

TENDER ID:HYD202004010
DATE:08.04.2020



**SBI INFRA MANAGEMENT SOLUTIONS PVT LTD
(WHOLLY OWNED SUBSIDIARY OF SBI)**

INVITES TENDERS ON BEHALF OF SBI LHO, HYDERABAD.
IN A SINGLE BID THROUGH E-TENDERING PROCESS.

FOR

**PROVIDING OF FIRE HYDRANT SYSTEM AND SPRINKLER SYSTEM AT SBI DAC
BUILDING LOCATED AT GACHIBOWLI, HYDERABAD.**

FROM

**THE ELIGIBLE EMPANELLED VENDORS FOR FIRE HYDRANT SYSTEM
WORKS(APPROPRIATE CATEGORY) IN THE HYDERABAD CIRCLE**

**The Vice president & Head,
SBI Infra Management Solutions Pvt. Ltd.
Ground Floor, Adj Commercial Branch, SBI LHO campus,
Bank Street, Koti,
Hyderabad – 500 095
Phone:040-23466310/46**

NOTICE INVITING TENDER. (NIT)

1.	Name of the Work	Supply, Installation, Testing and commissioning of Fire Hydrant System and Sprinkler System at SBI, DAC Building located at Gachibowli, Hyderabad.
2.	Eligibility of the contractor	Empanelled vendors for fire hydrant system works in the Hyderabad Circle appropriate category
3.	Estimated cost of work:	Rs. 36,63,345.00 plus GST as applicable
4.	Earnest Money Deposit. (EMD)	Rs.37,000 /- all Drafts/BCs shall be in favour of "SBIIMS, Hyderabad". Payable at Hyderabad. Up load copy of EMD / one time EMD in etender.sbi.
5.	Tender Cost	Rs.3000/- Up load copy of tender cost(receipt of SBI collect) in etender.sbi. Offline tender cost will be not acceptable and we will treat it as rejected. to be paid through State Bank Collect ONLY as detailed under; 1) login https://www.onlinesbi.com 2) Select SB Collect from Top Menu, click the check box and "Proceed" 3) Select "All India" in "State of Corporate/Institution" & Select "Commercial Services" in "Type of Corporate/Institution" then "Go" 4) Select " SBI Infra Management Solutions pvt. Ltd" in Commercial Services Name and "Submit" 5) Select "Tender Application Fee" in "Payment Category" and enter the "Tender ID" exactly as given in first page top of this tender(characters in uppercase only). 6) Fill up all fields such as email, GST No., Mobile No, Vendor/Firm Name etc and make payment. 7) Enclose payment receipt having unique reference Number. along with EMD.
6.	Time of Completion:	60 DAYS.

Signature of the Contractor with seal

7.	Payment terms	Minimum ₹15 Lakh in each running bill
8.	Date of download of tender documents from Bank's web site http://www.sbi.co.in under "procurement news" / bank.sbi/etender.sbi	From 08.04.2020 to 21.04.2020
9.	Last date and time for submission of online e-tender. at https://etender.sbi	Date: 21.04.2020 by 3.00 P.M.
10.	Date and Time of opening of e-Tenders: (Technical Bid and Price Bid)	Date: 21.04.2020 at 3.30 P. M. (IST).
11.	Date, time and Venue of Pre-bid meeting	15.04.2020 at 11.00 hours at Office of SBIIMS, Hyderabad
12.	Publishing of pre-bid clarifications in website	16.04.2020
13.	Address of opening of tender	Vice President, SBI Infra Management Solutions Pvt. Ltd., Office, Ground floor, Adj to commercial branch, SBI LHO campus, Bank Street, Kothi, Hyderabad – 500 095. Technical Bid of those firms / contractors who do not submit EMD shall be rejected. Those who are already submitted the one time EMD need not to be submitted again. Representatives of Bidder may be present during opening of Bids. However Bids would be opened even in the absence of any or all the bidder's representatives.
14.	EMD & Tender cost to be submitted at:	EMD should be submitted physically at above mentioned address before due date. Contact: Vice President. 040-23466346. vg.reddy@sbi.co.in
15.	Bidder Contact Details.	Bidder to provide following information. 1) Name of Company. 2) Contact Person. 3) Mailing address with Pin Code. 4) Telephone number and Fax number. 5) Mobile Number and E-MAIL.
16.	Agency for arranging online bidding.	e-Procurement technologies Limited, Ahmedabad. e-Procurement technologies Limited, Ahmedabad. Primary Contact Numbers:- M:- 9081000427, 9904407997 Sujith Nair:- 079-68136857, sujith@eptl.in 1. Jaymeet Rathod:- 079-68136829, jaymeet.rathod@eptl.in 2. Vinayak Khambe:- 079-68136835, vinayak.k@eptl.in 3. Nadeem Mansuri:- 079-68136853, nadeem@eptl.in 4. Nandan Valera:- 079-68136843, nandan.v@eptl.in

		<p>5. Hemangi Patel:- 079-68136852, hemangi@eptl.in</p> <p>6. KanchanKumari:- 079-68136820, kanchan.k@eptl.in</p> <p>7. Deepak Narekar:- 079-68136863, deepak@eptl.in</p> <p>8. AnshulJuneja:- 079-68136840, anshul.juneja@eptl.in</p> <p>9. Salina Motani:- 079-68136831, salina.motani@eptl.in</p> <p>10. Devang Patel:- 079-68136859, devang@eptl.in</p> <p>Primary Contact person : Ms. ShubhangiBanodiya,</p> <p>Contact No.:- 079-68136826/6824/6868, +91-9879996111</p> <p>Email: shubhangi@auctiontiger.net</p> <p>Secondary contact person: Mr. Samjad khan</p> <p>Contact No.:- 079-68136868, +91-9265871720</p> <p>Email: samjad@auctiontiger.net</p> <p>Alternate Contact No.:- Mr. YashrajsinhRathod:- 079-68136815, 9879996111, yashrajsinh@auctiontiger.net</p>
17.	Initial Security Deposit	2% including EMD.
18.	Defects Liability Period	12 Months (Twelve months) from the commissioning of equipments
19.	Total Security Deposit	5 % of contract value including initial security deposit.
20.	Retention money	<p>a. 50% of the total retention money will be released with final certificate of payment after removing of all his material, equipment, labour force, store room from the site.</p> <p>b. Balance 50% payment will be released after completion of defects liability period.</p>
21.	Liquidated Damages	0.50% per week subject to max 5%of the value of work
22.	Validity	90 days
23.	Working time	Contractor has to work round the clock including holidays, for which no extra payment will be paid

The SBIIMS reserves the right to accept or reject any or all the tenders without assigning any reason whatsoever.

INSTRUCTIONS TO THE TENDERERS

1.0 Scope of Work

Sealed online Tenders are invited by M/s SBIIMS, Hyderabad for and behalf of State Bank of India for the work of Supply, Installation, Testing and commissioning of Fire Hydrant System and Sprinkler System at SBI, DAC Building located at Gachibowli, Hyderabad. The electrical works related fire Hydrant and sprinkler system should be executed to valid class A electrical license holder or empanelled electrical contractors of LHO Hyderabad. Making provision of scaffolding is bidder scope only.

1.1 Site and Its Location

The proposed work is to be carried out at Gachibowli, Hyderabad.

2.0 Tender Documents

2.1 The work has to be carried out strictly according to the conditions stipulated in tender

consisting the following documents and the most workmanlike manner,

- Instructions to tenderers
- General Conditions of Contract
- Special Conditions of Contract
- Additional Conditions for Electrical Installation
- Technical Specifications
- Drawings
- Priced Bid

2.2 The above documents shall be taken as complementary and mutually explanatory of one another but in case of ambiguities or discrepancies, shall take precedence in the order given below:

- Price Bid
- Technical Specifications
- Additional Conditions for Electrical Installation
- Special Conditions of Contract
- General Conditions of Contract
- Instructions to Tenderers

2.3 The tender documents are not transferable.

3.0 Site Visit

3.1 The tenderer must obtain himself on his own responsibility and his own

expenses all information and data which may be required for the purpose of filling this tender document and enter into a contract for the satisfactory performance of the work. The Tenderer is requested satisfy himself regarding the availability of water, power, transport and communication facilities, the character quality and quantity of the materials, labour, the law and order situation, climatic conditions local authorities requirement, traffic regulationsetc;

The tenderer will be fully responsible for considering the financial effect of any or all the factors while submitting his tender.

4.0 EarnestMoney

4.1 The tenderers are requested to submit the Earnest Money as specified in the NIT

4.2 EMD in any other form other than Demand Draft will not be accepted. Tender not accompanied by the EMD in accordance with clause 4.1 above shall be rejected.

4.3 No interest will be paid on the EMD.

4.4 EMD of unsuccessful tenderers will be refunded within 30 days of award of Contract.

4.5 EMD of successful tenderer will be retained as a part of security deposit.

5.0 Initial Security Deposit

The successful tenderer will have to submit a sum equivalent to 2% of contract value less EMD by means of D/D drawn in favour of State Bank of India within a period of 15 days of acceptance of tender.

6.0 Security Deposit

6.1 Total security deposit shall be 5% of contract value. Out of this 2% of contract value is in the form of initial security deposit which includes the EMD. Balance 3% shall be deducted from the running account bill of the work at the rate of 10% of the respective running account bill i.e. deduction from each running bill account will be 10% till total 3% of contract value is reached. 50% of the total security shall be paid to the contractors on the basis of architect's certifying the virtual completion. The balance 50% would be paid to the contractors after the defects liability period as specified in the contract.

6.2 No interest shall be paid to the amount retained by the Bank as Security Deposit.

7.0 Signing of Contract Documents

The successful tenderer shall be bound to implement the contract by signing an agreement and conditions of contract attached herewith within 15 days from the receipt of intimation of acceptance of his tender by the Bank. However, the written acceptance of the tender by the Bank will constitute a binding agreement between the Bank and successful tenderer whether such formal agreement is subsequently entered into or not.

8.0 Completion Period: As specified in the NIT

9.0 Validity of Tender

Tenders shall remain valid and open for acceptance for a period of 3 (Three) months from the date of opening price bid. If the tenderer withdraws his/her offer during the validity period or makes modifications in his/her original offer which are not acceptable to the Bank without prejudice to any other right or remedy the Bank shall be at liberty to forfeit the EMD.

10.0 Liquidated Damages

The liquidated damages shall be 0.5% per week subject to a maximum of 5% of contract value.

11.0 Rates and Prices

In case of item rate tender

11.1

11.1.1 The tenderers shall quote their rates for individual items both in words and figures in case of discrepancy between the rates quoted in words and figures the unit rate quoted in words will prevail. If no rate is quoted for a particular item the contractor shall not be paid for that item when it is executed.

The amount of each item shall be calculated and the requisite total is given. In case of discrepancy between the unit rate and the total amount

calculated from multiplication of unit rate and the quantity the unit rate quoted will govern and the amount will be corrected.

11.1.2 The tenderers need not quote their rates for which no quantities have been given. In case the tenderers quote their rates for such items those rates will be ignored and will not be considered during execution.

11.1.3 The tenderers should not change the units as specified in the tender. If any unit is changed the tenders would be evaluated as per the original unit and the contractor would be paid accordingly.

The tenderer should not change or modify or delete the description of the item. If any discrepancy is observed he should immediately bring to the knowledge of the Architect/ Bank.

11.1.4 Each page of the BOQ shall be signed by the authorized person and cutting or overwriting shall be duly attested by him. Which is not applicable for online tender.

11.1.5 Each page shall be totaled and the grand total shall be given. which is not applicable for online tender.

11.1.6 The rate quoted shall be firm and shall include all costs, allowances, taxes, ,etc. except GST. GST will be reimbursed by the Bank.

GENERAL CONDITIONS OF CONTRACT

1.0 Definitions

“Contract” means the documents forming the tender and the acceptance thereof and the formal agreement executed between State Bank of India (Client) and the contractor, together with the documents referred therein including these conditions, the specifications, designs, drawings and instructions issued from time to time by the Architects/Bank and all these documents taken together shall be deemed to form one contract and shall be complementary to one another.

1.1 In the contract the following expressions shall, unless the context otherwise requires, have the meaning hereby respectively assigned to them.

1.1.1 ‘SBI’ shall mean State Bank of India (client) a body Corporate created under State Bank of India Act 1955, having its Corporate Centre at State Bank Bhavan, Madame Cama Road, Mumbai 400 021 and a LHO at Hyderabad and include the client’s representatives, successors and assigns.

1.1.2 ‘Site Engineer’ shall mean an Engineer appointed by the Bank as their representative to give instructions to the contractors.

1.1.3 ‘The Contractor’ shall mean the individual or firm or company whether incorporated or not, undertaking the works and shall include legal personal representative of such individual or the composing the firm or company and the permitted assignees of such individual or firms of company.

