



Balmer Lawrie & Co. Ltd. (बामर लॉरी एंड कंपनी लिमिटेड)
(A Government of India Enterprise) (भारत सरकार का एक उद्यम)
Engineering & Projects (इंजीनियरिंग और परियोजनाएं)
21, Netaji Subhas Road (21, नेताजी सुभाष रोड)
Kolkata - 700 001 (कोलकाता – 700 001)

Fire Protection System for Temperature Controlled Warehouse (तापमान नियंत्रित गोदाम के लिए अग्नि सुरक्षा प्रणाली)

at (पर)

IDCO Industrial Estate, Chhatabar, Dist-Khurda, Odisha
(इंडस्ट्रियल एस्टेट, छतबार, डिस्ट्रिक्ट – खुर्दा, ओडिशा)

Tender No. EP/TCW/BHU/FPS/12

Tender Date: 09.06.2020

Due Date: 29.06.2020, 16:00 Hrs

UNPRICED PART (PART-I)

TENDERER'S CHECKLIST POINTS

Tenderer shall require filling in the table below appropriately:

| SI No. | Submission of Document | Bidder's Confirmation/Submission (Yes / No) |
|--------|--|---|
| 1 | Earnest Money Deposit | |
| 2 | 90 days validity of the offer confirmation | |
| 3 | Audited Annual Reports (for past three years) | |
| 4 | Copy of Work Order and Completion Certificates for similar job as per Pre-qualification Criteria | |
| 5 | Power of Attorney of the Signatory | |
| 6 | PAN | |
| 7 | Provident Fund Registration | |
| 8 | GSTIN Registration | |
| 9 | Valid MSE registration certificate as per tender if applicable | |
| 10 | Compliance of Company's HSE policy | |
| 11 | Price Schedule in Un-priced Bid duly blanked out and signed | |
| 12 | Tender Document (along with addendum if any) duly signed and stamped on all pages | |
| 13 | Price quoted strictly as per Tender price schedule | |
| 14 | Payment Terms in compliance to tender requirement | |
| 15 | Completion Period in compliance to tender requirement | |
| 16 | LD clause in compliance to tender requirement | |
| 17 | Warranties and Guarantee in compliance to tender requirement | |
| 18 | All others Technical & Commercial Terms & Conditions shall remain unaltered as per Tender document | |

Hard copies of the above confirmatory documents must be sent before due date of submission of online tenders

Bidder's Information

| Sl no. | Description | Details to be filled up by Bidder |
|--------|---|-----------------------------------|
| 1 | Name1 (max. 35 char.) | |
| 2 | Name2 (max. 40 char.) | |
| 3 | Street/House No. (max. 50 char.) | |
| 4 | Street1 (max. 40 char.) | |
| 5 | Street2 (max. 40 char.) | |
| 6 | PIN Code (Postal Index No. e.g. "700001") (max. 6 char.) | |
| 7 | City/Place (e.g. "Kolkata" or "Dehradun") (max. 40 char.) or as the name of the city | |
| 8 | Country ("India" or "England" or as the name of country be) | |
| 9 | State (Name the state from where the office of Bidder operates) | |
| 10 | First Tel. No. (With STD Code): (e.g. 033- 22225280 or 022-66552814) (max. 30 char.) | |
| 11 | First Fax No. (with STD Code) | |
| 12 | Contact Person | |
| 13 | First Mobile No. | |
| 14 | E-mail Address) (max. 40 char.) | |
| 15 | PAN No. : | |
| 16 | GSTIN Registration No. : | |
| 17 | GSP Name (GST Suvidha Provider) | |
| 18 | Bank Name (max. 60 char.) | |
| 19 | Street (max. 35 char.) | |
| 20 | City (max. 35 char.) | |
| 21 | Branch (max. 40 char.) | |
| 22 | IFSC Code | |
| 23 | MICR Code | |
| 24 | Account No. | |
| 25 | Type of Account (Current, Savings, etc.) | |

LIST OF CONTENT:

UN-PRICED PART (PART I)

1. NOTICE INVITING TENDER
2. CONDITIONS OF CONTRACT
3. DESIGN BASIS REPORT
4. TECHNICAL SPECIFICATION
5. LIST OF APPROVED MAKE
6. TECHNICAL DATA SHEETS
7. TENDER DRAWING

PRICED PART (PART II)

1. SCHEDULE OF WORK

NOTICE INVITING TENDER
Tender No. EP/TCW/BHU/FPS/12

1.0 Balmer Lawrie & Co. Ltd. invite **ONLINE BIDS in Two Part System** from experienced, competent and resourceful Contractors with sound technical and financial capabilities for Supply, Installation, Testing & Commissioning of Fire Protection System at proposed Temperature Controlled Warehouse at IDCO Industrial Estate, Chhatabar, Dist-Khorda, Odisha

2.0 **SCOPE OF WORK**

The tender under reference covers supply, installation, testing, commissioning of Fire Protection System as per the notice inviting tender, condition of contract, technical specification, tender drawing, data sheet, schedule of work and as per the satisfaction of the Engineer-in-Charge.

Quantities mentioned in the Schedule of Work are estimated only. Successful bidder need to submit Layout of Hydrant System, Sprinkler System, Fire Detection and Alarm System, Layout of Pump House along with bill of quantities of equipment/item for owner's approval.

During Performance Guarantee period regular check-up of the Fire Hydrant, Sprinkler & Fire Detection & Alarm system shall be carried out once in 2 months (i.e. 6 times during Guarantee period) by the contractor. The quoted rates shall include these services. Apart from that quoted price also includes any emergency requirement for attending any problem/ failure of the system during Performance Guarantee period. Every such emergency call shall be attended within 48Hrs of the call-booking through written communication / e-mail etc. during this period & afterwards.

Order for AMC will be placed separately after completion of the project.

3.0 **COMPLETION PERIOD**

Time is the essence of the contract. The time schedule for total work according to the contract shall be **16 (Sixteen) Weeks** from the date of placement of order or within **4 (Four) weeks** from the date of handing over of last-work front at site whichever is later.

4.0 **EARNEST MONEY DEPOSIT**

Unpriced Part of the Bid should be accompanied by a Demand Draft or Bank Guarantee of **Rs 31,000.00 (Rupees Thirty One Thousand Only)** towards Earnest Money Deposit (EMD) executed by any scheduled bank drawn in favour of M/s Balmer Lawrie & Co. Ltd. payable at Kolkata as per format enclosed. EMD submitted by way of Bank Guarantee should be valid for a minimum period of 120 days after the due date of tender submission.

Earnest Money deposit (EMD) is exempted for agencies registered under NSIC or coming under the definition of Micro and Small Industries and holding valid registration certificates covering the tendered items/services. Declaration of Udyog Aadhar Memorandum (UAM)

by the MSE parties on Central Public Procurement Portal (CPPP) shall be mandatory. However, valid NSIC certificate or "Micro and Small" industry certificate must be submitted in this regard.

- 4.1 For the successful bidder, the EMD will be refunded only after completion of the work. No interest shall be payable towards EMD amount.
- 4.2 For the unsuccessful bidders, the EMD will be refunded only after the successful bidder has accepted the work order and the acknowledgment of the same has been received by the owner.
- 4.3 EMD is liable to forfeiture in the event of:
 - a) Withdrawal of offers during validity period of the offer
 - b) Non acceptance of orders by the bidder within the stipulated time after placement of order.
 - c) Any unilateral revision made by the bidder during the validity period of the offer.
 - d) Non-performance of the bidder during the tenure of work.
 - e) Bidders submitting false/fabricated/bogus documents in support of their credentials

5.0 **PRE-QUALIFICATION CRITERIA**

- 5.1 Average annual turnover of the tenderer shall be minimum of **Rs 56 Lakh** during last three financial years ending 31st March, 2019.
- 5.2 The tenderer should have successfully executed **Fire Protection System** during past seven (7) years ending last day of month previous to the one in which the tender is invited.
 - a. 3 jobs each of value not less than **Rs 25 Lakh** or
 - b. 2 jobs each of value not less than **Rs 31 Lakh** or
 - c. 1 job of value not less than **Rs 50 Lakh**

Copy of work orders and completion certificates / commissioning report from the owner/ consultant should be enclosed as supportive documents. Order copy issued by the owner to the consultant shall also be furnished if the completion certificate is issued by the consultant on behalf of the owner.

