

SCOPE OF WORK

1. Salient details of the work for which qualification applications are invited are as under:

Name of work	Estimated cost	Period of completion
Operation with Comprehensive Maintenance Contract (CMC) for various Fire Fighting Equipment and Fire Alarm System at Homi Bhabha Cancer Hospital & Research Centre, Visakhapatnam, Andhra Pradesh - 530053.	Rs 23.00 Lac + GST extra as applicable.	01 Year

2. The work should be carried out in co-ordination with other contractors working in the vicinity of the proposed work without causing inconvenience etc.
3. Work shall be executed according to the Tender Conditions of Contract for this Project.
4. The bidder must visit the site at his own cost for complete evaluation of the project before submitting the tender.
5. The work involves **Operation with Comprehensive Maintenance Contract (CMC) for various Fire Fighting Equipment and Fire Alarm System at Homi Bhabha Cancer Hospital & Research Centre, Visakhapatnam, Andhra Pradesh - 530053.**
6. The Bidder quoted rates should be inclusive preparation of drawings/shop drawings. The bidder should prepare the required copies of the drawings and shop drawings for execution of the above specified work at his own cost.
7. Reference to the Standard Codes of Practice

8 Comprehensive Maintenance Contract for complete Fire fighting system, Fire Alarm System , Domestic water and UG Sump Dewatering system consists of all blocks viz. Under Ground Sump, RT Block, Doctors Hostel, Nurses Hostel, Dharmashala, Service Block, Registration Block, Substation, Cafeteria Block Technical details of equipment for the Operation and Comprehensive Annual Maintenance Contract (CAMC) are mentioned as above.

9 Vendor has to visit the site prior to bidding at his own expenses to assess the fire fighting installations at HBCH&RC, Vizag and participate in tendering process.

10 All fire fighting, Domestic and UG Sump, Dewatering water installations mentioned in equipment list should be fully functional and available for operation at any time. Fire main pressure of 7 Bar has to be maintained at all times and regular rounds of all blocks has to be taken by the duty technician for leakage of water and any irregularities in fire main system.

11 The bidder/agency which is selected after tender process will have to undertake Repair/Maintenance (Planned Preventive Maintenance) of the Fire Alarm System , Fire Fighting System , Domestic water & Dewatering system on regularly monthly basis and also as prescribed above (or) as instructed by Engineer-in- Charge.

12 The agency and their appointed technicians must operate and undertake preventive and breakdown maintenance of all firefighting equipment, Domestic water arrangement, UG Sump De watering arrangement. The shift technician must operate Domestic water pump in co ordination with Civil engineering Dept for the purpose of filling all water tanks (10 No's) located in terrace of all blocks.

13 The agency should provide 04 technicians (03 shift +01 Reliever) under the supervision of 01 No. skilled engineer for round the clock (24X7 ,including Sunday's & holidays) operation of fire pumps and valves and provide first aid technical assistance during defect in any firefighting equipment. Salaries for 04 technicians and 01 No . Skilled Engineer /Supervisor will be considered for billing, The 01 No. Skilled engineer will be a single point of contact for all maintenance/defect activities .Salaries will be initially paid by contractor which will be credited by HBCH&RC, Vizag on submission of quarterly RA bills. All payments will be paid after completion of service period on quarterly basis and on receipt of invoice/challan signed by Security Officer & EIC

14 The contractor must pass on the monthly manpower charges mentioned to the Technicians & Engineer, ESIC and EPFO shall submit proof of such payments made by him for claiming reimbursement thereof. The contractor shall note that only the manpower charges based on notified minimum wages as mentioned above shall be reimbursed and any payment over and above the same shall be borne by the contractor who may factor in the same while quoting Lumpsum Annual Operation & Maintenance Charges at above.

15 The 04 No's technicians deputed should be minimum qualified **ITI (05 Years of Experience)(OR) Diploma Engg (03 Years of experience)** from relevant trade/branch and the 01 No. Supervisor should be minimum qualified **Diploma in Mechanical/Electrical Engineer with 05 years experience (OR) B.E/B.Tech in Mechanical/Electrical Engineer with 03 years experience** and have to be well versed with the all electrical distribution Boxes, incoming/outgoing supplies fire fighting layouts, drawings, all valves and their locations/ various blocks. The Qualification of Technician & Supervisor/Engineer, who will be appointed, will be assessed by the Engg Dept. HBCH&RC, Vizag for requisite qualification and Experience. The personnel employed for Supervisor/Technician will be scrutinized by this office in addition to the contractor's recommendations for checking technical competency and skill. Only Annual maintenance and checks of fire fighting installations is covered in this scope of work, However, in the event of fire action will be undertaken by fire dept under the supervision of Fire Officer HBCH&RC,Vizag.