The expression ‘works’ or ‘work’ shall mean the permanent or temporary work described in the ‘Scope of Work’ and/or to be executed in accordance with the contract and includes materials, apparatus, equipment, temporary supports, fittings and things of all kinds to be provided, the obligations of the

contractor hereunder and work to be done by the contractor under the contract.

1.1.4 'Engineer' shall mean the representative of the Architect/consultant.

1.1.5 'Drawings' shall mean the drawings prepared by the Architects and issued by the Engineer and referred to in the specifications and any modifications of such drawings as may be issued by the Engineer from time to time. 'Contract value' shall mean the value of the entire work as stipulated in the letter of acceptance of tender subject to such additions thereto or deduction therefrom as may be made under the provision herein after contained.

1.1.6 'Specifications' shall mean the specifications referred to in the tender and any modifications thereof as may time to time be furnished or approved by the architect/ consultant "Month" means calendar month.

1.1.7 "Week" means seven consecutive days.

1.1.8 "Day" means a calendar day beginning and ending at 00 Hrs and 24 hrs respectively.

CLAUSE

1.0 Total Security Deposit

Total Security deposit comprise of :

Earnest Money

Deposit Initial

Security Deposit

Retention Money

(a) Earnest Money Deposit:

The tenderer shall furnish EMD as specified in the NIT in the form of Demand draft or bankers cheque

drawn in favour of SBIIMS, Hyderabad, on any Scheduled Bank. No tender shall be considered unless the EMD is deposited in the required form. No interest shall be paid on this EMD. The EMD of the unsuccessful tenderer shall be refunded soon after the decision to award the contract is taken without interest. The EMD shall stand absolutely forfeited if the tenderer revokes his tender at any time during the period when he is required to keep his tender open acceptance by the SBIIMS or after it is accepted by the SBIIMS the contractor fails to enter into a formal agreement or fail to pay the initial security deposit as stipulated or fail to commence the work within the stipulated time.

a) Initial Security Deposit (ISD)

The amount of ISD shall be 2% of accepted value of tender including the EMD. Balance of ISD (i.e. excluding EMD) is to be submitted in the form of D/D drawn on any scheduled Bank and shall be deposited within 15 days from the date of letter of acceptance of tender.

b) Retention Money

Besides the ISD as deposited by the contractor in the above said manner the retention money shall be deducted from the running account bill at the rate of 10% of the gross value of work done by the contractor and claimed in each bill provided the total security deposit is not more than 5% of the contract value.

The ISD plus Retention Money shall both together not exceed 5% of the contract value. 50% of the total security deposit shall be refunded to the contractor without any interest on issue of Virtual Completion certificate by the Architect/consultant. The balance 50% of the total security deposit shall be refunded to the contractor without interest within fifteen days after the end of defects liability period provided the contractor has satisfactorily attended to all defects in accordance with the conditions of contract including site clearance.

GENERAL CONDITIONS

1. Adequate engineering and technical staff to be appointed at site. FIRE FIGHTING contractor should inform of their number and qualification. An Approval of employer / Consultants should be taken prior to appointing such technical staff on site.
2. The contractor should keep the tender submitted by him open for acceptance for a minimum period of three months from the date of its submission. When once the tender is accepted the rates quoted by the successful tenderer should be firm the variation in rates of any one or all the items on any account should not be allowed during the entire duration of the contract.
3. During the execution of work contractor must check the work with his drawings. The contractor should be responsible for all the errors in this connection and should have to rectify all the defects at his own cost, failing which the client reserves the right to get the same rectified at the risk and cost of contractor.
4. No claim for extra item or deviation from specification should be entertained unless the same is pointed out and accepted as such before the work is taken in hand or within 15 days of this work by the successful tenderer.
5. The contractor should comply with all bye- laws and sales tax regulations of local and other statutory authorities having jurisdiction over the works and should be responsible for the payment of all the fees and other charges and the giving and receiving of all necessary notices drawings and test certificates.
6. The successful tenderer should properly safeguard against damage or injury to the public and to any property or thing and should alone be responsible for any such damage and injury to any person or persons or thing arising in connection with it's execution of work .The successful tenderer should protect and hold harmless the employer against any or all claims for any such injury or damage.
7. The work in every respect during the progress and till final acceptance by the employer, including raw materials delivered to the site to be incorporated or used in Electrical items of the work by the successful tenderer at his own risk

. Any loss or damage to any such material or work by the employer should immediately be replaced by the successful tenderer at his own expense.

8. The employer should have the right to direct the contractor to purchase and use the materials from any source for proper execution of work.
9. The employer / Consultant or their authorized representatives should have full power for inspecting the contractor's works or at any place from which the material is obtained. Acceptances of any such materials should no way relieve the contractor of his responsibility for meeting the requirements and /or analysis not called for in the specifications should be borne by the employer in case the material or work is found defective or of inferior quality .tests and /or analysis should be done in the laboratory approved by the client and the contractor should permit the employer/s and or the client's or their authorized representative to be present during any of the tests and /or analysis.

10. INSURANCE

The contractor should indemnify the employer up to CAR Policy for each claims against all claims which may be made against the employer by any member of the public or the third party in respect of anything which may arise in consequence thereof and should at his own expense arrange to effect and maintain up to one month after the virtual completion with an office approved by the employer a policy of insurance in the joint names and deposit such policy or policies with the employer from time to time during the currency of this contract. The contractor should also indemnify the employer against employer against all claims which may be made upon the employer under the workman's compensation act or any other statute in force during the currency of this contract or at common law in respect of any employee of the contractor or any sub contractor and, should at his own expenses effect and maintain upto one month after virtual completion of the contract with the effect approved by the employer a policy or policies of insurance in the joint names of the employer and the contractor as aforesaid .The contractor should be responsible for anything which may exclude from the insurance policies above referred to and also for any other damage to any property arising out of and incidental to the negligent or defective carrying out of this contract He should also indemnify the employer in respect of any costs, charges or expenses arising out of any claim or proceedings and also in respect of any award of compensation or damage arising therefrom. The employer should be at liberty and is hereby empowered to deduct the amount of any damages, compensation caused, charges and expenses arising or occurring from or in respect of any such claims or damages from any sum or sums due or to become due to the contractor.

11. STATUTORY DEDUCTIONS.

The applicable TDS will be deducted at source from the bill / invoice amount as per the Govt. rule.

12. WORKMAN AT SITE:

The contractor's workpeople should not be allowed to live on the site at any time throughout the contract nor to trespass beyond the limits of the site. The contractor will be held responsible for any acts of trespass by his workpeople.

13. DIMENSIONS:

Figures dimensions are to be taken in preference to scaled dimensions in all cases. Before commencing any work the contractor should verify all measurements. If any discrepancies are found they should immediately be brought to the notice of the Consultants.

14. DISCREPANCIES

All the items shown in the Technical specifications or specifications are taken to be included in both. Any discrepancies, which occur in specifications, should immediately be brought to the attention of the Bank and clarification should be obtained.

15. CUTTING AND MAKING GOOD.

Where it is found necessary to interfere with finished work in order to execute this contract, the contractor will be required to do all necessary work at his expenses including making holes in the floor, wall and ceiling etc. and after work, making good to the original. Only approved material should be used for accessories for fixing/ installation works. Wooden plugs will not be permitted. Holes should be formed with electric drills whenever possible. Structural members should not be cut or drilled without prior consent of the client.

16. MAINTENANCE AND GUARANTEE

The whole of the work to be performed under this contract should be completed to the satisfaction of the Consultants / Employer.

The contractor without additional charge to the employer renew or replaces any works which prove faulty from workmanship or materials and fully maintain the whole installations for a period of 12 months after the commencement of a defects liability period of the main contract and a sum of 5% of the contract amount should be retained by the employer for this period.

17. PREVENTION OF SPOIL DUMPING.

The contractor should take all reasonable steps to prevent spoil, rubbish, debris surplus materials etc. arising from a work being dumped on an area other than a recognized or approved tipping area and the Contractor will be

held responsible for and should indemnify the employer against any claim or loss arising there from.

18. LEAVE PERFECT:

The Contractor should remove all rubbish and superfluous material from the site of the works with all reasonable speed from time to time and at completion. On no account should W.C' S or the employer's receptacles to be used for this purpose. The client reserves its right to clear contractors uncleared debris at contractors own cost without any reasons & not more than one notice will be given for this.

19. SETTLEMENT OF DISPUTES AND ARBITRATION:

Except where otherwise provided in the contract all questions and disputes relating to the meaning of the specifications, design, drawings and instructions herein before mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions orders or these conditions or otherwise concerning the work or the execution or failure to execute the same weather arising during the progress of work or after the cancellation, termination, completion, or abandonment thereof should be dealt with as mentioned hereinafter.

i) If the contractor considers that he is entitled to any extra payment or compensation in respect of the works over and above the amounts admitted as payable by the Consultant or in case the contractor wants to dispute the validity of any deductions or recoveries made or proposed to be made from the contract or raise any dispute, the contractor should forthwith give notice in writing of his claim, or dispute to **The Assistant General Manager**, Premises and Estate Department, **STATE BANK OF INDIA, Local Head Office,koti, Bank Street, HYDERABAD – 500 0095.** 040-23466100 and endorse a copy of the same to the Consultant, within 30 days from the date of disallowance thereof or the date of deduction or recovery, The said notice should give full particulars of the claim, grounds on which it is based and detailed calculations of the amount claimed and the contractor should not be entitled to raise any claim nor should the employer be in way liable in respect any claim by the contractor unless notice of such claim should have been given by the contractor to the **The Assistant General Manager**, Premises and Estate Department, **STATE BANK OF INDIA, Local Head Office, Koti, Bank Street, , HYDERABAD – 500 095. PH: 040-23466100**in the manner and

within the time as aforesaid. The contractor should be deemed to have waived and extinguished all his rights in respect of any claim not notified

ii) **“The Assistant General Manager, Premises and Estate Department, STATE BANK OF INDIA, KOTI, BANK STREET, HYDERABAD – 500 095. PH:040-23466100** should give his decision in writing on the claims notified by the contractor. The contractor may within 30 days of the receipt of the decision of the work.

iii) If the conciliation proceedings are terminated without settlement of the disputes, the contractor should, within a period of 30 days of termination thereof should give a notice to the concerned Assistant General Manager for appointment of an arbitrator to adjudicate the notified claims failing which the claims of the contractor should be deemed to have been considered absolutely barred and waived.

iv) Except where the decision has become final, binding and conclusive in terms of the contract, all disputes or differences arising out of the notified claims of the contractor as aforesaid and all claims of the employer should be referred for adjudication through arbitration by the sole Arbitrator appointed by the Assistant General Manager. It will also be no objection to any such appointment that the Arbitrator so appointed is a employer/bank Officer and that he had to deal with the matters to which the contract relates in the course of his duties as employers/bank Officer. If the Arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever another sole Arbitrator should be appointed in the manner aforesaid by the said Assistant General Manager. Such person should be entitled to proceed with the reference from the stage at which it was left by his predecessor.

It is a term of contract that the party invoking arbitration should give a list of disputes with amounts claimed in respect of each dispute along with the notice for appointment of Arbitrator.

It is also a term of this contract that no person other than a person appointed by such Assistant General Manager as aforesaid should act as arbitrator.

The conciliation and arbitration should be conducted in accordance with the provisions of the arbitration & conciliation Act 1996 or any statutory modification or reenactment thereof and rules made there under.

It is also a term of the contract that if any fees are payable to the arbitrator these should be paid equally by both the parties. However no fees will be payable to the arbitrator if he is a employer/bank Officer.

It is also a term of the contract that the arbitrator should be deemed to have entered on the reference on the date he issues notice to both the parties

calling them to submit their statement of claims. The venue of the arbitration should be such place as may be fixed by the arbitrator in his sole discretion. The fees, if any, of the arbitrator should, if required to be paid before the award is made and published, be paid half and half by each of the parties. The cost of the reference and of the award (including the fees, if any of the arbitrator) should be in the discretion of the arbitrator who may direct to any by whom and in what manner, such costs or any part thereof, should be paid and fix or settle the amount of costs to be so paid.

ARTICLES OF AGREEMENT

NAME OF WORK: "PROPOSED FIRE FIGHTING SYSTEM INSTALLATION WORKS FOR THE SBI, DAC, GACHIBOWLI, HYDERABAD".

Articles of agreement made at Hyderabad, this ____ day of _____ 2020

The Assistant General Manager, Premises and Estate Department, State Bank of India, Local Head Office, Koti, bank Street, Hyderabad (*herein after called the Employer which expression should include its successors and assignees*) of the one part and _____ (*herein after called the contractors which expression should include its successors and assignees*) of the other part.

Whereas the employer desires to get the above mentioned work namely **"PROPOSED FIRE FIGHTING SYSTEM WORKS FOR THE SBI DAC, GACHIBOWLI, HYDERABAD"** as envisaged in tender documents dated _____, schedule of quantities, specifications and the drawings.