- 5.3 Tenderer should have PAN, GSTIN registration, PF registration. Copy of the same shall be submitted along with techno commercial offer.

6.0 **TENDER DOCUMENTS**

Tender Documents comprises two parts viz. Part-I (Un-priced) and Part-II (Priced). The Un-priced Part consists of Notice Inviting Tender, Condition of Contract, Technical Specification and Drawings. The Priced Part consists of Priced Schedule. Bidders are requested to download the tender document and read all the terms and conditions mentioned in the tender document and seek clarification if any, from Sk Abu Jafor, Manager, Mob (7893422855). Any clause defining offline bid submission in the tender

document shall not be considered.

7.0 **TENDER SUBMISSION**

The intending tenderers shall be deemed to have visited the site and familiarise themselves thoroughly with the prevailing site conditions before submission of the tender. Non familiarity with the site conditions will not be considered reason either for extra claim or for not carrying out the work in strict conformity with the drawing, specification and time schedule.

The tenderer is required to register on the e-procurement site <https://balmerlawrie.eproc.in> and submit their bids online.

For registration and online bid submission tenderer may contact the following officials at the HELP DESK of M/s C1 India on browsing to the website <https://balmerlawrie.eproc.in> as mentioned below: during business hours (10:00 a.m. to 06:30 p.m.) from Monday to Friday (Excluding holidays of the Company):

| Dedicated email : blsupport[at]c1india[dot]com | | | |
|---|--|-----------------------------|-----------------------------------|
| Dedicated Helpdesk for Balmer Lawrie | | | |
| <u>Contact Person</u> | <u>E-Mail ID</u> | <u>Tel. No.</u> | <u>Helpdesk Nos are open from</u> |
| 1. Mr.Tirtha Das (Kolkata) | tirtha.das@c1india.com | +91-9163254290 | MON - FRI |
| 2. Mr. CH. Mani Sankar (Chennai) | chikkavarapu.manisankar@c1india.com | +91-6374241783 | MON - SAT |
| 3. Ms. Ritu Patil (Mumbai) | ritu.patil@c1india.com | +91-124-4302000 (Ex-236) | MON - FRI |
| 4. Helpdesk Support (Kolkata) | blsupport@c1india.com | +91-8017272644 | SAT |
| Escalation Level 1 | | | |
| Mr.Tuhin Ghosh | tuhin.ghosh@c1india.com | +91-8981165071 | |
| Escalation Level 2 | | | |
| Mr.Sandeep Bhandari | sandeep.bhandari@c1india.com | +91-8826814007 | |
| Escalation Level 3 | | | |
| Mr.Achal Garg | achal.garg@c1india.com | | |
| In case, you are unable to get in touch with any of the Technical Support Associates, kindly drop a mail at blsupport@c1india.com mentioning your Name and Mobile No. One of our associates will get back shortly. | | | |

The tenderer shall authenticate the bid with his Digital Certificate for submitting the bid electronically on e-procurement platform and the bids not authenticated by digital certificate of the tenderer will not be accepted on the e-procurement platform.

All the tenderers who do not have digital certificates need to obtain Digital Certificate (**with both Signing and Encryption Components**). They may contact help desk of M/s C1 India.

The tenderer shall furnish the Demand Draft /BG for EMD to the tender inviting authority so as to reach on or before the due date and time of the Tender either personally or through courier or by post and the receipt of the same within the stipulated time shall be the responsibility of tenderer. The Company shall not take any responsibility for any delay or non-receipt. If any of the documents furnished by the tenderer is found to be false/fabricated/bogus, the tenderer is liable for black listing, forfeiture of the EMD, cancellation of work and criminal prosecution. The tenderer is requested to get a confirmed acknowledgement from the Tender Inviting Authority as a proof of Hardcopies submission to avoid any discrepancy.

The bidders found defaulting in submission of hard copies of original Demand Draft for EMD and other documents to the Tender Inviting Authority on or before the stipulated time in the Tender will not be permitted to participate in the Tender.

The bidder is requested to read all the terms and conditions mentioned in the tender Document and seek clarification if any.

The bidder should keep track of any Addendum / Corrigendum / Amendment issued by the Tender Inviting Authority on time-to-time basis in Company's website (www.Balmerlawrie.com) and e-procurement site (<https://balmerlawrie.eproc.in>). No separate newspaper advertisement shall be published for such Addendum / Corrigendum / Amendment etc. The Company calling for tenders shall not be responsible for any claims/problems arising out of this.

The tenderer should complete all the processes and steps required for bid submission. The successful bid submission can be ascertained once acknowledgement is given by the system through bid submission number after completing all the process and steps. M/s C1 India is not responsible for incomplete bid submission by users. Tenderers may also note that the incomplete bids will not be saved by the system and are not available for the Tender Inviting Authority for processing.

Neither the Company (Balmer Lawrie & Co. Ltd.) nor the service provider (M/s C1 India) is responsible for any failure or non-submission of bids due to failure of internet or other connectivity problems or reasons thereof.

The hardcopies of the Bid Documents as explained above and also defined in clause no. 2.0 of Condition of Contract under sealed envelope should reach the office of Head (Engineering & Projects), Balmer Lawrie & Co Ltd, Engineering & Projects Department, 21 Netaji Subhas Road, Kolkata 700001, on or before the due date of submission of tender. The Bidders who are submitting the Bids in person are requested to drop the same in our tender box located at the entrance of 2nd floor at the above address.

8.0 SUPPLY OF MATERIAL

All materials required for the work shall be supplied by the Tenderer.

9.0 TAXES & DUTIES

All taxes and duties other than GST shall be included in the quoted rate. GST shall be quoted separately as per schedule of work of price bid.

10.0 DEVIATION

It is expected that bidders will submit their bid strictly based on the terms and conditions and specifications contained in the bidding documents and will not stipulate any deviations. Should it, however, become unavoidable, deviations (in the form of Deviation Sheet-Attachment-X) should be submitted along with the Bid. Deviations mentioned in any other place shall not be taken into account by BL.

11.0 BASIS OF EVALUATION

Bidders will be selected through evaluation of their Unpriced Bids based on fulfilment of pre-qualification criteria i.e. submission of all required PQ documents and other required documents, EMD/MSE Certificate as per the instructions contained in the tender document. Price Bids will be opened only for the bidders whose Unpriced Bids (Part-I) are found to be acceptable. It is mandatory to quote for all the items failing which bid may be rejected. L1 Bidder will be determined based on total basic amount comprising of all items covered upto sl. no G [i.e. all items except Annual Maintenance Contract].

12.0 INSTALLATION, COMMISSIONING & TRAINING

The installation, testing and commissioning of the equipment/fire protection system shall be carried out by competent engineers/technicians of the Tenderer at the work site. After commissioning, the successful bidder's engineer / technician shall impart necessary training to Owner's personnel in operating and maintaining the installed fire protection system. No separate charge shall be payable by the Owner/BL for the purpose.

13.0 NON-CONFORMANCE

Tenders not conforming to the above mentioned requirements are liable to be rejected.

14.0 VALIDITY OF OFFER

Tendered shall keep their offer valid for a period of 90 days from the date of opening of Unpriced bid.