16 Maintenance of Fire Fighting, Fire Alarm , Fire detection system , Domestic water and Dewatering system in the areas under this contract the maintenance agency (contractor / firm) shall be solely responsible to keep the system serviceable at all the time. The maintenance shall include servicing of all the equipments associated with the systems, all pipelines connected to valves, pumps, sprinklers, pendants, . Cost of spares & consumables etc. shall be included in the quoted rates except which are mentioned.

The cost of major or special repair or overhauling of any equipment such as Fire pump, motor, batteries & hooters including winding of motor is also covered in the scope of this work. Repair of underground cable, pipelines and PCB replacement of fire alarm panel is not included. Preventive & routine maintenance including servicing, minor rectification will be the responsibility of the agency. Diesel oil for fire engine pump will be provided to the agency by HBCH&RC,Vizag for such rectification free of cost and for which consumption has to be recorded in log book. All minor material such as Petroleum Jelly, straw, lubricants, tools & tackles, nuts & bolts, distilled water, cleaning materials (soda & waste cloths etc.), log books & Stationeries, fuse, rubber packing, threads, indicator lamps, clamps, resistors, diodes, repairing of Integrated circuit (IC/PCB) etc. are in the scope of this work. Nothing extra shall be paid on account of consumables and small tools & plants required for the work.

The agency should promptly inform HBCH&RC , Vizag Fire- in- charge as soon as occurrence of any Major defect in these systems is noticed. So that the latter can take advance action towards its rectification and procurement of any material required for that purpose. Labour for the rectification will be provided by the agency in his quoted rates.

The firm has to arrange for testing both the fire pumps. The test includes running of the pressurization pumping set in case of loss of pressure of fire hydrant system and running of diesel engine pump by artificial closure of electricity. The pumps shall be tested as to whether the constant pressure is being maintained by creating pressure loss in the pipe lines. Pressure test at the various locations of hydrant valves shall be done by opening the valve at one location. Such test shall be done at least once in every alternate month in the presence of Fire-in-charge and Engineer in charge of HBCH&RC,Vizag.

The servicing of major equipments like fire pump, jockey pump, Diesel Driven Pump, Domestic water pump & Dewatering pump, pressure regulator & main fire alarm panel etc. shall be done quarterly. However, all the valves, valve handles, smoke detectors, manual call points, hooters, fire control cable etc. shall be checked and greased if required in every month

After award of work order the contractor should identify and maintain critical spares related to Mechanical and electrical works which must also include Fire pendants, Sprinklers, Smoke detectors, HVWS nozzles, NOVEC Gas and as desired by contractor so that rectify defect in minimum possible time and avoid any penalty issues.

Recharging of NOVEC gas for the system provided in any of the rooms viz. CT Simulator, CT Scan, PET -CT & SPEC-CT will be as follows:-

- (a) If NOVEC Gas released by the system for the purpose of actual extinguishing of the fire in the Room/ space will be paid by HBCH&RC,Vizag as extra charge as per the rates mentioned in this tender.
- (b) If NOVEC Gas released during any maintenance of complete system by the firm and Malfunctioning of any of Panel/Program card / Alarm panel/Any sensor/Smoke and Heat Detector will be completely borne by the Firm only.

The contractor should maintain the below mentioned log books with the help of their shift technicians:- (a) Pumps starting/stopping with running hours log book (b) Maintenance schedule record for all fire equipments (c) Defects record book (d) fire and alarm system Test record book.