And whereas the Contractor agreed to execute upon and subject to conditions set forth herein and to the conditions set forth in special conditions and in schedule of quantities, specifications, conditions of contract, drawings etc., (*all of which are collectively hereinafter referred to as the said conditions*) at the respective rates therein set forth amounting to the sum as herein arrived at or such sum as should become payable there under (*herein after referred as the said contract sum*)

Now it is hereby agreed as follows :

1. In consideration of the said contract amount to be paid at the times and manner set forth in the said conditions the contractor should upon and subjected to the said conditions and complete the work shown upon the said drawings and described in the specifications and schedule of quantities.
2. The employer will be pay the contractor a sum of Rs. _____ (Rupees _____) herein after referred to as the contract sum or such other sum as should become payable at the times and in the manner specified in the said conditions.

3. The said conditions and appendix thereto should be read and construed as forming part of this agreement and parties hereto should respectively abide by, subject to themselves to the said conditions and perform agreements on their part respectively in the said conditions contained.
4. The following documents should be deemed to form and read and construed as part of this agreement:
 - a) Tender Notice.
 - b) Tender Form.
 - c) General Conditions
 - d) Abstract of General Conditions
 - e) Special Conditions of Contract
 - f) Safety Code.
 - g) Technical Specifications
 - h) Recommended Makes of Materials
 - i) Employers letter of intent no. _____.
 - j) Contractors letter of acceptance.
5. This contract is neither a fixed lump sum contract nor a piece work contract but a contract to carry out the work in respect of the entire building to be paid for according to actual measured quantities at the rates contained in schedule of quantities in the said conditions.
6. The Employer reserves to himself the right of altering the drawings and nature of work by adding or omitting any items of work having portions of the same carried out through the other agencies without prejudice to this contract.
8. The time should be considered as essence of this contract and the contractor hereby agrees to commence the work from the _____ (which should be considered as the date of commencement of the work) and to complete the entire work within in the time period as specified in the NIT **from the date of commencement**. The work should throughout the stipulated period of contract, be proceeded with all due diligence and if the contractor fails to complete the work within the specified period, he should be liable to pay compensation as provided in clause 7 of the special conditions of contract.
9. That the several conditions of this contract have been read to & fully understood by us.

As witness our hands, this _____ day of _____ 2020 in the presence of:

Witness :

1.

EMPLOYER:

SPECIAL CONDITIONS

1. General:

1.1 These special conditions should be read in conjunction with the description of the item of work in the Bill(s) of Quantities, the particular Specifications, Local Statutory Regulations, Indian Standards Specifications/Codes and the drawings. All the above quoted documents should be considered supplementary to each other. However, in the case of conflict amongst the various provisions, the owner's and the consultant's opinion will be final and should be adopted.

1.2 The tenderer is advised to inspect the site to ascertain the nature of site, access thereto, local facilities for procurement of materials and working labour rates prevalent in the area, in fact all matters affecting his prices and execution of the work. The tender should be deemed to have full knowledge of the site and drawings whether or not he actually inspects them.

2. Rates

2.1 The rates quoted should be deemed to allow for all minor extras and constructional details which are not specifically shown on drawings or given on the specifications but are essential in the opinion of the Engineer-in-charge to the execution of works to conform to good workmanship and sound engineering practice. The Consultant/Employer reserves the right to make any minor changes during the execution without any extra payment.

2.2 The Banks decision to clarify any item under minor changes, minor extras and constructional details should be final, conclusive and binding on the Contractor.

2.3 The rates quoted by the Contractor should be net so as to include all requirements described in the contract agreement and no claim whatsoever due to fluctuations in the price of material and labour will be entertained.

2.4 The rates quoted by the Contractor should include for supplying materials and labour necessary for completing the work in the best and most workmanship like manner to the satisfaction of the Consultant/Employer and which in the opinion of the Consultant cannot be made better, and for maintaining the same.

The rates should be complete in all respects also including cost of materials, erection, fabrication, labour, supervision, tools and plant, transport,

contingencies, breakage, wastage, sundries, scaffoldings, etc., on the basis of works contract. The rates quoted should exclude GST.

3.0 Materials:

3.1 The Contractor should ensure to the satisfaction of the Consultant/Employer that the materials are packed in original sealed containers/packing bearing manufacturer's markings and brands etc., except where the gross quantity required is a fraction of the smallest packing. Materials not complying with this requirement should be rejected.

3.2 Testing of Materials:

a) When required by the Bank, the Contractor should provide all facilities at site or at manufacturer's works or in an approved laboratory for testing the materials and/or workmanship. All the expenditure in respect of this should be borne by the Contractor unless specified otherwise in the Contract. The Contractor should, when required to do so by the Bank should submit at his own cost, manufacturer's certificate of tests, proof sheets, mill sheets etc., showing that the materials have been tested in accordance with requirements of these specifications.

b) Neither the omission by the Consultant to test the materials nor the production of manufacturer(s) certificate etc., as aforesaid should affect the right of the Consultant to reject, after delivery the materials found unsuitable or not in accordance with the specifications.

4 Clarifications:

4.1 The Clarifications required or discrepancies, if any, noted by the Contractor in the technical specifications, tender conditions etc. must be obtained well before tendering, failing which the decision of the Bank should be final and binding on the Contractor with regard to detailing and general acceptance of the Contract.

5.0 Rectification of Defects:

5.1 Any defect in the work done or materials used in the works pointed out by the Consultant should be rectified within a week or such extended time as may be allowed in this failing which the Consultant at the risk and cost of the Contractors should be rectified the said defect.

7.0 Regulations & Standards:

7.1 The installation should conform in all respects to Indian Standard Code of Practice for Fire Fighting Installation and National Building Code. It should also be in conformity with the current Rules and Regulations and requirements of the local Fire Authority in so far as these become applicable to the installation. However, in the case of conflict amongst the various provisions the owner's and the consultant's opinion will be final and should be adopted.

8.0 Shop Drawings:

8.1 Before starting the work, the Contractor should prepare and submit to the Bank for the approval of detailed working drawings for the above systems i.e. Fire Hydrant System & Sprinkler System i.e. Pipe Routing and Pumps layout etc. by Contractor within 15 days of signing of the contract.

9.0 Completion Drawings:

9.1 On completion of the work and before issuance of certificate of virtual completion the contractor should submit to the consultant/Employer layout drawings drawn at approved scale indicating the complete fire fighting system "As Installed". These drawings should in particular, give the following information.

- (a) Routing of Pipe Lines.
- (b) Location and Size of Hose Boxes, Hose Reels, valves etc
- (d) Location and details of Fire Pumps with all accessories
- (e) Layout and particulars of all Hydrants etc.

Five Sets of Blue Prints and One set of Drawings on RTF should be submitted after completion of work.

10.0 Manufacturer's Instructions:

10.1 Where manufacturers have furnished specific instructions, relating to the materials used in this job, covering points not specifically mentioned in the documents, these instructions should be followed in all cases.

11.0 Completion Certificate:

11.1 On completion of the Installation a certificate should be furnished by the Contractor counter signed by a licensed supervisor, under whose direct supervision the installation was carried out.

12.0 Qualified Competent Supervision:

12.1 The Contractor should employ competent fully licensed, qualified full time Engineer to direct the work of Fire installation in accordance with drawings and specifications. The Engineer should be available at all times on the site to receive

instructions from Consultant in the day-to-day activities, throughout the duration of the contract. The foremen should co-relate the progress of the work in conjunction with all relevant requirements of the supply authorities.

13.0 Sub Contractor:

13.1 If the Main Contractor proposes to subcontract the part/ whole of the work, the sub contractor's credentials should be submitted and get the same approved before employment. The Sub contractor should be licensed to execute works.

7. SITE SAFETY REQUIREMENTS

The Contractor, his Sub-Contractors and nominated sub-contractors, should comply with the safety precautions, protective measures, house keeping requirements, etc. The Client with due intimation should have the right to stop the work at site, if in his opinion proceeding with the work will lead to an unsafe and dangerous condition. The contractor should get the unsafe condition removed or provide protective equipment. The contractor should ensure that all workmen are aware about the nature of risk involved in their work and have adequate knowledge for carrying out their work safely.

The instructions issued herein are indicative and not exhaustive. Therefore the contractor should be responsible to ensure that adequate safety measures have been adopted in the course of execution of the contract in accordance with safety standards / statutory regulations, as applicable.

The contractor should be held responsible for non-compliance if any of the safety measures and delays, implications, injuries, fatalities and compensation arising out of such situations or incidents. The Bank will not be responsible for any unfortunate incident at site if any.

1. TRAFFIC

1.1 The contractor should organize operations by taking approval to use the existing roads, if any, from Client.

1.2 The contractor should exercise full care to ensure that no damage is caused by him or workmen, during the operation, to the existing water supply, sewerage, power or telecommunication lines or any other services or works. The contractor should provide and erect before construction, substantial barricades, guardrails, and warning signs. He should furnish, place and maintain adequate warning lights, signals, etc., as required by Client.

2. SAFE MEANS OF ACCESS

2.1 Adequate and safe means of access and exit should be provided for all work places, at all elevations.

2.2 Suitable scaffolds should be provided for workmen for all works that cannot safely be done from the ground, or from solid construction except such short duration work as can be done safely from ladders. Ladder should be of rigid construction having sufficient strength for the intended loads and made of metal and all ladders should be maintained well for safe working condition. Suitable footholds and handholds should be provided on the ladder. The ladder should be given an inclination not steeper than 1 in 4 (1 horizontal and 4 vertical).

2.3 Scaffolding or staging more than 3.5m above the ground or floor, swung or suspended from an overhead support or erected with stationary support should have a standard guard-rail properly attached, bolted, braced or otherwise secured at least 1m high above the floor or platform of such scaffolding or staging. The guardrail should extend along the entire exposed length of the scaffolding with only such opening as may be necessary for the delivery of materials. Standard railing should have posts not more than 2m apart and an intermediate rail half way between the floor and platform of the scaffolding and the top rail. Such scaffolding or staging should be so fastened as to prevent it from swaying from the building or structure. Scaffolding and ladder should conform to relevant IS specification (IS 3696-1966). **TIMBER/BAMBOO SCAFFOLDING SHOULD NOT BE USED.**

2.4 Working platforms of scaffolds should have toe boards at least 15cm in ht. to prevent materials from falling down.

2.5 A sketch of the scaffolding proposed to be used should be prepared prior to start of erection of scaffolding. Safety engineer should examine all scaffolds before using.

2.6 Safe means of access should be provided to all working platforms and other elevated working places. Every ladder should be securely fixed. No single portable ladder should be over 9m in length. For ladders, up to 3m in length the width between side rails in the ladders should in no case be less than 300mm. For longer ladders, this width should be increased by at least 20mm for each additional meter of length. Step spacing should be uniform and should not exceed 300mm.

2.7 Adequate precautions should be taken to prevent danger from electrical lines and equipment. No scaffolding, ladder, working platform, gangway runs, etc. should exist within 3 meters of any nu-insulated electric wire. Whenever electric power and lighting cables are required to run through (pass on) the

scaffolding or electrical equipment are used, such scaffolding structures should have minimum two earth connections with earth continuity conforming to IS code of practice.

3. DEMOLITION

- a. Before any demolition work is commenced and also during the progress of the work the contractor should ensure that the power on all electric service lines is shut off and the lines cut or disconnected at or outside the demolition site.
- b. If it is necessary to maintain electric power during demolition operation, the required service lines should be adequately protected against damage.
- c. Persons handling heavy materials/equipment should wear safety shoes.

4. PERSONAL PROTECTIVE EQUIPMENT

All necessary personal protective equipment should be kept available for the use of the persons employed on the site and maintained in a condition suitable for immediate use. Also the contractor should take adequate steps to ensure proper use of equipment by those concerned. The personal protective equipment to be provided by the contractor are:

- (i) All persons employed at the construction site should use safety helmets.
- (ii) Persons engaged in welding and gas-cutting works should use suitable aprons, leather gloves and welding face shields. The persons who assist the welders should use suitable goggles. Protective goggles should be worn while chipping and grinding.
- (iii) All persons working at heights more than 4.5m above ground or floor and exposed to risk of falling down should use safety belts, unless otherwise protected by cages, guard railings, etc. In places where the use of safety belts is impractical, suitable net of adequate strength fastened to substantial supports should be employed.

5. LIFTING MACHINES AND TACKLES

5.1 Use of lifting machines and tackles including their attachments, anchorage and supports should conform to the following standards or conditions:

Lifting machines and tackles should be of good mechanical construction, sound material and adequate strength and free from any defects and should be kept in good repair and in good working order.

Every rope used in hoisting or lowering materials or as a means of suspension should be of good quality and adequate strength and free from any defect.

