

SECTION – III

	प्लाज़्मा अनुसंधान संस्थान	
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SCOPE OF WORK, TECHNICAL SPECIFICATION, OTHER DETAILS

1) INTRODUCTION:

Institute for Plasma Research (IPR) that is located at Bhat village, near Indira Bridge, Gandhinagar. Fire Fighting System includes fire hydrant system, fire suppression system, fire extinguishers, etc. installed at IPR, Bhat, Gandhinagar and at FCIPT, GIDC, Gandhinagar.

The detailed list of installed system is attached as **Annexure – I(A,B &C)**.

2) SCOPE OF WORK:

A. Service & Maintenance of Fire Hydrant System

The equipment of the Fire Hydrant System required to be operated and maintained by the contractor for its smooth working and performance. In order to ensure 100% serviceability for efficient working of the equipment under contract scope of work will include the following,

1. Fire Hydrant Maintenance
 - ⇒ External Inspection and cleaning
 - ⇒ Greasing and oiling of all spring catches, valves, hose boxes doors
 - ⇒ Replacement of gasket/spares of hydrant valve, if required
 - ⇒ Flushing Fire Hydrant till clarified water comes out
 - ⇒ Oiling of Landing valve lugs
2. Maintenance of Main Pump and Jockey Pump
 - ⇒ Bearing lubricant (for water contamination and sediments)
 - ⇒ Oil ring for performance
 - ⇒ Deflector for looseness
 - ⇒ Constant level oiler for leakage
 - ⇒ Mechanical seal for leakage
 - ⇒ Seal flushing/quenching system (of Mechanical Seal) for clogging and chocking.
 - ⇒ Gland for leakage
 - ⇒ Cooling water flow in both the bearing housings
 - ⇒ Condition of bearing by sound and temperature (in running condition)
 - ⇒ Performance of all measuring instruments (Pressure/Temperature gauges and Flow Meters)
 - ⇒ Coupling Guard
 - ⇒ Electric Motor load current
 - ⇒ NRV checking and lapping seat
 - ⇒ Suction strainer checking and cleaning
 - ⇒ Axial position indicator (in case of multistage pump)

- ⇒ Dowel pins (in position or not; wherever provided)
 - ⇒ Flushing of bearing with lube oil and refilling of oil to required level, whether carried out or not
 - ⇒ Flushing of cooling water lines and strainers, whether carried out or not (to ensure proper flow of cooling water.
 - ⇒ Foundation, foundation bolts and supports
 - ⇒ Alignment (Misalignment shall not be more than 0.05 mm)
 - ⇒ Replacement of old packing with new ones and condition of gland follower, lantern ring and sleeves (in case of gland packing)
 - ⇒ Condition of coupling, coupling bolts, nuts, spring washers and their conformity to uniform size. Change grease in half coupling in case of gear type.
 - ⇒ Condition of outboard bearing, lock nut and lock washer (in case lock washer found damaged and lock nut loose, shaft axial play shall be checked)
 - ⇒ Following items of Journal bearings :
 - a) Clearance of I/B and O/B bearings
 - b) High spot (High Spots shall be scrapped)
 - c) Condition of thrust bearing, lock nut and lock washer (in case lock washer found damaged and lock nut loose, shaft axial play shall be checked).
 - ⇒ Pump float (adjust if necessary)
 - ⇒ Oil filter for cleanliness if journal bearings are hydrodynamic
 - ⇒ Painting of equipment, whether carried out or not
 - ⇒ Other, if any
3. Maintenance of Isolation Valve
- ⇒ Gland replacement, if required
 - ⇒ Gasket replacement, if required
 - ⇒ Oiling/grease application to threads for ease of operation
4. Maintenance of Electrical Panel
- ⇒ Pressure switch replacement, if required
 - ⇒ Relay replacement, if required
 - ⇒ Total electrical connections checking and tightening, if required.
 - ⇒ ON / OFF indicator checking and replacement, if any
 - ⇒ Yearly calibration of field meters such as voltmeter and ammeter
5. Maintenance of Diesel Engine
- ⇒ Oil servicing, replacement of diesel, oil filter, as applicable
 - ⇒ Air filter cleaning and replacement, if required
 - ⇒ Foundation bolt checking and tightening
 - ⇒ Radiator cleaning, filling of coolant
 - ⇒ Battery terminal testing and cleaning
 - ⇒ Engine total checking and cleaning
 - ⇒ Solenoid total checking and cleaning
 - ⇒ Oil level checking and replenishment, if required
6. Pipe support
- ⇒ Checking and tightening of clamps of hydrant line
 - ⇒ FRP plate provision in between support and hydrant line pipe, if required
7. Each pump should be tested for at least 60 seconds every visit. Discharge of water should be from hydrant or through a test line. Unnecessary sound and vibration, if any, should be noted and corrected.
8. Pump automation should be checked.