- 24 PENALTY: - Break** downs, if any, shall be attended by the agency at the earliest after lodging of complaints. The penalty amount per complaint will be as follows :-
- (a) Minor Faults viz. Valve glands ,Weld/ hole leaks in pipes above ground level in any blocks, Leakage in fire shaft, any type of sensor/nozzle/sprinkler replacement ,eplacement of flexible pipe above nozzle, replacement of pressure gauge, any other defects as instructed by EIC not rectified within 24 hour @ Rs 500/- per day.
 - (b) Major faults viz. refilling of NOVEC gas, refilling of extinguisher, Smoke and Heat detector or any other detector in fire alarm system, r damage of sensor cable above ground level ,replacing of damaged hose pipe/ hose reel, welding repairs to any hydrant post any other defects as instructed by EIC etc. not rectified within 48 hours @ Rs 1000/- per day.
 - (c) The repairing/replacing any damaged part of each fire pump or Diesel engine any other defects as instructed by EIC, Replacement of any of the PCB card, Panel, software if not done within 48 Hrs. @ Rs. 2000/- per day.
 - (d) Any delay beyond 02 days in rectifying all minor/major faults at S.No. (a),(b) except repairing of fire pump , the equipment will be got repaired from the market and the actual cost of the same shall be recovered from the payable amount of AMC in addition to the penalties as mentioned in (a), (b).
 - (e) Any delay beyond 04 days in rectifying the faults at S.No. (d), the equipment will be got repaired from the market and the actual cost of the same shall be recovered from the payable amount of AMC in addition to the penalties as mentioned in (c).
 - (f) In extreme cases, the action of forfeiture of security money/pending bill/blacklisting of the firm can be resorted at the discretion of the competent authority in case of failure by the contractor to rectify the complaints within the specified time.
 - (g) Any damage to the building or the any part of the equipment which might result during the operation shall be repaired by the contractor.
 - (h) Any damage resulting to the system on account of the negligence or mal- operation shall be made good by the contractor. Nothing extra will be paid for such work.
 - (i) At the time of acceptance of the tender, the contractor shall furnish the details of staff members along with contact details to the corporation who will look after maintenance work of Firefighting equipment and alarm system.
- 25** The Contractor has to Remove, Refill, Reinstall 01 No. 80 L cylinder with NOVEC Gas ,pressure testing and pressure gauge replacing if required
- The agency shall always keep the Fire System/Pump Room, Valve chambers, hydrants , stand posts, Fire shafts
- 26** area neat and clean. Apply primer with Signal red color where corrosion or paint removed due to weather conditions.
- 27** All materials provided by the agency should be either BIS certified or should be certified by the agency designated

for the purpose by appropriate Government.

28 Whenever the agency sends any person (Technician/Engineer) to attend the complaint/rectification, such person shall sign in a log book maintained for office records.

29 Since the hospital is under construction ,the agency should provide Uniform, safety shoes ,Identity Cards, Name Plates to each and every Staff by the contractor and has to be included in AMC charges, no other expenses for the technician will be provided from HBCH&RC,Vizag

30 Maintenance routines which are to be followed has been mentioned briefly in succeeding paragraphs. Detailed maintenance schedule will be provided with work order. 03 No's separate Log Books for pumps running hours , defects occurred daily, maintenance schedule has to be maintained.

31 All underground pipe lines are of Ductile Iron Material .Repair of underground pipelines if any ,is not included In the scope of this CMC ,however assistance be provided for rectifying and make good the system which will be paid separately with quarterly payment.

32 The agency should maintain various sizes of adaptors/dummy plates for the purpose of blanking and isolating of valves or repair of flexible pie connections.

33 All Tools, Plants, and equipments to carry out the Fire work at site are to be provided by the Contractor free of cost.

34 The agency shall depute their Engineer/supervisor in working site to meet Engineer - in - charge & Fire In-Charge for any official purpose.

35 All materials or any part(s) of Fire system which are required to remove any deficiency or defect in the Functioning of Fire system shall be provided by the agency, for which payment will be made by the HBCH&RC,Vizag against valid bills along with proof of supply of such material.

36 The requirement of material if any should be approved by ENGINEER IN-CHARGE of HBCH&RC,Vizag.

37 All materials or any part(s) of Fire system which is required to be replaced shall be from the same Manufacturer/ supplier who has provided the original equipments/parts.

38 The agency shall undertake the maintenance of Pump Room Diesel Generators Set with OEM of the equipment so to make available at all times.

39 The agency shall simulate/burst fire fighting extinguishing system at 01 location at substation (using HVLS) , 02 locations in RT Block system as part of Quarterly test/Routine and replace the bursted nozzle on the same day .the event has to be coordinated with HBCH&RC, Vizag Fire Personnel.

40 The agency shall liaise with AP Fire Disaster Management in co ordination with HBCH&RC, Fire Officer to ensure that Fire Department provides the NOC/Renewal of Fire system to the handed over blocks and Hospital Block.

- 41 Monthly inspection of the entire extinguisher including checking their tubes, discharge, hose pipes, nozzle, clamp etc. checking of weight for loss of mass in gas type extinguisher and to keep a record of the same. Mentioning of Last charged date and due date
- 42 All Log books as mentioned above must be signed after every service by the engineer in charge and Fire officer designated by the HBCH&RC,Vizag for such purpose.
- 43 To perform any additional special tests as required by the local fire codes.
- 44 Report any incidence of breakout of fire in the form of fire record to PCRA (Petroleum Conservation Research Association).
- 45 To organize and impart training to the occupants of building in First Aid, Fire fighting, using Fire Extinguisher and building evacuation during emergency situation.

46 **INCLUSIONS & EXCLUSIONS**

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INCLUSIONS:

The following components of the fire alarm system are required to be replaced within the scope of contract if found defective for satisfactory

operation of fire alarm system.

- (a) Power cords, Charging cords, SMF batteries
- (b) All types of fire alarm detectors
- (c) Response indicators
- (d) Manual call points
- (e) Hooters
- (f) Connecting cables
- (g) All spares of Fire panels (Including reprogramming etc)
- (h) All spares for pumps ,Diesel engine, any type fire fighting installation, nozzles, sprinklers, NOVEC gas system mechanical and electronic parts, Valves, sensors, hose pipes, Extinguishers

47 **EXCLUSIONS:**

- (a) Repair of Underground Pipelines,

Underground cables

(b) Refilling of NOVEC Gas to be charged per KG as and when required as per the rates fixed in Tender

MAINTENANCE SCHEDULE

	MAINTENANCE SCHEDULE
1	Maintenance of Fire Extinguisher (Co2 Type, ABC Type, and Foam Type):-
	(a) AMC also covers refilling of Extinguishers (After expiry or if used before of expiring/empty). (b) Pressure is at recommended level or not. Nozzle, Pipe or other discharging paths are not hindered in any way. (c) The pin & tamper seal are intact. Check full weight (Quarterly basis). (d) Shaking of dry powder type to prevent powder from setting /packing. (e) Certification of all types of fire extinguisher following its inspection, maintenance/refilling etc. (f) To arrange for proper placement of extinguisher after inspection/ maintenance/ refilling and/ or subsequent to its use during fire drills/demonstration etc. (g) To maintain record/history card of inspection and maintenance done on each extinguisher.
2	AMC of Fire Hydrant: (a) Fire water network including hydrants and water monitors. (b) Monthly discharges test from at least one external hydrant and one internal hydrant (Preferably from top floor or terrace) by attaching single length of fire hose, with nozzle to check automatic starting of pump with hydrant operation.
3	AMC of Hydrant Wet Riser System: (a) Visual /Physical Check:- weekly to check washers, couplings, valve logo wheel check nuts etc. monthly visual check of Hose/Hose Box for any damage rot/rust etc. Monthly hose reel by actual actuation. (b) Pump / Jockey Pump:- Weekly physical check/ greasing of nipples. (c) Automatic start: - Monthly check to test automatic start of Jockey Pump at present pressure and auto stop of Jockey Pump at present pressure.
4	Pumps and Control: (a) Starter contacts cleaning twice a month. (b) Insulation resistance test of pump, motor circuit etc. (c) Any other inspection as contained in manufacturers' literature for pumps & controls.

5	Weekly checks of fire pump room (a) The starting and stopping of pressurization pump should be checked through operation of the test valve (so that water flows back to the pump). Record the pressure reading of both the operations to ensure that generated pressure in the system is in order. (b) While conducting the above said test check, the pumps should be run one by one for 5 minutes each and any abnormality such as excessive noise & vibration, burning smell from cable end, warming of bearing surface etc. should be observed for taking remedial actions . (c) Check the alarm systems in the pump room. (d) Check the level of electrolyte in the battery of the engine and top up with distilled water as necessary. Check also its specific gravity. If the battery needs charging (as can be judged by the cell voltage) arrange for its charging early and also examine whether trickle charger is defective.
6	Weekly checks of Wet Riser components: (a) Clean the Internal hydrant points at all floors. See that these spaces are not misused for dumping rubbish or for storage. (b) Look for damages to or pilferages of components including the front glass cover of door and attend as required. (c) Look for leakages in the piping system within the building. Attend as required for example bolts at joints may need tightening, gasket at joints may need replacement etc. (d) Visually inspect the roof tank and pump for down comer (if provided) for any defects to take timely actions.
7	Monthly checks on all fire fighting and alarm system engine and pumps: a) Operational readiness of system during mains failure b) Check battery water level & Specific Gravity of electrolyte c) Check the fire circuit of each zone from the panels d) Check whether signals of fire and fault get transmitted from zonal panel to main panel e) Performance check of the hooters shall be done along with the performance check of manual call points. f) Check smoke detectors, if required cleaning shall be carried out with suitable reagents. g) Checking of water pressure of the hydrant line & action shall be taken to arrest leakage on urgent basis. h) Checking of main control panel of fire pump & alarming system (i) Check engine radiator for air restriction if any and clean the same if required. Check the condition of drive belts, hose and radiator cap. (j) Clean the battery terminals and apply grease to prevent corrosion. Check specific gravity of the electrolyte. (k) Check the exhaust system for leakage, corrosion and vibration. See whether the exhaust smoke is not very dark.

	(l) Check that there are no restrictions to air flow in air cleaner. Check that oil heater is functional. (m) Check also the water level in the static tank. (n) Check coupling with pumps for any sign of fatigue. (o) Lubricate bearings of motors and pumps as required. Check the gland seal in pumps for Leakages and tighten as necessary.
8	Quarterly Checks on Fire fighting and fire alarm system :- a) Check fault circuit of each zone by actually disconnecting wire by removing a detector. b) Check fire circuits by facilitating actual smoke to one detector of each zone c) Cleaning of all types of detectors with suitable means. d) Checking/ servicing of major equipments such as Fire pump, Jockey pump, pressure gauges, panels including contactors, valves, main alarm panel, auxiliary panel etc.
9	Six monthly checks on system components (a) Roll out the hose pipes in an open space and test for leakage by filling with water. After the test, wash the hose and suspend free from an upper floor vertically in shade (not sunshine) so as to drain and dry evenly. When fully dry inside and outside, brush the external surface and roll up evenly with the female coupling end at the centre so that roll out for firefighting operation is quick without twisting. Alternatively the hose may be folded at mid length and rolled up evenly from the fold so that both the male and female couplings will be on the periphery. (b) Check the integrity of all gate valves, in the pump room, internal and external hydrants and elsewhere in the wet riser/ sprinkler system. Lubricate if required. (c) Clean the sprinkler heads externally and also the sprinkler bulbs carefully to make them free from dirt. See that the sprinkler heads are correctly repositioned after cleaning. (d) Look for corrosion of metallic surfaces including GI components used for earthing system. Clean up and treat the corroded surfaces with appropriate anti-corrosive paint. (e) Inspect the electrical control panel and starters to see that all power/control contacts are clean, all terminations are sound and all fuses are intact. (f) Inspect all cable end terminations in the fire protection system, including control cables and tighten as required. (g) Check and change filters of diesel oil, engine oil, coolant and air cleaner element of the engine after checking total hours of operation vis-a-vis manufacturer's recommendation.
10	Auto operation of wet riser (a) All hydrants, internal and external, should be operated to check the operational readiness of the system. For this purpose, open the hydrant valve of one hydrant at a time and stop the pump after 1 or 2 minutes of operation. Take due precaution to see that there is no flooding of areas within the building during testing. Water should be directed towards drains. (b) While checking the internal hydrants, verify the free turning of fire hose reel. Lubricate if

	necessary.
11	Annual checks
	(a) Drain out static tank, clean and fill up with fresh water. If there is no sedimentation, algae etc.
	found, this can be done once in 2 years also.
	(b) Flush out the entire piping network in sprinkler system and check that the pipes are clear.
	Charge the system again.
	(c) Check condition of strainer, foot valve (where provided), suction line hardware etc.
	(d) Check pump shaft alignment, and condition of anti-vibration mountings for all the pump sets (i.e. with their drives).
	(e) Paint all external MS surfaces, machine base plates, hydrants (not the couplers), pipes, supports etc. Take care to see that the sprinkler bulbs and spray outlets are not painted up, check also display boards installed for fire safety at strategic locations.
	(e) Inspect the fuel tank for any sedimentation. Clean up if required.
	(f) Conduct Megger test on all cabling, mains and control wiring motors and earth test. (Earth test is to be done in summer and Megger test during monsoon).
	(g) Replace the engine oil as per hours of operation and recommendation of the manufacturer.
12	FIRE ALARM SYSTEM MAINTENANCE SCHEDULE
13	Fire detector and alarm: (a) Monthly visual check of each detector. (b) Quarterly cleaning of smoke /heat detector (removal of dirt, if any) (c) Quarterly actuation of smoke detector by turn – at least one detector in each floor to be subjected to test. (d) Circuit test/panel test for fault and fire condition every month, for fault test and every quarter for fire condition. (e) Manual test of public address system.

Fire Detection, Suppression & Protection System

(a) Fire Detection, Suppression & Protection System comprise of fire alarm system, smoke detectors fire extinguishers, sprinklers, wet riser system with fire hydrants (at each floor & around the building on the ground floor), fire doors, fire evacuation plan with signage, fire escape etc. and these are provided in the buildings as per extant provisions of National Building Code (NBC) & Local Bye Laws so that the building is free from any fire hazard.

(b) Proper maintenance of all electro - mechanical installations in the building is an essential part of fire safety precautions as such these should be checked, inspected and tested periodically in accordance with relevant extant provisions of BIS / NBC / CPWD specifications to ensure their full functionality and operational readiness at all times.

(c) Prominent display of the following relevant information at strategic locations is indispensable from fire safety considerations :

(d) External board (preferably illuminated) to indicate fire pump room.

(e) Painted boards in fire pump room and control room, indicating telephone numbers and names of engineers, nearest Fire brigade station, nearest Medical College & Hospital etc.

(f) Marking of fire lift at each landing and also the floor numbers and of locations of main switchgear / substation for ready identification.

(g) Locations of internal hydrants by illuminated sign boards, if the same are not readily identifiable from the main lobby areas.

(h) Painted board at each floor lobby indicating important instructions and fire escape to the occupants as part of full proof evacuation plan in the event of fire in the building.

(i) Proper upkeep of maintenance records is very important. Log books are to be maintained to record the log readings such as pressure, current, voltage, operating (testing) periods etc. Maintenance register should indicate actual compliance to the maintenance schedule item wise. Major repairs or replacements should be recorded in the history book for future referencing.

(j) Note the belt size, lubricant oil brand name and grade and similar particulars of other such consumables in the front page of maintenance register for engine and pumps so as to ensure that only the materials of proper quality is used in maintenance.

(k) Batteries have certain limited life (3 or 4 years) and it also depends on the usage and rates of charging / discharging etc. The voltage readings give a fair indication in this regard. Check with manufacturer concerned before deciding on replacement.

(l) Certain periodicities have to be finalized for various maintenance activities on components like fire detectors, control panels, hydrants etc. In order to achieve compliance to these prescribed periodicities, each of these components may be divided into convenient numbers to carry out the respective activities. For example, if all control panels are to be cleaned weekly and there are 10 such panels, 2 panels may be cleaned every day in sequential order so that all the 10 panels are cleaned once a week. This should be programmed in advance to avoid inconvenience.

	(m) Every maintenance operation involving operation of sounders in the building should be done after displaying notice in advance to the occupants so as to avoid panic during testing.					
15	Daily routine checks (a) Keep the pump room dry as wet flooring may turn slippery, invite growth of mosquitoes and cause an unhealthy environment. (b) Clean the pump room. Wipe out dirt from external surface of equipment & ensure that the approach to pump room and ventilation openings in pump room are free. (c) Where a priming tank is provided, it should be ensured that it is full. (d) Check to ensure that the selector in control panel is in AUTO mode. (e) Record the readings of voltage of supply, battery voltage at engine and at control panel and pressure of water in the system at pump room and at the top most floor. Record also the current if any electric motor is run. (f) Observe whether there is any external sign of leakage in internal piping network and damage to yard hydrants and attend to the same immediately so as to pressure drop in the system.					
16.1	Daily Checks					
	(a). Check the power supply of all the panel installed.					
	(b). Check the healthiness of battery. Replace if required.					
	(c) . Check the fault indication of the panel, if any and rectify the same.					
	(d). Check whether signals of fire and fault condition is transmitted from detector/devices to main control panel.					
16.2	Weekly Checks					
	(a) Operate a call point & detector to test the system. Each week choose a different detector / device so that all detectors are tested.					
	(b) Check the fault circuit of each loop / zone from the panel					

	(c) Clean all the control panels, sounders and call boxes.					
	(d) While cleaning each panel, verify whether any fault indication lamp is on. If it is on with or without an alarm, investigate and rectify the fault.					
	(e) Check whether all panel lamps are regulated by the "panel lamp test button" in each panel.					
	(f) Check that the system operates under mains failure condition by switching of the mains supply to the C & I panel and testing any zone for fault / fire condition from the zonal panel. Confirm also that the audio visual alarm comes up in the C & I panel. Restore mains supply after the test.					
	(g) log all the panel instruments in C&I Panel					
	(h) Maintenance free battery should be used preferably.					
16.3	Monthly Checks					
	(a) Check the hooters/alarms/speakers.					
	(b) Visual Check of each detector.					
16.4	Quarterly Checks					
	(a) Check fault circuit of each zone by actually disconnecting wire by removing a detector.					
	(b) Check fire circuits by actual smoke to one detector of each zone.					
	(c) Cleaning of all type of detectors.					
16.5	Six monthly checks on Fire Alarm System (FAS)					
	(a) All fire detectors should be cleaned. Do not blow in heavily into the detector. Use a proper suction device. Never leave a detector base without replacement of the detector. Restore the zonal panel, if it was switched off for this cleaning operation.					
	(b) Check the satisfactory operation of the system by an artificial fire in a bucket; keep required extinguishers before this test as precaution.					

	(c) Do Megger test for the wiring of FAS.					
16.6	Check on associated items					
	(a) Check all fire exit lights for satisfactory operation. Clean / replace lamps as may be necessary.					
	(b) Check whether the fire lift is operational and the Fireman's switch is intact.					
	(c) Inspect the building to ensure that the following are complied with :					
	(d) There is no temporary wiring in the building.					
	(e) There are no joints in the supply cord for window type AC units or office equipment.					
	(f) There is no bare wiring (without metallic conduit or channel cover) over the flooring.					
	(g) Heaters are not used in record rooms.					
	(h) The space in front of SDBs and other distribution switch boards is kept free.					
	(i) See if the system of switching of supply to the building in the evenings (off) and mornings (on) is being followed strictly as fixed in consultation with user departments.					
	(j) In single occupancy buildings, have a joint inspection of the installation with the authorized officer of the client department.					
16.7	Check on control panel operation					
	(a) All Zonal (sector) panels and C & I panel should be checked once a month.					
	(b) Repeater panels if any should also be checked once a month.					
	(c) To check to confirm and ensure that the operation of the system in each zone through the test button in zonal (sector) panel is happening. The check should confirm initiation of audio visual indication in the zonal (sector) panel concerned and in the C & I panel and also in relevant sounders.					
	(d) Check that the Air-conditioning / ventilation blowers are automatically switched off when fire condition is simulated by the Test button in the zonal (sector) panel. It is likely the A/C system is not interconnected with the fire alarm system in many installations. Get the interconnection done for all such (sector) panel at the earliest to avoid hazard. Page					

(e) Check the battery condition from the log book readings of voltage. Check the charger, if there is any problem. Check battery terminal and replace old grease with fresh grease to prevent corrosion. Consult manufacturer for replacement after 3 to 4 years of battery life.

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The Testing frequencies for fire detection and alarm systems shall be followed as per National Fire Alarm Code, NPFA - 72

	S.No	Component	Test Interval	Testing Procedure
	1	Manual stations	For every months	1. Visual inspection
				2. Put zone in Test mode
				3. Activate mechanism
				4. Verify proper IDC zone response
	2	Non-restorable heat detectors	For every 3 months	1. Visual inspection
				2. Put zone in Test mode
				3. Test mechanically and/or electrically
				4. Verify proper IDC zone response
	3	Restorable heat detectors	For every 3 months	1. Visual inspection
				2. Put zone in Test mode
				3. Activate at least one detector on each IDC. All detectors on each IDC must be tested within five years.
	4	Smoke detectors	Half Yearly	1. Visual inspection
				2. Put zone in Test mode
				3. Conduct a Functional test to verify proper IDC