Every crane operator or lifting appliance operator should be properly qualified. No person under the age of 21 years should be in charge of any hoisting machine or give signal to operator of such machine.

In case of every lifting machine (and of every chain, ring, hook, shackle, swivel and pulley block used in hoisting or as means of suspension) the safe working load should be ascertained and clearly marked. In case of a lifting machine having a variable safe working load, each safe working load and the conditions under which it is applicable should be clearly indicated. No part of any machine or any gear referred to above in this paragraph should be loaded beyond the safe working load except for the purpose of testing. The safety engineer should approve this.

The safety engineer should note the safe working load. Regarding other machines, the contractor should notify the safe working load of the machine to the safety engineer, whenever he brings any machinery to site of work and gets it verified by the safety engineer.

Thorough inspection and load testing of lifting machines and tackles should be done by a competent person at least once every 2 months and records of such inspection and testing should be maintained.

5.2 Motors, gearing transmission, couplings, belts, chain drives and other moving parts of hoisting appliances should be provided with adequate safeguards. Hoisting appliances should be provided with such means as will reduce to the minimum the risk of any part of a suspended load becoming accidentally displaced or lowered. Barricades should be erected around the place of hoisting the equipment(s).

6. WELDING AND GAS CUTTING

6.1 Welding and gas cutting operations should be done by qualified and authorized persons and as per IS specifications and code of practice.

6.2 Welding and gas cutting should not be carried out in places where flammable or combustible materials are kept and where there is danger of explosion due to presence of gaseous mixtures.

6.3 Welding and gas cutting equipment including hoses and cables should be maintained in good condition.

6.4 Barriers should be erected to protect other persons from harmful rays from the work. When welding or gas cutting is done in elevated positions, precautions should be taken to prevent sparks or hot metal falling on persons or flammable materials.

6.5 Suitable type of protective clothing consisting of fire resistant gauntlet gloves, leggings, boots and aprons should be provided to workers as protection from heat and hot metal splashes. Welding shields with filter glasses of appropriate shade should be worn as face protection.

6.6 Adequate ventilation should be provided while welding in confined space or while brazing, cutting or welding zinc, brass, bronze, galvanized or lead coated materials.

6.7 Welding and gas cutting should not be done on drums, barrels, tanks or other containers unless they have been emptied cleaned thoroughly and it is made certain that no flammable material is present.

6.8 Fire extinguishers should be available near the location of welding operations. Fire safety permit should be obtained for working at vulnerable areas and operating areas before flame cutting/welding is taken up.

6.9 For electric (Arc) welding the following additional safety precautions should be taken:

When electrical welding is undertaken near pipelines carrying flammables, such pipelines should not be used as part of earth conductor but a separate earth conductor should be connected to the machine directly from the job.

Personnel contact with the electrode or other live parts of electric welding equipment should be avoided.

Extreme caution should be exercised to prevent accidental contact of electrodes with ground.

The welding cable should not be allowed to get entangled with power cables. It should be ensured that movement of materials does not damage the cables.

7. GRINDING

7.1 All portable grinders should be used only with their wheel guards in position to reduce the danger from flying fragments should the wheel break during the use.

7.2 Grinding wheels of specified diameter only should be used on a grinder – portable or pedestal - in order not to exceed the prescribed peripheral speed.

7.3 Goggles should be used during grinding operation.

8. HOUSE KEEPING

8.1 The contractor should at all times keep his work site, site office and surroundings clean and tidy from rubbish, scrap, surplus materials and unwanted tools and equipment.

8.2 Welding and other electrical cables should be so routed as to allow safe traffic by all concerned.

8.3 No materials on any of the sites of work should be so stacked or placed as to cause danger or inconvenience to any person or the public.

8.4 At the completion of the work, the contractor should ensure removal from the work premises all scaffoldings, surplus materials, rubbish and all huts and sanitary arrangements used/installed for workmen on the site.

9. FIRE SAFETY

All necessary precautions should be taken to prevent outbreak of fires at the construction site. Adequate provisions should be made to extinguish fires, should they still break out.

Quantities of combustible materials like timber, bamboo, coal, paints, etc. should be the minimum required in order to avoid unnecessary accumulation of combustibles at site.

Containers of paints, thinners and allied materials should be stored in a separate room, which should be well ventilated, and free from excessive heat, sparks, flame or direct rays of the sun. The containers of paint should be kept covered and properly fitted with lid and should not be kept open except while using.

Fire extinguishers should be located at the construction site at appropriate places.

Adequate number of workmen should be given education and training in fire fighting and extinguishing methods

10. WORK IN RADIATION AREA

The contractor should follow the stipulated procedure regarding work in the radiation area and other works related with radiography.

11. MEDICAL FACILITIES

11.1 The contractor should arrange for medical aid and treatment for his staff and workers engaged on the work site including the first-aid facilities if they are not available at the project site.

11.2 First-aid appliance including sterilized dressing, cotton wool and antiseptic cream should be made available at readily accessible places at every work site. These should be maintained in good order under the charge of a responsible person.

11.3 At large work places, where hospital facilities are not available within easy reach of the work first-aid posts should be established. Ambulance availability should be identified during the entire period of work for attending to injury cases.

12. SAFETY COORDINATOR

The contractor should have a Safety Office or a Supervisor to be designated as a Safety Coordinator in order to specifically look into the implementation of different safety requirements of the site work. The person thus designated will in general coordinate on matters of safety and in particular ensure that the Safety Manual is complied with. His name should be displayed on the Notice Board at a prominent place at the work site.

13. REPORTING OF ACCIDENT

13.1 All accident leading to property damage and/or personnel injuries should be reported to the concerned authorities viz. Insurance Co. Police, Head Office, Regional Office, etc.

13.2 The contractor should also submit a monthly statement of accidents to the Client by 4th of every month showing details of accident, nature of injury including disability, days lost, treatment provided, etc., and the extent of property damage.

14. PUBLIC PROTECTION

The contractor should make all necessary provisions to protect the public. He should be held responsible for defense of every action of other proceedings at law that may be brought by any person for injury sustained owing to neglect of any precaution required to taken to protect the public.

15. OTHER STATUTORY PROVISION

All operations involving the transport, handling, storage and use of explosive should be as per the standing instructions and conform with the latest Indian Explosives Act and the explosives Rules. Handling, transport, storage and use of compressed gas cylinders and pressure vessels should conform to the latest Gas Cylinder Rules and Static and Mobile Pressure Vessels (Unfired) Rules. In addition, The Indian Electricity Act and Indian Electricity Rules - latest, the Atomic Energy Act, the Radiation Protection Rules - latest, Radiation Protection Manual of Nuclear Facilities and the Atomic Energy (Factories) Rules – latest, and various latest rules and Act related to mining should also be strictly complied with.

16. **GUIDELINES AND GENERAL PROCEDURES FOR SUPPLY AND USE OF ELECTRICITY AT SITE**

16.1 Following safety requirements should be complied with before the contractor uses the power supply.

16.1.1 The contractor should submit a list of licensed electrical staff to be posted at Site.

16.1.2 It should be the responsibility of the contractor to provide and maintain complete installation on the load side of the supply point with regard to the safety requirements at Site. All cabling and installation should comply with the appropriate latest statutory requirements given below and should be subject to approval of the Project Manager:

Indian Electricity Act.

Electricity (Supply) Act.

Indian Electricity Rules.

National Electricity Code.

Other relevant rules of Local Bodies and Electricity Boards.

The power supply should be regulated as per the terms and conditions of the supply of the respective electricity boards.

16.1.3 Where distribution boards are located at different places the contractor should submit schematic drawing indicating all details like size of wires, Over head and Cable feeders, earthing etc. The position and location of all equipment and switches should be given.

16.1.4 The contractor should make his own arrangement for main earth electrode and tapings thereof. The existing earth points available at site can be used at the discretion of Client with prior permission. Method of earthing, installation and earth testing results should conform to relevant I.S. Specifications (IS-3043).

16.1.5 All three phases' equipment should be provided with double earthing. All light fixtures and portable equipment should be effectively earthed to main earthing.

16.1.6 All earth terminals should be visible. No gas pipes and water pipes should be used for earth connection. Neutral conductor should not be treated as earth wire.

16.1.7 The contractor should not connect any additional load without prior permission of Client.

16.1.8 Joints in earthing conductors should be avoided. Loop earthing of equipment should not be allowed. However, taping from an earth bus may be done.

16.1.9 The entire installation should be subjected to the following tests before energisation of installation including portable equipment: -

- i) Insulation resistance test.
- j) Polarity test of switches.
- k) Earth continuity test.
- l) Earth electrode resistance.

The test procedures and their results should conform to relevant standards.

16.2 Following guidelines are provided for general observations: -

INSTALLATIONS:

1. Only persons having valid wire man's license/competency certificate should be employed for carrying out electrical work and repair of electrical equipment, installation and maintenance at site. A qualified licensed Supervisor should supervise the job.
2. Electrical equipment and installations should be installed and maintained as to prevent danger from contact with live conductors and to prevent fires originating from electrical causes like short circuits, overheating etc. Installation should not cause any hindrance to movement of men and materials.
3. Materials for all electrical equipment should be selected with regard to working voltage, load and working environment. Such equipment should conform to the relevant standards.
4. The minimum clearance to be maintained for all overhead lines along roads and across roads should be as per the statutory requirements.
5. Grounding conductor of wiring system should be of copper or other corrosion-resistant material. An extra grounding connection should be made in appliances/equipment where chances of electric shock are high.
6. Electric fuses and/or circuit breakers installed in equipment circuits for short circuit protection should be of proper rating. It is also recommended that high rupturing capacity (HRC) fuses are used in all circuits. For load of 5 kW or more earth leakage circuit breaker should be provided in the circuits.
7. Wherever cables or wires are laid on poles, a guard wire of adequate size should be run along the cables/wires and earthen effectively. Metallic poles as a general rule, should be avoided and if used should be earthen individually. Anti climbing guards and danger notices should be provided on poles. Each equipment should have an isolating switch.
8. Wires and cables should be properly supported and an approved method of fixing should be adopted. Loose hanging of wires and cables should be avoided. Lighting and power circuits should be kept distinct and separate.
9. Reinforcement rods or any metallic part of structure should not be used for supporting wires and cables, fixtures, equipment, earthing etc.
10. All cables and wires should be adequately protected mechanically against damages. In case the cable is required to be laid under ground, it should be adequately protected by covering the same with bricks, Plain Cement Concrete (PCC) tile or any other approved means.
11. Using suitable cable glands should properly terminate all armoured cables. Using cable lugs/sockets should connect multi-stranded conductor cables. Cable lugs should preferably be crimped. They should be of proper size and

should correspond to the current rating and size of the cable. Twisted connections will not be allowed.

12. All cable glands, armoring and sheathing of electric cable, metal circuits and their fittings, metallic fittings and other non-current carrying parts of electrical equipment and apparatus should be effectively grounded.
13. All the Distribution Boards, Switch Fuse Units, Bus bar chambers, ducts, cubicles etc. should have MS enclosures and should be dust, vermin and waterproof. The Distribution Boards, switches etc. should be so fixed that they should be easily accessible. Changes should be done only after the approval of the Project Manager.
14. The contractor should provide proper enclosures/covers for protection of the entire switchboard, equipment etc. against rain. Exposed live parts of all electrical circuits and equipment should be enclosed permanently. Crane trolley wires and other conductor, which cannot be completely insulated, should be placed such that they are inaccessible under normal working conditions.
15. Ironclad industrial type plug outlets are preferred for additional safety.
16. Open type distribution boards should be placed only in dry and ventilated rooms; they should not be placed in the vicinity of storage batteries or otherwise exposed to chemical fumes.
17. Isolating switches should be provided close to equipment for easy disconnection of electrical equipment or conductors from the source of supply when repair or maintenance work has to be done on them.
18. In front of distribution boards a clear space of 90 cm should be maintained in order to have easy access during an emergency.
19. Adequate working space should be provided around electrical equipment, which requires adjustment or examination during operation.
20. As far as possible electrical switches should be excluded from a place where there is danger of explosion. All electrical equipment such as motors; switches and lighting fittings installed in workroom where there is possibility of explosion hazard should be explosion proof.
21. All connections to lighting fixtures, starters or other power supplies should be provided with PVC insulate, PVC sheathed twin/three/four core wires to have better mechanical protection for preventing possible damage to equipment or injury to personnel. Taped joints should not be allowed and the connections may be made in looping system. Electric starter of motors, Switches should not be mounted on wooden boards. Only sheet steel mounting or iron framework should be used.
22. All the lighting fixtures and lap holders should be of good quality and in good condition. Badly repaired or broken holders, etc. should not be used.