9. Greasing of pumps and motors to be carried out as per manufacturers recommendation or whenever necessary.
10. Hydrant externally and terrace shall be tested with hose and branch pipe. The jet should be operated for at least 2 minutes. Hose shall be dried before rolling.
11. First aid hose reels shall be tested by swinging it on its support and partly opening the hose and discharge of water for 60 seconds. Each hose shall be tested and checked. There shall be no leakage from MS piping or from clips holding rubber or even from rubber pipe. Hose pipe shall be rolled back uniformly, line by line.
12. First aid hose reels shall be extended to full length and water discharged for 120 seconds. The pipe shall be rolled back uniformly, line by line.
13. Internal hose cabinet shutters (including glass) shall be cleaned every visit. Dust and dirt within cabinet shall be removed in every visit.
14. Any line rupture affecting hydrants should be repaired within 12 hours from intimation time (through any mode, i.e. verbal, written, etc.) Other repairs should be carried out within 24 hours.
15. Replacing of gland packing/seals in various pumps and valves on as and when required to ensure that there is no leakage.
16. Checking of electrical terminals, contact points of the starters/contractors, and relays installed in various control panels.
17. Contractor will visit the site as and when called by the Engineer In-charge (EIC). On his visit, he should give report to EIC about satisfactory working of the system.
18. The contractor will be responsible not only for his own men and material but also for the security of the equipment/materials of the IPR. The cost of repair/replacement of equipment damage due to mishandling by the worker of the contractor will be deducted from the contractor's bill after loss assessment by the EIC. The assessment of the EIC will be final and binding on the contractor.
19. The contracting bidder shall guarantee prompt repairs/replacement of components to minimize interruption. In all probability, the bidder will be required to arrange repair and/replacement of such damaged components the same day or reasonable time as per situation.
20. The bidder shall manage/arrange all tools, tackles, ladders, other requisite materials, etc. required for the safe and satisfactory maintenance of the related equipment.
21. Conveyance / transportation arrangement from IPR and return back shall be borne by contractor.
22. The equipment taken out side for maintenance / servicing is to be returned within 15 days from the date of issued.
23. The vendor shall submit duly filled maintenance report in format prescribed by IPR as per Annexure-II(A).
24. Any activity not specifically mentioned in the tender but necessary in the opinion of Engineer in charge of work must be carried out for successful completion of the job.
25. The rubber gasket of any size, glass for the hose box, hammer for hose box, painting of pipe and hose boxes, pressure switch, pressure gauges, Electrical panel parts like, lamps, contactors, MCCB, relays, etc., repairing of the water tanks and other small parts which are not mentioned in the spares list are needed to be supplied and installed by AMC provider with free of cost.
26. The materials like lubricants, screw drivers, relevant accessories, etc. used which are utilized for the day to day operation shall be arranged by the contractor.
27. Maintenance of records and documents as per requirements and the instruction of Engineer In-charge.
28. Follow all necessary work permit procedures, precautions, while carrying out work. The contractor must provide safety shoes, safety helmet, hand gloves, torch light, rain coat, umbrella, other PPEs as per site and work requirements.
29. The contractor shall always keep the fire system/pump room clean.
30. The contractor shall ensure that all provisions for Renewal of NOC of fire system should meet.

B. Service & Maintenance of Fire Suppression System

1. Routine cleaning of various parts of this system for trouble free operation.
2. Routine checking of all electrical controls and components.
3. Checking of battery status.
4. The vendor shall submit duly filled maintenance report in format prescribed by IPR as per Annexure-II(B).

