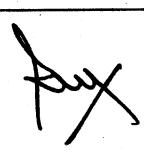
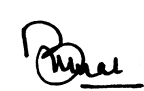
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13	Backup system	The hydraulic platform should be supplied with 3 Nos. (three) different and independent back-up systems, which guarantee that the cage, booms, slew, outriggers and vertical jacks can be operated, for stowing purpose, even if any failure occurs to the chassis engine or main pump. 13.1 AUXILIARY ENGINE DRIVEN PUMP: The unit should be fitted with suitable Diesel/ Petrol powered auxiliary engine with self start facility mounted at a suitable location. It should allow the use of the platform, for stowage only, when the main truck engine fails. The on/off controls for this engine shall be provided on all control panels. 13.2 BATTERY DRIVEN HYDRAULIC PUMP: The 24V battery driven stand-by electro-pump shall be provided to allow retraction and stowage of the unit in transport position from all control stations. This pump shall also feed the hydraulic oil to the cage levelling mechanism for manual levelling of the cage. 13.3 MANUAL OVER-RIDE - In case of complete failure of electric and hydraulic power a manually operated hand pump or other suitable arrangement shall be provided for all boom and outrigger movements for stowing the unit.
14	Electrical System	a. 14.1 The electrical system shall be 24V DC from the chassis battery, which is kept, charged when the engine is running. All electrical circuits shall be provided with fuses. Output sockets for battery supply power shall be provided at the turntable and cage. In addition, all electrical wiring shall be made of flame retardant automotive wires and routed through conduit


		pipng to minimize the risk of short circuits, enhance safety against accidental damage and facilitate easy inspection and maintenance during fault rectification or routine servicing. 14.2 When the main current is switched on, amber blinking lights, mounted on the outriggers, underneath the working cage and booms shall be automatically switched on. Amber colored rotating beacons on each side of the driver's cabin roof shall be provided. The switching controls shall be in the driver's cabin. 14.3 <u>SIREN AND PUBLIC ADDRESS SYSTEM:</u> An electric siren unit will be fitted at a suitable place on vehicle cab. Control, panel for the same will be suitably located in the driver's cabin and siren shall have fast (yelp) and slow (wail) sounds. Microphone shall be fitted with push to talk switch, to allow public address message to override the siren function. 14.4 Two yellow fog lights shall be mounted at front bumpers or other suitable locations and controls provided in driver's cabin.
15	Turntable and cage control panel	15.1 Control panels shall be provided at the turntable as well as at the cage. A convenient sitting arrangement for the operator shall be provided at the turntable. Both the panels shall be similar to avoid confusion, with over riding controls provided at the turntable control. 15.2 The control station shall be fitted with convenient adjustable seat to provide comfort even in case of prolonged operation. The platform underneath the control position shall be covered by nonslip aluminium plate. 15.3 The control panel at turn table and cage shall be exactly alike which will reduce the risk of confusion amongst operators under stress or even panic. Both the control panels shall be provided with weather protection covers/box. 15.4 The turntable control panel shall have a change over switch to select the control station from which the operation is performed. 15.5 Both control panels shall be fitted with following warning, indication and control devices, and shall be marked by clear symbols for easy recognition 15.5.1 Visual and audible indication for exceeding safe working load in the cage. 15.5.2 Visual warning for activation of working cage collision guard system. 15.5.3 Visual indication for ground pressure of the outriggers. 15.5.4 Visual indication for the rescue ladder "Rungs in alignment". 15.5.5 Visual indication for the center position of the booms. 15.5.6 Visual indication for the center position of the working cage. 15.5.7 Starting and stopping of chassis engine. 15.5.8 Switch, for the operating battery driven pump for hydraulic back-up system 15.5.9 Starting and stopping switch for standby diesel engine for hydraulic backup system 15.5.10 Joystick control levers for each movement. 15.5.11 Push buttons/joystick for cage slewing. 15.5.12 Emergency stop button. 15.5.13 Overriding of the automatic working cage levelling system. 15.5.14 Manual operation for the working cage levelling system. 15.5.15 Switches for activating the bleed down system near turn table control panel.

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		15.5.16 LCD display monitors indicating- • Main boom length. • Main boom angle. • Cage load. • Outreach
16	Indicators and control in driver's cabin.	The following indicators and controls shall be provided in driver's cabin- 1. Visual warning for booms and outriggers not intraveling position. 2. Visual indication for any of the lockers not in closed position. 3. Visual indication for engagement of PTO. 4. Hour meter.
17	Safety Device	The unit must be designed for absolute safety, keeping in view the application and should be equipped with the latest technologies available. The following safety devices should be strictly included- a) boom rest until the outrigger beams have been set in permitted jacking position: i.e. all four jacks deployed, with wheels off the ground b) The boom and slew movements shall be consistent with jacking position, described previously c) Outreach management: The installed outreach management should control the boom position of the unit to prevent excessive outreach. An automatic motion should cut or stop the machine once the permitted limit has been reached and thereafter should allow only safe increasing motions. d) Lock valves shall be provided on all cylinders to ensure that the system remains in position in the event of hose failure. Over-center valves shall be provided in place of lock valves on all boom cylinders, which apart from performing the load holding function of lock valve, in event of hydraulic pressure failure, also ensure smooth movement of the boom cylinders. e) End stroke speed damping, Main boom lift motions must have an automatic end-stroke damping system, which reduces the end-stroke speed independent of the control lever position. f) Automatic speed ramps: All main boom controls should have an automatic speed ramp function for automatic speed acceleration and deceleration on activating and releasing the control. g) Dead man lever controls: all lever controls must be of dead man type, returning automatically to zero if abandoned, stopping the motion in neutral position. h) Collision guard: The cage motion must be cut out on contact of cage collision guard with obstacle. i) Restrictor valves are to be provided to ensure slow descent in the event of lock valve failure j) Automatic stops to prevent platform from reaching unsafe area of operation shall be provided. k) Emergency cut off device shall be provided at turntable and cage controls to cut off all functions, with easy restoration. l) Manual rotation of turntable should be possible in case of emergency. m) Illumination of cage and base controls shall be provided for night operation. n) Anchor points for 4 safety harnesses are to be provided in cage. - o). Level indicators at outrigger control box.
18	Water Way	18.1 The unit must be equipped with water pipeline for fire extinguishing operations that connects inlets on the chassis with the cage monitor. A 75mm diameter corrosion resistant telescopic pipeline must be fixed on sides of booms (on the opposite side to rescue ladder).