23. Only PVC insulated and PVC sheathed wires or armored PVC insulated and sheathed cables should be used for external power supply connections of temporary nature. Weatherproof rubber wires should not be used for any temporary power supply connections. Taped joints in the wires should not be used.
24. The bulbs/lamps used for illumination and testing purpose should have cover or guard to protect them from accidental breakage. Only 24 V supply system should be used for hand lamps etc. while working inside metallic tanks or conducting vessels.

16.3 OPERATION & MAINTENANCE

1. All persons, who work with electrical installation/equipment, should be aware of the electrical hazards, use to protective devices and safe operational procedures. They should be given training in fire fighting, first aid and artificial resuscitation techniques.
2. The contractor should instruct the workers in the proper procedure, specify and enforce the use of necessary protective equipment such as adequately insulated pliers, screw drivers, fuse pulleys, testing lamps and similar hand tools. Only wooden ladders should be used to reach the heights in electrical work.
3. No material or earthwork should be allowed to be dumped below or in the vicinity of the bare overhead line conductors.
4. Before any maintenance work is commenced on electrical installations/equipment, the circuits should be de-energized and ascertained to be dead by positive test with an approved voltage-testing device. Switches should be tagged or the fuse holders withdrawn before starting the work. Adequate precautions should be taken in two important aspects viz. a .That there should be no danger from any adjacent live parts and b.That there should be no chances of re-energisation of the equipment on which the persons are working.
5. While working on or near a circuit, whenever possible the use of one hand may be practiced even though the circuit is supposed to be dead. The other hand may preferably be kept in pocket.
6. When it is necessary to touch electrical equipment (for example when checking for overload of motors) back of the hand may be used. Thus, if accidental shock were to cause muscular contractions, one would not 'freeze' to the conductor.
7. Operations of electrical equipment should be avoided which standing on wet floor or when hands are wet.
8. Before blown fuses are replaced, the circuit should be locked out and an investigation should be made for the cause of the short circuit or overload.

9. When two persons are working within reach of each other, they should never work on difference phases of the supply.
10. When structural repairs, modification or painting work are to be undertaken, appropriate measures should be taken for the protection of persons whose work may bring them into the priority of live equipment/circuit.
11. It should be ensured that the insulation and wire size of extension cords are adequate for the voltage and current to be carried.
12. While tapping electricity from the socket, plug top must be used. It should be ensured that no extension boards are over loaded while tapping. Only standard three pin plugs should be used for tapping electricity. Broken sockets/plugs should be replaced immediately with good ones. Only joints free cables should be used for connecting equipment/ apparatus.
13. Floors should be kept free from trailing electrical cables to avoid tripping hazard.
14. Power supply to the entire machines and lighting fixture should be switched off when not in use.
15. Temporary electrical connections should be removed as soon as the stipulated work is over. After completion of the works, the contractor should dismantle the distribution boards and the other facilities erected at site.
16. Unauthorized tapping of power by others from distribution boards under the control of the NCC should be prohibited at all circumstances. No flammable materials should be stored in any working area near the switchboards.
17. "MEN ON LINE" "DO NOT SWITCH ON" "DANGER" OR "CAUTION" boards as applicable should be used during maintenance works on the electrical equipment.

16.4 PORTABLE ELECTRICAL EQUIPMENT

1. Portable electrical equipment should be regularly examined, tested and maintained to ensure that the equipment and its leads are in good order. Register should be maintained for inspection recording the testing dates and results of the equipment.
2. All portable appliances should be provided with tree core cable and three-pin plug. The third pin of the plug should invariably be earthen. It should be ensured that the metal part of the equipment should be effectively earthen.
3. All connections to portable equipment or machines from the panel/distribution board/extension board should be taken using 3 core double insulated PVC flexible copper wire in one length. No joints

should be allowed in this flexible wire. In case single length of wire is not sufficient for a particular location then the supply can be tapped by providing another extension board comprising of switch and socket.

4. Flexible cables for portable lamps, tools and apparatus should be regularly examined, tested periodically and maintained to ensure safety.

DECLARATION

I/We have inspected the site of works and fully acquainted with the local conditions in and around the site of works. I/We hereby declare that I/We have gone through the conditions laid down in the Notice Inviting Tender, Conditions of Contract, Technical Specifications, scope of work and understood the same and on the basis of the same I/We quoted our rates in the pricebid as per Schedule of Quantities attached with the tender documents.

I/We should also uniformly maintain such progress as may be directed by the Employer/Architect to ensure completion of same within the target date as mentioned in the tender document.

Signature of Tenderer

Witness:

Address _____

Date : _____

TECHNICAL SPECIFICATIONS FIRE FIGHTING SYSTEMS

A. FIRE HYDRANT SYSTEM:

The Works should be executed as per NBC specifications Vol. IV-2016 / attached specifications/ T.A.C.Rules / NFPA for Fire pumps and wet risers and hydrant system.

In the absence of any definite provision of any particular issue in the specifications/codes reference should be made to the relevant latest IS: specifications. Wherever the IS codes are silent, the design and construction should confirm to the sound engineering practice.

1. General Requirements:

- a) All materials should be new & of the Best quality conforming to specifications with ISI marks. All works to be accepted should be to the satisfaction of the employer.
- b) Pipes & fittings should be fixed truly vertical, horizontal or in slopes as required in a neat workman like manner.
- c) Short or long bends should be used on all main pipelines as far as possible. Use of elbows should be restricted for short connections.
- d) Pipes should be fixed in manner as to provide easy accessibility of repair & maintenance & should not cause obstruction in shafts, passage etc.
- e) Pipes should be securely fixed to walls & ceiling by suitable clamps at intervals specified.
- f) Clamps, hangers & support on RCC Walls, columns & slabs should be fixed only by use of power drills.
- g) All Pipes, clamps, supports, nuts, bolts, and washers should be galvanized mild steel throughout the building. Painted M.S.clamps& M.S. nuts, bolts & washers should not be accepted.
- h) Rates for items should include supplying, fixing, testing, jointing, labour equipment, machinery, tools, scaffolding, etc., up to all heights within the complex.
- i) No escalation for labour, material or any other account should be payable in any circumstances.
- j) Pipes being laid should be as per IS : 3589 and IS : 1239 latest edition or

any other equipment relevant IS or BIS code/s with ISI mark.

2. Valves and Gauges

- a) Butterfly valves should be of cast iron body and bronze / gunmetal seat. They should conform to IS 13095. Rating should conform to PN 1.6.
- b) Non-return valves should be of wafer type with cast iron body and bronze/gunmetal seat. They should conform to IS: 5312 (PN 1.6). They should be swing check type in horizontal runs and lift check type in vertical runs of piping.
- c) Foot Valves: It should be of cast iron ball type with nitrile reinforced ball conforming to IS:4038 with flanged ends suitable for working pressure of 10 Kg/cm² (Normex / Equivalent make).
- d) Pressure gauge of suitable range should be installed on the discharge side of each pump. The dial size should be 250mm. The gauges should be with necessary cocks.

3. Piping for Yard line:

- a) Pipes and Fittings
Pipes for Fire hydrant system should be M.S 'C' Class as specified conforming to relevant I.S.1239/IS 3589 of ISI mark. Fittings M.S. 'C' Class pipes should be malleable iron suitable for welding or approved type cast iron fittings with tapered screwed threads.
- b) Jointing
Joint for pipes and fittings should be metal-to-metal tapered thread or welded joints. A small amount of red lead may be used of lubrication and rust prevention in threaded joints. Joints between G.I pipes, valves and other appurtenances, pumps etc., should be made with G.I. flanges with appropriate number of bolts. Flanged joints should be made with 3mm thick insertion rubber gasket.
- c) Pipe Protection
All pipes above ground and in exposed locations should be painted with one coat of red oxide primer and two or more coats of synthetic enamel paint of approved shade. Pipes in chase or buried underground should be painted with two coats of hot bitumen, wrapped with bituminized Hessian cloth and finished with one coat of hot bitumen paint or with fiber glass tissue paper.
- d) Pipe Supports
All pipes should be provided with CC supports for laying above ground / adequately supported from walls by structural clamps fabricated from G.I.

structural e.g. channels, angles, hardware and flats / MS pedestal supports using ISMC channels, MS Angles etc. as per the site condition. All clamps should be painted with one coat of red lead and two coats of black enamel paint. Where inserts are not provided, the Contractor should provide anchor fasteners.

4. Hydrant Valves

- a) The external hydrant outlet should comprise “single headed, Stainless Steel landing valve” conforming to of IS 5290-1977. Type “A” of ISI mark.
- b) A cap with chain is provided on one head of the outlet, which will have an instantaneous pattern female coupling for connecting to the hosepipe.

5. First Aid hose reel Equipment

- a) First Aid Hose reel equipment should comprise hose reel drum, fixing bracket, hose tubing (synthetic), ball / gate valve, stopcock and polymer (jet, spray, shut off) nozzle. This should conform to IS: 884-1969. The hose tubing shall be of thermoplastic reinforced hose with ISI mark and should conform to IS: 12585. The hose tubing should be 20mm dia and 40 meters long. The fixing bracket should be of swinging type (180 degree). Operating instructions should be engraved on the assembly.

6. Hose pipes, branch pipes and nozzles

- a) Hose Pipes: Hose pipes should be fabric reinforced rubber lined woven jacketed and 63mm in diameter. They should conform to type 2 (Reinforced rubber lined) of I.S: 636-Type 'B'-1988 of “ISI marked. The hose should be sufficiently flexible and capable of being rolled and each run of hose pipe should be complete with necessary SS coupling at the ends of match with the landing valve or with another run of hose pipe or with branch pipe. The couplings should be of instantaneous spring lock type.
- b) Branch Pipe: Branch pipe should be of SS 63mm dia and be complete with male instantaneous spring lock type coupling for connection to the hosepipe. The branch pipe should be externally threaded to receive the nozzle. It should be ISI marked.
- c) Nozzle: The nozzle should be of SS, 20mm in internal diameter. The screw threads at the inlet connection should match with the threading on the branch pipe. The inlet end should have hexagonal head to facilitate screwing of the nozzle on to the branch pipe with nozzle spanner.
- d) End Couplings, branch pipes, and nozzles should conform to IS: 903-1985.

- e) Two hoses of 15m lengths with couplings should be provided with each external (yard) hydrant and internal hydrant. One nozzle and one branch pipe with coupling should be provided with each yard hydrant and internal hydrant. Nozzle Hose pipe should be fixed / Hanged on M.S. Rod Hook or support properly as per instruction given to the contractor by the Architect/Owner.

7. Hose Cabinet

- a) The hose cabinet to accommodate two hose pipe of 15 meter length each, branch pipe nozzle. It should be made of MS sheet of 16 guage with 4 mm thick glass door and locking arrangement and drain holes at the bottom of the cabinet with suitable iron stand for fixing.
- b) The scope of work includes provision of masonry or steel frame structure, as specified for installation.
- c) The hose cabinet should be painted red and stove enameled.

8. Fire brigade inlet connections:

- a) FB Connection to Risers: Four ways collector head made of Cast iron body with SS coupling and built-in non return valve for yard line / wet riser enclosed in a MS metal box with glass fronted door.
- b) FB Connection to UG Tank: 4 ways F.B. inlets for U.G. sump without built-in NRVs and butter fly valve enclosed in a MS metal box with glass fronted door.

9. SPECIFICATION FOR FIRE PUMPS

a) PUMPS:

- i. Pumps should be exclusively used for firefighting purposes should be of Horizontal end suction back pull out type conforming to IS 1520 and specifications of TAC
- ii. The Pumps should be direct-coupled.
- iii. Parts of pumps like impeller, shaft sleeve, wearing ring etc., should be of bronze.
- iv. Pumps should be capable of delivering min. 2280 LPM at 7.0Kg/sq.cm pressure
- v. Pumps should be capable of furnishing not less than 150% of rated capacity at a head of not less than 65% of the rated head. The shut off head should not exceed 120% of rated head in the case of

horizontal pumps.

b) Electrically Driven Pumps

- i) The pumping set(s) should be direct-coupled and securely mounted on a robust bed plate and should be free from vibration at all variations of load.
- ii) The rating and design of motors and switchgear should conform to the relevant Indian Standards Specification. The motor should be of continuous rating type and its rating should be at least equivalent to the horse power required to drive the pump at 150% of its rated discharge.
- iii) The motor should be of SPDP type, and their air inlets and outlets protected with meshed wire panels to exclude rodents, reptiles and insects.
- iv) The motors should be wound for minimum class F insulation, and the windings should be vacuum impregnated with heat and moisture resisting varnish and preferably glass fiber insulated to withstand tropical conditions.
- v) The starting switchgear for the fire pumps should be suitable for star delta / direct on line starting. It should also incorporate an ammeter with a clear indication of the motor full load current.
- vi) Cables for motors and switchgear should be with flat steel strip/wire armourer.
- vii) It is recommended that equipment throughout be painted fire red (shade no. 536 as per IS: 5-1978) and suitably marked for identification.
- viii) Necessary spare parts, including a set of fuse holders (where fuses are employed) should be kept in readiness at all times.

c) Diesel Engine Driven Pumps

The engine should be:

- a. With turbo charged and coolant.
- b. Capable of operating continuously on full load at the site elevation for a period of six hours.