C. Service & Maintenance of Fire Extinguishers

- i. To carry out service, maintenance, hydraulic test, performance test and refilling of various type of fire extinguishers as per IS 2190:2010. Service and Maintenance are to be carried out once in a period of three months (quarterly) as per **Appendix-A**.
- ii. A weather proof tag must be prepared by the contractor, get it approved from the IPR and paste on each of the fire extinguishers. This tag must have, Sr. No., Type, Capacity, Location, Refilling Date, Hydro Test Date, Date of service, Remarks, Sign, Name of Contractor & contact number.
- iii. Repair and replace the necessary parts (if required) of the fire extinguisher as instructed by the Engineer in-charge, IPR. In case of replacement of the parts, new parts shall be replaced by the contractor within 03 (three) days from the date of checking or as instructed by the Engineer in-charge.
- iv. Contractor shall carry out refilling of FE, whenever it is required. The contractor has to collect the empty fire extinguishers from the installed site for refilling within 24 hours after registration of the requirement telephonically or through any other media.
Contractor has to ensure that refilled ABC & DCP type FE will be returned back within TEN (10) days, refilled CO₂ type FE will be returned back within FIFTEEN (15) days and refilled Clean Agent type FE will be returned back within TWENTY ONE (21) days.
- v. Necessary records of checking, maintenance and refilling to be maintained as per **Annexure – II (C)**. The finished report must be submitted to Engineer in-charge within SEVEN (07) days from the completion of servicing and maintenance.
- vi. Register showing status of each and every Fire Extinguisher must be prepared and maintained as per mutual developed format.
- vii. Fire extinguishers shall be refilled and/or operated for its performance test as per **Appendix-B (I)**. Every extinguisher installed in premises shall be hydraulically pressure tested as per **Appendix-B (II)**.
- viii. The contractor shall at all times keep the site free from the accumulation of waste materials and debris and upon completion of work shall clear away and dispose all the surplus materials, rubbish and temporary works of whatsoever nature and kind. The contractor shall ensure clean and tidy site
- ix. Necessary tools & tackles, instruments, weighing machines (for cartridge & extinguishers), etc. required for checking / refilling are in the scope of contractor. The contractor has to submit valid calibration certificates of measuring instruments that are to be used for carrying out maintenance work every time.
- x. Installation and fixing (as required) of extinguisher at its designated place, is to be done by the contractor.
- xi. All transportation required for the activities like refilling, testing, checking etc. and the transit insurance shall be in the scope of the contractor.
- xii. Serious note shall be taken if the contractor maintained i.e. serviced, refilled, repaired and/or checked fire extinguishers, do not operate during performance testing and/or emergency. The same must be immediately investigated, rectified including refilling and testing, detailed report generated and submitted within 07 days to Engineer in-charge by the contractor free of cost.
- xiii. The contractor shall depute technical persons to conduct live demonstration and training in presentation mode at IPR and FCIPT to train employees as well as security personnel at each location on half-yearly basis at each location. All arrangements for demonstration shall be done by the contractor.
- xiv. Thorough supervision and responsibility for flawless services lies with the contractor.

Please note that in order to maintain the FEs in good and operating condition, contractor need to carry out something which is not written here exclusively should also be the part of scope without any extra cost.

D. Operation & Maintenance Manpower Resource Structure:

Following is the minimum manpower requirement for O&M of firefighting system as per the scope of work mentioned in this tender.

Resource Category	No. of Resources	General Shift	1st Shift*	2nd Shift*	3rd Shift*
Sub Officer@[All days at site]	1 No.	09:00hrs.-18:00hrs.	-		
Fireman@[All days at site]	2 Nos. in each shift	-	07:00hrs.-15:00hrs.	15:00hrs.-23:00hrs.	23:00hrs.-07:00hrs.

Note: *Shift timing may vary at the time of actual execution.
Sub-officer may also work non-general shift, whenever required.

@IPR requires above manpower in all days, hence, contractor has to manage availability of the required manpower as per above table during weekly off, leave/s, etc. through reliever. No extra payment will be made for such relievers.

The contractor has to submit CVs alongwith copies of educational qualifications & experience of manpower for final approval of IPR before deputing them at site.

B-1: Qualification & Experience:

B-1.1: Sub-Officer – Sub Officer’s course from National Fire Service College. Candidates should be conversant with the operation and maintenance of Fire Engines, Fire Pumps, Fire Alarm & Detection System, Fire Extinguishers and other firefighting equipment.

B-1.2: Fireman – SSC passed + basic regular course of Minimum 06 months’ duration on elementary firefighting from a recognized University/Institute of State Government/Central Government/CISF fire training centre. Minimum 02 years’ experience as Fireman in well-established organisation. Must be physically fit and capable of performing strenuous duties.

B-2: Major role and responsibilities:

B-2.1: Sub-Officer - To carry out training program for employees, security personnel and firemen. Submit inspection reports of equipment / installation to IPR. To conduct maintenance of firefighting equipment, maintain its records, maintaining shift log book, shift schedule, reconciliation of free issue material (If any), proper records of tools & tackles, equipment, machinery and other items of contractor with proper gate entry etc. Permit to Work (PTW) to be issued after visit the site and ensure the implementation of precautions to be taken for respective work. Act as coordinator between firemen and Engineer In-charge (EIC) of IPR and report to IPR regularly. In addition, any task as assigned by EIC, IPR.

