

SCOPE OF WORK

Name of Work: Annual maintenance contract for Firefighting and refilling of fire extinguisher installed in various buildings at IISER TVM

A Periodical Testing and Maintenance Chart

Sl no.	Activity to be executed for the Maintenance work	Duration
1	Water level checking of Fire tanks	Weekly
2	Test run of Electric/Diesel Engine Fire pumps	
3	Checking of battery voltage and ampere of Diesel engine	
4	Checking of Fuel level in Diesel tank	
5	Checking and recording of Hydrant line pressure	
6	Checking of the starter panel and its terminal connections	
7	Operation of all the valves for Fire hydrant	Quarterly
8	Operation and checking of the Hose reel and hose pipes	
9	Checking of the Fire brigade	
10	Lubrication of pumps and motors(including bearings and couplers)	Quarterly
11	Checking and tightening the terminals of motors and starters	
12	Lubrication of all the Fire hydrant valves	
13	Cleaning of Fire hydrant shafts(including cleaning of hose reel, hose boxes etc.), Pump panels, Pump room, yard hydrant boxes etc.	
14	Operation and testing of all RRL hoses with branch pipe.	
15	Measuring and recording of the insulation resistance of the motors	Yearly
16	Flushing of the hydrant lines	

For achieving the objective and meeting the requirement of periodical testing and checking the system is essential. Various activities and their duration have been tabulated in periodical testing and maintenance schedule.

- Water for firefighting purpose shall be changed/cleaned as per exigencies, if engineer in charge will give the permission for this, otherwise it is not applicable.
- Maintaining diesel engine is very important for the system operation. Maintenance shall be through authorised service centre.
- Adequate diesel should be either be available in the pump house or nearby so that operation is not discontinued for want of Diesel-Management is required.
- If any outlet is found to be defective and replacement is not easily available, the whole assembly should be removed and be replaced by bank off plate so that the system remains operational.
- Repairing of the sluice/landing/butterfly valves shall be under the scope of the contractor.
- Replacement of hose reels, hoses, valves, glasses of the hose boxes etc. should be under the scope of the contractor.

B Fire Extinguisher refilling work

1. All fire extinguishers and refills and spare parts must confirm to performance and construction specifications as laid down IS 15683:2006 as amended from time to time by BIS.
2. For Dry Power or ABC type fire extinguisher (4Kg/6Kg/9Kg):
 - a) The extinguisher shall be filled with ABC Grade 40, Mono Ammonium Phosphate (MAP base) from approved manufacturer/dealer/firm.
 - b) The Capacity of the extinguisher when filled with Dry Chemical Powder (First filling) as per IS 4308, part II 8/ IS 15683, shall be same capacity.
 - c) It shall be pressurized with Dry Nitrogen, as expelling. The Nitrogen is to be charged at a pressure of 15 kg / cm².
 - d) The pressure gauge shall be suited for the purpose to discharge powder during use.
3. For water type extinguisher (Gas pressure type) (09 Litters), Mechanical Form Type (50 Litter):
 - a) The cartridge shall be as per IS, and have 60 gm net carbon dioxide gas for expelling.
 - b) Discharge should be not less than 06 meters and continue so far at least for 60 sec. The capacity of the Extinguisher, when filled up to the indicated level, shall be 9 litters.
4. For Carbon dioxide type extinguisher (2Kg/4.5kg/22Kg):
 - a) 1. The gas shall be conforming to IS: 307 and shall be stored at about 85 kg/cm². The expansion ratio between stored liquid carbon dioxide to expanded gas shall be 1:9 times and total discharge time shall be minimum 10 sec. and Maximum 25 sec.
5. Refilling work would be carried out in consultation with the Office of Estate & Engineering Department at IISER TVM
6. The Fire Extinguisher should be examined internally for any damage & corrosion before re-filling.
7. All Fire Extinguishers must be properly numbered and discharged in the presence of IISERTVM representative before re-filling of fire extinguishers.
8. The weight of all the Fire extinguishers should be measured after emptying and refilling. (suitable weighing machine shall be arranged by the contractor)
9. Checking of nozzles, porthole, vent hole, cap assembly, siphon tube, safety pin/clip, discharge pipe etc.
10. After refilling, paste the inspection card to the body of fire extinguishers indicating the serial number, date of re-filling, next due date of re-filling, the due date for hydraulic testing etc. whatsoever required.
11. Ensure that all joints are fully tightened and the nozzle and vent hole etc. are free from dust/dirt.
12. The refilling of fire extinguishers shall have a warranty of 01 year from the date of refilling.
13. Random testing of the quality MAP powder at the time of refilling may be carried out by the IISER TVM authority at any authorized laboratory. If testing found fail, no payment will be made to the contractor for the work done. One or two fire extinguishers of each category should be tested to ensure satisfactory compliance and the testing costs shall be borne by the contractor/vendor.
14. Replacement of small spares like rings/washers etc. to be done by the contractors at free of cost.

C MAINTENANCE AND OPERATION OF WET RISER/DOWN COMER SYSTEM

C.1 OBJECTIVE:-

- (i) To keep the entire system fully operational and functional at all times.
- (ii) In case full system cannot be kept functional for unavoidable reason, as much as possible, the installation shall be retained functional by isolating the defective section.

C.2 MAINTENANCE REQUIREMENT OF SYSTEM COMPONENTS

For maintaining firefighting system following points are to be taken care of:-

C.2.1 To ensure availability of water in UG tank and terrace tank all the time and to maintain the tanks in clean condition.

C.2.2 To ensure that the piping system is free from leakage any portion found to be leaking is to be isolated, rectified and connected with healthy system in shortest possible time.

C.2.3 To ensure that all pumps are in good running condition. Any pump found to be defective is to be isolated by closing valves and attended immediately and put in to service in minimum time. All pump glands shall be maintained in efficient working condition and the packing renewed as required to maintain the efficiency. All working parts shall be kept clean and lightly oiled. Any necessary repairs shall be put in hand and carried out immediately.

C.2.4 To ensure availability of power for electrical pumps, working of starters, switch gear and other electrical components.

C.2.5 To ensure healthiness of diesel engine starting system, battery voltage, battery charger and availability of adequate diesel for engine operation. C.2.6 To check all landing valves of internal and external hydrants, isolating valves and replace the defective ones whenever necessary

C.2.7 To check automatic operation of entire system by opening landing valves at different locations.

C.2.8 To conduct fire drill at regular interval.

C.3 PERIODICAL TESTING

For achieving the objectives of Para C.1.1 and meeting the requirement of Para C.2 periodical testing and checking the system is essential. Various activities and their duration have been tabulated in Table C.1.

C.4 PROCEDURE

C.4.1 Though the firefighting system operation is automatic, however, for routine checking and attending to the system in case of operation, a trained pump operator shall be available.

C.4.2 Operation and Maintenance instructions shall be available in the pump room and fire control room.

C.4.3 Water for firefighting purpose is not to be used for any other purpose. However in order to avoid stagnation, the same shall be changed / cleaned regularly.

C.4.4 Maintaining Diesel Engine is very important for the system operation since during fire, power supply is deliberately or un-deliberately switched off. Maintenance of diesel engine shall be executed through the authorized service centre of Engine

manufacturer. Adequate diesel should either be available in the pump house or nearby so that operation is not discontinued for want of diesel.

C.4.5 Hydrant Mains / Ring Mains shall be tested once a fortnight with a pump delivering at its maximum pressure. A running test with two or more hose lines each 30m long operating shall be carried out.

C.4.6 If any out let is found to be defective and replacement is not easily available the whole assembly should be removed and be replaced by blank off plate so that the system remains operational.

C.4.7 Hose reels shall be subjected to regular inspection to ensure that all valve are functional, out let nozzle not choked. At least once in a year the same shall be subjected to operation to ensure that hose reel is in good condition and that the coupling joints are water tight. Flow should also be checked for the leakage of hose reel.

C.4.8 All hydrants shall be examined systematically once a week to ensure that valves and spring catches are maintained in good condition. Spare washers shall be kept for hydrant valve seats.

C.4.9 Cut-off valves shall be thoroughly overhauled annually to remove sludge and other foreign matter collected in the valve seating.