15.0 QUANTITY VARIATION

The quantity as mentioned in the Schedule of Work/ Price Bid is indicative. The selected bidder/Contractor shall however ascertain the exact quantity required at site, obtain approval from BL on quantity, supply and install accordingly. As the work progresses, it is possible that there will be quantity variations to any extent & omission of items. Specially, the quantity of pipes, cables, misc. civil work etc. may vary extensively based on detailed design requirement/site conditions. Under all such circumstances, the rates should be firm.

16.0 FIRM PRICE

The price should be firm and irrevocable and not subject to any change till the completion of Scope of Work.

17.0 RATES AND OTHER ENTRIES

- (a) The tenderer should quote for all items in the Schedule of Rates. If there is any discrepancy between unit rate and total amount, the unit rate will prevail.
- (b) The rates should be quoted in the same units as mentioned in the tender schedule of quantities.
- (c) All entries in the tender documents should be in ink / type. Corrections if any should be attested by full signature of the tenderer.
- (d) Every page of the tender document including annexure / enclosures shall be stamped and signed by the tenderer or his authorized representative thereby indicating that each and every page has been read and the points noted.

18.0 RIGHT TO ACCEPT OR REJECT TENDER

- 18.1 M/s Balmer Lawrie & Co Ltd reserves the right to accept or reject any or every tender without assigning any reason whatsoever / or to negotiate with the tenderer (s) in the manner it considers suitable. In the event of receipt of lowest price from more than one (1) bidders, fresh price bids shall be invited from the lowest bidders only to determine final lowest bidder for placement of order.
- 18.2 Bids of any tenderer may be rejected if a conflict of interest between the bidder and Company (Balmer Lawrie) is detected at any stage.
- 18.3 All the bids will be evaluated based on Pre-qualification and other criteria as mentioned in this NIT. Tenders of those bidders who are not meeting the pre-qualification criteria will not be considered for commercial evaluation.
- 18.4 Tender if submitted through e-mail or fax shall be summarily rejected.
- 18.5 Hard copy of Price Bid should not be submitted in the envelope containing Un-priced documents failing which the bid will be summarily rejected.
- 18.6 Clarifications /exceptions / deviations to the tender terms & conditions and specifications:**

Balmer Lawrie & Co. Ltd. expects Tenderers to confirm compliance to tender terms & conditions and specifications, failing which the Tenderers are liable to be rejected. Hence all Tenderers in their own interest are advised to submit their bids in all respects confirming to all terms & conditions of the bid document.

Bids shall be evaluated based on the information / documents available in the bid. Hence Tenderers are advised to ensure that they submit appropriate and relevant supporting documentation alongwith their proposal in the first instance itself. Bids not complying the requirements of bid documents will be rejected without any further opportunity.

For any Technical clarifications / queries Tenderers are requested to contact from Sk Abu Jafor, Manager, Mob (7893422855) (from 10.00AM to 06.00PM, Monday - Friday).

for **Balmer Lawrie & Co Ltd**

(G C Saha)
Head (Engineering & Projects)

CONDITIONS OF CONTRACT

1.0 DEFINITIONS

The following expressions hereunder and elsewhere in the contract documents used shall have the following meanings respectively assigned to them namely,

- 1.1 The "Owner/Client" shall mean M/s **Balmer Lawrie & Co. Ltd**; a company incorporated in India and having its Registered Office at 21, Netaji Subhas Road, Kolkata - 700 001, and shall include its successors and assigns.
- 1.2 The "Project" shall mean "**Supply, Installation, Testing & Commissioning of Fire Protection System" for Temperature Controlled Warehouse at IDCO Industrial Estate, Chhattabar, Dist-Khorda, Odisha.**
- 1.3 The 'Engineer-In-Charge'/'Engineer' shall mean the Engineer /Officer authorised by the 'Owner' for the purpose of the contract for overall Supervision and Co-ordination of site activity and certification of billing.

2.0 DETAILS OF HARD COPIES TO BE SUBMITTED ALONG WITH THE TENDER

The tender, as submitted, shall consist of the following:

- (i) Hard copy of Un-priced Tender Document duly filled in, stamped and signed by the Tenderer as prescribed in different clauses of Tender documents. No hard copy of priced bid shall be submitted. Priced bid shall only be submitted online. The price bid format (. xls file) shall be downloaded from the website, bidder to fill in their item-wise rates and change GST % (if required), print stamp, sign, scan and upload the same.
- (ii) Earnest money amounting to and in the manner specified or MSE certificate along with the Un-priced bid.
- (iii) The Power of Attorney or authorisation, or any other document consisting of adequate proof of the ability of the signatory to bind the bidder, in original, when the power of attorney is a special "Power of Attorney" relating to the specific tender of Balmer Lawrie & Co Ltd only. A notarized true copy of the "Power of Attorney" shall also be accepted in lieu of the original, if the power of attorney is a general "Power of Attorney". However, photocopy of such notarized true copy shall not be accepted.
- (iv) Similar work done in past Seven years by the tenderer with copy of work orders and completion/commissioning certificate from the client/ consultant appointed by the client.
- (v) Audited annual reports for last three financial years.

- (vi) PAN / GSTIN / PF / ESI and/or declaration regarding PF& ESI
- (vii) Any other documents required in terms of this tender.

3.0 RATES AND OTHER ENTRIES

- (a) The tenderer should quote for all items in the Schedule of Rates. Where discrepancy exists between the two, the rates expressed in words will prevail. Similarly if there is any discrepancy between unit rate and total amount, the unit rate will prevail.
- (b) The rates should be quoted in the same units as mentioned in the tender schedule of quantities.
- (c) All entries in the tender documents should be in ink / type. Corrections if any should be attested by full signature of the tenderer.
- (d) Every page of the tender document including annexure / enclosures shall be stamped and signed by the tenderer or his authorised representative thereby indicating that each and every page has been read and the points noted.

4.0 RIGHT TO ACCEPT OR REJECT TENDER

The Owner reserves the right to accept or reject any or every tender without assigning any reason whatsoever / or to negotiate with the tenderer(s) in the manner the Owner considers suitable. The work may be split up if considered expedient.

5.0 SECURITY DEPOSIT

- (i) On acceptance of the Bid, Bidder shall within fifteen (15) days, deposit with Owner an Initial Security Deposit of **5% of the Basic Contract value** (i.e. order value excluding taxes) and the same shall be in any of the following form:
 - a) Bank draft drawn on a Kolkata Branch of any Scheduled Bank in favour of Balmer Lawrie & Co Ltd.
 - b) Bank Guarantee executed by any Scheduled Bank as per proforma enclosed and shall be valid at least sixty days after the completion of work.
- (ii) If the Bidder fails to provide the Security Deposit within the period specified, such failure will constitute a breach of the Contract and Owner shall be entitled to award the Work elsewhere at Supplier's risk and cost. The EMD of the bidder to whom Contract was awarded, shall be forfeited
- (iii) No interest shall be payable against Security Deposit.