B-2.2: Fireman - Servicing & Maintenance of fire extinguishers, fire hydrant system, landing valves, etc. Routine checking of all firefighting installation & equipment placed for firefighting & fire protection. Carry out all routine tests of fire water pump such as suction test, delivery test, etc. Carry out routine service and maintenance of Engine, pump & other allied equipment such as cleaning of filters, tightening of bolts, topping of oils, oiling & greasing of all moving parts, etc. Testing of firefighting hoses, hose pipes, checking of good working of SCBA sets, air-line respirator system, checking & maintenance of Fire Hydrant, hose pipes, hose reels, water monitors, etc. To attend stand by duties as directed by Sub-Officer or EIC, IPR.

In addition to this, following are checks, but not limited to, to be followed and maintained,

Daily Checks:

- Running of Fire pumps daily for 3-5 minutes,
- Checking of pressure gauges, pressure switches, NRV's strainers, flow meters, air cock valves, sluice valves, sprinkler heads, drains valves, alarm gauges, isolation valves, deluge valves, alarm valves and all components parts incorporated with system and any discrepancies / faults to be attended within specific time.
- Check the pressure in common header line on fixed fire protection system and if drop is significant check for the leakages, identify & rectify the leakages.
- All function checks of addressable fire alarm cum detection system and rectification of observed faults.
- To run the pumps to fill under underground water tank & overhead water tank on daily basis and other associated activities

Weekly Checks:

- Starter contacts, cleaning of pumps, insulation resistance, test of pump motor circuit etc.
- Testing of Hydrant points, etc.
- Circuit test/ Panel test – for fault and fire.
- Fire detection with alarm panel.
- External checking of fire extinguishers.

Monthly Checks:

- Visual check of each fire detectors (external check only).
- Actuation of smoke detectors by turn – at least one detector in each zone to be subjected to test.
- Test of Manual call point.
- Run the pump on discharge basis and check its noise, vibration and temperature to rectify any deformity.
- Check all the terminal connection in electric panel, battery charging terminal, self-starter etc.
- Cleaning of all fire hoses, fire hose boxes, fire service inlet, fire hydrant valve, branch pipe, air release valve tank, hose reel drum, and hydrant pipe line.
- Replacing of gasket and washer if leakage is noticed.
- Greasing of all landing valve, sluice valve, hydrant valve, hose reel drum and hose Pipe Lugs.

Quarterly Checks:

- Cleaning of smoke / heat detectors.
- Cleaning & testing of all Electrical panels & Risers.
- Cleaning, Greasing, Oiling, etc. of all Hydrant Points.
- Servicing of all Motors & Pumps
- Polishing and Colouring of gun metals parts like branch pipe, hose coupling and hydrant outlet.
- Check of all delivery hose pipe on discharge basis.
- Greasing of pump shaft, diesel engine etc.
- Cleaning of fuel tank and fuel line of diesel pump. Check fan belt & Gravity of battery of diesel pump.

Half yearly checks:

- Full running test of all pumps (minimum 10 minute run.)
- Change engine oil and filter aliment.
- Recalibration of all measuring instrument like pressure gauge, pressure switch etc.
- Overhauling of all pumps.
- Cleaning of foot valve and strainer
- Training of each fire system to staff and security agency.

3) SAFETY CODE :

- i. The contractor shall cover his employees/workers under PF, ESI, personal accident insurance policy and applicable laws. Contractor has to submit PF details, ESI No. and insurance policy documents of all employees before commencement of the work.
- ii. The contractor shall be fully responsible for the behavior, conduct, theft and any breach at security etc. by his personnel and workers.
- iii. The contractor shall comply with all Govt. rules & regulations for his staff in regard to maintain the applicable labor laws, their amendments etc. in force from time to time.
- iv. The contractor shall comply with the instructions given by the engineer in charge, regarding safety regulations, safety precautions, protective measures, clean-up practices, housekeeping etc.
- v. The contractor shall ensure adequate safety precautions at site as required under the law of land. Contractor must be entirely responsible for safety of their personnel and provide them safety helmets, safety shoes, other safety gadgets as required and prescribed.
- vi. The contractor shall abide with all the safety regulations as in included in the Electrical safety guide for works contract at site. The contractor shall comply with all applicable provisions of the safety regulations, cleanup program and other precautionary measures, which the Engineer-In-charge has in effect at the site. The contractor shall comply with all instructions given by the safety engineer or his authorized representatives regarding safety precautions, protective measures, clean up and all the other practice which in the opinion of the Engineer or his authorized representative might be hazardous.
- vii. For the work at elevated places, the persons identified to work shall be subjected to medical check-up once in 12 months with respect to :-
 - a) Vertigo
 - b) Epilepsy/fits
 - c) Other related medical problemThe fitness certificate in this regard shall be submitted before commencement of work on letterhead of registered medical officer.
Safety and fire training for labour engaged on work shall be organized by the contractor under the guidance of IPR Safety Section. Cost for such training occurred, if any, shall be borne by the contractor.
Safety helmets, safety shoes, gloves and any other safety equipment are to be provided by the contractor to his workers.