- c. Provided with an adjustable governor to control the engine speed within 5% of its rated speed under any condition of load up to the full load rating. The governor should be set to maintain rated pump speed at maximum pump load.
- d. Any manual device fitted to the engine which could prevent the engine starting should return automatically to the normal position.
- e. Provided with a tachometer to indicate R.P.M of the engine.
- f. Engines after correction for altitude and ambient temperature should have bare engine horse power rating at least 20% greater than the maximum brake horse power required to drive the pump at its duty point and in no case less than the brake horse power required to drive the pump at 150% of rated discharge.
- g. The coupling between the engine and the pump should allow each unit to be removed without disturbing the other.

h. Air Filtration

The air intake should be fitted with a filter of adequate size to prevent foreign matter entering the engine.

i. Exhaust System

The exhaust should be fitted with a suitable Residential silencer and the total back pressure should not exceed the engine maker's recommendation. When the exhaust system rises above the engine, means should be provided to prevent any condensate flowing into the engine. The Exhausts stack should extend at least 2.5mtrs above the height of Pump room and Pipe should be cladded with Rock wool insulation and 24SWG Aluminium sheet throughout the length including silencer.

j. Engine Shutdown Mechanism

This should be manually operated and returned automatically to the starting position after use.

k. Fuel System

Fuel:

The engine fuel oil should be of quality and grade specified by engine makers. There should be kept on hand at all times

sufficient fuel to run the engine on full load for 8 hours, in addition to that in the engine fuel tank.

Fuel Tank:

The fuel tank should be of welded steel constructed to relevant Indian or Foreign Standard for Mild Steel Drums. The tank should be mounted above the engine fuel pump to provide a gravity feed. The tank should be fitted with an indicator showing the level of the fuel in the tank. The capacity of the tank should be sufficient to allow the engine to run on full load for 8 Hours

Fuel Feed Pipes

Any valve in the fuel feed pipe between the fuel tank and the engine should be placed adjacent to the tank and it should be locked in the open position. Pipe joints should not be soldered and plastic tubing should not be used.

I. Auxiliary Equipment

The following should be provided:

- a) A sludge and sediment trap
- b) A fuel level gauge
- c) An inspection and cleaning hole
- d) A filter between the fuel tank and the fuel pump mounted in an accessible position for cleaning.
- e) Means to enable the entire fuel system to be bled of air. Air relief cocks are not allowed, screwed plugs are permitted.

m. Starting Mechanism:

Provision should be made for two separate methods of engine starting viz.:

i. Automatic starting by means of battery powered electric starter motor incorporating the axial displacement type of pinion, having automatic repeat start facilities initiated by a fall in pressure in the water supply pipe to the sprinkler and/ or hydrant installation. The battery capacity should be adequate for ten consecutive starts without recharging with a cold engine under full compression.

ii. Manual Starting by:

- a. Crank handle, if engine size permits
OR

B. Electric starter motor

m. Battery Charging:

The mean of charging the batteries should be by a 2- rate trickle charger with manual selection of boost charge and the batteries should be charged in position.

n. Tools:

A standard kit of tools should be provided with the engine and kept on hand at all times.

O. Engine Exercising:

The test should be for a period of at least five minutes each day. Where closed circuit cooling system should be checked at the time of carrying out each test and, if necessary water should be added during the course of the test procedure

15. Terrace pumping equipment

ii. Scope

This section covers the details of requirements of the terrace pump of the down comer / wet riser.

iii. General

The pump should be suitable for manual operation complete necessary electric motor, suitable for operation on 415 volts 3 phase 50 Hz A.c. system. Both the motor and the pump should be assembled on a common base plate, fabricated mild steel channel type or cast iron type.

iv. Drive

The pump should be mono block type directly driven from the electric motor.

- v. The discharge of the terrace pump should be 900 litres per minute as specified and 40 mtrs head as to provide 4.0 Kg. Sq.cm pressure the top farthest out let of the down comer.

The pump casing should be of cast iron, bronze impeller. Shaft sleeve, wearing ring etc., should be of non-corrosive metal like bronze, brass or gunmetal. The shaft should be of stainless steel.

- vi. Bearings of the pump should be effectively sealed to prevent loss of lubricant or entry of dust / water.

- vii. The pump casing should be designed to with stand 1.5 times the working pressure.

Viii. Motor

The motor should be squirrel cage A.C. induction type suitable for operation of 415 volts 3 phase 50 Hz system. The motor should be totally enclosed fan cooled type conforming to protection clause IP 21 of IS 4691. The class of insulation should be E the later being preferred. The synchronous speed should be 2900 RPM as specified. The motor should conform to IS: 325-1978 and rated for continuous duty, motor protection with weather proof cover with G.I 14 Gauge sheet with handle. It should be provided with metallic guard / cover for protection against rain and suix.

ix. Motor Starter

The Motor starter should be of Star Delta / DOL type with overload trip, but without under voltage/no volt trip. An independent single phasing preventor should be provided for each motor. The unit should include ammeter of suitable range on the one line to indicate the current. Starter should conform to IS : 1822-1967.

16. POWER AND CONTROL PANEL AND OTHER CONTROL COMPONENTS

1. Scope

The section covers the detailed requirements of the power and the control panel for the yard hydrant and down comer system and also for the various control components in the system.

i.) Power and Control Panel for Fire Pumps-Constructional Requirements

General Features: - The power and control panel should be totally enclosed, free standing, floor mounted, cubicle type, fabricated out of sheet steel not less than 1.6mm thick. Wherever necessary, additional stiffening should be provided by angle iron framework. General construction should be of compartmentalization and sectionalization such as mains incomer, bus bars, pump and control, so that there is no mix up of power and control wiring and connections in the same sections as far as possible. The panel should be front operated type with all connections accessible from the front. Front doors should be hinged type. Back doors should be hinged type or removable type for inspection. The door hinges should be of concealed type. The doors should be provided with quick fixing doors knobs with indication, the general arrangement of the panel should be got approved before fabrication, the cubicle construction should be to IP 21 as per IS: 2147.

ii) Cable entries and gland plates

All cable entries should be through gland plates, which are removable, and sectionalized. Necessary compression type glands should also be provided. Where heavy cables are brought in and terminated, suitable clamps should be incorporated to relieve the stress on the glands due to the weight of the cable. Cable entries may be from top or bottom depending on the equipment layout and cable scheme as approved.

iii) Bus bar and connections

The bus bars should be air insulated, and of Copper high conductivity electrolytic quality (grade E 91 E to IS : 5082) and of adequate cross section. Current density should not exceed 100 Amps Sq.cm. All connections to individual circuits from the bus bars should preferably be with solid connections. The bus bars and the connections should be suitably covered with PVC sleeves or in an approved manner. Bus bars should be suitably supported using non-hygroscopic insulated supports such that they may stand 50 KA RMS symmetrical current for one second. High tensile bolts and spring washers should be provided at bus bars joints.

iv) Earthing Arrangement

GI strip 25mm x 5mm should be run at the rear of the board, bonding all the sections suitably, 2 Nos. earth terminals should be provided at the ends of the GI strip for connection to earth system. Earth terminals should be with a flexible loop and the hardware should be of G.I. or passivated and plated iron.

v) Terminal blocks and small wiring

Terminal blocks should be of heavy duty and generally not less than 15 Amps 250 V grade for the rest of the functions. They should be easily accessible for maintenance. All control wiring inside the panel should be with PVC insulated copper connection of 6.0 Sq.mm size and 600 V grade conforming to IS:694-1977. Suitable Colour changing may be adopted. Wiring harness should be neatly formed and run preferably function wise and as far as possible segregated voltage wise. Identification ferrules should be used at both ends of the wires.

vi) Instruments and lamps

All indication lamps and instruments should be flush mounted type in front of the panel. The voltmeter and ammeter should be not less than size 96 x 96 mm conforming to clause 1.5 of IS 1248 for accuracy.

Current transformers should be provided with ammeters, wherever necessary. Indicating lamps to indicate the availability of electric supply should be provided at the incoming section. Necessary indicating lamps for alarm indications and battery charging should be provided in the respective sections.

All indicating lamps and voltmeter should be protected with HRC cartridge type fuses.

vii) Labels

All internal components should be provided with suitable identification labels. Suitably engorged labels should be fixed at the panel for all switches, instruments, push buttons, indicating lamps etc.

viii) Painting

The entire panel should be given a primer coat of red lead after degreasing and phosphate treatment and 2 coat of final paint of approved shade before assembly of various items. The panels for the terrace pumps should be of cubicle design. The specifications of power and control panel for the wet riser should be applicable for those panels, with controls and indications.

ix) Pressure Switches

Pressure switches should be provided for switching on and off the pressurization pump at present pressures and also for switching on the fire pump at preset pressure, being the main component for initiating the signal for the operation of the pumps. The pressure switches should be totally reliable, sturdy in construction and of long life. The pressure settings should be adjustable.

x) Dry Run Protection

To prevent the dry running of fire pumps, dry run protection will be provided for the main fire pump sets.

xi) Electrical Work and Earthing.

Electric Power supply should be terminated in the incoming switch gear of the power and control panel by the Department, all further connections to the various components of the system should be the responsibility of the contractor, for a complete and working system satisfying all the functional requirements.

The scope should particularly include the following:

Power and Control Panel (s) :

All inter connections with multi-core armored copper cables of size as approved between various control units and control panel (s).

All power cable connections with multi-core armouredaluminium cables of size as approved between panels motors etc., either clamped on all run on cable trays or laid in duct etc., as the case may be. Trays clamp supports and all labour should be inclusive within the quoted cost.

Necessary earthing with 2 Nos. G.I. plate electrodes and loop earthing.

The work should be carried out conforming to CPWD General Specifications for electrical works Part I (Internal) 1994 amended upto date and Part II (External) 1994 amended upto date.

17. INSTALLATIONS AND TESTING

a) Pipe Work

The suction line for each pump should be independent. No Sluice/BFV valve should be provided in suction line, where the pump is located above the water level in the sump foot valve and strainer should however be provided.

Sluice/BFV valve should be provided in suction line, where the pump is located below the water level in the sump, strainer at the suction end should be provided.

Sluice valves should be kept in open position and the scope of work includes provision of necessary leather strap and pad lock as so as to prevent unauthorized closing of valve.

The installation work includes provision of all clamps, supports anchors, spacing between vertical supports should not exceed 1.5m. Clamps should be provided on either side of the Tee joints for internal hydrants. Necessary anchors / thrust pads should be provided as approved at locations of bends, tees etc., as required within the scope of work..

Underground pipes of the external hydrant system should be laid at least 1m below ground level and at least 2m away from the face of the buildings or as approved by Owner. The run of piping should be preferably along roads and footpaths and should not be under buildings. Where specifically indicated to cross buildings, these should be laid in masonry trenches with removable covers, with cut off valves at the entry and exit points.

Where provision of MS 'C' class should below ground becomes inescapable as indicated it should be protected from soil inescapable as indicated it should be protected from soil corrosion by 2 coats of coal tar hot enamel paint and 2 wraps of reinforced fiber glass tissue of Pypcoate

Each MS 'C' Class should be subjected to hydraulic pressure test before installation, in presence of the Engineer-in-Charge or his authorized or his authorized representative.

Necessary facility for draining the rise pipe should be provided at ground floor level with 40mm size Gate valve.

Internal hydrants at each floor should be located at about 1m above floor level.

Valve chambers should be as specified / 1m square in size, with cover.

b) Hoses and Hose Cabinet

All hoses should be numbered and a record submitted with completion plans the number and length should be easily recognizable on each hosepipe.

External hose boxes should be installed such that the hose is not exposed to sun rays.

c) Painting:

Painting of the entire down comer/wet riser and yard piping over the ground should be done with an anti corrosive primer and 2 coats of approved paint. The colour should be red to shade no 536 of IS:5/1961 Paint should conform to IS: 2932/1964.

The pumps should be painted after installation with a coat of approved paint to similar shade as per original supply.

d. Testing of the system

After laying and jointing, the entire piping should be tested to hydrostatic test pressure. The pipes should be slowly charged with water so that the air is expelled from the pipes. The pipes should be allowed to stand full of water for a period of not less than 24 hours and then tested under pressure. The test pressure should be at least 1.5 times the operating pressure. The test pressure should be applied by means of manually operated test pump or by a power driven test pump to be provided by the contractor. In either case precautions should be taken to ensure that the required test pressure is not exceeded.

The open end of the piping should be temporarily closed for testing.

Test should be conducted on each pump set after completion of the installation with respect of delivery head, flow and B.H.P. The test should be carried out by the Contractor at his own cost except for water and electricity, which should be provided by the Employer free.

All leaks and defects in different joints noticed during the testing and before commissioning should be rectified to the satisfaction of Engineer-in-Charge.

Testing of fitting/equipment should be carried out either at site or at works in the presence of a representative of the Department. The Contractor should also furnish test certificates.

The automatic operation of the system, for the various functional requirements and alarms as laid down in his specification should be satisfactorily carried out in the presence of the Engineer-in-Charge.

B. AUTOMATIC SPRINKLER SYSTEM

1. SCOPE OF WORK:

Sprinklers shall be provided in all Floors of the Building. The rated temperature of quartzoid bulb shall be 68⁰C. Sprinkler heads shall be provided at approximate spacing to cover 6.96 to 12 Sq.m per sprinkler (i.e. spacing of 3 to 3.5 metres). In any case the spacing between the detectors should not be less than 2.0 meters. The sprinklers should not be provided in Electrical panel room, UPS Room, and Toilets etc. The flow switches and control valves shall be provided at the entrances of each storage halls on the sprinkler line. All the flow switches will be connected to the annunciation sprinkler panel located at the ground floor. On completion of work floor wise as built drawing should be submitted to the bank.

2.0 SPRINKLER HEADS.

Sprinkler heads shall be of quartzoid bulb type with standard response bulb, valve assembly, yoke, rosette plate and the deflector. The sprinkler shall be of approved make and type.

2.1 TYPES

2.1.1 PENDENT PATTERN

These sprinklers shall be designed to produce a hemi spherical type of discharge below the plane of the deflector with little or no water being discharged upwards to wet the ceiling.

2.1.2 SPRAY PATTERNS

The spray type sprinklers shall produce a hemispherical discharge below the plane of the deflector.

2.1.3 CEILING (FLUSH) PATTERNS: (CONCEALED TYPE)

These shall be designed for use with concealed pipe work. These shall be installed pendant with the cover plate flush to the ceiling with pushover rosette ceiling tile adjustable escutcheon screw adjustment concealed solder type sprinkler cover plate of proper temperature rating etc., as per manufacturer's specification.

2.2 CONSTRUCTION

2.2.1 BULB

Bulb shall be made of corrosion free material strong enough to withstand any water pressure likely to occur in the system. The bulb shall shatter when the temperature

of the surrounding air reaches a pre-determined level. Bulb used should be slimmer than the normal sprinkler bulb, which is of standard response type.

2.2.2 VALVE ASSEMBLY

Water passage of the sprinkler shall be closed by a valve assembly of flexible construction. The valve assembly shall be held in position by the quartzoid bulb. The assembly shall be stable and shall withstand pressure surges or external vibration with displacement.

2.2.3 YOKE

The yoke shall be made of high quality gunmetal. The arms of yoke shall be so designed as to avoid interference with discharge of water from the deflector. The sprinkler body shall be coated with an approved anti-corrosive treatment if the same is to be used in corrosive conditions.

2.2.4 DEFLECTOR

The deflector shall be suitable for either upright or pendent erection. The deflector shall be designed to give an even distribution of water over the area protected by each sprinkler.

COLOUR CODE

The following colour code shall be adopted for classification of sprinklers according to nominal temperature ratings: -

Temperature Rating in ^o C (1)	Colour of Bulb Liquid (2)
57	Orange
68	Red
79	Yellow
93	Green
141	Blue
182	Mauve
204/260	Black

SIZE OF SPRINKLER ORIFICES

The following sizes of sprinklers shall be selected for various classes of hazards:

Ordinary hazard : 15mm nominal bore

TEMPERATURE RATINGS

For normal conditions and temperature climates, rating of 68 ^oC shall be used. However, the temperature rating shall be as close as possible to, but not less than 30^oC above the highest anticipated temperature conditions.

2.3 PIPE WORK:

2.3.1 GENERAL

Pipes for the sprinkler system shall be M.S. 'C' Class pipes conforming to IS 1239 fittings for M.S. pipes shall be of approved make with flanged fittings M.S.'C' Class. For jointing of pipes, butterfly valves check valves etc.

2.3.2 PIPES ABOVE GROUND

The above ground sprinkler system pipes shall be heavy duty M.S. Class 'C' conforming to IS 1239. The fittings used such as bends, Tees, Reducers etc.,

2.3.3 PIPES

The pipes MS class 'C' of all diameters shall be jointed together by Mechanical coupling.

2.3.4 Fittings:

Special fittings of MS class 'C' Forged and tapped to a special taper so as to make a metal-to-metal joint with the piping.

2.4 INSTALLATION OF PIPE FOR SPRINKLER SYSTEM

All above ground piping shall be installed on suitable pipe hangers/supports as required. The hangers shall be made of MS angles, channels, etc., and painted to the required finish (with one coat of zinc chromate primer and two coat of synthetic enamel paint). The spacing of piping supports shall be as follows:

20 mm to 32 mm dia.	-	2.5 meters
40 mm to 65 mm dia.	-	3.0 meters
65 mm and above	-	3.6 meters

Piping shall be so installed that the system can be thoroughly drained. All the pipes shall be arranged to drain to the installation drain valve.

Piping shall be of screwed type upto and including 32 mm dia. Mechanical coupled joints will be allowed for pipes of 40mm or larger diameters.

Sprinklers should have range pipes 25 mm dia of 150 mm length forming part of the fitting. Balance piping from Branch/ sub header will be measured part of piping works.

2.5 FUNCTIONAL TESTS

Upon the completion of the installation, the contractor shall conduct functional tests with simulated fire conditions in the space decided by the owners. The contractor

shall supply all materials, labour and personnel required for the functional tests. Rate quoted in the BOQ shall be deemed to include cost of the above.

SPECIAL SPECIFICATIONS TO BE NOTED:

1. Hanger assemblies should be designed to support five times the weight of the water filled pipe plus 114 kg (250 lb) at each point of piping support. Hanger details should be shown on the plans with the sizes clearly indicated. Hanger design calculations should also be shown in design drawings.

2. Distance between hangers should not exceed 3.7 m for pipes of 32 mm diameter and smaller and not more than 4.6 m for pipes 40 mm diameter and larger. For upright sprinklers, the distance between a hanger and sprinkler head should be more than 76 mm (3 in).

CHAPTER - 2

STANDARDS AND CODES

1. IS - 1648 – 1961 : Code of Practice for fire safety of Building (General) fire fighting equipment and
2. IS - 3844 – 1966 : Code of Practice for installation of Internal fire hydrant in multi storeyed building maintenance.
3. IS - 2217 – 1963 : Recommendation for providing first aid and Fire fighting arrangement in public buildings.
4. IS - 2190 – 1971 : Code of practice for selection, installation and Maintenance of portable first aid fire applicable.
5. NBC : National Building Code.
6. IS - 1239 : G. I pipes and fittings (G.I)
7. IS - 780 – 1984 : Specification for sluice valves for water works purposes.
8. IS - 5312 – 1984 : Specification for Swing check Type Reflex (Part – I)
I)
9. IS - 778 : Gun Metal Valves.

- 10. IS - 909-1965 : External Fire Hydrant (underground)
- 11. IS - 5290 – 1983 : Specification for Landing Valve.
- 12. IS -884 – 1985 / 12585 : Specification first Aid Hose Reel for Fire Fighting
- 13. IS - 903 – 1984 : Specification for Fire Hose Delivery couplings, Branch Pipe, Nozzles and Nozzle Spanner.

CHAPTER - 3

RECOMMENDED MAKES OF MATERIALS FOR FIRE FIGHTING SYSTEMS

1. Hydrant Valve : Essel / Firex / Newage/ Geetech
2. Male / Female coupling : Essel / Safex / Geetech / Newage
3. S.S. Branch Pipe and nozzle : Essel /Geetech / Firex /Newage
4. RRL hose pipe : Jay Shree / Newage / safex
5. First Aid Fire hose reel drum : Dunlop / Newage / Sri / Eversafe/
6. Thermoplastic Rubber hose 20mm dia : Sri/ Newage / / Safex / Eversafe.
7. Collection head : Geetech/ Minimax/Vijay/Newage
8. Fire Hydrant box / hose cabinet : Local make
10. Pump IS : 1520, IS : 5120 : Kirloskar/ Mather & Platte.
11. Electric Motor IS : 325 : Siemens/Kirloskar/ ABB/Crompton Greaves
12. Sluice Valve : Kirloskar or equivalent
13. Non return valve : L & T / AUDCO/ Kartar/ Normex
14. Gate Valve : Leader / Sant / Zoloto/L&T
15. DOL Starters : Siemens / L&T / Merlin gerin/ABB
16. Ammeter / Voltmeter : AE / L & T / IMP
17. CTs : PowerAE Kappa, Poweronics
18. Pressure Switches : Dan Foss / Trafag / Honeywell
19. Pressure Gauges IS : 3624 : Fievig, HGuru
20. M.S. / G.I 'C' class Pipe : : Jindal , Tata steel (IS : 1239 or IS : 3589)
21. PVC insulated, Aluminium, copper conductor : Nicco/finolex/Havells UG. LT. Cables 1100 Volts grade IS : 1554 (Part I)
22. Cable end terminations : Dowells, Dmsuel
23. Terminal Block : Elemech
24. Butterfly Valve : L & T / AUDCO/ Kartar/ Normex

- | | | |
|-----|--------------------------|-----------------------------------|
| 25. | MCB | : Legrand/Hager/Merlin Gerin |
| 26. | MCCB (50 KA rating only) | : L&T/Siemens/Schneider(M-G) |
| 27. | Flow Switch | : Honeywell/System Sensor/Switzer |
| 28. | Sprinkler Bulbs | : Tyco, Viking, Newage, Monsher. |
| 29. | Sprinkler Flexible Drop | : Easyflex, Seuingzin, Monsher. |
| 30. | Universal Clamps | : Perfeket, Hitech |
| 31. | Air Release Valves | : Audco, Durga, Sant, Zoloto |
| 32. | Foot valve | : Normax |
| 33. | Twisted pair wire/Cables | : Lapp/Polycab/Thermopads/ eqvt |
| 34. | Copper Cables | : RR /Gloster/ Nicco/finolex |

Note : Before use of any of the above brands for the Project, Prior written permission should be taken from the client/Consultant. The Client should have choice to select any of the above approved brands.

**BOQ FOR FIRE HYDRANT , SPRINKLER SYSTEMS AND RELATED
ELECTRICAL WORKS AT DAC GACHIBOWLI**

FIRE HYDRANT SYSTEM WORK: PART-A					
S No	DISCREPTION	Unit	Qty	RATE (Rs.)	AMOUNT (Rs.)
1	Supply, installation, testing and commissioning of Diesel Engine driven pump of end suction centrifugal type 2280 LPM , Cast iron body, Bronze impeller, stainless steel shaft, mechanical seal, Head 70 mts, Coupled with Diesel Engine with radiator, silencer, manual starting panel, Battery, diesel engine developing 68 BHP, 2140 RPM, flexible coupling and guard with the pump, common base plate fabricated with mild steel channel including suitable cement concrete foundation (1:2:4) with nuts and bolts for mounting the engine and pump, Exhaust pipe with heat insulator and mufflers. Diesel oil tank of 150 liters or of suitable capacity for minimum 8 hrs run with stand, all fuel lines, hose pipes and level indicator complete. MAKE: KIRLOSKAR or Equivalent.	Set	1		
2	Supply, installation, testing and commissioning of 2280 lpm, 70 M head centrifugal pump of cast iron body and bronze impeller with stainless steel shaft confirming to IS: 1520 along with 60 HP, 2900 RPM induction motor TEFC type suitable for operation on 415V, 3 phase, 50 Hz, AC with IP 65 class of protection enclosure horizontal type with class 'F' insulation, confirming to IS 325 complete with flexible coupling with guard and MS chanel base plate and RCC (1:2:4) foundation with nuts and boltsetc. MAKE: KIRLOSKAR		1		

3	Supply, installation, testing and commissioning of 180 lpm, 70 M head monoblock centrifugal pump of cast iron body and bronze impeller with stainless steel shaft confirming to IS: 1520 along with 12.5 HP, 2900 RPM induction motor TEFC type suitable for operation on 415V, 3 phase, 50 Hz, AC with IP 65 class of protection enclosure horizontal type with class 'F' insulation, confirming to IS 325 complete with MS chanel base plate and RCC (1:2:4) foundation with nuts and boltsetc. MAKE: KIRLOSKAR	Set	1		
4	Supply, installation, testing and commissioning of electric driven terrace/ booster monoblock pump suitable for automatic operation and consisting of following: complete in all respect as required a) horizontal type centrifugal pump of cast iron body and bronze impeller with stainless steel shaft, mechanical seal and flow of 900 LPM at 40 Mtrs head, 3000 RPM confirming to IS: 1520 b) 12.5 HP sq cage induction motor TEFC type suitable for operation on 415V, 3 phase, 50 Hz, AC with IP 65 class of protection enclosure horizontal foot mounted type with class 'F' insulation, confirming to IS 325 c) MS fabricated common base plate, and suitable cement concrete (1:2:4) foundation with nut & bolts etc. MAKE: KIRLOSKAR or Equivalent	Set	1		
5	Supply, Installation, testing and commissioning of Compartmentalized common control panel as per IS: specification & tested as per standard specification made out of 2mm sheet painted with powder coating process suitable for electrical motor driven pumps , diesel engine driven pump, jockey pump and booster pump with following switchgear:	Set	1		
	Incoming: 1 no. 250A, 35KVA TPN MCCB, 1 set of 400A TPN copper bus bar with color coded heat shrinkable PVC sleeves. 1 set of RYB indicating lamp with individual MCB control fuses 1NO. of 96 sq.mm, 0-400A ammeter with selector switch and suitable rated current transformers. 1 no. 0-500, 96 sq.mm voltmeter with selector switch.				