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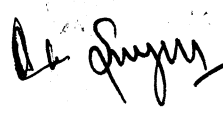
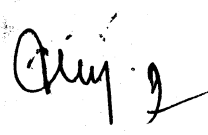
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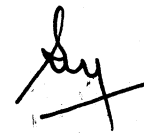
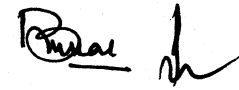
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		18.2 Articulated pipe connections with flexible hoses are to be provided at boom pivoting points and for the connection to the cage. The water line must end at the front of the cage where the monitor coupling flange and an additional 63mm outlet with shut valve for water hose and hand branch or additional clamp-on monitor are provided. 18.3 Multiple self-protection water sprinkler nozzles must be provided at the bottom of the cage to protect cage occupants from radiant heat. The shut valve for the water spray curtain should be located in the cage. The water pipe line shall be fitted with over pressure- relief valve as means to relieve excess pressure. The valve should be mounted beneath the turntable. 18.4 Intakes shall be located, one on each side of the vehicle, placed in a well-protected but easily accessible position on the front of rear outriggers. Both the intakes should be fitted with quarter turn ball valves and 63mm male instantaneous couplings. 18.5 Swivel-in-line-which shall be mounted in the center line of the turntable shall be so placed that maintenance is carried out without hindrance. Continuous rotation of hydraulic platform shall be provided even if water supply is used simultaneously. 18.6 The water line shall be protected from possible over pressure by means of relief valves (set at a pressure of 12 kg/cm²) mounted underneath of the turntable. 18.7 An additional outlet of 63mm (as per BS standards) with female coupling and closing ball valve shall be provided to the water piping the cage. There shall be drain cocks fitted in the piping to enable to drain the water from the piping after use.
19	Portable Fire Pump	A portable fire pump (Centrifugal) made from Aluminum alloy material with SS main shaft having rated performance of 1600 LPM at 7 KG/CM ² while working on 3M static suction lift at NTP shall be provided. The pump shall be powered by a self-contained petrol engine with cooling system and push button/ standby hand recoil start system The pump shall be light weight for easy handling. The pump shall have two delivery outlets of 63mm diameter (BIS standards) with instantaneous couplings and 100 mm suction inlet with blank cap. The primer shall either be Exhaust ejector type or Rotary type or automatic piston type, capable of lifting the water from a depth of 7 mtr within 30 seconds. The pump and engine shall be mounted on SS carrying frame with four folding handles. The fuel tank capacity shall be adequate to run the pump for minimum one hour delivering full rated output. The pump shall be mounted in one of the locker with suitable roll in/out arrangement. All necessary instruments, controls, levers, lights, switches etc shall be provided.
20	Breathing Air System	Compressed breathing air supply from turntable to the cage shall be provided through a four way manifold at the cage. There should be four breathing air masks at cage confirming to BIS Standards. Four nos. of 6 liters 300 bar steel or Carbon composite air cylinders shall be provided at turntable with pressure reducer valve and other fitments. It should be possible to change the cylinders without interrupting the air supply.
21	Stretcher carrier	Provision for drop down stretcher carrier shall be made at the working cage. The carrier shall be provided in such a way that the whole cage area is still available to its occupants. This is the same as indicated in heading "Working Cage".
22	Painting	Surfaces of steel structure shall be first sand blasted or shot blasted or



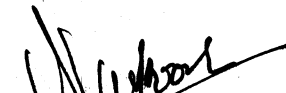



		chemically cleaned, followed by primer and surface, before being painted with high gloss paint. The booms shall be primed from inside also. The paint used shall be as under- a. Working cage - White aluminium b. Working cage support, boom sections, turntable, cylinders - white c. Main frame, outriggers, body work - Red
23	Digital Display Unit	23.1 The vehicle shall be provided with 3 full colour LCD display situated at outrigger center at turntable and the cage control panels. 23.2 The display shall be TFT type, trans reflective of minimum 6.5 inches size with 396x 23 RGB pixels, full colours with Multifunctional Membrane type Push buttons, LED/Lamps for Warning lights with Backlight. 23.3 The display shall show the location of the fault if occurred in the system operating the vehicle.
24	Fault Finding System	24.1 The control system of the vehicle shall have self-fault finding system. If any fault occurs during the operation the system shall find out the same and shall show the location of the defective component on the display. The system shall incorporate simple test screens to enable testing of the working cage and the turntable control panel. The tests shall also cover display unit push buttons, Joysticks. 24.2 For maintenance purposes the following tools shall be provided as standards supply. • Fault finding system and fault register • Status screens for sensors, switches, hydraulic valves, control lamps etc. • Total operation and hour meter. • Operation and hour meter since last service • Service counters and alarm for general maintenance • Software verification management. • Service laptop with compatible software relevant to the system.
25	Accessories	The following accessories will be supplied along with the unit- • Wooden outrigger spreader plates - 04 Nos • Working range diagrams at turn table and cage - 02 Nos. • 24V/70W working light with universal bracket - 02 Nos. • Lifting hook under cage capacity 400 kg - 01 Nos. • Fitments for safety belts and harness at cage - 04 Nos. • Hydraulic pressure gauge - 01 Nos. • Drop down stretcher at cage - 01 Nos. • Plug for 24 V working light at turntable and cage - 01 Nos. • Medical First Responder kit - 02 Nos. • Delivery hose Type B, ISI marked 63mm X 30m length - 10 Nos. (with matching coupling) • Portable ABC Type Extinguisher' 10 kg capacity - 02 Nos. • Service laptop with all accessories compatible to system - 01 Nos. • Safety belts - 05 Nos.
26	Tools and Manuals	a) A kit containing all the necessary tools for regular service and maintenance of the vehicle shall be supplied along with the unit for all the equipment & machines as per manufacturer's recommendations. b) Instruction manuals for the operation and maintenance of the chassis and hydraulic platform unit (including all systems) standby engine, self-contained fire pump and itemized spare parts list will be supplied along with the appliance. The quantity shall be as under-

		• Spare parts catalogue cum Operation manuals for hydraulic platform - 02 Nos. • Workshop manual for fire pump - 02 Nos • Spare parts catalogue for standby engine - 02 Nos
27	Stability	The stability of the vehicle (in traveling position) when fully equipped and loaded {excluding crew member}, with hydraulic platform resting on the resting stand and without extending the stabilizing jacks shall be such that it shall remain stable and shall not overturn even if the surface on which the vehicle stands has inclination on either side from the horizontal as per the safety norms stipulated in national/ international standards.