4) TERMS AND CONDITIONS:

- i. The mentioned work shall be carried out under direct supervision of responsible person along with at least two trained persons of the contractor. Avoid, as far as possible, to change deputed personnel except justifiable reasons.
- ii. Care must be taken while carrying out the job to avoid any damage to equipment & property of IPR.
- iii. Contractor shall be allowed to execute the service and maintenance work from 9.30 a.m. to 5.30 p.m. on all working days.
- iv. Contractor shall respond promptly for any communication made by IPR via letter, e-mail or any other mode.
- v. The repairs must be carried out without damaging other working parts of the system.
- vi. The contractor shall provide uniform of approved quality and colour to his staff. The uniform should have well displayed firm's name by suitable means. No extra payments on account of uniform shall be made to the contractor.

- vii. The contractor shall be fully responsible for any untoward incident happened to their personnel. The contractor will be liable or responsible for all its persons / its contractors / sub late manpower for matters including any injury / (death) due to any reason/s and client shall not be responsible for the same.
- viii. IPR may visit any running contract site of the bidder, if so required.
- ix. The Contractor shall use only genuine original parts. If it is found otherwise it will be termed as a breach of contract. In case if the original manufacturer do not exist or particular item is phased out, then the other available makes or model of the parts shall be got approved from IPR and installed at no extra cost.
- x. Notwithstanding as to what is specifically stated, it shall be the responsibility of the successful tenderer to attend to all the preventive maintenance/routine maintenance and repairs and breakdown services including replacements of all parts/components.
- xi. IPR will not supply any tool / tackle / equipment except power supply and water for any work. After satisfactory completion of each of the work, the Contractor shall get approval from IPR. Incase any spares parts, equipment or accessories which supplied by IPR during the maintenance/ repairing/ service purpose on temporary basis, the contractor will be responsible for it and has to be returned back same to IPR in all good manners.
- xii. **Normally repairing and replacement works should be done at IPR Campus. However, if it is to be taken outside IPR campus to and fro transportation charges including any other charges like transit insurance etc. shall be borne by the contractor.**

5) SPECIAL TERMS AND CONDITIONS:

- i. No personnel should resign & leave the Site unless proper replacement is made by Contractor within 7 days' time from the date of resignation.
- ii. To prepare monthly resource deployment planning.
- iii. To guide & provide necessary resources to the emergency team for combating the emergency.
- iv. Monitoring fire system, operation of all Emergency communication system.
- v. To supervise & perform the jobs related to inspection & maintenance of all fire equipment, monitor & ensure their performance for optimum & reliable operation.
- vi. To prepare & coordinate for all fire equipment maintenance & fire training activity.
- vii. To report immediately any failure in system to the Dept. concerned.
- viii. To maintain records on daily shift wise log books & record for jobs carried out by Fireman.
- ix. To attend all fire/emergency calls with good response time.
- x. To attend duty in prescribed uniform.
- xi. Accommodation & transportation of manpower will be in contractor's scope. During emergency call by IPR, Contractor shall arrange his staff to reach at site within 15-30 minutes after call.
- xii. The daily/weekly/monthly report(s) shall be submitted by Contractor to IPR in mutually agreed format. Shift log book/register shall also be maintained by Contractor in the requisite form.
- xiii. IPR will not provide any canteen facilities to the contractor or its employees.
- xiv. Contractor's personnel should mark their attendance according to the procedure specified by IPR from time to time.

Site Visit: *It is advisable that bidder should visit IPR before quoting the bid.*

PROCEUDRE FOR MAINTENANCE AND SERVICES OF FIRE EXTINGUISHERS

A. FIRE EXTINGUISHER, DRY POWDER TYPE GAS CARTRIDGE:

The dry powder extinguishers should be opened in a dry room and for a minimum possible time to avoid effect to atmospheric moisture on powder.