C.4.10 All isolating valves shall be checked for operation. The valves in closed position be opened and closed couple of times and the valves in open position be closed and opened couple of times so that when required, the valves perform their function.

C.4.11 All hose boxes/hose stations shall be inspected externally once every week to ensure that the equipment installed therein is intact. Further, the hose boxes/hose stations shall be cleaned internally and externally once a month. When the hose gets worn out at the tail end of the coupling(s), it is permissible to cut the end(s) of the hose. However should the lengths of the hose after cutting(s) fall below 90 percent of its original, the hose shall be discarded. A hose register shall be kept showing Information such as date purchased, date brought into use, date cut (if reduced in length), is useful. Any hose becoming inefficient through use, neglect or from any other cause, shall be discarded. Fire protection hose shall not be used for purposes other than fire protection and drill. Hose pipes and their couplings shall be checked to ensure there is no pressure leakage during their use. The female coupling cam tooth mechanism be operated and lubricated for ensuring ease of operation.

C.4.12 Power supply to the pump house is not to be discontinued for any reason. Alternative arrangement shall be made in case any feeding switch gear is under repair / replacement.

C.4.13 It has to be ensured that there are no obstructions in front of the hydrants impeding accessibility

D MAINTENANCE OF AUTOMATIC SPRINKLER SYSTEM

- D1. Maintenance of other fire fighting installation has been described in Appendix 'C' which hold good for sprinkler installation also.
- D.1.1 Sprinkler shall not be re-conditioned or repaired. Used and/or defective sprinklers shall be replaced by new ones.
- D.1.2 Sprinklers shall not be painted after installation.
- D.1.3 Spare sprinklers – A stock of spare sprinklers shall be kept in Fire Control Room so that prompt replacement is possible after operation/damage of a sprinkler head. A minimum of 5% of the installed capacity or 25 sprinklers of all types whichever is more shall be kept in stock.
- Spanners for sprinklers and teflon tape shall also be kept along with spare sprinklers in readiness.
- D.1.4 As far as possible, the installation shall be maintained in operating condition by blanking of pipe work feeding the in operative part or parts where work is taking place.
- D.1.5 The inoperative part, if defective shall be attended to and connected with the operative system.
- D.1.6 Action following sprinkler operation
- D.1.6.1 Following the operation of sprinklers, the operated head shall be replaced with new ones and water supply shall be restored.
- D.1.6.2 The sprinklers in the vicinity of the operated sprinklers shall also be checked for damage by heat or any other cause and replaced if necessary.
- D.1.6.3 The sprinkler pump shall not be shut off until complete extinguishment of the fire. The starting of the pump shall be automatic but the stopping of the pump after an extinguishment shall be manual.
- D.1.7 All piping shall be examined to determine its conditions at least once a year.
- D.1.8 All installation valves and associated equipment shall be serviced and tested annually.
- D.1.9 When normally opened valves are closed following system operation or test, suitable procedure shall be instituted to ensure that they are re-opened.
- D.1.10 The entire system shall flushed at least once in a year.
- D.1.11 The sprinkler bulb shall be kept free from paint or dust.
- D.1.12 Only trained personnel shall be engaged in the work.

E FIRE DRILL

For making the users familiar with the system, Fire Drills shall be conducted for each buildings in IISER, Thiruvananthapuram by a qualified Fire Safety officer/supervisor in accordance with the fire safety plan, at least twice in a year. A written record of such drill shall be submitted to IISER. Operation of the system shall be demonstrated so that all users are confident of the system and aware of their duties and responsibilities during fire.

F PAYMENT TERMS

1. Payment shall be made on quarterly basis for the services rendered on submission of quarterly service report as per the maintenance activity mentioned in the scope of work for which the Contractor shall raise a bill against IISER after deductions towards income tax, GST and penalties if any, etc. as applicable from running bills.
2. A qualified authorised person from the contractor should inspect the site every quarter and the person will be responsible for submission of the service report.
3. The Contractor shall maintain an attendance register which shall be checked by the Engineer-in-Charge or his representatives as and when necessary. Payment of wages to the Contractor's employees shall be made on or before 7th of every calendar month through bank accounts only, ESI and EPF regarding the same shall be submitted to the Engineer-in-Charge/his representatives for verification.