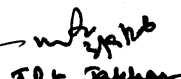

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Sh. Vimal
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Sh. Anil Kapoor
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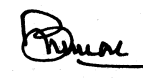

Sh. Sanjay Singh
(AC/NSG)


Manoj Kumar
(AC/CRPF)

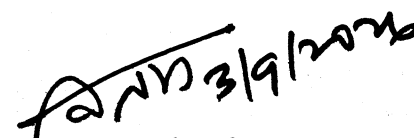

SP K. Jahan
ADG/P, CISF


Sh. Rajesh Shukla
(ADO/DFS)


Sh. Pankaj Chawla
(Sc. "F"/CFEES -DRDO)


Sh. Binay Kumar
(AD/BPR&D)


Sh. Amit Agarwal
(DIG/CISF)


Sh. Vijay Prakash, IPS
ADG (HQ)/CISF
Chairman


Director General/CISF

TRAIL DIRECTIVES (TDs) OF HYDRAULIC PLATFORM 32 MTRS

Sl	Parameter	Qualitative Requirement/ Specification	Trial Directives for BOOs
1	SCOPE	1.1 This specification covers hydraulic platform unit with a working height of 32M working height shall be measured as the height from ground level to cage base plus 1.5 M. The operational stability shall be safe on an inline of 7°. The structural strength of booms shall be secure and designed for 1.5 times rated load at prescribed reach. The manufacturer of the hydraulic platform shall be an ISO: 9001 certified Company who meets the eligibility conditions. 1.2 The scope of the contract includes the manufacture of the hydraulic platform step by step mounting of the same on purchaser's chassis, bodywork and fitment of accessories. Inspection, supply and training of operators nominated by purchaser as well as rendering warranty services. 1.3 The Hydraulic Platform shall be designed as per the designed, operational stability and structural strength based on the criteria laid in International/National norms and other norms and standards applicable for elevated raised platforms used for Fire Fighting and rescue operations. 1.4 The manufacturer/supplier should have supplied similar Hydraulic Platforms of minimum 32M height and above in past to the emergency/fire services with satisfactory performance. 1.5 The manufacturer/supplier should have the facility of trained manpower for repair and maintenance of Hydraulic platform through its authorized sales/service agents in India. Or they should confirm in writing that they will establish service center in India and shall provide support to the vehicle for the period of warranty and extended support for further period thereafter, either in the form of AMC (Annual Maintenance Contract) or paid service.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.
2	Chassis	2.1 The Chassis shall be 6x4, having approx., 5000 mm Wheel Base (as per Central Motor Vehicle Rules 1989) with fully factory built cabin and suitable capacity PTO. The Vehicle Chassis shall be a Right Hand Drive and shall comply emission norms in force. 2.2 The Chassis shall be homologated from the	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

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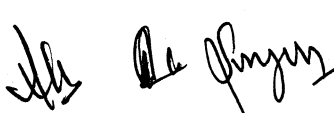
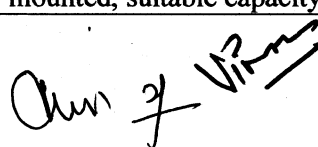
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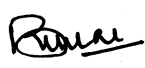
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	appropriate authority in India. 2.3 The engine shall be six cylinders, inline, Diesel with direct injection, turbo charges with intercooler. 2.4 The engine-developing minimum 250 HP (184KW) at 2000 rpm approx. or higher capacity, which will meet operating parameters. 2.5 The clutch shall be single plate, dry type, and power assistant. 2.6 The gearbox shall be synchromesh type with crawler gear manual gearbox or automatic gearbox. 2.7 Rear Axle shall be Tandem Bogie type with Hub reduction and differential lock between the wheels and axles. 2.8 Chassis frame shall be 'C' Channel section made of high strength steel with cross members. 2.9 The Steering shall be integral power steering with collapsible steering wheel and column. 2.10 The Front Suspension shall be leaf spring type and the rear suspension shall be reverse scamel type with shock absorber in the front or equivalent. 2.11 The Brakes shall be dual circuit airbrakes, with parking brakes acting on rear wheels. 2.12 Fuel Tank – Capacity shall be minimum 300 ltrs with lockable fuel cap. 2.13 The Chassis shall be provided with 11.00 Rx 20 radial tyres – 11 nos. with spare tyres or equivalent. 2.14 The chassis shall be provided with single day type cab with RED colour, made from high strength steel fully trimmed, external panels hot dip galvanized with hydraulic cab tilting mechanism. The Cab suspension shall be provided with coil spring and shock absorber. The cab shall be provided with adequate ventilation, rear view mirrors, windscreen and windows, adjustable driver seat, wiper system along with all other standards fitments. 2.15 The Electrical system shall be 24 V, with suitable capacity batteries & Alternator for charging the batteries. 2.16 The chassis shall be supplied with standards tool kit, hydraulic jack of 20 Ton capacity, operator & workshop manuals. 2.17 The Chassis shall be fitted with gearbox mounted, suitable capacity Power Take Off,	
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		Unit to drive the hydraulic pump for boom movements. 2.18 The Chassis shall comply all the provisions and enactment of Motor Vehicle Act 1988 and Central Motor Vehicle Rules 1989 and any amendment from time to time. The Hydraulic Platform shall be equipped with a factory-fitted air-conditioned driver-cum-crew cabin in compliance with GSR 886(E) dated 08 December 2023 and the AC system shall conform to IS 14618:2022 requirements and testing procedures, as amended. The unit shall meet the following operating parameters:- - Minimum working height from ground level.....32.0M. - Minimum cage floor height from ground level.....30.0M - Minimum safe working load (without water monitor in operation).....400 kg - Minimum safe working load (with water monitor in operation).....200 kg - Minimum reach* (*from slew center) to cage corner at 400 kg....18.0M - Continuous unlimited rotation in both directions-360°+endless - Maximum outrigger width with both jacks extended (as per design)....6M - Cage rotation (left and right).....45° - Full working load permitted in wind speed upto.....12.5M/Sec - Max time for reaching to maximum height and vice-versa.....90 seconds. - Max time for turning through complete circle...120 seconds. - Max time for extending jacks on both sides.....30 seconds. - Total operating time, including stabilizing, cage from rest and 90°turntable/ turret rotation.....180 seconds (Minimum)	
3	Main Frame	The main frame shall be a fully welded rectangular steel structure fixed on to the chassis frame with bolts and springs so as to allow performance and durability of the chassis without causing stress concentration in the chassis beam. The hydraulic tank of suitable capacity shall be integrated into the main frame with proper heat decapitation facilities.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