- i. Dry powder extinguisher, where discharge control is fitted on the nozzle, should be operated before opening the extinguisher to ensure that there is no pressure in the extinguisher.
- ii. Weigh the extinguisher to check the correct mass of powder filled in it, which should be marked on the body of extinguisher, and record book when it was first put into service.
- iii. Open the extinguisher and remove gas cartridge and see that sealing disc is intact. Weigh and compare its mass with full mass of cartridge marked on it. In case, loss of mass is more than 10 percent, it should be replaced by new cartridge.
- iv. Check the operating mechanism, discharge control for free movement and closing. Examine nozzle, hose, vent holes, piercing mechanism of cap cartridge holder, grease and wipe clean. Remove the inner shell (if any) and clean port holes.
- v. Empty the dry powder in a dry container and examine for caking, lumps and foreign matter, in which case replace it with new dry powder charge.
- vi. Examine the extinguisher body internally for any damage or corrosion and replace corroded or damaged extinguisher. Clean the extinguisher using dry air.
- vii. Return the original charge to the extinguisher and fit the cartridge and other fittings.
- viii. In case of higher capacity dry powder fire extinguisher as per IS 10658, remove the carbon dioxide cylinder and check the weight marked on the cylinder to ensure that the size conforms to that stipulated in the specification. On weighing, if the loss of mass is more than 10 percent it should be sent for recharging. Also examine the wheel carriage and discharge hose assembly with control nozzle for free flow and test it with dry air.
- ix. The safety valves and pressure gauges fitted on higher capacity extinguishers should be calibrated once in 3 years and recorded in the register.

B. FIRE EXTINGUISHER, CARBON DIOXIDE TYPE:

- i. Examine extinguisher body externally. Damaged or corroded extinguisher should be replaced. Weigh the extinguisher, compare mass against the mass marked on it for fully, charged extinguisher. It should be sent for refilling if the loss is more than 10 percent of mass.
- ii. Clean and polish externally.
- iii. Examine hose, horn and assembly and clean. In case of trolley mounted extinguisher, examine the wheel carriage for free movement.

C. FIRE EXTINGUISHER, STORED PRESSURE TYPE:

- i. Examine and verify that the pressure gauge or any other pressure indicating device fitted in is indicating the internal pressure correctly, if the extinguisher shows a loss of pressure of more than 10 percent, refer to the manufacturer's instructions for appropriate action.
- ii. Examine the extinguisher body externally for corrosion or damage.
- iii. Weigh the extinguisher (with or without the operating mechanism according to the manufacturer's instructions) or use suitable alternate means to check that it contains the correct mass of liquid. Check the mass against the mass recorded when it was first put into service.
- iv. Examine the nozzle and hose and clean if necessary. Examine the hose for wear and replace if not in good condition.

- v. Where the extinguishers are designed to have the operating mechanism removed, check the operating mechanism and discharge control (where fitted) for free movement, clean, rectify or replace, if necessary. Replace safety clip/wire seal or equivalent device as originally fitted.

Note: *As this type of extinguisher is pressurized, it can be opened for inspection only after discharge of the extinguisher. It should be subjected to discharge/performance test every two years.*

D. FIRE EXTINGUISHER, MECHANICAL FOAM TYPE:

- i. Open the extinguisher, check the liquid level. Pour liquid in separate clean receptacle to see if there is any sediment at the bottom of the cylinder. Reject the charge if there is sufficient sludge formation.
- ii. Examine the extinguisher externally and internally and remove from use if corroded or damaged. Corroded gas cartridge should also be replaced.
- iii. Examine the gas cartridge of mass. If there is loss of more than 10 percent of original mass, replace it with fully charged one.
- iv. Examine the foam generating nozzle, strainer, vent holes, internal discharge tube ceiling washer, etc. Replace them, if not in good condition. Otherwise clean them thoroughly.
- v. Check the operating mechanism for free movement and piercing mechanism for proper working. Clean the hose assembly and check it for any dust/sediment at either shank ends.

E. FIRE EXTINGUISHER, CLEAN AGENT TYPE:

- i. Examine extinguisher body externally. Damage or corroded extinguisher should be replaced.
- ii. Check the pressure gauge to see that extinguisher is pressurized correctly. Extinguisher showing loss in pressure should be sent to manufacturer for pressurization.
- iii. Weigh the extinguisher to check its contents of the extinguishing media and compare it with mass recorded on the cylinder. In case of loss of more than 10 percent, the extinguisher should be sent for recharging.

FREQUENCY FOR REFILLING/PERFORMANCE TEST AND HYDRAULIC TEST**I. Extinguishers to be refilled / operated for performance test:-**

1.1 Once in Two Years

- a) Portable fire extinguisher, water type stored pressure,
- b) Portable fire extinguisher, mechanical foam type.