- (iv) As and by way of additional security, from every progress bill of Bidder, Security Deposit in the form of Retention Money (interest free) at the rate of 10% (inclusive of initial security deposit of 5%) of the Gross value of such bill as determined before payment shall be retained by the Owner. Owner can permit Bidder to replace the Security Deposit / Retention Money so retained by Bank Guarantee at his discretion after successful completion of the work.
- (v) Wherever the Security Deposit / Retention Money is furnished by Bidder in any form other than in cash or Demand Draft, Bidder shall be entirely responsible to keep such form of security deposit enforceable by extending the validity thereof before one month of date of expiry and keep them enforceable, until released by Owner after the Defect Liability Period.
- (vi) The Security Deposit / Retention Money shall remain at the entire disposal of Owner as a security for satisfactory execution and completion of the Work(s). Owner shall be at liberty to deduct and appropriate from the Security Deposit / Retention Money such damages (liquidated or otherwise) and other dues and recoveries from Bidder under this Contract and the amount by which Security Deposit / Retention Money is reduced by such appropriations, will be made by further deductions from Bidder's subsequent bills to that extent as to make up the Security Deposit / Retention Money.
- (vii) Notwithstanding anything to contrary, in as much as the Security Deposit is to be in cash with Owner, Owner shall be entitled to enforce any of the approved forms of Security Deposit furnished by Bidder at any time and realise cash thereof irrespective of whether or not Bidder disputes such right. However, if Bidder obtains the extension of the time limit, if any, for the enforceability of such form of Security Deposit and intimates Owner of such extension within one month before expiry, Owner may not enforce such form of Security Deposit, unless it has otherwise become enforceable.
- (viii) On due and satisfactory performance of all the obligations of Bidder under this Contract including completion of work in all respects, carrying out the obligations of Bidder during Defect Liability Period, Retention Money shall be released by Owner subject to recoveries, deductions and retentions therefrom as provided under the Contract.

6.0 TESTING & INSPECTION

- (i) All materials required for the execution of the work should be new and should conform to applicable standard specification and approved by the Engineer-in-Charge before actually put to use. Commencement of work without prior approval shall be entirely at the risk and cost of the Contractor. No delay due to non-availability of the materials, tools, equipment etc. will be entertained by the Owner. In the case of certain Machinery / Equipment, the Engineer-in-Charge may inspect the item for approval, before they are brought to site.

- (ii) The Owner shall be entitled at all times at the risk of the Contractor to inspect and/or test by themselves or through any independent person(s) or agency (ies) appointed by the owner and/or to direct the Contractor to inspect and/or test all material(s), items and components whatsoever supplied or proposed for supply, for incorporation in the work inclusive, during the course of manufacture or fabrication by the Contractor and/or at the Contractors work or otherwise, such materials or items or components. The inspection and/or test shall be conducted at the expense of the Contractor and if conducted by the Contractor may be directed by the Owner to be conducted by agency (ies) nominated by Owner and/or in the presence of witness (ess) nominated by the Owner.
- (iii) The Contractor shall furnish to the Engineer-in-Charge for approval when requested or as required by the specification or other contract documents, adequate samples of material intended for incorporation in the works. Such sample to be submitted before the work is commenced permitting sufficient time for tests, examination(s) thereto by the Engineer-in-Charge. All materials furnished and incorporated in the work shall conform to the sample(s) in all respects.
- (iv) The Engineer-in-Charge shall be entitled to reject at any time any defective materials, item or components, (including special manufactured or fabricated items or components) supplied by the Contractor for incorporation in the works.
- (v) The Contractor shall at all times ensure highest standard of workmanship, relating to the work to the satisfaction of the Engineer-in-Charge. The Engineer-in-Charge shall have the power to inspect the work as also to test or instruct the Contractor to test the works or any structure, material or component thereto at the risk and cost of the Contractor, either by the Contractor or by any agency(ies) nominated by the Engineer-in-Charge or Site Engineer on his behalf.
- (vi) The Contractor shall provide all facilities, instruments material / labour and accommodation required for testing the works (including checking the set time out of work) and shall provide Engineer-in-Charge all assistance necessary to conduct the test whenever and wherever required.
- (vii) The Engineer-in-Charge on inspection or test be not satisfied with the quality or workmanship of any work, structure, material, component (decision of the Engineer-in-Charge being final in this behalf), the Contractor shall re-perform, replace, re-install and / or re-erect as the case may be such work, structure material or component, as no such rejected work, structure, material, item or component shall be re-used without the prior permission of Engineer-in-Charge.
- (viii) Notwithstanding any provided in the foregoing clauses hereto and notwithstanding the Engineer-in-Charge/ or his representative has inspected tested and/or approved any particular work, structure, material or component, such inspection, test or approval shall not absolve the Contractor of his full responsibilities under the contract inclusive or relative to the specification, performance guarantee. The

said inspection and test procedure being intended basically for satisfaction of the Owner / prima-facie erection and/or material and equipment supplied for incorporation in the work is in order.

- (ix) On no account shall the Contractor proceed with the covering up or otherwise placing beyond reach of inspection or measurement any work before necessary inspection, entries are filled in the Site Inspection Register by the Engineer-in-Charge or his authorised representative. Should the Contractor do so the same shall be uncovered at the Contractor's risk and expense for carrying out the inspection and measurement. Measurement of Work shall be recorded as per the direction of Engineer-in-Charge.
- (x) If any tests are required to be carried out in connection with the work or materials or workmanship not supplied by the Contractor, such tests shall be carried out by the Contractor as per the instructions of Engineer-in-Charge and cost of such tests shall be reimbursed by the Owner.
- (xi) The owner reserve the right to inspect the Equipment at Tenderer's works by them or through a third party nominated by the Owner. Tenderer will provide all assistance to Owner's inspector in carrying out such inspection at Tenderer's works free of any charges.

7.0 PERFORMANCE GUARANTEE:

7.1 Performance Guarantee:

- a) The Contractor shall guarantee that the equipment and workmanship of work done and any fittings designed / manufactured / supplied by him are as specified in the tender schedule and wherever there is nothing specifically mentioned shall correspond to the best available grade and quality as required for the application.
- b) The Contractor shall also guarantee that the work done and any fittings designed, manufactured, supplied, erected shall be as per prevailing relevant standard, codes and statutory practices / stipulations.
- c) The Contractor shall **guarantee** the work done and any fittings designed, manufactured, supplied, erected and tested by him against defective materials, poor workmanship, improper design, operation inadequacies & problems and failure from normal usage, for a period of **12 (twelve) calendar months** after final acceptance of the work by the Owner. Performance Bank Guarantee shall be issued by any Nationalized / Scheduled Bank on basic value of material supplied and shall remain valid for above guarantee period.

7.2 Warranty:

The Contractor will repair and/or replace all defective parts, components / fittings, accessories etc. which shall be notified to them in writing within the Defect Liability Period Promptly at free of cost. The Contractor will provide similar warranty on the parts, components, fittings, accessories etc. repaired and/ or replaced.

8.0 SITE PARTICULARS

The intending tenderers shall be deemed to have visited the site and familiarised themselves thoroughly with the site conditions before submitting the tender. Non-familiarity with the site conditions will not be considered reason either for extra claims or for not carrying out the work in strict conformity with the drawings and specifications.

Project site is located at plot nos. 5 & 13(P) of combined area 1.5acres at Chhatabar, District–Khorda, Odisha inside the premises of IDCO Industrial Estate. It is approximately 1.5KM from Khorda- Chandraka road.

Contact Person for Site Visit: Mr Purnendu Das, Manager (06289 090838)

9.0 SUPPLY OF MATERIAL

9.01 All materials required for the work shall be supplied by the Contractor. In addition, all materials required for temporary and enabling work shall be arranged and provided by the Contractor. All incidental expenses, loading, unloading, transportation, handling etc. shall be the responsibility of the Contractor and cost towards such expenses should be included in the finished item rates.

9.02 All other materials, as required to complete the works in all respects according to the contract rates shall be inclusive of all freights, GST and other taxes, duties, loading, unloading, transporting, handling and storage charges etc.

10.0 TIME FOR COMPLETION OF WORK

Time is the essence of the contract. The tenderer shall submit their plan to complete the whole work according to the overall time allowed for the execution of work as given in the Tender Documents and NIT.

13.0 TERMS OF PAYMENT

For all Items except AMC

- (i) No mobilization advance shall be paid to the Contractor.
- (ii) 80% of rate along with applicable taxes and duties against item wise receipt of materials as certified by the Engineer-in-Charge.
- (iii) 10% of rate along with applicable taxes and duties against item wise installation upon certification by the Engineer- in-Charge.