	OUTGOING: (1)Feeder for Main pump -1 No. 1 no 200 A 4 pole 25KA MCCB. Star delta starter with over load relay, single phase preventer and ON/OFF/TRIP indicating lamps with start/ stop push buttons along with ammeter with CTs. Auto/ manual selector switch with wiring.				
	(2) Feeder for jockey Pump-1 No.				
	1 no. 63 A 4 Pole MCB. DOL starter same as above for jockey pump motor.				
	(3) Feeder for Booster Pump - 1 No				
	1 no. 63 A,4 pole MCB. DOL starter same as above for booster pump motor.				
	(4) DIESEL ENGINE MAIN PUMP				
	a) 20 Amps DPMCB-3 nos.				
	b) Electronic rectifier, DC ammeter, DC Voltmeter, Trickle/booster/off selector switch.				
	c) Set of indicating lamps for the following: phase indication, DC supply on, Engine run, engine idle, engine fails to start, low oil pressure, high water temp.				
	d) ON/OFF selector switch for AC supply				
	e) Battery charging system				
	Description:				
	f) ON/OFF selector switch for DC supply				
	g) Auto/ manual selector switch				
	h) Sets of push button stations for the following.				
	i) Engine start, engine stop, engine hooter ACK, engine reset				
	j) Auxiliary relays/ contractors/timer for sequence operating for starting and stopping of the engine- 1 set				
	k) Hooter for audio alarm-1 No.				
	l) The panel should have both bottom cable entry provisions and panel should be mounted on pedestal/ stand of 300 mm height. Also panel should have sufficient (min 6 nos. per pump set) NO/NC. contacts for extending the status of fire pumps to the external annunciation panel.				
6	SITC of weather proof push button starter panel for booster pump with provision of ON / OFF switch and indicator lamps (To be installed on the terrace near booster pump)	No	1		

7	Supply and laying of the following MS pipe of class 'C' with ISI mark, conforming to IS:1239 / 3589 including supports, bends, reducers, flanges including painting with one coat primer and 2 coats of post office red enamel paint and all Make: Tata/Jindal				
7.1	200 mm	Rmt	6		
7.2	150 mm	Rmt	60		
7.3	100 mm	Rmt	230		
7.4	80 mm	Rmt	12		
7.5	50 mm (For priming connections)	Rmt	12		
7.6	15 mm	Rmt	10		
8	Civil Works				
8.1	Supply and Laying of 300 mm dia. NP3 RCC Hume pipe with collors for road crossings	Rmt	24		
8.1	Excavation of earth / Road upto one meter depth for laying 300 mm hume pipe including backfilling and making good to the original with cement concreting after completion of work. The scope of work includes excavation/ cutting of rock also	Rmt	24		
8.2	Excavation of earth / Road upto one meter depth for laying 150 mm MS pipe including backfilling and making good to the original after completion of work. The scope of work includes excavation/ cutting of rock also	Rmt	90		
8.3	Anticorrosive wrapping and coating treatment to the underground pipes as per relevant standard.	Rmt	90		
8.4	Making holes (Core cutting) in the wall for following size of pipe and making it good to the original as required				
a.	100 mm dia.	No	1		
b.	150 mm dia	No	1		
9	Supply and fixing of wafer / Clapper type cast iron Non Return Valve (PN-1.6) valves with matching flanges nuts, bolts, washers and gaskets confirming to IS: 5312 with ISI mark of the following size. Make: Kirloskar/ Audco / Kartar/ Normex				
9.1	150 mm	No	2		
9.2	80 mm	No	1		
9.3	50 mm (For priming connections)	No	3		

10	Supply, Installation and testing of cast iron Butter fly valves (PN-1.6) with matching flanges nuts, bolts, washers and gaskets as per IS: 13095 with ISI mark of following sizes. Make: Kirlosker/ Audco/Kartar/ Normex				
10.1	150 mm	No	5		
10.2	100 mm (Including yard line isolation valves)	No	12		
10.3	80 mm	No	2		
10.4	50 mm (Priming Control valves)	No	4		
11	Supply, Installation, Testing & Commissioning of ball type Foot valves of following sizes. Make: Normax/ Equivalent				
11.1	200 mm	No	2		
11.2	100 mm	No	1		
12	Supply and fixing of new hose reel drum of wall mounted swinging type (180 degree) conforming to IS:884 along with 19 mm dia. Reinforced thermoplastic hose reel with ISI mark confirming to IS:12585 of 40 mtrs length with gate valve and shut of nozzle with necessary fixing accessories like anchor bolts and connecting with main pipes by welding make: New age/Dunlop/Sri / Eversafe/ Minimax/ Safex	No	4		
13	SHORT BRANCH PIPE: Supply, installation, testing and commissioning of 63 mm dia S.S Short Branch pipes as per IS 903 standards with nozzle having ISI Mark. Make: Eseel	No	9		
14	Supply and testing of R.R.L Hose pipe as per IS: 636, type 'B' ISI mark (Length of 15 M long, 63mm dia) with male and female heavy duty stainless steel couplings with ISI mark and with copper binding. Make: (New Age/ shah bhogilal/CRC,Wimco/shahbhogilal/New age)	No	18		
15	Supply, installation and commissioning of Cast iron fire brigade inlet connection of 4 way inlet with in-built stainless steel non return valve instantaneous coupling type along with 100 mm butter fly valve enclosed in a MS metal box with glass fronted door (To be connected one to to yard line wet risers and other to th sprinkler Riser).Make Essel/Newtech	No	2		

16	Supply & Installation of 500 liters capacity Tank of PVC HDPE tank for priming of fire pumps with stand and all accessories.	No	2		
17	Supply, installation and commissioning of Cast iron fire brigade inlet connection of 4 way inlet Stainless steel couplings with out in-built non return valve nd enclosed in a MS metal box with glass fronted door (To be connected to UG water sump).Make Essel/Newtech	No	1		
18	FIRE HOSE BOXES: Supply, installation, testing and commissioning of Hose box size 30 X 24 X 10, fabricated out of MS sheet of 36 Gauge with Glass glazed doors of 4mm thick & Locking arrangements. The hose box capable of storing 2 Nos. of Fire Hoses of 15 mtr length & one branch pipe. The Fire Hose box will be powder coated. The hose box to be mounted on Angle frame.	No	9		
19	SITC of M.S. Air cushion vessel of 200 mm dia., 5 mm thick and one meter length complete with safety valve and drain valve and all accessories and stand etc.	No	1		
20	Supply and installation of single headed oblique type hydrant valve with female stainless steel coupling of 63 mm as per IS:903 with ISI mark complete with wheel and chained blank cap and overall conforming to IS: 5290 with ISI mark.	No	9		
21	Supply, installation, testing and commissioning of Air release valve (GUN metal), 25mm dia, with control valve and all necessary fixing accessories, etc complete. Make: Officine/Regamonti.	No	2		
22	Supply, installation testing and commissioning of pressure switches (0 to 100) psi including control valve, necessary cablings etc.	No	3		
23	Pressure gauge (0 – 14 Kg/cm ²) with siphon tube and control valve Make H guru/KI	No	6		
24	Supply, Installation, Testing & commissioning of Ball Valves of 20 mm dia. Make: Zoloto	No	6		

25	MV cables: supply, laying and commissioning of following size 11 KV grade PVC insulated, sheathed steel strip/ wire armoured conductor underground cable to be laid from panel to pump motors. The cable should be conform to IS: 1554/ Part I, with including double compression gland terminations both the ends and supply & fixing of canopy for the glands on load side(quantity should be on actual)				
25.1	3Cx25 sq.mm Aluminium Ar Cable for main pump(For Star deita starter)	Rmt	20		
25.2	3Cx 10 sq.mm copper Ar Cable for jockey pump For DOL starter)	Rmt	12		
25.3	3Cx10 sq.mm copper Ar, cable for Booster pump	Rmt	35		
25.4	12Cx 1.5 sq.mm Ar copper cable for Diesel Engine	Rmt	10		
25.5	3CX 1.5 Sq.mm Ar Copper cable	Rmt	80		
26	Supply and fixing of earthing (G.I. strip of 25 x 3 mm size) for control panels and motors	Rmt	25		
TOTAL COST FOR FIRE HYDRANT SYSTEM WORK: PART-A					
SPRINKLER SYSTEM - PART-B					
S.N O	DISCRIPTION	UNIT	QTY	RATE (RS)	AMOUNT (RS)
1	Supply, installation, Testing and commissioning of Following GI pipes of Class "C" with ISI Mark , Conforming to IS: 1239/3589 including supports, anchor fastners, clamps,bends, reducers , couplings and all necessary fittings, flanges and nut and bolts with gaskets etc. and painting with one coat primer and 2 coats of P.O. Red enamel paint (Make : Tata, Jindal)				
a	150 mm	Mtrs	54		
b	100 mm	Mtrs	54		
c	80 mm	Mtrs	102		
d	65 mm	Mtrs	54		
e	50 mm	Mtrs	42		
f	40 mm	Mtrs	150		
g	32 mm	Mtrs	360		
h	25 mm	Mtrs	360		

2	Supply, Installation, Testing and Commissioning of Cast Iron Butter Fly Valve as per IS:13039, PN 16 lever operated with matching flanges, gaskets, bolts and nuts with painting to the flanges with 1 coat primer and 2 coats of enamel paint (Make Audco, Kartar, Zoloto)				
(a)	100 mm (Control Valves)	No	8		
(b)	50 mm dia (for drain / Test connection)	No	8		
3	Supply, Installation, Testing and Commissioning of quartzoid bulb Pendant Type sprinkler heads 15 mm dia. With 68 degrees temperature ratings with UL approved (Make - HD, Tyco, Newage, equivalent)	NO	400		
4	Supply & installation of water Flow switches for Sprinkler line flow indication - make - Honeywell	No	8		
5	Supply and Installation of 12 Zone Flow switch indication panel with 230 V AC & 24 V DC battery charger, Fire Indications, System ON, fault indications - Make - Ravel	No	1		
6	2 core x 1.5 sq. mm copper Armoured cable Make: Finolex / Equivalent	RMT	600		
7	Supply and fixing of Cast iron flanged Y-type strainer of 150 mm dia. (Make: Kartar / Audco/Samsung)	No	1		
8	Supply, Installation, Testing and Commissioning of pressure guage (0 - 14Kg/sqcm) range with ball vave.	No	8		
8	Civil work - Making holes (Core cutting) in the wall for 100 mm pipe and making it good to the original as required	No	8		
SPRINKLER SYSTEM - PART-B					
ELECTRICAL WORKS RELATED TO FIRE HYDRANT- PART-C					
1	Supply & laying of 3.5 core 95 sqmm aluminium armoured cable upto the pump room for providing power to the pump control panel. The scope of work includes glanding for both the sides	Rmt	50		
2	SITC of 250A ,4 pole 25KA MCCB in a suitable enclosure with extendable rotary handle	No	1		

1	<u>GI EARTHING:</u> Providing independent earthing for important equipment with 40 mm dia "B" class 2.5m long G.I pipe and 19mm dia "B" class G.I pipe of 0.3 mtr. Long connected with reducer providing G.I. funnel with mesh enclosed in C.C. Chamber of 400mm x 400 mm x 400 mm with RCC slab cover duly providing staggered holes filling with salt and charcoal from the bottom of the pipe giving earth connection from electrode through G.I. strip 2 runs of 50 x 6 mm x 3000 mm length with all accessories and labour charges complete, as per IS specifications 732/1982 (part II)	No	2		
2	Supply & laying of 50 X 6 mm GI flat	Rmt	50		
ELECTRICAL WORKS RELATED TO FIRE HYDRANT- PART-C					
Grand Total: PART:A + PART:B + PART:C					

Note: above costs are exclusive of GST