1.2 Once in Five Years

- a) Portable fire extinguisher, water type (gas cartridge),
- b) Fire extinguisher, carbon dioxide type (portable and trolley mounted),
- c) Dry powder fire extinguishers for metal fires,

1.3 Once in a Three Years – BC and ABC dry powder conforming to IS 4308 and IS 14609.

Important Note:

- Refilling is to be done with liquid Carbon Dioxide confirming IS 307 and as per the code approved by the PESO.
- Refilling shall be done at installed site with DCP powder (Sodium/Potassium Bicarbonate) confirming IS 4308 & ISI marked.
- Refilling of ABC Fire Extinguishers includes refilling of powder and pressurizing with dry Nitrogen Gas.
- Refilling shall be done with Mono Ammonium Phosphate Powder 90% confirming IS 14609 (ISI marked) & cylinder to be pressurized more than 15 kg/cm² with dry Nitrogen Gas.
- Refilling of clean agent type Fire Extinguishers includes refilling of clean agent and pressurizing with dry Nitrogen Gas.
- Refilling shall be done with HFC Clean gas & cylinder to be pressurized more than 15 kg/cm² with dry Nitrogen Gas.
- Chemical Analysis Certificate and Safety Data Sheet (SDS) of all above mentioned refilling shall submit after each refilling of fire extinguishers along with invoice.

II. Hydraulic Test for Fire Extinguishers:-

- 2.1 Every extinguisher installed in premises shall be hydraulically pressure tested as per the schedule given below. There shall not be any leakage or visible distortion. Extinguisher which fails in this requirement shall be replaced. The contractor shall submit the hydraulic pressure testing certificate to the Safety Section, IPR.
- 2.2 The carbon dioxide type and clean agent type fire extinguishers shall be pressure tested every time the cylinders are sent for recharging (after periodic discharge test or otherwise) to the pressure specified in the relevant Indian Standard Specifications. The contractor shall submit hydraulic pressure testing certificate for Carbon Dioxide type which is certified and approved by PESO (earlier known as CCEO).

Sr. No.	Type of Fire Extinguisher	Test Interval	Test Pressure	Pressure Maintained for
1.	Water type (gas cartridge) (IS 940)	3 year	35 kg/cm ²	2.5 min
2.	Water type (stored pressure) (IS 6234)	2 year	35 kg/cm ²	2.5 min
3.	Mechanical Foam (IS 10204)	3 year	35 kg/cm ²	2.5 min
4.	Carbon Dioxide (IS 2878)	5 year	250 kg/cm ²	2.5 min
5.	Dry powder type (IS 13849)	3 year	35 kg/cm ²	2.5 min
6.	Clean Agent (IS 15683)	3 year	35 kg/cm ²	2.5 min
Note: Test interval shall be considered either from the date of manufacturing or from the last hydraulic test done for the cylinder.				

A. LIST OF ITEMS/EQUIPMENTS USED FOR FIRE HYDRANT SYSTEM

Sr. No.	Description	Unit	Qty.
1	Electric Motor drove back pull out centrifugal fire pump, delivery of 171 m ³ /hr against total head of 70 mtr. , 3 phase, 415 V supply, Make: Kirloskar	Set	1
2	Electric Motor driven back pull out centrifugal fire pump (terrace pump), delivery of 54 m ³ /hr against total head of 35 mtr. , 3 phase, 415 V supply, Make: Kirloskar	Set	1
3	Water cooled diesel engine driven fire pump, delivery of 171 m ³ /hr against total head of 70 mtr., Make: Kirloskar	Set	1
4	Electric Motor driven automatic pressurization pump, back pull out centrifugal fire pump, delivery of 10.8 m ³ /hr against total head of 70 mtr. , 3 phase, 415 V supply, Make: Kirloskar	Set	1
5	Electric control panel for fire hydrant pumps	Set	1
6	Electric control panel for terrace pump	Set	1
7	Single Headed - Hydrant landing valve 63 mm dia.	Nos.	37
8	First-aid hose reel, full swinging with 30 mtr. long, 25mm dia with shut off nozzle of 8 mm dia.	Nos.	18
9	Air vessel – 450 mm dia. with pressure relief valve, air vent, etc.	No.	1
10	Pressure gauge- 100 mm dia.	Nos.	5
11	Pressure switches	Nos.	4
12	Cast iron double flanged type IS marked sluice valve – 150 mm	Nos.	2
13	Cast Iron butterfly valve – 150 mm	Nos.	18
14	Cast Iron butterfly valve – 100 mm	Nos.	2
15	Cast Iron butterfly valve – 80 mm	No.	1
16	Ball valve – 25 mm	Nos.	21
17	Ball valve – 15 mm	Nos.	16
18	Cast Iron double flanged type Non-return valve – 150 mm	Nos.	2
19	Cast Iron double flanged type Non-return valve – 80 mm	No.	1
20	“Y” type strainer with SS 40 mesh	Nos.	2
21	“Y” type strainer with SS 40 mesh	No.	1
22	SS 304 – Branch Pipe 20 mm	Nos.	39
23	Hose box cabinet	Nos.	37
24	63 mm, 15 mtr. long reinforced rubber lined hose pipe	Nos.	82
25	4 way fire brigade inlet connection with 63 mm instantaneous coupling with plug, cap, chain, etc.	Nos.	2
26	2 way draw off connection with 63 mm instantaneous coupling with plug, cap, chain, etc.	No.	1
27	Auto air release valve 15 mm, body brass alloy, internal ss-304	Nos.	3
28	Fire pump ON switch	Nos.	10
29	Underground water tank with capacity 1,00,000 ltr.	No.	1
30	Overhead water tank with capacity 20,000 ltr.	No.	1
31	M.S. Pipe heavy class ‘C’ (sizes from 25 mm to 250 mm) with all fitting and paintings	R Mtr.	1125
32	Steel structure support	Lot	1

