1.0 SCOPE

This specification covers the general requirements regarding the material, design, construction, performances and test for Remote controlled / Manually operated elevated / grade Long Range Water cum Foam Monitors, non aspirating type consisting of UL/FM/ Vds listed Water cum Foam monitor along with additional remote operation mechanism to facilitate remote operation for monitor (Remote mechanism may not be UL listed).

Foam feeding shall be by aqua powered foam inductor JRCP. The induction system should be evaluated and listed by UL/FM/Vds.

The discharge capacity of remote controlled / manually operated Long Range high Volume water cum foam monitor shall be 10500 GPM (US) . The monitor shall be capable to give discharge with jet & fog arrangement (aqua fog/ foam type). Remote operated elevated long range water cum foam monitors shall be supplied along with control panels and associated piping, motor operated valve, and Wireless remote control device etc. Field mounted remote control panels (separately for each elevated monitor)shall be provided for operating monitors. Motor operated isolation valve for operation of remote operated long range monitor with push button On / Off for Open/ Close of isolation valve shall be provided. Foam feeding shall be by aqua powered foam inductor (Jet Ratio Controller Pump). The induction system shall be listed by UL/ FM/ Vds.

2.0 CODES AND STANDARDS

In general, the design, material and manufacture of the fire fighting system shall confirm to IS:15811 and the applicable ASME, API or BS standards and Code of Practice.

3.0 DESIGN AND CONSTRUCTION

Remote Operated Long Range Water Monitor

The nozzle of the monitor shall be non aspirating type aqua fog foam type. It shall be capable of discharging specified quantities of water/ foam over horizontal and vertical ranges as indicated in this specification/ basic data sheets with specified pressure at monitor base.

Material of construction of different parts of monitor shall be as per this specification, unless otherwise specified in job specific data sheet. The monitor shall be capable of rotation in horizontal and vertical planes. Suitable electric equipment shall be mounted on the monitor so that rotation of monitor can be achieved from remote operated local panel. Monitor shall be equipped with minimum of the following:

- Ball Bearing for turning
- Ball Bearing for elevation
- Balance springs for horizontal position
- Gear Motor for turret
- Horizontal and Vertical movement through push buttons.
- Arrangement for operation of nozzle (Jet/Fog)
- Terminal box
- Arrangement for Monitor (Open/Close)

The monitor assembly shall be designed to withstand nozzle reaction forces experienced during operation.

Monitor shall have provisions for following manual operations in addition to remote operation for Remote Operated Monitors

- Up/down motion
- Horizontal rotation
- Arrangement for Operation of Nozzle (Jet/Fog)

The monitor shall have traversing mechanism to give 340 deg. in either direction in horizontal plane and +90 deg. & -45 deg. in vertical plane through remote panel as well as through geared unit with worm and worm wheel operated by separate hand wheel for horizontal and vertical rotation. The arrangement shall be such that monitor shall be self-locking type and operated by a single person.
Swivel joints shall be provided both for horizontal and vertical rotation. Swivel joints to have SS ball bearings. Swivel Joints should be attached with Monitor body with Flanged Joints and the same shall be leak proof. A pressure gauge to indicate the inlet pressure shall be fitted in the monitor body near inlet of nozzle. A drain connection with valve shall be provided near the base/mating flange.

Approval

The Fire Foam Monitor shall be UL/ FM/ Vds Listed with following features:

i) Nozzle	: Non Aspirating aqua fog/ foam nozzle
ii) Monitor Flow	: 10500 GPM at 7.0 kg/cm2g
iii) Operating Pressure	: 7.0 kg/cm2g (minimum)
iv) Induction	: By Aqua Powered Foam Inductor from minimum distance of 50 meters from nozzle
v) Type	: Fixed Stand Post type/ Elevated type
vi) Rotation (Horizontal)	: 340 degree in either direction
vii) Rotation (Vertical)	: 135 degree (+90, -45)

Performance

With pressure of 7 kg/cm2 (g) at mating flange, the monitor shall be capable of discharging required flow of 10500 GPM for giving following performance.

a) Horizontal throw

10500 USGPM – 115m minimum for water/foam and nozzle at 30 deg. from horizontal.

The monitor shall be capable of producing good foam. It shall be capable of rotation in horizontal plane and vertical plane as per specification and data sheet. Electric system (as specified in data sheet/ job specification) shall be provided on the monitor body to rotate the worm gear in horizontal direction and vertical direction from a remote control panel provided in a suitable place for Monitors. Alternatively, manual system for rotations shall be provided.

In Addition to Manual and Remote operation the Monitor should be operated through wireless remote control device from a distance of 100 meters from Local control panel.

3.1 Electrically Operated Remote Control System

Electrically operated Remote control system shall be provided for horizontal and vertical rotation of the monitor from local panel to be supplied by the contractor for monitors. The remote control system shall be electrical as specified in the data sheet. Wireless remote controlled device for operating the system shall be designed and supplied along with Monitors.

3.2 Control Panel

All electrical connections shall be provided in a panel for operation such as start/ stop, monitor operation in horizontal and vertical plane in desired direction and angle. All electrical accessories shall be flameproof. Control panel shall have IP55 ingress protection as minimum. Control panel shall have minimum following indication and control functions for each monitor.
Push Button Control - up, down, right and left
Nozzle - Jet/Fog.
Push Button on/ off - Open/ Close Isolation valve
Power available - Indication lamp
Fault Indication - Indication Lamp

3.3 Foam Induction System

Foam feeding shall be by aqua powered foam inductor (Jet Ratio Controller Pump). The induction system shall be evaluated and listed by UL/ FM/ Vds. Water operated foam proportioner shall be suitable for feeding foam concentrate from minimum distance of 75 meters. The inlet and outlet of proportioner shall be provided with 200 mm male and female coupling. The nozzle should be able to discharge the rated capacity at a pressure of 7.0kg/cm2 (g) at the mating/ mounting flange.

The foam compound shall be AFFF/ Multipurpose AFFF (AR-AFFF). The nozzle shall give foam expansion of 1:3 to 1:4. The nozzle shall be able to give a fog up to 140 deg. The monitor should also be operable at a pressure of 10.50 kg/cm2/ (g).
It should be possible to meter and induct 1% foam, however, variation of + 20% of the induction rate is permissible.

3.4 Piping

The fire water piping material and isolation valves shall be as per piping material specification (PMS) of the job.
Fire water main (dia 8") up to inlet base of monitor is excluded from vendor's scope.
Construction of Elevated platform for installation of Long Range Water cum foam monitor is excluded from the vendor's scope of work. However, horizontal thrust in both directions along with vertical load required for design and execution of civil/structural work shall be furnished by the vendor with offer.

4.0 MATERIAL OF CONSTRUCTION

Material of construction shall be of approved quality. Following is the material which shall be used for various components.

a) Nozzle	:	SS 304
b) Swivel Joint	:	SS 304
c) Body	:	SS 304
d) Ball Bearing	:	SS 304
e) Worm Gear for traverse Mechanism	:	SS 304
f) Worm	:	SS 304
g) Handle SS self locking wheel	:	SS 304
h) Drain valve	:	SS 304
i) Pick-up tube of JRCP PVC	:	hose reinforced with high tensile steel wire Helix as per ASTM 1785 sch. 80 with SS 304 strainer

5.0 ELECTRICAL WORKS

Local control panel shall be complete with motor starters consisting of required rating AC3 motor duty switch, fuse, contactor & bimetal overload relay to suit motor rating. Motor start/ stop push button, selector switch, ammeter for motor KW>5.5 etc. and suitable for column/ structural mounting.

The panel shall be in flame proof enclosure suitable for Zone-2, Gas group-IIA/ IIB with GI sheet canopy.

Motor shall be minimum Ex-n type suitable for Zone-2, gas group IIA/ IIB, Temp. Class: T3. Starting current shall be limited to 600% and motor shall comply to specification 6-51-0032. Local control panel and motor shall be suitable for cable sizes which shall be informed during review of drawings.

All incoming and outgoing cables from panel to motor are excluded from vendor's scope. Earthing of the equipment shall be arranged by the purchaser.

Minimum conductor size of power cable shall be 4 mm2 copper and all cables shall be 1100V grade, PVC insulated, PVC inner sheathed, fire retardant PVC outer sheathed and armoured type.

All the cabling from local control panel to the monitor shall be provided by the owner.
All electrical equipment shall be epoxy painted.

6.0 PAINTING

Painting of all piping material shall be as per job specification for painting.

Monitor: Non ferrous components subject to direct foam/ water contact to be coated on inside with tin-lead alloy. External surface of such components shall be given good polish.

Monitor's steel parts shall be painted with fire red colour conforming to IS:5, shade no.536

and the paint shall conform to IS:2932.

7.0 INSPECTION & TESTING

7.1 Shop Testing

Prior to dispatch from vendor's shop, the following acceptance tests shall be carried out by the vendor to the complete satisfaction of owner's representative/ inspection agency without any extra cost to owner. All consumable (e.g. water, foam compound etc) shall be arranged byvendor at his own cost. Vendor shall arrange all facilities to carry out inspection & testing.

- Review of material test certificates & welding records
- Hydraulic test of monitor = 23 kg/cm2. There shall not be any leakage from any part of the equipments.
- The performance test of monitors system for specified parameters including vertical and horizontal throw with water and foam shall also be carried out.
- Functional test for horizontal and vertical rotation at a pressure of 10.5 kg/cm2(g)
- Visual and dimensional check.
- The valves shall be hydraulically tested as per pipe material specification.
- The piping manifolds including valves shall be hydraulically tested at 1.5 times of maximum working pressure.
- Leakage test shall be done as per IS:15811.

Owner or his representative shall have access at all reasonable times to vendor's works where the appliance or its accessories are being fabricated and tested. Originals/Transparencies after incorporating as built information shall be got signed by EIL inspection Engineers before submitting to Owner/EIL for records.

7.2 Field Testing

The performance test of monitors for remote/manual operation system shall further be carried out at site in presence of vendor's representative for ascertaining all parameters specified.

The piping manifolds including valves shall be hydraulically tested at 1.5 times of maximum working pressure again in presence of the Client as total system testing.

Vendor's obligation towards their scope shall be considered as complete only after successful demonstration of vertical and horizontal throw at site, which will be conducted by vendor at their cost.

8.0 MARKING

Each unit shall be clearly and permanently marked with the following.

a. Manufacturer's/Supplier's name
b. Year of manufacturer
c. Purchaser's name and order reference
d. Capacity
e. UL/ FM/ Vds marking

9.0 WORKMANSHIP AND FINISH

9.1 All the parts shall have good workmanship and finish. All burrs and sharp edges shall be removed; particularly passages for foam/ water and nozzle shall have smooth finish.

9.2 None of the joints shall be connected with permanent adhesive. No adhesive shall be used to arrest leaks or locking joint movement in threaded joints.

10.0 VENDOR DATA REQUIREMENTS

a. Documents listed in Annexure-A shall be submitted at various stages as indicated.
b. All drawings shall be in metric units.

11.0 APPROVALS

Vendor shall provide certified approved drawings/ documents authenticated by UL/FM/Vds as documentary evidence along with bids.