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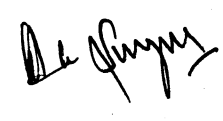
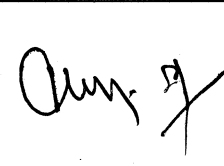
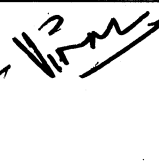
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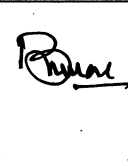
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4	Stabilizing System	4.1 The stabilizing and levelling system of the unit should consist of four vertical/horizontal jacks, which allow safe levelling of the whole unit and maximum stability in all permitted working conditions (operating on a slope of 7 degrees). The four welded box section outrigger beams slide inside the outrigger housings and extend and retract by means of four double acting hydraulic cylinders placed inside the beam housing. 4.2 The following jacking positions shall be feasible: a) <u>Outrigger beams fully extended on both sides:</u> This is normal working position, which allows maximum outreach at full working load over 360° continuous unlimited turntable/turret rotations and the use of the monitor within its full capacity and working range. b) <u>Outrigger beams fully extended only on one side with turntable rotation interlock:</u> In order to reduce the jacking width in narrow spaces, outrigger beams should be extended only on one side, either left or right in working direction. A safety system on the turntable should allow only 180° rotation over the working direction and automatically stop its motion once the center line of the chassis has been reached, preventing rotation of the turntable over the not extended side. Outreach and height over the working side should not be affected. 4.3 <u>Vertical jacks with positive safety lock valves and self-aligning feed plates:</u> Each outrigger beam should be equipped at its end with a hydraulic jacking cylinder with self-aligning ground contact foot plate (by means of movable joint) capable of lifting the unit completely off the ground, level the machine and keep it in its position even under continuous load conditions. Each jacking cylinder should be attached to a lock valve that prevents creeping in case of pressure failure. 4.4 <u>Automatically switched on jack blinking lights:</u> Each vertical jacking cylinder should be equipped, at its upper front side, with a grill protected red blinking light, which is	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.
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automatically switched on when the PTO control in the truck cab is engaged.

4.5 Additional square spreader plates:

In order to reduce the specific ground pressure of the jacks without exceeding the vehicle width when in stowed transport position, four separate foot plates of adequate size will have to be provided and stowed near outrigger. A handle on each plate allows for immediate and easy positioning under the jacks.

4.6 Rear center mounted outrigger control box:

The outrigger control should include 2 systems: manual and automatic. When in automatic control mode, one button controls to automatically stabilize vehicle in safe working condition. When in manual control mode, the vertical jacks and outriggers can be controlled, one by one, independently or simultaneously.

The lockable outrigger control box should be located at the rear of the vehicle. The control box should include a spirit levelling gauge, a green indicator light 'platform system on', a pushbutton control for the activation of the stand-by electro-hydraulic pump, engine start/stop button, Emergency stop button. Hour meter.

A display unit shall be installed at the outrigger control panel, showing the operator the maximum outreach system at the particular setup position. This system is to include normal jacking and one sided jacking.

4.7 Outrigger stowed indicator light in truck cab:

In order to control the transport stowage of the outriggers from the cab before departure, an indicator light should be provided on the cab dashboard, which indicates to the driver that the outrigger beams and jacks have been retracted and are in the transport position.

4.8 Outrigger safety interlocks:

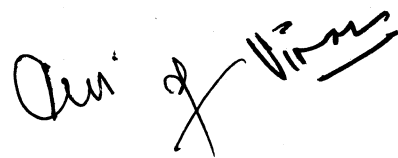
A safety system inhibits any operation of the platform before the outriggers have been set. Outrigger controls are isolated and cannot be moved if the boom is not in transport position and has not activated the boom rest switch. Reciprocally, the boom

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		movement should not be activated until and unless the outriggers have been activated and properly deployed. 4.9 Level sensor with audible alarm: A level sensor measures both the fore and aft and sideways inclination of the unit and gives audible warning if the permitted level tolerance is exceeded.	
5	Bodywork and equipment locker	A steel framework structure panelled by steel/aluminium should be provided. The entire framework should be treated for corrosion resistance before panelling. Two lockers on each side of the vehicle with low and easy access should be provided. The doors/shutters to lockers must be dust and water-resistant. They shall have drain holes to drain away water from the stowed equipment. Lockers shall be equipped with lights so that the operator can have better visibility while stowing the equipment. There shall be two side ladders, one on either-side to provide access to the main work deck.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.
6	Booms	6.1 The hydraulic platform shall be of telescopic cum-articulated design. So as to meet operating parameters such as safe working load, working height and outreach as well as 'up, over and down' access at building. All booms should be made from high strength welded box section in steel construction-with-internal treatment against corrosion. One Amber light at joint of main boom and tip boom should be provided. The cage pivot should be mounted at the top end of the tip boom and at the top of the cage for inherent tilt safety, which allows for 45° right/left cage swivelling. A well visible matching sign on the cage support should indicate when the cage is horizontally aligned for its stowing position. The cage shall be stowed between the cabin and turn table. An indicator light on both control stations should be provided to indicate when the boom is horizontally aligned and in matching position above the boom rest for its stowage. 6.2 The booms shall be box/trapezoidal section type, welded construction; welding method shall be of latest technology to provide high durability and extreme accuracy. For high strength and minimum flexing of the boom sections only high tensile strength steels shall be used for load bearing structure.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