Note: This system was commissioned on December-2018.

Annexure – I**B. LIST OF ITEMS/EQUIPMENTS USED FOR FIRE SUPPRESSION SYSTEM**

Sr. No	Description	Unit	Qty.
1.	Ceasefire make quick response automatic fire suppression system covers 2 kg. of clean agent fire extinguisher, pressure gauge, integrated ball valve, heat sensing tube with requisite fittings.	Set	12

Note: This system was commissioned on December-2018.

Annexure – I**C. LIST OF FIRE EXTINGUISHERS**

Sr. No	Description	Quantity	Location
1.	Checking and Maintenance of the DCP type (1kg. to 10 kg.), ABC Type (1 kg. to 10 kg.), CO ₂ Type (2 kg. to 4.5 kg.), Clean Agent Type (2 kg. to 6 kg.), Mechanical Foam Type (9 ltr.), Wheel Mounted ABC type (25 kg. & 50 kg.), CO ₂ Type (6.5 kg. to 22.5 kg.), Water Mist type Fire Extinguisher (35 ltr. & 50 ltr.with 6 ltr. Volume of air cylinder)	350	IPR, Bhat, Gandhinagar
2.	Checking and Maintenance of the ABC Type (2 kg. to 9 kg.), CO ₂ Type (2 kg. to 4.5 kg.), Clean Agent Type (2 kg. to 5 kg.), Wheel Mounted ABC type (25 kg. & 50 kg.), CO ₂ Type (6.5 kg. to 22.5 kg.), Water Mist type Fire Extinguisher (50 ltr. with 6 ltr. Volume of air cylinder)	40	FCIPT, A-10/B, GIDC, Sector-25, Gandhinagar

A. CHECKING AND MAINTENANCE REPORT FOR FIRE HYDRANT SYSTEM

(Sample)

Sr. No.	Description	Yes/ No	OK / Not OK	Not Applicable	Comments
1.	Water Level in Reservoirs				
2.	Main pump service & Maintenance				
3.	Jockey Pump service & Maintenance				
4.	Auto function of Jockey pump				
5.	Auto function of Main pump				
6.	Fire Control Panel				
7.	Operation of fire hydrant points				
8.	System Pressure				
9.	Output Pressure				
10.	Servicing/lubricating of all kind of valves pumps, motors, hydrant points etc.				
11.	Cleaning & Maintenance of Hose Boxes				
12.	Cleaning & Maintenance of Hose Pipes				
13.	Cleaning & Maintenance of Hose Reels				
14.	Filling glands, if required				
15.	Pressure Gauges				
16.	Pressure Switches				
17.	Servicing of Non return valve				
18.	Servicing of Gong Bell				
19.	Entire Pipeline network				
20.	Servicing of nipples, hose coupling, lugs etc.				
21.	Any other				

Signature with Stamp of the Contractor:

Name of the person:

Annexure – II

B. CHECKING REPORT FOR FIRE SUPPRESSION SYSTEM (Sample)

Sr. No.	Description	Yes/OK	No/Not OK	Not Applicable	Remarks
1.	Cylinder pressure gauge operable				
2.	Heat sensing tube pressure gauge				
3.	Any physical damage or condition exist that might prevent operation				
4.	Power supply status				
5.	Battery status				
6.	Panel and hooter status				
7.	Any other				

Annexure – II

C. CHECKING AND MAINTENANCE REPORT OF FIRE EXTINGUISHERS

Sr. No.	F/E No.	Type	Capacity	Location	Safety Clip/Pin	Plunger & Cap/ Squeeze Valve/ Discharge Valve	Tag	Handle	Discharge Hose/ Horn/ Nozzle	Pressure Gauge	Date of Servicing	Remarks

Signature with Stamp of the Contractor: