



Standard Bidding Document

Name of Work	Supply, Installation, Testing and Commissioning of Fire hydrant, Fire detection and Fire Alarm system for Auditorium at, Reasi.
District	Reasi
Estimated Cost	15.00 lacs
Unit	Mechanical Unit Jammu
Time Completion	of 08 weeks



J&K PROJECTS CONSTRUCTION CORPORATION LTD.

(A J&K State Govt. Undertaking)

OFFICE OF DEPUTY GENERAL MANAGER, MCHANICAL UNIT, JAMMU

E-NIT No: MECH/J/NIT/16 of 2018-19

Dated: 26-07-2018

On behalf of Managing Director, Jammu & Kashmir Projects Construction Corporation Ltd., the Deputy General Manager, Mechanical Unit JKPCC Ltd., Jammu invites e-tenders from Principal Manufacturers or their authorized dealers /eligible contractors for execution of below mentioned job:

Name of Work	Estimated Cost	Earnest Money	Cost of bid Documents	Period of Completion
Supply, Installation, Testing and Commissioning of Fire hydrant, Fire detection and Fire Alarm system for Auditorium at, Reasi.	15.00 lacs	0.30 lacs	1000/-	08 weeks

Scope of work:

Supply, Installation, Testing and Commissioning of Fire hydrant, Fire detection and Fire Alarm system for Auditorium at, Reasi..

GENERAL CONDITIONS:-

A. INVITATION:-

For and on behalf of the Managing Director JKPCC Ltd., Jammu e-tenders are hereby invited from Principal Manufacturers or their authorized dealers.

B. INSTRUCTIONS TO TENDERERS:-

1. The NIT Consisting of qualifying information, eligibility criteria, specifications, Bill of Quantities can be seen/downloaded from the departmental website www.jktenders.gov.in from Dt: 27-07-2018 from 1800 Hrs to Dt: 14-08-2018 upto 1400 Hr.
2. The pre bid meeting will be held on date 03-08-2018 at 1300 Hrs time 1200 Hrs in the office chambers of Deputy General Manager, Mechanical Unit, JKPCC Ltd., Rail Head Complex, Jammu.
3. The Bids shall be deposited in electronic format on the departmental website www.jktenders.gov.in from 03-08-2018 from 1600 Hrs to Dt: 14-08-2018.
4. The complete bidding process will be online.

5. That the bids shall be strictly uploaded on the prescribed website and after opening the financial bid, only L1 bidder shall have to submit any required documents in hard copy.
6. The cost of tender shall be deposited by the prospective bidders through banking mechanism as per the following Bank details:-
 - i) **Name of Bank:- J&K Bank Ltd**
 - ii) **Account Title:- Financial Controller JKPCC Ltd (Current Account).**
 - iii) **Account No:- 0084010100002408**
 - iv) **Branch:- New Secretariat Road Srinagar.**
 - v) **IFSC Code:- JAKOPROMPT**
 - vi) **SWIFT Code:- JAKABBINRSGR-Optional**
7.
 - a) The bidder shall only upload scanned copy of payment acknowledgement slip. Similarly the Earnest Money shall be duly pledged to **Deputy General Manager Mechanical Unit, JKPCC Ltd** and upload only a scanned copy of the Certificate on the Website.
 - b) However, before allotting the work or issuing the allotment order, the lowest bidder shall have to submit the original certificate, CDR/FDR/Bank Guarantee.
8. If the office happens to be closed on the date of receipt of the bids as specified, the bids will be received on the next working day at the same time and venue.
9. The Technical bids shall be opened online on **16-08-2018 at 1200 Hrs** in the Office chambers of **Deputy General Manager Mechanical Unit, JKPCC Ltd Jammu.**
10. A bidder shall not be permitted to bid for works in the jurisdiction of officer responsible for award and execution of contract in which his or his spouse's near relative (defined as first blood relations, and their spouses) is posted as unit Accountant or as an officer in any capacity between the grades of General Manager and Dy. General Manager (both inclusive).
11. No engineer of Gazetted rank or other Gazetted officer employed in Engineering or Administrative duties in an Engineering department of the State Government is allowed to work as a supplier for a period of two years after his retirement from Government service, without Government permission. This contract is liable to be cancelled if either the supplier or any of his employees is found any time to be such a person who had not obtained the permission of the government as aforesaid before submission of the tender or engagement in the contactor's service.
12. This office reserves the right to cancel any or all the tenders without assigning any reason thereof and conditional tenders shall be out rightly rejected.
13. Any other information regarding e-tendering process can be had from the Office Deputy General Manager, JKPCC Ltd., Mechanical Unit, Jammu at **Mobile no. 9419121510** or **e Tendering Cell on Mob No. 9419139825.**

14. To qualify for award of the contract, each bidder should upload the following documents:-

- A. Manufacturers or their authorized registered dealers or registered firm should have valid
 - (a) PAN No
 - (b) GST registration
- B. a) Certificate from any agency (Govt/PSU) for at least one successful Design, Manufacture, Supply, Erection /Installation, Testing & Successful Commissioning of Fire hydrants and Fighting System amounting to 12.00 lacs OR two similar works of amounting to 9.00 lacs each OR Three similar works amounting to 6.00 lacs each. (latest Copy of the work order and performance certificate shall be submitted).
- C) Manufacturers or their authorized registered dealers or registered firm should submit the documents pertaining to the existence of having service office at Jammu for better after sales service and maintenance of the equipments.
- D) Undertaking that the bid shall remain valid for the period of 90 days from the date of opening of bids.
- E) An affidavit affirming that information he has furnished in the bidding document is correct to the best of his knowledge and belief.

C. INSTRUCTION TO BIDDERS REGARDING E-TENDERING PROCESS

- a) The interested bidder can download the bid from the website <http://jktenders.gov.in>. Bidders are advised to download bid submission manual for the help of bid submission process from the Downloads option as well as from **Bidders Manual Kit** on website <http://jktenders.gov.in>
- b) To participate in bidding process, bidders have to get digital signature certificate card as per information technology Act- 2000, to participate in online bidding. This certificate will be required for digitally signing the bid. Bidders can get above mentioned digital signature certificate card from any approved vendors. The bidders who already possess valid digital signature certificates card, need not to procure new digital signature certificate card.
- c) **The bidders have to submit their bids online in electronic format with digital signature. The bids proposed without digital signature will not be accepted.**
- d) Bids will be opened online as per time schedule.
- e) Before submission of online bids, bidders must ensure that scanned copy of all the necessary documents have been attached with bid.
- f) The department will not be responsible for delay in online submission due to any reasons.
- g) All required information for bid must be filled and submitted online. The bidder should recheck his online document before submission on line otherwise damaged/ corrupt document shall not be considered in any case.
- h) Bidders are advised to use My Documents area in their user on e-tendering portal to store important documents which are used in all tenders like GST Certificate, sales Tax clearance Certificate etc and attach these certificates as Non Statutory Documents while submitting their bids.