- (iv) 10% of rate along with applicable taxes and duties against testing, commissioning & handing over of Fire Protection System to owner and also after obtaining Final approval/No Objection Certificate from Conferenced Department upon certification by Engineer-in-Charge.
- (v) From each bills, **10% of basic bill value** shall be deducted and retained as Retention money for the defect liability period which can be paid after completion of successful erection and commissioning of Insulated Doors and issuance of completion certificate against submission of Performance Bank Guarantee of equivalent amount. Validity of BG shall be till completion of defect liability /warranty period. Security Deposit submitted by the Supplier will be returned after completion of work. Initial Security Deposit submitted by the Supplier will be returned after completion of work.
- (i) Final payment shall be released based upon the measured installed quantity only.

AMC

AMC charge will be paid pro-rata basis based on quarterly invoices raised after completing the inspection/maintenance calls and submitting the inspection report duly verified by the Operation-in-Charge. AMC shall be enforced after the performance Guarantee period of one year from the date of commissioning.

Security Deposit, Liquidated Damage & Performance Guarantee clauses are not applicable for AMC.

14.0 ARBITRATION

Any dispute or difference arising under this Contract shall be referred under jurisdiction of Kolkata to a sole arbitrator to be appointed by the Chairman & Managing Director, Balmer Lawrie & Co. Limited and the provisions of Arbitration and Conciliation (Amendment) Act, 2015 including any statutory modifications or enactment thereof shall apply to the Arbitration proceedings. The fees of the arbitrator, if any, shall be shared equally by both the parties. The award shall be a speaking award stating reason therefor and is final & binding on the parties. The proceeding shall be conducted in English language and courts at Kolkata will have exclusive jurisdiction to settle any dispute arising out of this contract.

15.0 EXTRA ITEMS OF WORK

During the course of execution of the work, should the Contractor come across items of work which are not covered under the Schedule of Rate or not included therein, the Contractor shall draw the attention of the Owner / Engineer-in-Charge to the same and such items of work shall be treated as extra only with the prior approval of Engineer-in-Charge in writing. Contractor shall submit a quotation along with the rate analysis for such accepted extra items before he commences work or purchases the materials in connection with such items.

For extra items, rates shall be derived from similar item rates included in the schedule of work. Where there is no such similar item available in the schedule, rate shall be analysed as follows:

Rate for extra item = Cost of material including transportation upto site (a) + cost of labour inclusive of all necessary tools, tackles, equipment, machinery and consumable (b) required to carry out the work + 15% of (a+b) towards profit and overhead + taxes, duties etc.

16.0 RIGHT OF OWNER TO TERMINATE THE CONTRACT

(i) If the Contractor being an individual or a firm commits any 'Act of Insolvency' or shall be adjudged as insolvent or being an Incorporated Company shall have an order for compulsory winding up made against it, or pass an effective resolution for winding up voluntarily or subject to the supervision of the Court or shall be unable to carry out and fulfil the contract and to give security therefore, is so required by the Engineer-In-Charge.

Or if the Contractor (whether an individual, firm or incorporated company) shall suffer execution to be issued.

Or shall suffer any payment under this Contract to be attached by or on behalf of any of the creditors of the Contractor.

Or shall assign or charge, encumber or sublet this contract without the consent in writing of the Engineer-In-Charge first obtained.

Or shall charge or encumber this contract or any payments due or which may become due to the Contractor thereunder.

Or if the Engineer-In-Charge shall certify in writing to the Owner that the Contractor -

- a) has abandoned the Contract or
- b) has failed to commence the works, or has without any lawful excuse under these conditions, suspended the progress of the works for 14 days after receiving from the Engineer-In-Charge written notice to proceed or
- c) has failed to proceed with the works with such due diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon or
- d) has used sub-standard or inferior material or materials not conforming to the specifications or has employed inferior workmanship in carrying out the

works or part thereof or has not exercised due diligence in execution of the said work, or

- e) has neglected or failed persistently to observe and perform all or any of the acts, deeds, matters or things by this Contract to be observed and performed by the Contractor requiring the Contractor to observe or perform the same, or
- f) has to the detriment of good workmanship or in defiance of the Engineer-In-Charge's instructions to the contrary, sub-let or sub-contracted any part of the contract, or
- g) has failed to comply with the Engineer-In-Charge's instructions, or
- h) has in the opinion of the Engineer-In-Charge committed any breach of this Contract, then and in any of the said cases the Owner with the written consent of the Engineer-In-Charge may notwithstanding any previous waiver, after giving seven days' notice in writing to the Contractor terminate the Contract, but without hereby affecting the right of the Owner of the powers of the Engineer-In-Charge or the obligations and liabilities of the Contractor in respect of work, the contract shall continue enforce as fully as if the contract has not been so determined and the obligations of the Contractor in respect of work subsequently executed shall continue as if the works subsequently executed has been executed by or on behalf of the Contractor. And further, the Owner by its agents or servants shall be titled forthwith to enter upon and take possession of the works and all plants, tools, scaffoldings, sheds, machinery, steam and other power implements, machinery equipment and materials lying upon the site or the adjoining lands or roads and use the same as its own property and to employ the same by means of its own servants and workmen in carrying on and completing the work or by employing any other Contractor and the Contractor shall not in any way interrupt or do any act, matter or things to prevent, intimidate or hinder such other Contractor or other person or persons employed for completing and finishing or using the materials and plant for the work. When the works shall be completed or as soon thereafter as convenient, the Engineer-In-Charge shall give a notice in writing to the Contractor to remove his surplus materials and plant and should the Contractor fail to do so within the period of 14 days after receipt thereof by him, the Owner shall sell the same either by public auction or a private sale and shall be given credit to the Contractor for the amount realized. The Engineer-In-Charge shall thereafter ascertain and certify in writing under this hand what (if anything) shall be due or payable to or by the owner, the expense or loss which the owner shall have been put to in procuring the works to be completed and the amount, if any, owing to the Contractor and the amount which shall be so certified, shall thereupon be

paid by the owner to the Contractor or by the Contractor to the Owner, as the case may be and the Certificate of the Engineer-In-Charge shall be final and conclusive and binding on the parties hereto. In the event of termination under this Clause, the Owner shall not be bound by any provision of this Contract to make any further payment to the Contractor until the said works are completed.

- (ii) Owner shall, at any time, be entitled to determine and terminate the Contract, if in the opinion of the Owner the cessation of the Work becomes necessary owing to paucity of funds or for any other cause whatsoever, in which case the cost of approved materials at the Site at current market rates as verified and approved by Engineer-In-Charge and of the value of the Work done to date by the Contractor shall be paid for in full at the specified in the Contract. A notice in writing from the Owner to the Contractor of such determination and termination and the reason therefore shall be the conclusive proof of the fact that the Contract has been so determined and terminated by the Owner.
- (ii) Should the Contract be determined under sub-clause of this clause and the Contractor claims payment to compensate expenditure incurred by him in the expectation of completing the Work, the Owner shall consider and admit such claim as are deemed fair and reasonable and are supported by the vouchers to the satisfaction of the Engineer-In-charge. The Owner's decision on the necessity and propriety of such expenditure shall be final and conclusive and binding on the Contractor.

17.0 LABOUR LAWS

- (i) No Labour below the age of eighteen (18) years shall be employed on Work. In case female workers are engaged, requisite provisions shall be made as per the statute.
- (ii) Contractor shall not pay less than what is provided under law to labourers engaged by him on Work.
- (iii) Contractor shall at his expense comply with all labour laws and keep Owner indemnified in respect thereof.
- (iv) In addition to above, rules and regulations as contained in Contract Labour (Regulation and Abolition) Act, 1970 will also be applicable for this contract. For the purpose of registration as per the above Act, Contractor may contact Owner for further details.
- (v) Contractor shall secure full safety of the workers / employees engaged by him in the Site premises and shall take at his own cost, insurances and such other safety regulations for the said purpose.

18.0 INSURANCE

Contractor shall at his own expense carry out and maintain insurance with reputable companies to the satisfaction of the Owner as follows:

Employee's Compensation and Liability Insurance:

Contractor shall obtain Workmen Compensation policy in his name in respect of contractor's employees to be engaged for the work towards compensations as admissible under the Employee's Compensation Act, 1923 and Rules framed thereunder upon death/ disablement and also medical treatment of a worker and the same has to be produced to the Engineer-in-Charge before start of the work. Owner should be mentioned as the Beneficiary.

Contractors All Risk Insurance:

Contractor shall take out an All Risk Insurance policy in the Joint names of the Owner and the Contractor (owner as the first beneficiary) including third party liability, against loss or damage from any cause covering the work executed to the estimated current contract value together with the material for incorporation in the work. Such insurance shall be in such a manner that Owner and the Contractor are covered from the date of commencement of work.

The contractor shall indemnify the Owner against all losses and claims in respect of injuries or damage to any person, including any employee of the Owner, material or physical damage to any property whatsoever including that of the owner arising out of the execution of the works or in the carrying out of the contract, and shall insure against his liability with an insurer until the completion of this contract in terms approved by the owner. Whenever required, the contractor shall produce the insurance policy and the current premium receipts to the Owner.

In addition to what it is stipulated above the successful contractor shall execute Indemnity Bond to indemnify and hold harmless the Owner for complying with the provision of the following:

- i) Provident Fund Act for P.F. Scheme for labourers engaged by the Contractor / Subcontractors.
- ii) Interstate Migrant Workmen ("Regulation of Employment and Conditions of Services) Act - 1979.
- iii) Minimum Wages Act - 1948.
- iv) Equal Remuneration Act - 1976.
- v) Employee's Compensation Act - 1923.
- vi) Contract Labour (Regulation & Abolition) Act - 1970.

If any of the work is sublet, after necessary approval by the Owner, the contractor shall require the Sub-contractor to provide Employee's Compensation and Liability Insurance

for the Sub-contractor's employees, if such employees are not covered under the Contractor's Insurance.

19.0 HSE REQUIREMENTS BY CONTRACTORS

Housekeeping

Contractors shall ensure that their work area is kept clean tidy and free from debris. The work areas must be cleaned on a daily basis. Any disposal of waste shall be done by the Contractor.

All equipment, materials and vehicles shall be stored in an orderly manner. Access to emergency equipment, exits, telephones, safety showers, eye washes, fire extinguishers, pull boxes, fire hoses, etc. shall not be blocked or disturbed.

Confined Space

Before commencing Work in a confined space the Contractor must obtain from Owner a Permit to Work, the Permit to Work will define the requirements to be followed.

As minimum Contractors must ensure the following:

- a) Confined spaces are kept identified and marked by a sign near the entrance(s).
- b) Adequate ventilation is provided
- c) Adequate emergency provisions are in place
- d) Appropriate air monitoring is performed to ensure oxygen is above 20%.
- e) Persons are provided with Confined Space training.
- f) All necessary equipment and support personnel required to enter a Confined space is provided.

Tools, Equipment and Machinery

The Contractor must ensure that all tools & equipment provided for use during the Work is:

- a) suitable for its intended use;
- b) safe for use, maintained in a safe condition and where necessary inspected to ensure this remains the case (any inspection must be carried out by a competent person and records shall be available);
- c) Used only by people who have received adequate information, instruction and training to use the tool or equipment.

d) Provided with Earth leakage circuit breaker (ELCBs) at all times when using electric power cords. Use of electrical tape for temporary repairs is prohibited.

Working at Height

Any Work undertaken where there is a risk of fall and injury is considered to be working at height.

For any Contractor Personnel working at height, Contractors shall provide fall prevention whenever possible and fall protection only when fall prevention is not practicable. Before commencing Work in a height the Contractor must obtain from Owner a Permit to Work, the Permit to Work will define the requirements to be followed. Supervisor must be present at all point of time, to ensure no deviation occur during the course of work.

Fall Prevention System

Fall prevention systems (e.g. fixed guardrails, scaffolds, elevated work platforms) must provide protection for areas with open sides, including exposed floor openings.

Fall Protection Systems

- (i) Where fall protection systems are used then the Contractor must ensure the following is applied:
- (ii) Only approved full body harness and two shock-absorbing lanyards are used,
- (iii) Prior establishment of a rescue plan for the immediate rescue of an employee in the event they experience a fall while using the system,
- (iv) Anchorage points must be at waist level or higher; and capable of supporting at least the attached weight,
- (v) Lifeline systems must be approved by Owner before use.
- (vi) Use of ISI marked industrial helmet at all point of time.

Scaffolding

All scaffolds shall subject to a documented inspection by a competent person and clearly marked prior to use. The footings or anchorage for scaffolds shall be sound, rigid and capable of carrying the maximum intended load without settling or displacement. All scaffolding materials should be of MS tubular type.

Guardrails and toe-boards shall be installed on all open sides and ends of scaffold platforms. Scaffolds shall be provided with an access ladder or equivalent safe access. Contractor Personnel shall not climb or work from scaffold handrails, mid-rails or brace members.

Stairways and Ladders

Ladders should only be used for light duty, short-term work or access in line with the below and the Site Requirements.

- i) Fabricated ladders are prohibited.
- ii) Ladders will be secured to keep them from shifting, slipping, being knocked or blown over.
- iii) Ladders will never be tied to facility services piping, conduits, or ventilation ducting.
- iv) Ladders will be lowered and securely stored at the end of each workday.
- v) Ladders shall be maintained free of oil, grease and other slipping hazards
- vi) Ladders will be visually inspected by a competent person and approved for use before being put into service. Each user shall inspect ladders visually before using.
- vii) Ladders with structural defects shall be tagged "Do Not Use," immediately taken out of service, and removed from the Site by the end of the day.

Lifting Operations

Cranes and Hoisting Equipment

Contractors shall operate and maintain cranes and hoisting equipment in accordance with manufacturer's specifications and legal requirements.

Only Contractor Personnel trained in the use of cranes and hoists are permitted to use them.

Lifting Equipment and Accessories

All lifting equipment / accessories e.g., slings, chains, webbing, chain blocks, winches, jacks etc shall be indicated with their safe working load have an identification number visible on the unit and be inspected and tested in accordance with legal requirements.

Damaged equipment / accessories and equipment shall be tagged "out of use" and immediately removed from Site.

Lockout Tag out ("LOTO")

Prior to performing work on machines or equipment, the Contractor shall ensure that it is familiar with LOTO and Permit to Work procedures and that all of its affected Contractor Personnel receive the necessary training.

Barricades

Floor openings, stairwells, platforms and walkways, and trenching where a person can fall any distance shall be adequately barricaded and where necessary, well lit. Where there is a risk of injury from a fall then rigid barriers must be used.

Barricades must also be used to prevent personnel entering an area where risk of injury is high e.g., during overhead work activity or electrical testing etc. Such barricading must provide clear visual warning.

Compressed Gas Cylinders

Gas cylinder shall be securely stored and transported, and identified and used in line with the local requirements. Hose lines shall be inspected and tested for leaks in line with local requirements. Flash Back arrestor to be used to prevent any explosion due to back fire.

Electrical Safety

Prior to undertaking any work on live electrical equipment the Contractor must obtain a Permit to Work from Owner. Where ever possible live work should be avoided. Any control measures highlighted shall be implemented prior to work commencing.

The below measures will be taken:

- a) Work practices must protect against direct or indirect body contact by means of tools or materials and be suitable for work conditions and the exposed voltage level.
- b) Energized panels will be closed after normal working hours and whenever they are unattended. Temporary wiring will be de-energized when not in use.
- c) Only qualified electrical Contractor Personnel may enter substations and/or transformer and only after being specifically authorized by Owner.

Hot Works

A Permit to Work must be obtained from Owner prior to any hot works (welding, grinding, open flame work). Suitable fire extinguishing equipment shall be immediately available. Objects to be welded, cut or heated shall be moved to a designated safe location, or, if they cannot be readily moved, all movable fire hazards in the vicinity shall be taken to a safe place. Personnel working around or below the hot works shall be protected from falling or flying objects.

Prior to the use of temporary propane or resistance heating devices approval must be obtained from Owner.

Trenching, Excavating, Drilling and Concreting

A Permit to Work must be obtained from Owner and all underground lines, equipment and electrical cables shall be identified and located prior to beginning the work. The Contractor shall assign a competent Contractor Personnel to all trenching and excavation work.

Safe means of access and egress shall be located in trench excavations. Daily inspections shall be conducted by a competent Contractor Personnel for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems or other hazardous conditions.

Physical barriers shall be placed around or over trenches and excavations. Flashing light barriers shall be provided at night.

Environmental Requirements

Waste Management

The Contractor is responsible to remove any waste generated by the work being done on the Site. The Contractor must dispose of the waste in line with the relevant local legislative requirements. The waste disposal route shall be documented and made available for Owner to review at any time and may be subject to Owner's prior approval.

Wastes (includes rinse from washing of equipment, PPE, tools, etc) are not to be poured into sinks, drains, toilets, or storm sewers, or onto the ground. Solid or liquid wastes that are hazardous or regulated in any way are not to be disposed of in general site waste receptacles.

Spills

The Contractor is responsible for the provision of adequate spill kits/protection and the clean-up and disposal costs arising from such spills.

Emissions

The Contractor shall identify and quantify any emission sources associated with the Works. The control measures associated with these emission shall be subject to the approval of Owner's Emissions include but are not limited to noise, dust, fumes, vapours.

BANK GUARANTEE VERIFICATION CHECK LIST

| <u>CHECK LIST</u> | <u>YES</u> | <u>NO</u> |
|---|------------|-----------|
| I Does bank guarantee compare verbatim with standard Balmer Lawrie & Co Ltd proforma for BG | _____ | _____ |
| II. a. Has the executing officer of the BG indicated his name, designation and power of attorney No./ Signing Power No. etc. on BG | _____ | _____ |
| b. Is each page of BG duly signed/initialed by the executant and last page is signed with full particulars as required in the Balmer Lawrie's standard proforma of BG and under the seal of the Bank. | _____ | _____ |
| c. Does the last page of the BG carry the signature of two witnesses along side the signature of the executing Bank Manager | _____ | _____ |
| III. a. Does the non judicial stamp paper for BG purchase in the name of BG issuing Bank | _____ | _____ |
| b. Is the BG on non-judicial Stamp paper of value Rs. 100/- (Rupees One Hundred only) | _____ | _____ |
| c. Is the date of sale of non-judicial stamp paper shown on the BG and the stamp paper is issued not more than six months prior to date of execution of BG | _____ | _____ |
| IV. a. Are the factual details such as bid specifications No., LOI No., Contract price etc. correct | _____ | _____ |
| b. Whether over-writing/ cutting, if any on the BG authenticated under signature and seal of executant | _____ | _____ |
| V. a. Is the amount of BG in line with contract provisions / agreement /tender | _____ | _____ |
| b. Is the validity of BG in line with contract provisions / agreement /tender | _____ | _____ |
| VI. Covering letter from bank enclosed with the BG | _____ | _____ |
| VII. BG shall be from a Nationalised/ Scheduled Bank only | _____ | _____ |

BANK GUARANTEE
(PERFORMANCE)

Letter of Guarantee No.

Dated : the day of

THE GUARANTEE is executed at Kolkata on the day of by
.....(set out full name and address of the Bank) (hereinafter referred to as "the Bank"
which expression shall unless expressly executed or repugnant to the context or meaning thereof
mean and include its successors and assigns).

WHEREAS Balmer Lawrie & Co. Ltd. (local address), an existing company
within the meaning of the Companies Act, 1956 and having its Registered Office at 21, Netaji
Subhas Road, Kolkata – 700 001 (hereinafter referred to as "the Company") issued a Tender being
No. dated (hereinafter referred to as "the said Tender") for (set out
purpose of the job) and pursuant thereto Messrs/ Mr. (set out
full name and address of the Contractor) (hereinafter referred to as "the Contractor" which term
or expression wherever the context so requires shall mean and include the partner or partners of
the
Contractor for the time being/his/its heirs, executors, administrators, successors and assigns)
(delete which are not applicable) has accepted the said Tender and field its quotation.

AND WHEREAS the quotation of the Contractor had been accepted by the Company and in
pursuance thereof an Order being No..... dated (hereinafter referred to as "the
said Order") has been placed by the Company on the Contractor for (set out purpose of the job).

AND WHEREAS under the terms of the said Order the Contractor is required to furnish the
Company at their/his/its own costs and expenses a Bank Guarantee for
Rs.....(Rupees only) as performance guarantee for the
fulfilment of the terms and conditions of the said Tender and to do execute and perform the
obligations of the Contractor under the Agreement dated the day of
(hereinafter referred to as "the Agreement ") entered into by and between the Company of the
one part and the Contractor of the other part, the terms of the said Tender and the terms
contained in the said Order which expression shall include all amendments and/or
modifications/or variation thereto.

AND WHEREAS the Contractor had agreed to provide to the Company a Bank Guarantee as security
for the due performance of their/his/its obligations truly and faithfully as hereinbefore mentioned.

Contd....2/-

[2]

NOW THIS GUARANTEE WITNESSETH as follows:

1. In consideration of the aforesaid premises at the request of the Contractor, we (set out the full name of the Bank) the Bankers of the Contractor shall perform fully and faithfully their/his/its contractual obligations under the Agreement dated the day of entered into by and between the Company of the one part and the Contractor of the other part, the terms and conditions of the said Tender and the said Order.
2. We, (set out full name of the Bank) do hereby undertake to pay to the Company without any deduction whatsoever a sum not exceeding Rs..... (Rupees only) without any protest, demur or proof or condition on receipt of a written demand from the Company stating that the amount claimed is due by way of loss and damage caused to or would be caused to or suffered by the Company due to bad workmanship or by reason of breach of any of the terms and conditions of the Agreement, the said Tender and the said Order hereinbefore mentioned.
3. The Guarantee is issued as security against due performance of the obligations of the Contractor or under the Agreement aforesaid and the said Tender and the said Order hereinbefore mentioned and subject to the conditions that our liabilities under this Guarantee is limited to a maximum sum of Rs..... (Rupees only) or the amount of loss or damage suffered or to be suffered by the Company in its opinion at any period of time, whichever is lower.
4. We, (set out full name of the Bank) further agree that the undertaking herein contained shall remain in full force for a period of months from the date of the satisfactory execution of the Contract.
5. This Guarantee shall not be affected by any amendment or change in the Agreement or change in the constitution of the Bank and/or the Company and/or the Contractor.
6. We (set out full name of the Bank) undertake not to revoke this Agreement during its currency except with the previous consent of the Company in writing.
7. All claim under this Guarantee must be presented to us within the time stipulated after which date the Company's claim/right under this Guarantee shall be forfeited and we,(set out full name of the Bank) shall be released and discharged from all liabilities hereunder.

Contd....3/-

[3]

- 8. This instrument shall be returned upon its expiry or settlement of claim(s) if any, thereunder.