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		6.3 The main boom elevation and lowering shall be controlled by two hydraulic cylinders that both have their separate safety devices and can alone carry the entire load in case of failure of any one of the cylinders. The first boom shall be able to elevate in the range of 00 to 83° angle approx. 6.4 All telescopic sections of the first boom shall move in a synchronized way and there shall not be any intermediate jerks during extension/retraction. Automatic slowdown mechanism at the beginning of the movement as well as end of the movement shall be provided to all boom movements. All the moving sections shall be fitted with adjustable guides/rollers to provide smooth and accurate movement. Various maintenance points shall be located well at hand either outside the boom or behind easily removable covers. 6.5 All booms shall be internally and externally primed and painted for long life span, treated against rust and corrosion.	
7	Turntable	7.1 The turntable should be powered by a hydraulic motor. The 360° continuous endless clockwise and anti-clockwise rotating turntable should be mounted over sub-frame at chassis rear so as to keep overall transport height of the folded platform to minimum. The turntable should be bolted to a slew ring with High tensile bolts. 7.2 The hydraulic motor driving the slew system connected either directly or through suitable reduction gearbox should have adequate power to rotate the turntable in any position with full payload in the Cage. The slew brake should always be in permanently and automatically applied until the slew motion control of the turntable is activated, thus releasing the brake with hydraulic pressure. The fail safe brake should be able to hold the turntable in locked position, with any boom position when hydraulic power is removed. 7.3 A well designed rotary connector mounted under the platform turntable should convey water through 80mm stainless steel or equivalent water way, hydraulic and electric power from the truck chassis to the turntable and up to the cage at boom end, While allowing for endless unrestricted	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

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		rotation of the turntable over 360° in both directions. 7.4 There shall be provision for the manual rotation of turntable in case of failure of hydraulic system. 7.5 Pins securing the hydraulic cylinders to boom and turntable shall be properly installed and secured. 7.6 The hydraulic hoses, tubings and connections provided in the turntable shall be free from kinks, chaffing or leaks.	
8	Working Cage	8.1 The robust and spacious fire fighting cage made of tubular steel/aluminium profiles should have approx. 2 sq.mtr floorspace offering ample room for up to four fully equipped fire men (two operating with monitor). 8.2 Minimum safe cage working load should be 400 kg and minimum safe cage working load with monitor operational should be 200kg. 8.3 It should be approximately 2m long, 1m wide and 1.1m high. A 1.1m high handrail around the cage should be provided to protect people in the cage. The cage should be equipped with a closed footboard all around the cage floor to prevent objects lying on the cage floor to fall from the cage. 8.4 One- side and one front entrance to the cage are to be provided. The front entrance should comprise of an in wards opening gate with spring closing system, whereas the side entrance comprise of full width opening with fall bar protection. The cage floor should be covered with non-slip steel/aluminum plates with draining holes or small mesh expanded grill floor plates. 8.5 A front drop down platform (1.45m x 0.45m) with quick release and 180 kg capacity is to be provided to form a bridge between the cage and building for firefighting or rescue purpose. 8.6 The water line with shut valve and a flange for the installation of the 63 mm manual control water monitor should end at the bottom front inside center of the cage. A second 63 mm outlet with shut valve is to be provided under the monitor for an additional hose with hand branch or a second 'clamp-on' monitor. A multiple water spraying nozzles with shut valve from the	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.



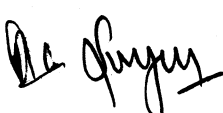






		cage should be provided at the bottom of the cage for self-protection of the crew from excessive heat and smoke, by acting as a water curtain heat protection 'shield'. 8.7 Direct access to the cage from ground or the vehicle deck without auxiliary ladder: The two entrances provided should allow for a direct and immediate access to the cage with full equipment without the help of an auxiliary ladder from ground level (with lowered tip boom) or from the vehicle deck (with boom in stowed position). 8.8 Automatic cage levelling with emergency over-ride: Cage levelling system should be fully automatic. The cage should remain constantly in a levelled horizontal position referred to the ground, irrespective of boom position and load in cage. In the unlikely event of failure of automatic cage levelling system, an emergency lever, manually controlled, should actuate a hydraulic mechanism to enable crew in cage to level cage directly. 8.9 Independent horizontal cage rotation: The slew unit of the cage should be set for a rotation of min, 45° left and 45° right directions. This rotation is to be independent of the turntable slew. The cage rotation control should be available from the cage and turntable control. The rotation balconies, windows, roof etc. from the front cage gate, irrespective of the boom position, in case of fire fighting and rescue operations 8.10 Cage control box: The cage control should be similar to turn table control. It should also include the same LCD display as main control. The dust and water resistant control box in the cage should contain all necessary control elements. A cover made from weather resistant material is to be provided for protection of the control box when not being used. 8.11 Proportional controls: a. The lever controls for boom and slew functions shall be joystick type proportional controls, ergonomically positioned in weatherproof and spray water resistant	
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		control box. Easy interpretable symbols identifying the function of each control lever/button, without language barrier shall be displayed on panel. b. A LCD display panel should be provided that permanently indicates the boom height and outreach on a clearly visible and rear-illuminated type display, with illumination adequate for night display. The main platform control levers should allow for a progressive control at infinite variable speed from creep to maximum and proportional to the lever position. All main controls should be capable of being operated with single motion or simultaneously. The system should be equipped with an automatic speed ramp that damps to sudden start or stop controls of the operator for relatively jerk-free operation, providing automatically for an adjustable, progressive acceleration or deceleration of the main platform movements. c. Other controls are to be controlled by an additional control lever or switch control. All controls should be of 'dead-man' type and return automatically to neutral position, stopping the motion, if the control is abandoned. 8.12 A cage collision guard shall be provided and shall be integrated to cage load sensor to provide additional safety when operating in darkness or in dense smoke. The system shall stop all movements. 8.13 An emergency stop button shall be provided on both control panels to provide immediate and complete "freezing of all systems in case of an unexpected emergency. 8.14 There shall be a "bleed down" system, which can be operated from working cage and turntable control panel to lower the booms and bring the working cage down onto the ground even if hydraulic pressure or electric power is not available with rotation mechanism. 8.15 Electric sockets in cage: The following electric outlets/connections should be provided in the cage- • 1 No. 24V DC socket that is directly fed by the vehicle electric system. • 1 No. 220 V AC socket with connection line from slew unit up to cage • 2 Nos. 24 Volts X 70 Watts lights mounted	
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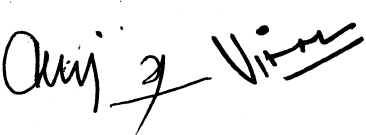
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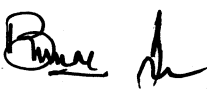
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		on swivelling brackets should be fitted on the cage railing to provide sufficient lighting and safety to the crew during search and rescue operation at night. Two more floodlights will be installed at the rear of the body to provide ground lighting.	
9	Intercommunication to the turntable control station	The hands free loudspeaker type intercom transmitter and receiver must be placed on the rear center of the cage and connected by a shielded cable with an identical second set placed on the turret of the turntable. The intercom system should allow, once switched on, loudness adjustment and free communication between base control and cage control positions.	To be checked/ tested physically by BOO as per the certificate provided by the firm.
10	Monitor	10.1 Water monitor shall be connected to the piping system and shall be mounted outside the cage in a suitable position so that the entire cage floor area can be fully utilized. 10.2 The monitor shall be made of light alloy and fitted with jet/ fog nozzle with maximum capacity of 2000 LPM at 8 kgf/cm². 10.3 The Monitor shall have Horizontal rotational movement to left and right of minimum 160° and also vertical 65° and 15° down movement minimum. 10.4 There shall be ball valve type control valve for the monitor and the monitor shall be manually operated.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.
11	Rescue Ladder	The unit must be equipped with a Telescopic type Aluminum rescue ladder; the width of top section shall be approx 490mm and approx 250 mm railing height. The distance between each rung should be 280mm minimum and shall not be more than 300 mm. To enable an easy access from ladder to the cage, there should be a suitable drop down platform at the cage. The step section should be made of special profile with non-slip external surfaces. The ladder system must be attached onto the side of the booms and shall give direct access from ground to the cage for rescue purposes. In case of platform of telescopic design, the ladder movement shall be synchronized with boom telescopic movement.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..
12	Hydraulic System	12.1 The Hydraulic power shall be provided by a reliable and adequate capacity variable displacement axial piston pump, which shall be driven by the vehicle power take off. 12.2 The filtration system of the hydraulic oil shall consist of suction strainer in the suction line, pressure filters in each	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