- i) Bidders are advised not to make any change in BOQ (Bill of Quantities) contents/ specifications or its name. In no case they should attempt to create similar BOQ manually. The BOQ downloaded should be used for filling the net item rate inclusive of all taxes and it should be saved with the same with the same name as it contains.
- j) Bidders are advised to scan their documents at 100 DPI (Dots per inch) resolutions with Black and white, JPEG scan properly. Convert scanned images to PDF.
- k) The guidelines for bidders to submit bid online can be downloaded from website <http://jktenders.gov.in> (**Download option**).

Deputy General Manager
Mechanical Unit JKPCC Ltd.,
Jammu

General Conditions of Contract

1. Scope of Contract :

The contractor shall carry out and complete the said work/ supplies in every respect in accordance with this contract and under the directions of and to the satisfaction of the Engineer in-charge. The Engineer In-charge may in his discretion and from time to time issue written instructions, details, directions and explanations which are hereunder collectively referred to as "Engineer In-charge" instruction in regard to :-

- a) The variation or modification of the quality or quantity of works/ supplies or omission or substitution of any work.
- b) Any discrepancy between the schedule of quantities and/or specifications.
- c) The removal and/or re execution of any works executed by the contractor.
- d) The amending and making good of any defects. The contractor shall forthwith comply with and duly execute any work / supplies comprised in such Engineer in-charge instructions provided always that verbal instructions, directions and explanations given to the contractor or his representative upon the works/ supplies by the Engineer In charge shall if involving a variation, be confirmed in writing by the contractor within 14 days. And if not dissented from in writing within a further 7 days by the Engineer in-charge, such shall be deemed to be the Engineer In-charge instructions within the scope of the contract.

2. Time of completion :-

The time of completion of the job will be **within 02(two) months** from the date of issuance of allotment order and shall be co-related with the completion of allied works (civil and electrical works).

3. Damage for Non Completion :

If the contractor fails to complete the works/ supplies by the date stated in the appendix or within any extended time under clause 6 thereof and the Engineer In-charge certifies in writing that in his opinion the same ought reasonably so to have been completed, the contractor shall pay or allow to the employer the sum named in the appendix as 'liquidated damages' for the period during which the said works/ supplies shall so remain incomplete and the employer may deduct such damage from any moneys due to the contractor.

4. Force Majeure :

The right of the contractor to proceed with the work/ supplies shall not be terminated because of any delay in the completion of the work/ supplies due to unforeseeable causes beyond the control and without the fault or negligence of the contractor, including but not limited to natural calamity, or of the public enemy, restraints of a sovereign state, firms, floods, unusually serve weather and act of the employer.

5. **Delay and Extension of Time :**

In the opinion of the Engineer In-charge the works/ supplies be delayed:

- a) By force majeure.
- b) By reasons of civil commotion, location combination of workers on strike or lock-out affecting any of the building trades.
- c) In consequence of the contractor for not having received in due time necessary instructions from the Engineer In-charge for which he shall have specifically applied in writing.
- d) By reasons of Engineers In-charge' instructions. The Engineers In-charge shall make a fair and reasonable extension of time for completion of the contract works/ supplies.

In case the physical progress of the work/ supplies is delayed as compared to the time schedule referred to above due to reasons which are beyond the control of the contractor, or due to force majeure conditions, or due to delays owing to other agencies, strike or lock-out, the contractor shall apply in writing for extension of the time for completion of the work/ supplies, stating clearly the reasons for the delay, period of delay and the extension of time desired. The owner on satisfying himself that the reasons for delay are really beyond the control of the contractor, may grant extension of time for the completion of work/ supplies. No payment or compensation shall be made to the contractor in the event of the owner is not in a position to allow the contractor to do the work on specific days and time due to whatsoever reason. Such delays are only for the consideration of extension of time. On no account any compensation shall be made to the contractor for extension of time due to delay made by the owner. However the liquidated damages from the contractor can be recovered on account of delay from his side for completion.

7. **Prices :**

The prices to be quoted by the intending tenderer shall include the supply and installation of all equipment at site, ancillary material and other items whatsoever required for carrying out the job to fulfill the intent and purpose as laid down in the specifications whether specifically mentioned or not. The prices/rates quoted shall be inclusive of **GST**, all taxes, Entry tax, duties, packing, forwarding, freight, transit insurance and all other levies as applicable by the Central as well as State Government. Failure to include all other taxes and duties will not entitle the contractor to any extra claims from the employer. The contractor's rates shall remain firm and fixed during the currency of the contract. **However any statutory variation in taxes as per notifications issued by the State/Central Govt. shall be allowed under rules.**

8. **Maintenance Manuals etc :**

Prior to the completion of work the contractor shall furnish to the employer (3) three sets of a comprehensive manual, describing all components, furnish a list of spare parts and settings forth in details the instructions for the operation and maintenance of the equipment .

Any special tools required for the operation or the maintenance of the Fire Fighting System, shall be supplied free of cost.

9. **Testing and handing over :**

The contractor shall complete the following before handing over:

- a) Preparation of working drawings on the basis of actual site conditions and getting approval of the Engineer In Charge.
- b) Getting tested by and approval of the installation by the Local Fire Authority after completion of work.
- c) Supply of necessary spare parts during the commissioning stage.
- d) Before release of final payment the allottee shall produce NOC from local fire authorities regarding safety, suitability of the system installed
- e) On the completion of work the contractor shall arrange to carry out various initial tests, in the presence of and to the complete satisfaction of the Engineer in-charge or his representative. Any defects or shortcomings found during the tests shall be speedily rectified or made good by the contractors at his own expense.

In case if test readings are not satisfactory, contractor shall carry out all modifications required to bring the unit up to the level of acceptability within a period, not exceeding 10 days from the date test readings are rejected and failure to do so, will entitle the clients to forfeit the Security Deposit.