				zone response.
				4. Check sensitivity
				5. Clean as required.
	5	Smoke and Heat detectors in CT Simulator, CT Scan ,PET CT Room, SPEC-CT Room.	Monthly	1. Visual inspection and clean the sensor
				2. Put zone in Test mode
				3. Activate alarm system and check for functionality of Solenoid valve
				4. Verify proper IDC zone response
18	The following consumable materials & tool items for maintaining the, fire alarm system shall be arranged by the firm at their own cost and shall be kept ready at site in sufficient quantity under the scope of work for which nothing extra shall be paid.			
19	(I) All materials/spares like LEDs, Battery acid, distilled water, battery thimbles clamp, grease, copper conductor PVC insulated wire & control cables, thimbles & ferrules of all sizes indicating lamps, lamp holder, connectors, 6/16 amps control fuse, control fuse, Kit Kat assembly, Fire alarm cable of required size, Relays, wires, for Fire alarm control panel, hooters/alarms/speakers/other connected accessories, PVC insulation tapes indicating plates, nuts bolts, screws, washer.			
20	All relevant Tool & plant required to operate, repair, servicing and maintain the System shall be arranged by the firm in advance.			
21	In the event of non-compliance, the necessary material/spare/tools & plant shall be purchased by the department and			
	the expenditure incurred on it shall be recovered from the bill of the contractor.			
	In addition to it, penalty of amount “twice of such expenditure” shall also be imposed on the firm/agency.			

22	<u>Device routine maintenance tips and checks</u>					
	1. <u>Detectors:</u>					
	a) When removing one detector at a time, wait 1 minute after replacing the first detector before removing the next detector.					
	This gives the system time to recognize and re-map the first detector before generating a trouble condition caused by removing the second detector.					
	2. <u>Modules:</u>					
	a) Signature modules should be visually inspected to insure the physical installation is secure.					
	Functional testing of the module should be done regularly as required by the AHJ.					
	3. <u>Signature detector cleaning procedure:</u>					
	a) Signature detectors may be cleaned using a conventional vacuum cleaner with the detector cleaning tool (P/N SIGA-ST) installed on the end of the suction hose (nominal 1.5 in. [3.8 cm] ID) extension tubes. The tool creates a high velocity vortex scrubbing action around the detector, removing loose dust and debris which is subsequently drawn into the vacuum.					
	b) In order to avoid false alarms, disable the detector being cleaned before using the detector cleaning tool.					
	c) Disable the detector to prevent false alarms.					
	d) Use the conventional vacuum cleaner brush attachment to remove any visible cobwebs etc. from the immediate area of the detector.					
	e) Connect the detector cleaning tool to the suction hose.					
	f) Place the detector cleaning tool over the detector head for approximately 10 seconds.					
	g) After the detector has been cleaned,					

	Restore it to proper operation.					
	h) Check the detector's sensitivity to verify the effectiveness of the cleaning.					
23	Following maintenance and operation of addressable fire alarm system are included in the scope of work.					
	1. The firm will maintain the logbook for maintenance as detailed below.					
	2. After each maintenance/Testing the test reports details are to be entered in the log register with dates and result achieved.					
	3. The servicing of the system shall be done smoothly including fire detector system and random checking and heat detectors periodically by heat and smoke.					
	4. The system shall be kept in fully working condition till completion of contract. The firm will arrange handing over of the total system in fully functional condition on completion of the contract. However the complete system will be handed over by the department to the successful agency in good working condition for carrying out the maintenance.					
	5. The demonstration drill of the working of the system shall be given once in month as and when desired by the Engineer-in-Charge or as per his direction.					
	6. The Engineer-in-Charge or representative of this office shall have access to installation during all hours.					
	7. Department shall be in no way be involved in any dispute of whatever kind between the contractor & the staff engaged by him.					
	8. Periodical checking, cleaning and valuation of all devices, verifying the integrity and preventing maintenance of the system shall be carried out quarterly and report to this effect shall be submitted. Routine cleaning and testing of all detectors with cleaning agent (solo duster) and					
	testing agent shall be carried out at the interval decided by Engineer-in-Charge failing which recovery at the discretion of the Engineer-in-Charge will be made from the bills.					

All Standards, Technical Specifications and Codes of practice referred to shall be latest editions including all applicable official amendments and revisions. The Contractor shall make available at site hard copies of all relevant Indian Standard Codes of practice as applicable.

Wherever Indian Standards do not cover some particular aspects of design/ construction, relevant International Standards shall be referred to. The Contractor shall make available at site such standard codes of practice.

In case of discrepancy among Standard codes of practice, Technical Specifications and provisions in Employer's Requirements, the order of precedence shall be as below:

- i) Provision in General Requirements of Employer's Requirements
- ii) Technical Specifications in Employer's Requirements.
- iii) Standard Codes of Practice.

In case of discrepancy in reference to Standard Codes of Practice, the order of precedence shall be BIS, IRC, BS, ASTM, DIN.