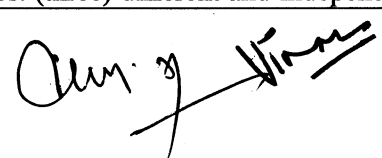
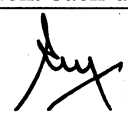




		pressure circuit, return filter in return line and air filter on the reservoir. All the pressure filters shall have blockage indicator. 12.3 All hydraulic cylinders shall be double acting with hard chrome plated piston rods and shall be fastened by means of self-aligning ball bearings to prevent lateral forces from damaging the seals or piston rods of the cylinders. 12.4 Hydraulic oil tank shall be integrated or fitted into the main frame and shall have proper heat dissipation system. The tank shall be fitted with oil level gauge, temperature gauge, and suction connections with closing valves for easy maintenance and draining outlet with closing valve. 12.5 All the controls for the boom movement and slew functions shall be joystick type proportional controls, ergonomically designed in weatherproof and spray water resistant control box. Easy interpretable symbols identifying the function of each control lever/button, in English language shall be displayed on panel. 12.6 The main platform control levers should allow for a progressive control at infinite variable speed from creep to maximum and proportional to the lever position. All main controls should be capable of being operated with single motion or simultaneously. The system should be equipped with an automatic speed ramp that damps too sudden start or stop controls of the operator for relatively jerk-free operation, providing automatically for an adjustable, progressive acceleration or deceleration of the main platform movements. All the control levers shall be dead man's type and should return to zero automatically when released. 12.7 Pressure measuring points with quick coupling for connection of a manometer supplied with the unit are to be provided for each hydraulic circuit. All platform motions are to be performed either by double acting hydraulic cylinders or hydraulic motors with automatic brake. 12.8 Hoses shall be tested to twice rated-pressure and the bursting pressure shall be at least four times the rated pressure.	
13	Backup system	The hydraulic platform should be supplied with 3 Nos. (three) different and independent back-up	Shall be tested/ measured/ checked physically as per

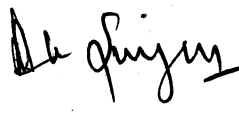




		systems, which guarantee that the cage, booms, slew, outriggers and vertical jacks can be operated, for stowing purpose, even if any failure occurs to the chassis engine or main pump. 13.1 AUXILIARY ENGINE DRIVEN PUMP: The unit should be fitted with suitable Diesel/ Petrol powered auxiliary engine with self start facility mounted at a suitable location. It should allow the use of the platform, for stowage only, when the main truck engine fails. The on/off controls for this engine shall be provided on all control panels. 13.2 BATTERY DRIVEN HYDRAULIC PUMP: The 24V battery driven stand-by electro-pump shall be provided to allow retraction and stowage of the unit in transport position from all control stations. This pump shall also feed the hydraulic oil to the cage levelling mechanism for manual levelling of the cage. 13.3 MANUAL OVER-RIDE - In case of complete failure of electric and hydraulic power a manually operated hand pump or other suitable arrangement shall be provided for all boom and outrigger movements for stowing the unit.	relevant national/ international standard by the B.O.O.
14	Electrical System	a. 14.1 The electrical system shall be 24V DC from the chassis battery, which is kept, charged when the engine is running. All electrical circuits shall be provided with fuses. Output sockets for battery supply power shall be provided at the turntable and cage. In addition, all electrical wiring shall be made of flame retardant automotive wires and routed through conduit piping to minimize the risk of short circuits, enhance safety against accidental damage and facilitate easy inspection and maintenance during fault rectification or routine servicing. 14.2 When the main current is switched on, amber blinking lights, mounted on the outriggers, underneath the working cage and booms shall be automatically switched on. Amber colored rotating beacons on each side of the driver's cabin roof shall be provided. The switching controls shall be in the driver's cabin. 14.3 SIREN AND PUBLIC ADDRESS SYSTEM:	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

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		An electric siren unit will be fitted at a suitable place on vehicle cab. Control, panel for the same will be suitably located in the driver's cabin and siren shall have fast (yelp) and slow (wail) sounds. Microphone shall be fitted with push to talk switch, to allow public address message to override the siren function. 14.4 Two yellow fog lights shall be mounted at front bumpers or other suitable locations and controls provided in driver's cabin.	
15	Turntable and cage control panel	15.1 Control panels shall be provided at the turntable as well as at the cage. A convenient sitting arrangement for the operator shall be provided at the turntable. Both the panels shall be similar to avoid confusion, with over riding controls provided at the turntable control. 15.2 The control station shall be fitted with convenient adjustable seat to provide comfort even in case of prolonged operation. The platform underneath the control position shall be covered by nonslip aluminium plate. 15.3 The control panel at turn table and cage shall be exactly alike which will reduce the risk of confusion amongst operators under stress or even panic. Both the control panels shall be provided with weather protection covers/box. 15.4 The turntable control panel shall have a change over switch to select the control station from which the operation is performed. 15.5 Both control panels shall be fitted with following warning, indication and control devices, and shall be marked by clear symbols for easy recognition 15.5.1 Visual and audible indication for exceeding safe working load in the cage. 15.5.2 Visual warning for activation of working cage collision guard system. 15.5.3 Visual indication for ground pressure of the outriggers. 15.5.4 Visual indication for the rescue ladder "Rungs in alignment". 15.5.5 Visual indication for the center position of the booms. 15.5.6 Visual indication for the center position of the working cage. 15.5.7 Starting and stopping of chassis engine. 15.5.8 Switch, for the operating battery driven	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O.

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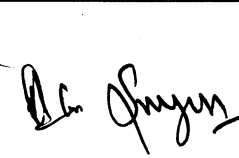
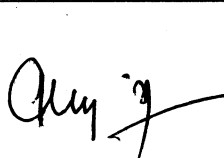
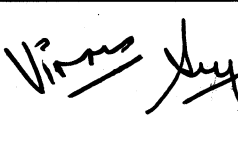
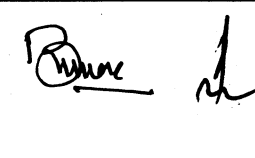
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		pump for hydraulic back-up system 15.5.9 Starting and stopping switch for standby diesel engine for hydraulic backup system 15.5.10 Joystick control levers for each movement. 15.5.11 Push buttons/joystick for cage slewing. 15.5.12 Emergency stop button. 15.5.13 Overriding of the automatic working cage levelling system. 15.5.14 Manual operation for the working cage levelling system. 15.5.15 Switches for activating the bleed down system near turn table control panel. 15.5.16 LCD display monitors indicating- • Main boom length. • Main boom angle. • Cage load. • Outreach	
16	Indicators and control in driver's cabin.	The following indicators and controls shall be provided in driver's cabin- 1. Visual warning for booms and outriggers not intraveling position. 2. Visual indication for any of the lockers not in closed position. 3. Visual indication for engagement of PTO. 4. Hour meter.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..
17	Safety Device	The unit must be designed for absolute safety, keeping in view the application and should be equipped with the latest technologies available. The following safety devices should be strictly included- a) boom rest until the outrigger beams have been set in permitted jacking position: i.e. all four jacks deployed, with wheels off the ground b) The boom and slew movements shall be consistent with jacking position, described previously c) Outreach management: The installed outreach management should control the boom position of the unit to prevent excessive outreach. An automatic motion should cut or stop the machine once the permitted limit has been reached and thereafter should allow only safe increasing motions. d) Lock valves shall be provided on all cylinders to ensure that the system remains in position in the event of hose failure. Over-center valves shall be provided in place of lock valves on all boom cylinders, which apart from performing the load holding function of lock valve, in event of hydraulic pressure failure, also ensure smooth movement of the	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..

		boom cylinders. e) End stroke speed damping, Main boom lift motions must have an automatic end-stroke damping system, which reduces the end-stroke speed independent of the control lever position. f) Automatic speed ramps: All main boom controls should have an automatic speed ramp function for automatic speed acceleration and deceleration on activating and releasing the control. g) Dead man lever controls: all lever controls must be of dead man type, returning automatically to zero if abandoned, stopping the motion in neutral position. h) Collision guard: The cage motion must be cut out on contact of cage collision guard with obstacle. i) Restrictor valves are to be provided to ensure slow descent in the event of lock valve failure j) Automatic stops to prevent platform from reaching unsafe area of operation shall be provided. k) Emergency cut off device shall be provided at turntable and cage controls to cut off all functions, with easy restoration. l) Manual rotation of turntable should be possible in case of emergency. m) Illumination of cage and base controls shall be provided for night operation. n) Anchor points for 4 safety harnesses are to be provided in cage. o). Level indicators at outrigger control box.	
18	Water Way	18.1 The unit must be equipped with water pipeline for fire extinguishing operations that connects inlets on the chassis with the cage monitor. A 75mm diameter corrosion resistant telescopic pipeline must be fixed on sides of booms (on the opposite side to rescue ladder). 18.2 Articulated pipe connections with flexible hoses are to be provided at boom pivoting points and for the connection to the cage. The water line must end at the front of the cage where the monitor coupling flange and an additional 63mm outlet with shut valve for water hose and hand branch or additional clamp-on monitor are provided. 18.3 Multiple self-protection water sprinkler nozzles must be provided at the bottom of the cage to protect cage occupants from radiant heat. The shut valve for the water	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..