10. **Copies of bill**

Contractor shall submit all bills and vouchers in Duplicate

11. **Defects liability**

The complete work shall be guaranteed against defective materials and workmanship for a period of 12 months from the successful commissioning of the Fire Fighting System. This however, shall not impair the validity of any action according to any law enforced for any non-performance of any work under this contract. If any part of work is found unsound or defective during the defect liability period, the contractor shall repair and make good the same, within a reasonable time, at his own risk, responsibility and cost. Any delay in such repairing and making good by the contractor, shall entitle the Employer to do it at the contractors entire risk, cost and responsibility

12. **Rejection of Defective Plant :**

- a) If on test any portion of the Fire Fighting System is found to be defective or not fulfilling the intent or the meaning of the specifications, the same shall be replaced or repaired to the entire satisfaction of the Engineer In-charge.
- b) In case the contractor fails to remove the defects, within a period considered reasonable by the Engineer in-charge, the JKPCC reserves the right to take necessary remedial measures through other agencies and all expenses thus incurred would be recovered from the contractor.

13. **Variation**

The J.K.P.C.C. shall be entitled to make any variation of the quality or quantity of the works/ supplies or any part there of (subject to a maximum of 10% of the contract amount), that may, in his opinion, be necessary and for that purpose, or if for any reason it shall, in his opinion be desirable, he shall have power to order the contractor to do.

14. **Contract Specification**

Before execution of contract, the contractor shall check all specification and shall within ten days report any errors, discrepancies or omissions discovered therein to Engineer-in-Charge and obtain appropriate clarifications on the same. Any adjustment made by the contractor without prior approval of JKPCC shall be at his own risk and cost.

15. **Liquidated damages**

i) 0.25% (zero point two five percent) of contract value for every week of delay after the schedule date of completion of work for the incomplete/balance quantity and value of the work in the contract.

(ii) Total Amount of Recovery shall be maximum 5 % (Five percent) of contract value.

16. **Specifications**

The Specifications lay down minimum standards of equipment and workmanship. Should the Tenderer wish to deviate from the provision of the specifications ,either on account of manufacturing practice or for any other reasons, he should clearly draw attention in his tender to the proposed points of departures and submit each complete information and specifications, as will enable the relative merits of the deviations to be fully approached. In the absence of any deviations, it will be deemed that the Tenderer is fully satisfied with the intents of the Specifications and their compliance with the statutory provisions and local codes.

Tenderers not submitting equipment data in full, will do so at the risk of their tenders being valuated with such information as may be available with the J.K.P.C.C.

17. **Maintenance of the system and Training of Personnel :**

The successful bidder shall have to operate the plant after commissioning by the staff trained for the purpose for 6 months and nothing extra shall be paid. The contractor shall also train the JKPCC's personnel, to operate the system and carry out routine checks, during the period of testing and commissioning. If found necessary, the supplier shall train such personnel at his works at no extra cost to the employer.

18. **Completeness of the work/ job :**

a) The contractor shall provide all required materials, equipment, ancillary items, etc., to install the Fire Fighting System capable of fulfilling the intent and purpose of the contract, whether or not each and every item is

mentioned in the specifications. Any shortcomings noticed at any stage shall be made good at no extra cost.

b) Watch and ward

Watch and ward of the machinery/equipment supplied during execution shall be included in the scope of contract and any damage to the machinery/equipment during transportation, handling, erection shall be borne by the contractor itself without any extra claim to the department.

19. **Guarantee :**

- a) The contractor shall guarantee that all the material, and components supplied, fabricated, designed and installed by him on Fire Fighting System, shall be free from defects due to faulty design material and/or workmanship, that the unit shall perform satisfactorily and the efficiency of all the components shall not be less than the values laid down in the specifications and the capacities, shall be at least equal to those specified.
- b) The period of the guarantee shall be minimum (12) Twelve months after the Fire Fighting System, is successfully commissioned during which period if any or all components found to be defective shall be replaced or repaired free of charge and any short comings found in the system as specified shall be removed at no extra cost. The contractor shall provide the necessary personnel and tools for fulfilling the above guarantee.
- c) If the defects are not removed with in a reasonable time, the employer may arrange to do so at the contractor's risk and cost, without prejudice to any other rights.

20. **Terms of payment :**

70% prorate payment shall be paid against supply of equipment, component at site and its verification by the Engineer In charge. 20% of the contract value on against completion of work. Final 10% payment shall be made after successful testing and commissioning of Fire Fighting System and with the submission of NOC from the local Fire and emergency services.

21. **Bank Guarantee :**

The firm shall execute bank guarantee of any scheduled bank in favour of Dy. Deputy General Manager, Mechanical Unit JKPCC Ltd. Jammu amounting to 10% of the value of the contract after the issue of the Allotment order and will be released after warranty period is over.

22. **After Sales Service :**

The firm shall provide free services during the guarantee period and give prompt attention to any complaint of consignee at short notice. The firm shall provide service and spares for the said equipment /system for at least 10 years at the mutually acceptable terms and conditions after expiry of the guarantee period of 12 months.

23. **Arbitration :**

In case of any dispute arising at any time between the Contractor and the Corporation, the same shall be referred to the Deputy General Manager, Mechanical Unit,, JKPCC

Ltd., who may give decision on such a dispute himself or request the Government to nominate any other officer of the Government for arbitration. Decision of the Deputy General Manager, Mechanical Unit, or the officer nominated by the Government shall be final and binding on both the parties.

24. **Agreement** :

The firm shall execute an agreement with the corporation within 15 days from the date of allotment of work.

25. **Insurance**

The successful contractor shall take out contractor all risk (AR) insurance policy in the name of the contractor and the original policy shall be deposited with the Department.

26. **Earnest Money:-**

Cost of document & Earnest Money :-

a) The bidder shall only upload scanned copy of payment acknowledgement slip. Similarly the Earnest Money shall be duly pledged to **DGM(Mech.) Unit, JKPCC Ltd Jammu** and shall upload only a scanned copy of the Certificate on the Website.

b) However, before allotting the work or issuing the supply order, the lowest bidder shall have to submit the original certificate, CDR/FDR/Bank Guarantee.

c) Any bid not accompanied by an Earnest Money acknowledgement slip, **Pledged in favour of DGM(Mech.) Unit, JKPCC Ltd Jammu** shall be rejected by the Employer as non-responsive.

d) The earnest money of unsuccessful bidders shall be returned within 30 days of the end of the Bid validity period.

e) The earnest Money of the successful Bidder will be released when the Bidder has signed the Agreement and furnished the required performance security.

26.4. The earnest money of unsuccessful bidders shall be returned within 30 days of the end of the Bid validity period.

26.5. The earnest Money of the successful Bidder will be released when the Bidder has signed the Agreement and furnished the required performance security.

27. **Fundamental breach of contract will include:-**

- a) Continuous stoppage of Work for a period of 30 days without authorization of Engineer in-charge.
- b) Contractor is declared bankrupt.
- c) Any evidence of involvement of contractor in corrupt practices.
- d) Contractor delays the completion of work beyond stipulated time of completion.
- e) Pursuant to the process of termination of defaulted contract, the employer reserves the right to invite fresh tender for the balance work at the risk and cost of defaulter contractor.

- f) If In case contractor failed to start /complete the work, within the stipulated time period, his CDR/Earnest Money shall be forfeited after termination of the contract. Besides, defaulting contractor shall be debarred from taking works in JKPCC Department at least for one year.

28. **MAJOR LABOUR LAWS APPLICABLE TO ESTABLISHMENT ENGAGED IN BUILDING AND OTHER CONSTRUCTION WORK**

Compliance with Labour Regulation Laws of J&K State

29. **Specification/Quality Control**

All items of works shall conform to specifications as per IRC/MORTH/NBO/CPWD/SSR/ Any other prescribed specifications.

30. **Insurance**

Insurance cover to Labour / Machinery / Work / Plant material / Equipment by the contractor shall be mandatory.

31. **Laws Governing the Contract**

The contract shall be governed by Laws of the land.

32. **Court's Jurisdiction**

In case of any disputes/differences between contractor and Department the jurisdiction shall be J&K State.

33. **Any other item, not included in the scope of work but necessary for completion of work shall be deemed to be included in the scope of work.**

34. **All other terms and conditions are as same as are in vogue in JKPCC Ltd.**

Deputy General Manager
Mechanical Unit JKPCC Ltd.,
Jammu

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATION FOR FIRE FIGHTING, SMOKE DETECTION

FIRE FIGHTING SYSTEMS

1.0 CODES & STANDARDS

1.1 The work shall be carried out in accordance with the regulations of local bodies and the following specifications and codes which may govern the requirement of the system.

- a. IS 636 Fabric reinforced rubber lined Hose
- b. IS 638 Sheet rubber joining and rubber insertion jointing
- c. IS 778 Copper alloy gate, globe and check valves for water work purposes
- d. IS 901 Couplings, double male and double female instantaneous pattern for Fire Fighting
- e. IS 903 Fire hose delivery couplings Branch pipe, nozzles and nozzle spanner
- f. IS 908 Fire Hydrant stand post
- g. IS 1239 Mild steel tubes, tubulars and other wrought steel (part I & II) fittings h. IS 3844 Air vessels
- i. IS 844 Swinging type wall mounted hose reel with drum & hose tubing
- j. IS 4038 Foot valves for water works purposes
- k. IS 5290 Landing valves
- l. IS 10211 Anti corrosion treatment for underground M. S. pipes
- m. IS 13039 CI Butterfly valves
- n. IS 1520 Horizontal centrifugal pumps for clear cold and fresh water
- o. IS 325 Induction motors – 3 – phase
- p. IS 900 Induction motors, installation, maintenance code of practice.
- q. IS 3043 Code of practice for earthing.
- r. IS 599 Installation and testing of pumps.
- s. IS 2189 Code of practice for Selection, installation and maintenance of Automatic Fire detection and alarm system
- t. IS 2190 Code of practice for selection, installation and maintenance of First aid fire extinguishers.

1.2

- A. National Fire Protection Association (NFPA)
 - 13-2002 Installation of Sprinkler Systems
 - 14-2003 Installation of Standpipe and Hose Systems
 - 20-2003 Installation of Centrifugal Fire Pump
 - 24-2002 Installation of Private Fire Service Mains and Their Appurtenances
 - 25-2004 Inspection, Testing and Maintenance of water Based Fire Protection Systems
 - 70-2004 National Electrical Code
 - 72-2002 National Fire Alarm Code
 - 101-2003 Safety to Life from Fire in Buildings and Structures (Life Safety Code)
 - 170-2005 Standards for Fire Safety Symbols
 - 291-2002 Fire Flow Testing and Marking of Hydrants

- B. Underwriters Laboratories Inc. (UL)2006 Fire Protection Equipment Directory
 - C. Factory Mutual Engineering Corporation (FM)2006 Approval Guide
 - D. All inspections, testing, acceptance and maintenance work required by NFPA 25, NFPA 20, NFPA 13 and NFPA 409 recommended by the equipment manufacturer shall be provided.
- Work shall include operation of sprinkler system alarm and supervisory devices.

2.0 SCOPE OF WORK

- 2.1 The scope of work in general shall be to design, supply, installation, testing, commissioning and handing over the system to the clients.
- 2.2 The work shall be executed in accordance with the rules and regulations of the local Fire authority and that of the National Building code (Latest amendment) regulations applicable group clauses OR guidelines of NFPA-409 as applicable.
- 2.3 All material used in the works shall have Bureau of Indian Standards valid certification stamped, marked or cast on the material in an acceptable and approved manner.
- 2.4 Keeping in view the specific requirement of Fire Fighting and Sprinkler work, this specification shall be supplemented by schedule of quantities based on the drawings. In the event of the conflict between schedule of quantities & other documents, including specifications the more stringent will apply and interpretation of Architect / consultant / client shall be final and binding.

3.0 SYSTEM DESCRIPTION

- 3.1 Fire protection system for the project is based on the concept of ‘TOTAL PROTECTION’ by wet riser / hydrant for the entire premises.

4. BUTTERFLY VALVES

- 4.1 All Butterfly valves shall be slim seal type, lever operated and suitable for mounting on flanges.

4.2 TESTING

- 4.3 After laying and jointing, the entire piping shall be tested to 1.5 times the working pressure. The pipes shall be slowly charged with water so that the air is expelled from the pipes. The pipes shall be allowed to stand full of water for a period of not less than 24 Hours and then tested under pressure without drop in pressure for at least 30 minutes. The test pressure shall be applied by means of manually / electrically operated test pump. Precautions shall be taken to ensure that the required test pressure is not exceeded. All leaks and defects in different joints noticed during testing and before commissioning shall be rectified to the satisfaction of client’s representative.

4.4 PIPE SUPPORTS

The pipe supports shall be of Hi-Tech make or equivalent and intervals of supports shall be as follows:

Pipe size

20mm to 32mm - 2.5mtrs

40mm to 65mm - 3.0mtrs

75mm to 100mm - 3.6mtrs

100mm to 150mm - 4.3mtrs

200mm to 300mm - 5.0mtrs

4.5 PIPES FOR DRAINAGE

4.6 Hydrant pipes shall be so installed that the system can be thoroughly drained. In case of basement & other areas where sprinkler pipe work is below the installation drain valve and in other trapped points in the system auxiliary valves of the following sizes shall be provided.

20 mm valves for pipes upto 50 mm dia

25 mm valves for pipes upto 65 mm dia

32 mm valves for pipes larger than 65 mm dia

5.0 PIPING

5.1 All pipes inside and outside the building shall be Mild steel conforming to ISI 1239 heavy duty.

5.2 All pipes above ground and in exposed locations shall be painted with one coat of red oxide primer and two coats of synthetic enamel paint of approved RED shade.

5.3 Hanger and supports shall be capable of carrying the sum of all concurrently acting loads. They shall be designed to provide the required supporting effects and allow pipe line movement as necessary.

5.4 The piping system shall be capable of withstanding 150% of the working pressure including water hammer effects.

5.5 Flanged joints shall be used to connect two straight lengths of pipe lines at strategic points to facilitate erection and subsequent maintenance work.

5.6 Pipes shall be kept thoroughly clean during the course of laying. The ends of pipes shall be blocked at end of each day's work to prevent dirt, insects, rodents etc entering the pipe.

5.7 Pipes shall be carefully laid to the alignment, levels and gradients and great care shall be taken to prevent any sand, earth or any other matter from entering the pipe during laying.

5.8 A test pipe of 25mm in dia with a drain valve shall be provided to test alarm devices.

6.0 WATER FLOW INDICATOR

6.1 These shall be paddle or vane type, consisting of moveable flexible vane of thin metal or plastic which is inserted through a circular opening cut in the wall of sprinkler supply pipe.

Motion of the vane shall extend into water way sufficiently to be deflected by movement of water flowing to the open sprinklers. Motion of the vane shall operate an alarm actuating electric switch or mechanically trip a signaling system transmitter.

7.0 HAND APPLIANCES

7.1 Fully charged and Tested ISI marked fire extinguishers of various types as required shall be installed in readily accessible locations with brackets fixed to wall by suitable anchor fasteners.

7.2 Each appliance, shall be provided with an inspection card indicating the date of inspection, testing, change of charge and other relevant data.

7.3 All appliances shall be fixed in a true workman like manner, truly vertical and at correct locations.

7.4 Fire extinguishers shall be installed as per Indian standard 'code of practice for selection, Installation

PART 1 . Electronic components

2.3 FIRE ALARM CONTROL UNIT

A. General:

1. Each building shall be provided with a fire alarm control loop(s) and shall operate as a supervised zoned fire alarm system.
2. Each power source shall be supervised from the other source for loss of power.
3. All circuits shall be monitored for integrity.
4. Visually and audibly annunciate any trouble condition including, but not limited to main power failure, grounds and system wiring derangement.
5. Transmit digital alarm information to the main fire alarm control unit.

B. Enclosure:

1. The control unit shall be housed in a cabinet suitable for both recessed and surface mounting. Cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.
2. Cabinet shall contain all necessary relays, terminals, lamps, and legend plates to provide control for the system.

C. Centralized Operator terminal unit:

1. Operator terminal shall consist of the central processing unit, display screen, keyboard and printer.
2. Display screen shall have a minimum diagonal non-glare screen capable of displaying 4 to 24 lines of 80 characters each.

3. Keyboard shall consist of alpha numeric and minimum 12 user/functional control keys.

4. Printer shall be the automatic type, printing the date, time and location for all alarm, supervisory, and trouble conditions.

D. Power Supply:

1. The control unit shall derive its normal power from a 230 volt, 50 Hz dedicated supply connected to the emergency power system. Standby power shall be provided by a 24 volt DC battery as hereinafter specified. The normal power shall be transformed, rectified, coordinated, and interfaced with the standby battery and charger.

2. Power supply for smoke detectors shall be taken from the fire alarm control unit.

3. Provide protectors to protect the fire alarm equipment from damage due to lightning or voltage and current transients.

4. Provide new separate and direct ground lines to the outside to protect the equipment from unwanted grounds.

E. Circuit Supervision: Each alarm initiating device circuit, signaling line circuit, and notification appliance circuit, shall be supervised against the occurrence of a break or ground fault condition in the field wiring. These conditions shall cause a trouble signal to sound in the control unit until manually silenced by an off switch.

F. Supervisory Devices: All sprinkler system valves, standpipe control valves, post indicator valves (PIV), and main gate valves shall be supervised for off-normal position. Low air pressure switches and duct detectors shall be monitored as supervisory signals. The power supply to the elevator shunt trip breaker shall be monitored by the fire alarm system as a supervisory signal.

G. Trouble signals:

1. Arrange the trouble signals for automatic reset (non-latching).

2. System trouble switch off and on lamps shall be visible through the fire alarm control unit door.

H. Function Switches: Provide the following switches in addition to any other switches required for the system:

1. Remote Alarm Transmission By-pass Switch: Shall prevent transmission of all signals to the main fire alarm control unit when in the "off" position. A system trouble signal shall be energized when switch is in the off position.

2. Alarm Off Switch: Shall disconnect power to alarm notification circuits on the local building alarm system. A system trouble signal shall be activated when switch is in the off position.

3. Trouble Silence Switch: Shall silence the trouble signal whenever the trouble silence switch is operated. This switch shall not reset the trouble signal.

4. Reset Switch: Shall reset the system after an alarm, provided the initiating device has been reset. The system shall lock in alarm until reset.

5. Lamp Test Switch: A test switch or other approved convenient means shall be provided to test the indicator lamps.

6. Drill Switch: Shall activate all notification devices without tripping the remote alarm transmitter. This switch is required only for general evacuation systems specified herein.

7. Door Holder By-Pass Switch: Shall prevent doors from releasing during fire alarm tests. A system trouble alarm shall be energized when switch is in the abnormal position.

8. Elevator recall By-Pass Switch: Shall prevent the elevators from recalling upon operation of any of the devices installed to perform that function. A system trouble alarm shall be energized when the switch is in the abnormal position.

9. HVAC/Smoke Damper By-Pass: Provide a means to disable HVAC fans from shutting down and/or smoke dampers from closing upon operation of an initiating device designed to interconnect with these devices.

I. System Expansion: Design the fire alarm control units and enclosures so that the system can be expanded in the future (to include the addition of twenty percent more alarm initiating, alarm notification and door holder circuits) without disruption or replacement of the existing control unit and secondary power supply.

2.4 STANDBY POWER SUPPLY

The fire alarm system control panel shall have a standby power supply unit which shall comprise of the following:

A. Uninterrupted Power Supply (UPS):

1. The UPS system shall be comprised of a static inverter, a precision battery float charger, and sealed maintenance free batteries.

2. Under normal operating conditions, the load shall be filtered through a ferroresonant transformer.

3. When normal AC power fails, the inverter shall supply AC power to the transformer from the battery source. There shall be no break in output of the system during transfer of the system from normal to battery supply or back to normal.

4. Batteries shall be sealed, gel cell type.

5. UPS system shall be sized to operate the fire alarm control panel, printer, and all other directly connected equipment for 48 Hours upon a normal AC power failure.

B. Batteries:

1. Battery shall be of the sealed, maintenance free type, 24-volt nominal.

2. Battery shall have sufficient capacity to power the fire alarm system for not less than 48 hours plus 30 minutes of alarm upon a normal AC power failure.

3. Battery racks shall be steel with an alkali-resistant finish. Batteries shall be secured in

seismic areas as defined by the local Building Code.

C. Battery Charger:

1. Shall be completely automatic, with constant potential charger maintaining the battery fully charged under all service conditions. Charger shall operate from a 230-volt, 50 hertz emergency power source.
2. Shall be rated for fully charging a completely discharged battery within 24 hours while simultaneously supplying any loads connected to the battery.
3. Shall have protection to prevent discharge through the charger.
4. Shall have protection for overloads and short circuits on both AC and DC sides.
5. A trouble condition shall actuate the fire alarm trouble signal.
6. Charger shall have automatic AC line voltage regulation, automatic current-limiting features, and adjustable voltage controls.

2.5 ANNUNCIATION (ONLINE REPEATER PANEL)

A. Annunciator, Alphanumeric Type (System):

1. Shall be a supervised, LCD display containing a minimum of two to four lines of 40 characters for alarm annunciation in clear English text.
2. Message shall identify building number, floor, zone, etc on the first line and device description and status (pull station, smoke detector, waterflow alarm or trouble condition) on the second line.
3. The initial alarm received shall be indicated as such.
4. A selector switch shall be provided for viewing subsequent alarm messages.
5. The display shall be UL listed for fire alarm application.
6. Annunciators shall display information for all buildings connected to the system. Local building annunciators, for general evacuation system buildings, shall be permitted when shown on the drawings and approved by the Client.

2.6 ALARM NOTIFICATION APPLIANCES

A. Bells:

1. Shall be electric, single-stroke or vibrating, heavy-duty, under-dome, solenoid type
2. Unless otherwise shown on the drawings, shall be 150 mm (6 inches) diameter and have a minimum nominal rating of 80 dBA at 3000 mm (10 feet).
3. Mount on removable adapter plates on outlet boxes.
4. Bells located outdoors shall be weatherproof type with metal housing and protective grille.
5. Each bell circuit shall have a minimum of twenty percent spare capacity.

B. Strobes:

1. Xenon flash tube type minimum 15 candela in toilet rooms and 75 candelas in all other areas with a flash rate of 1 HZ. Strobes shall be synchronized where required by the National Fire Alarm Code NFPA 72 and IS 2189 2008.
2. Back plate shall be red with 13 mm (1/2 inch) permanent red letters. Lettering to read "Fire", be oriented on the wall or ceiling properly, and be visible from all viewing directions.
3. Each strobe circuit shall have a minimum of twenty (20) percent spare capacity.
4. Strobes may be combined with the audible notification appliances specified herein.

C. Fire Alarm Horns:

1. Shall be electric, utilizing solid state electronic technology operating on a nominal 24 VDC.
2. Shall be a minimum nominal rating of 80 dBA at ten feet.
3. Mount on removable adapter plates on conduit boxes.
4. Horns located outdoors shall be of weatherproof type with metal housing and protective grille.
5. Each horn circuit shall have a minimum of twenty (20) percent spare capacity.

2.7 ALARM INITIATING DEVICES**A. Manual Fire Alarm Stations:**

1. Shall be breakglass or non-breakglass, address reporting type.
2. Station front shall be constructed of a durable material such as cast or extruded metal or high impact plastic. Stations shall be semi-flush type.
3. Stations shall be of single action pull down type or break glass type with suitable operating instructions provided on front in raised or depressed letters, and clearly labeled "FIRE".
4. Operating handles shall be constructed of a durable material. On operation, the lever shall lock in alarm position and remain so until reset. A key shall be required to gain access for resetting, or conducting tests and drills.
5. Unless otherwise specified, all exposed parts shall be red in color and have a smooth, hard, durable finish.

B. Smoke Detectors:

1. Smoke detectors shall be UL listed for use with the fire alarm control unit being furnished.
2. Smoke detectors shall be addressable type complying with applicable UL Standards for system type detectors. Smoke detectors shall be installed in accordance with the manufacturer's recommendations and NFPA 72 and IS 2189 2008.
3. Detectors shall have an indication lamp to denote an alarm condition. Provide remote indicator lamps and identification plates where detectors are concealed from view. Locate the remote indicator lamps and identification plates flush mounted on walls so they can be observed from a normal standing position.
4. All spot type and duct type detectors installed shall be of the photoelectric type.
5. Photoelectric detectors shall be factory calibrated and readily field adjustable. The sensitivity of any photoelectric detector shall be factory set at 3.0 plus or minus 0.25 percent obscuration per foot.

6. Detectors shall provide a visual trouble indication if they drift out of sensitivity range or fail internal diagnostics. Detectors shall also provide visual indication of sensitivity level upon testing. Detectors, along with the fire alarm control units shall be UL listed for testing the sensitivity of the detectors.

C. Heat Detectors:

1. Heat detectors shall be of the addressable restorable rate of rise temperature spot type.
2. Detectors shall have a minimum smooth ceiling rating of 2500 square feet.

D. Water Flow and Pressure Switches:

1. Wet pipe water flow switches and dry pipe alarm pressure switches for sprinkler systems shall be connected to the fire alarm system by way of an address reporting interface device.
2. All water flow switches shall be of a single manufacturer. Connect all switches shown on the approved shop drawings.
3. All switches shall have an alarm transmission delay time that is conveniently adjustable from 0 to 60 seconds. Initial settings shall be 30-45 seconds. Timing shall be recorded and documented during testing.

E. Extinguishing System Connections:

1. Kitchen Range Hood and Duct Suppression Systems:

- a. Each suppression system shall be equipped with a micro-switch connected to the building fire alarm control unit. Discharge of a suppression system shall automatically send an alarm signal to the building fire detection and alarm system for annunciation.
- b. Operation of this suppression system shall also automatically shut off all sources of fuel and heat to all equipment requiring protection under the same hood.

2. Each gaseous suppression system shall be monitored for system alarm and system trouble conditions via addressable interface devices.

F. Flame detector:

1. The Long Range Flame Detector shall be used for protecting large enclosed or open spaces where other forms of monitoring are inadequate or impractical. The unit shall particularly suited when there is a potential hazard due to volatile materials such as aviation fuel. The detector shall employ enhanced infra-red monitoring technology that analyses the levels of IR emission in specific bands. The unique "signature" of a flame condition can be recognised whilst "background" and "transient" IR spectra shall be discriminated. If non-flame IR conditions prevail at sufficient level and duration to effectively "blind" the flame detection function then a fault warning shall be signalled. The system's primary designed application is the protection of Aircraft Hangers, especially the monolithic structures.

2. The unit shall be specifically designed to both meet the rigors of all of these environments and to provide the reliability demanded by the application:

- a. Detection of flame at distances in excess of 100m.
- b. Resilient to optical background interference - High false alarm immunity.
- c. Sixteen high integrity detectors - Eight channels of discrete viewed field processing - Enhanced optical and spectral analysis.
- d. Unique multi-axis reflective cone lensing system with solid state controlled focal adjustment - Zoom feature analogous to photographic cameras.

- e. Four sensitivity level settings - each with the focal axis zoom option.
 - f. Volt free contact outputs for Fire and Fault signaling.
 - g. Tuned response - Solar blind - Static anomaly and transient immune.
 - h. Specifically designed for high EMC compliance.
- G. The intrinsically safe, optical/heat multi-sensor detectors shall be used for more sensitive to fast burning, flaming fires - including liquid fires - than optical detectors. They shall be readily used instead of optical smoke detectors for areas where the fire risk is likely to include heat at an early stage in the development of the fire.

1. The Multi-Sensor Operation:

- a. The multi sensor shall be thermally enhanced smoke detector and as such will not give an alarm from heat alone. It shall be an improvement on a standard optical detector since it goes further in its capabilities of fire detection. The sensitivity of its optical detector shall be influenced by a heat sensing element which makes the detector more responsive to fast-burning, flaming fires.

H. LPG Gas detector:

- 1. The LPG Gas sensor shall detect the presence of a dangerous LPG leak in LPG cylinder yard. This unit shall have provision to be easily incorporated into a fire alarm unit, to sound an alarm or give a visual indication of the LPG concentration. The sensor shall have excellent sensitivity combined with a quick response time. The sensor shall also sense iso-butane, propane, LNG and cigarette smoke.

2.8 SUPERVISORY DEVICES

A. Duct Smoke Detectors:

- 1. Duct smoke detectors shall be provided and connected by way of an address reporting interface device. Detectors shall be provided with an approved duct housing mounted exterior to the duct, and shall have perforated sampling tubes extending across the full width of the duct (wall to wall). Detector placement shall be such that there is uniform airflow in the cross section of the duct.

2. Interlocking with fans shall be provided in accordance with NFPA 90A.

- 3. Provide remote indicator lamps, key test stations and identification nameplates (e.g. "DUCT SMOKE DETECTOR AHU-X") for all duct detectors. Locate key test stations in plain view on walls or ceilings so that they can be observed and operated from a normal standing position.

B. Sprinkler and Standpipe System Supervisory Switches:

- 1. Each sprinkler system water supply control valve, riser valve or zone control valve, and each standpipe system riser control valve shall be equipped with a supervisory switch. Standpipe hose valves, and test and drain valves shall not be equipped with supervisory switches.
- 2. PIV (post indicator valve) or main gate valve shall be equipped with a supervisory switch.

3. Valve supervisory switches shall be connected to the fire alarm system by way of address reporting interface device.

4. The mechanism shall be contained in a weatherproof die-cast aluminum housing that shall provide a 19 mm (3/4 inch) tapped conduit entrance and incorporate the necessary facilities for attachment to the valves.

5. The entire installed assembly shall be tamper-proof and arranged to cause a switch operation if the housing cover is removed or if the unit is removed from its mounting.

6. Where dry-pipe sprinkler systems are installed, high and low air pressure switches shall be provided and monitored by way of an address reporting interface devices.

8. Fire pump running, power failure and phase reversal supervisory alarms shall be provided and monitored by way of address reporting interface devices for the fire pump Status.

2.9 ADDRESS REPORTING INTERFACE DEVICE

A. Shall have unique addresses that reports directly to the building fire alarm panel.

B. Shall be configurable to monitor normally open or normally closed devices for both alarm and trouble conditions.

C. Shall have terminal designations clearly differentiating between the circuit to which they are reporting from and the device that they are monitoring.

D. Shall be UL listed for fire alarm use and compatibility with the panel to which they are connected.

E. Shall be mounted in weatherproof housings if mounted exterior to a building.

2.10 UTILITY LOCKS AND KEYS:

A. All key operated test switches, control units, annunciator panels and lockable cabinets shall be provided with a single standardized utility lock and key.

B. Key-operated manual fire alarm stations shall have a single standardized lock and key separate from the control equipment.

C. All keys shall be delivered to the Client.

2.11 SPARE AND REPLACEMENT PARTS

A. Provide spare and replacement parts as recommended by the manufacturer. Spare and replacement parts shall be in original packaging and submitted to the Client.

C. Provide to the Client, all hardware, software, programming tools, license and documentation necessary to permanently modify the fire alarm system on site. The minimum level of modification includes addition and deletion of devices, circuits, zones and changes to system description, system operation, and instructional messages.

2.12 INSTRUCTION CHART:

Provide a typeset printed or typewritten instruction card mounted behind a Lexan plastic or glass cover in a stainless steel or aluminum frame with a backplate. Install the frame in a conspicuous location observable from each control unit where operations are performed. The card shall show those steps to be taken by an operator when a signal is received under all conditions, normal, alarm, supervisory, and trouble. Provide an additional copy with the binder for the input output matrix for the sequence of operation. The instructions shall be approved by the Client before being posted.

PART 3 – EXECUTION

3.1 INSTALLATION:

A. Installation shall be in accordance with IS 2189 2008, NFPA 70, 72, 90A, and 101 as shown on the drawings, and as recommended by the major equipment manufacturer. Fire alarm wiring shall be installed in conduit. All conduit and wire shall be installed in accordance with local regulation for **LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW)**, and all penetrations of smoke and fire barriers shall be protected as required by **FIRESTOPPING**.

B. All conduits, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas.

C. All exposed conduit shall be painted in accordance with local regulation to match surrounding finished areas and red in unfinished areas.

D. All fire detection and alarm system devices, control units and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas. Exact locations to be approved by the Client.

F. Horns shall be ceiling mounted and fully recessed in areas with suspended ceilings. Horns shall be wall mounted and recessed in finished areas without suspended ceilings. Horns may be surface mounted in unfinished areas.

G. Strobes shall be flush wall mounted 2,000 mm (80 inches) above the floor or 150 mm (6 inches) below ceiling, whichever is lower. Locate and mount to maintain a minimum 900mm (36 inches) clearance from side obstructions.

H. Manual pull stations shall be installed not less than 1050 mm (42 inches) or more than 1200 mm (48 inches) from finished floor to bottom of device and within 1500 mm (60 inches) of a stairway or an exit door.

I. Where possible, locate water flow and pressure switches a minimum of 300 mm (12 inches) from a fitting that changes the direction of the flow and a minimum of 900 mm (36 inches) from a valve.

J. Mount valve tamper switches so as not to interfere with the normal operation of the valve and adjust to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.

3.2 TYPICAL OPERATION

A. Activation of any manual pull station, water flow or pressure switch, heat detector, kitchen hood suppression system, gaseous suppression system, or smoke detector shall cause the following operations to occur:

1. Continuously sound a temporal pattern general alarm and flash all strobes in the building in alarm until reset at the local fire alarm control unit in indicate building.
2. Unlock the electrically locked exit doors within the zone of alarm.

B. Detectors in elevator machine rooms shall, in addition to the above functions, disconnect all power to all elevators served by that machine room after a time delay. The time delay shall be programmed within the fire alarm system programming and be equal to the time it takes for the car to travel from the highest to the lowest level, plus 10 seconds.

c. Operation of duct smoke detectors shall cause a system supervisory condition and shut down the ventilation system and close the associated smoke dampers as appropriate.

G. Operation of any sprinkler or standpipe system valve supervisory switch, high/low air pressure switch, or fire pump alarm switch shall cause a system supervisory condition.

3.3 TESTS

A. Provide the service of a factory-trained engineer authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system. Make all adjustments and tests in the presence of the Client.

B. When the systems have been completed and prior to the scheduling of the final inspection, furnish testing equipment and perform the following tests in the presence of the Client. When any defects are detected, make repairs or install replacement components, and repeat the tests until such time that the complete fire alarm system meets all contract requirements. After the system has passed the initial test and been approved by the Client, the contractor may request a final inspection.

1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
2. Run water through all flow switches. Check time delay on water flow switches. Submit a report listing all water flow switch operations and their retard time in seconds.
3. Open each alarm initiating and notification circuit to see if trouble signal actuates.
4. Ground each alarm initiation and notification circuit and verify response of trouble signals.

3.4 FINAL INSPECTION AND ACCEPTANCE

A. Prior to final acceptance a minimum 30 day "burn-in" period shall be provided. The purpose shall be to allow equipment to stabilize and potential installation and software

problems and equipment malfunctions to be identified and corrected. During this diagnostic period, all system operations and malfunctions shall be recorded. Final acceptance will be made upon successful completion of the "burn-in" period and where the last 14 days is without a system or equipment malfunction.

B. At the final inspection a factory trained representative of the manufacturer of the major equipment shall repeat the tests in as required by NFPA 72 and IS 2189 2008. In addition the representative shall demonstrate that the systems function properly in every respect. The demonstration shall be made in the presence of the Client.

3.5 INSTRUCTION

A. The manufacturer's authorized engineer shall provide instruction and training to the Client as follows:

1. Six one-hour sessions to engineering staff, security police and central attendant personnel for simple operation of the system. Two sessions at the start of installation, two sessions at the completion of installation and two sessions 3 months after the completion of installation.

2. Four two-hour sessions to engineering staff for detailed operation of the system. Two sessions at the completion of installation and two sessions 3 months after the completion of installation.

3. Three eight-hour sessions to electrical technicians for maintaining, programming, modifying, and repairing the system at the completion of installation and one eight-hour refresher session 3 months after the completion of installation.

B. The Contractor and/or the Systems Manufacturer's engineer shall provide a type written "Sequence of Operation" including a trouble shooting guide of the entire system for submittal to the Client. The sequence of operation will be shown for each input in the system in a matrix format and provided in a loose leaf binder. When reading the sequence of operation, the reader will be able to quickly and easily determine what output will occur upon activation of any input in the system.

C. Furnish the services of a competent instructor for instructing personnel in the programming requirements necessary for system expansion. Such programming shall include addition or deletion of devices, zones, indicating circuits and printer/display text.

3.0 LIST OF MAKES OF EQUIPMENTS FOR HYDRANT SYSTEMS

1. MS pipes : Jindal / TATA
2. Butterfly Valves : Leher / Normex / Danfoss / Audco / Intervolve
3. Service Valves : Advance / Zoloto / H. sarkax / Kalpana
4. Non Return Valves : Normex / Zoloto / Advance / H. sarkax / Kalpana
5. Pressure gauge : H Guru / Fiebig
6. Pipe GI support : Hi Tech or Equivalent.
7. Gunmetal brass valve : RB/ Leher/ Approved make.

8. (50mm and below) : Bharat Fire / Tube products /VC /VM.
9. Flow Switch : System Sensor / Potter / Switzer.
10. Flexible hose : Cooper / Tyco / approved make
11. Pumps : Kirlosker/ Mather & Platt/KSB/Maxflow/flow more
12. Mptors: Kirloskar/Crompton Greaves/Siemens/ABB.

LIST OF MAKES OF EQUIPMENTS FOR FIRE ALARM SYSTEM

1. Fire alarm control panel : GST / AGNI / JOHNSONS CONTROLS
2. Smoke detectors : GST / AGNI / JOHNSONS CONTROLS
3. Loop Isolator : GST / AGNI / JOHNSONS CONTROLS
4. Manual Call Points : GST / AGNI / JOHNSONS CONTROLS
5. Sounder cum Strobe : GST / AGNI / JOHNSONS CONTROLS
6. FLRS Cables – ISI : Polycab / Anchor / Paramount
7. FRLS PVC Conduit – ISI : VINSON//AKG/BEC/DIPLAST.
8. Addressable Control /Relay /Input Module : GST / AGNI / JOHNSONS CONTROLS

Deputy General Manager
Mechanical Unit, JKPCC Ltd
Jammu