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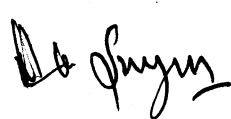
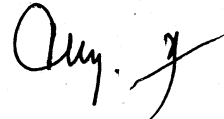
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		spray curtain should be located in the cage. The water pipe line shall be fitted with over pressure- relief valve as means to relieve excess pressure. The valve should be mounted beneath the turntable. 18.4 Intakes shall be located, one on each side of the vehicle, placed in a well-protected but easily accessible position on the front of rear outriggers. Both the intakes should be fitted with quarter turn ball valves and 63mm male instantaneous couplings. 18.5 Swivel-in-line-which shall be mounted in the center line of the turntable shall be so placed that maintenance is carried out without hindrance. Continuous rotation of hydraulic platform shall be provided even if water supply is used simultaneously. 18.6 The water line shall be protected from possible over pressure by means of relief valves (set at a pressure of 12 kg/cm²) mounted underneath of the turntable. 18.7 An additional outlet of 63mm (as per BS standards) with female coupling and closing ball valve shall be provided to the water piping the cage. There shall be drain cocks fitted in the piping to enable to drain the water from the piping after use.	
19	Portable Fire Pump	A portable fire pump (Centrifugal) made from Aluminum alloy material with SS main shaft having rated performance of 1600 LPM at 7 KG/CM² while working on 3M static suction lift at NTP shall be provided. The pump shall be powered by a self-contained petrol engine with cooling system and push button/ standby hand recoil start system The pump shall be light weight for easy handling. The pump shall have two delivery outlets of 63mm diameter (BIS standards) with instantaneous couplings and 100 mm suction inlet with blank cap. The primer shall either be Exhaust ejector type or Rotary type or automatic piston type, capable of lifting the water from a depth of 7 mtr within 30 seconds. The pump and engine shall be mounted on SS carrying frame with four folding handles. The fuel tank capacity shall be adequate to run the pump for minimum one hour delivering full rated output. The pump shall be mounted in one of the locker with suitable roll in/out arrangement. All necessary instruments, controls, levers, lights, switches etc shall be provided.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..





20	Breathing Air System	Compressed breathing air supply from turntable to the cage shall be provided through a four way manifold at the cage. There should be four breathing air masks at cage conforming to BIS Standards. Four nos. of 6 liters 300 bar steel or Carbon composite air cylinders shall be provided at turntable with pressure reducer valve and other fitments. It should be possible to change the cylinders without interrupting the air supply.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..
21	Stretcher carrier	Provision for drop down stretcher carrier shall be made at the working cage. The carrier shall be provided in such a way that the whole cage area is still available to its occupants. This is the same as indicated in heading "Working Cage".	Shall be tested/ measured/ checked physically
22	Painting	Surfaces of steel structure shall be first sand blasted or shot blasted or chemically cleaned, followed by primer and surface, before being painted with high gloss paint. The booms shall be primed from inside also. The paint used shall be as under- a. Working cage - White aluminium b. Working cage support, boom sections, turntable, cylinders - white c. Main frame, outriggers, body work - Red	Shall be tested/ measured/ checked physically
23	Digital Display Unit	23.1 The vehicle shall be provided with 3 full colour LCD display situated at outrigger center at turntable and the cage control panels. 23.2 The display shall be TFT type, trans reflective of minimum 6.5 inches size with 396x 23 RGB pixels, full colours with Multifunctional Membrane type Push buttons, LED/Lamps for Warning lights with Backlight. 23.3 The display shall show the location of the fault if occurred in the system operating the vehicle.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..
24	Fault Finding System	24.1 The control system of the vehicle shall have self-fault finding system. If any fault occurs during the operation the system shall find out the same and shall show the location of the defective component on the display. The system shall incorporate simple test screens to enable testing of the working cage and the turntable control panel. The tests shall also cover display unit push buttons, Joysticks. 24.2 For maintenance purposes the following tools shall be provided as standards supply. • Fault finding system and fault register • Status screens for sensors, switches, hydraulic valves, control lamps etc.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..

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		• Total operation and hour meter. • Operation and hour meter since last service • Service counters and alarm for general maintenance • Software verification management. • Service laptop with compatible software relevant to the system.	
25	Accessories	The following accessories will be supplied along with the unit- • Wooden outrigger spreader plates - 04 Nos • Working range diagrams at turn table and cage - 02 Nos. • 24V/70W working light with universal bracket - 02 Nos. • Lifting hook under cage capacity 400 kg - 01 Nos. • Fitments for safety belts and harness at cage - 04 Nos. • Hydraulic pressure gauge - 01 Nos. • Drop down stretcher at cage - 01 Nos. • Plug for 24 V working light at turntable and cage - 01 Nos. • Medical First Responder kit - 02 Nos. • Delivery hose Type B, ISI marked 63mm X 30m length - 10 Nos. (with matching coupling) • Portable ABC Type Extinguisher'10 kg capacity - 02 Nos. • Service laptop with all accessories compatible to system - 01 Nos. • Safety belts - 05 Nos.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..
26	Tools and Manuals	a) A kit containing all the necessary tools for regular service and maintenance of the vehicle shall be supplied along with the unit for all the equipment & machines as per manufacturer's recommendations. b) Instruction manuals for the operation and maintenance of the chassis and hydraulic platform unit (including all systems) standby engine, self-contained fire pump and itemized spare parts list will be supplied along with the appliance. The quantity shall be as under- • Spare parts catalogue cum Operation manuals for hydraulic platform - 02 Nos. • Workshop manual for fire pump - 02 Nos • Spare parts catalogue for standby engine - 02 Nos	Shall be checked physically by the B.O.O.

Handwritten signatures and text:
 Mr. P. S. Singh, Chief of Vehicle Dept. B.O.O.

27	Stability	The stability of the vehicle (in traveling position) when fully equipped and loaded {excluding crew member}, with hydraulic platform resting on the resting stand and without extending the stabilizing jacks shall be such that it shall remain stable and shall not overturn even if the surface on which the vehicle stands has inclination on either side from the horizontal as per the safety norms stipulated in national/ international standards.	Shall be tested/ measured/ checked physically as per relevant national/ international standard by the B.O.O..
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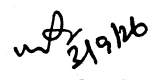

Sh. S K Yadav
(AC/BSF)


Sh. Vimal
(DC/SSB)


Sh. Ashish Kapoor
(AC/ITBP)

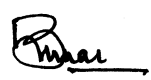

Sh. Sanjay Singh
(AC/NSG)

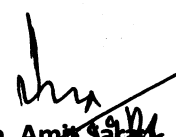

Manoj Kumar
(AC/CRPF)


JPR Jethan
AC/CF, USF


Sh. Rajesh Shukla
(ADO/DFS)


Sh. Pankaj Chawla
(Sc. "F"/CFEES -DRDO)


Sh. Binay Kumar
(AD/BPR&D)


Sh. Anil Kumar
(DIG/CISF)


Sh. Vijay Prakash, IPS
ADG (HQ)/CISF
Chairman

3/9/2026


Director General/CISF