- 9. Notwithstanding anything contained hereinbefore our total liabilities under this Guarantee shall not exceed a sum of Rs..... (Rupees only) and unless a demand or claim in writing under this Guarantee reaches us on or before the date of (last date of claim) and if no claim is received by us by that date all rights and claims of the Company under this Guarantee shall be forfeited and we,(set out full name of the Bank) shall be released and discharged of all our liabilities under this Guarantee thereafter.

- 10. We have power to issue this guarantee in your favour under our Memorandum and Articles of Association and the undersigned has full power to execute this Guarantee under Power of Attorney dated the day of granted to him by the Bank.

Place :

Date :

**PROFORMA OF THE GUARANTEE
(SECURITY DEPOSIT)**

Balmer Lawrie & Co. Ltd.
Kolkata- 700 001

Dear Sir,

That Messrs/Mr.(set out full name and address and constitution of the Contractor) (hereinafter referred to as "the Contractor") filed their/his/its quotation against your Tender being Tender No. dated (hereinafter referred as "the said Tender") for the work (set out the purpose of the job) and in pursuance thereto an Order being No. dated (hereinafter to as "the Order") was issued by you to the Contractor.

The conditions of the said Tender, inter alia, requires that the Contractor shall pay a sum of Rs..... only) as full security deposit (hereinafter referred to as "the security deposit") in the form therein mentioned. The form of payment of security deposit includes a guarantee to be executed by a Scheduled Bank.

The said Messrs/Mr. (set out full name of the Contractor) have/has approached us and at their/his/its request and in consideration of the premises We (set out full name of the Bank) having our office, inter alia at (state the address of the Bank) have agreed to give such guarantee in the manner following :

- 3 We, (set out full name of the Bank), hereby undertake with you if default is made by Messrs/Mr. (set out full name of the Contractor) in performing any of the terms and conditions of the Tender and/or in payment of the security deposit or any other or in payment of money payable to you. We, (set out full name of the Bank) shall merely on demand from you without demur or protest shall pay you the said amount of Rs..... (Rupees only) or such portion thereof not exceeding the said sum as you may demand from time to time.

2. We, (set out full name of the Bank), further agree with you that you hereunder to adopt any mode for realisation of your dues from the Contractor and/or to vary any of the Terms and Conditions of your Contract with the said Messrs/Mr. (set out full name of the Contractor), or to extend time of performance by Contractor from time to time or to postpone for any time or from time to time any of the powers exercisable by you against Contractor and to forbear or enforce any of the terms and conditions relating to the Contract and we, (set out full name of the Bank) shall not be relieved from our liability by reason of any such variation, or any indulgence to be given by you to the Contractor or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so releasing us.

Contd.....2/-

[2]

- 3. Your right to recover the said sum of Rs..... (Rupees only) from us in the manner aforesaid will not be affected or suspended by reason of the fact that any dispute or disputes is/are pending before any Officer, tribunal, court or any other authority or authorities.
- 4. The guarantee herein contained shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the said Messrs/Mr. (set out the full name of the Contractor), but shall in all respect, and for all purposes be binding and operative until payment of all the money due to you in respect of such liabilities is paid,
- 5. Our liability under this guarantee is restricted to Rs. (Rupees only).
- 6. Our guarantee shall remain in force and effect until (set out the date of expiry) and unless a claim or demand in writing is made against us under this guarantee before the expiry of six months from the aforesaid date i.e. (set out last date of Claim period), the said Guarantee all your rights under this guarantee shall be forfeited and we, (set out full name of the Bank) shall be relieved and discharged from all liabilities thereunder.
- 7. We , (set out full name of the Bank) undertake not to revoke this Guarantee during its currency except with your previous consent in writing.
- 8. We, (set out full name of the Bank) have power to issue this Guarantee in your favour under our Memorandum and Articles of Association and the undersigned has full power to execute/sign this Guarantee under the Power of the Attorney dated the day of Two Thousand and Eighteen granted by the Bank.

Yours faithfully,

Dated : (Place)

.....(Date)

.....
 (Signature of Officer on
 behalf of)
 (Set out name of the Bank)

**DESIGN BASIS REPORT
(9 Pages)
Attached as Enclosure-I**



Balmer Lawrie & Co. Ltd.

(A Government of India Enterprise)

Engineering & Projects

21, Netaji Subhas Road

Kolkata - 700 001

DESIGN BASIS REPORT

(Enclosure-I of Tender No. EP/TCW/BHU/FPS/12)

OF

FIRE PROTECTION SYSTEM

for

**Temperature Controlled Warehouse at IDCO Industrial Estate,
Chhattabar, Dist-Khorda, Odisha**

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1.0 INTRODUCTION:

M/s. Balmer Lawrie & Co. Ltd. (BL) intends to set-up a Temperature Controlled Warehouse in Odisha. Project site is located at plot nos. 5 & 13(P) of combined area 1.5acres at Chhatabar, District–Khorda, Odisha inside the premises of IDCO Industrial Estate. It is approximately 1.5KM from Khorda- Chandraka road.

2.0 OCCUPANCY DESCRIPTION

2.1 The facility is segregated in 2 areas within a single Steel Structural Warehouse [Size: 44.8M (W) x 58.35M M (L) X 14 M (H)]as follows:

- ❖ Freezer chambers to be maintained at -25 Deg C temperature with racks which will be used to store palletized cargo such as fruits, dairy products, marine products, meat etc. Anterooms & Docking area will be provided for loading, unloading, handling of products at a room temperature of +6 Deg to +10 Deg C.
- ❖ Potato Storage Chambers to be maintained at + 2 to +4 Deg C.

2.2 Office Building of Size 17.5 M X 11 M.

2.3 Plant Room of (Single Storied RCC) Size 7.2 M X 22.2 M to house refrigeration equipment such as compressors, condensers etc.

2.4 Electrical Substation Bldg. (Double Storied RCC) to house electrical panels, transformer, DG.

2.5 Fire Water Pump room (Single Storied RCC) of Size 6 M X 7.2 M to house all fire pumps.

2.6 Gate Office (Single Storied RCC) of Size 4 M X 3 M.

2.7 Meter Room (Single Storied RCC) of Size 3 M X 3 M.

The occupancy is considered as ORDINARY HAZARD or MODERATE HAZARD as per TAC norms. As per NBC Code, the 'cold storage' occupancy falls under Group-H category. However, complete facility can be termed as mixed occupancy due to cold storage, office building and utility buildings.

Protection systems proposed:

- ❖ Dedicated Centralized firewater tank and Fire equipment in the fire pump room
- ❖ Wet riser cum down comer system
- ❖ Yard Hydrants with external ring main
- ❖ Automatic Sprinkler System at ground and 1st floors of office bldg, Cold. storage anteroom, docking area
- ❖ Addressable Fire detection & alarm system
- ❖ Fire extinguishers and Signage (Fire safety plans).

3.0 OBJECTIVE:

The function of the Fire Protection System is to ensure reliable and efficient Fire Detection and Protection facilities in the occupancy.

- ❖ To mitigate the occurrence and spread of fire.
- ❖ Providing protection and safety for operating personnel and dumped materials
- ❖ Early detection and warning of fire, so as to minimize the damage and consequential losses resulting from the fire.

The above requirements will be met by optimum selections of Fire Protection System devices and by adequate Fire Detection and early warning measures.

The system is designed in compliance with the recommendation guidelines of Tariff Advisory Committee (TAC) and the relevant norms of National Building Code (NBC)

The objective of this report is as follows:

- ❖ Identify the risk / hazardous areas and determine the type of Fire Protection and Detection System for various areas.
- ❖ Determine and recommend basic system features and equipment parameters
- ❖ Describe the system features and operation.
- ❖ Indicating the requirements of fire water pumps and storage tank for the proposed occupancy

4.0 SYSTEM DESCRIPTION

4.1 Operating Philosophy of Fire Pumps

Fire water distribution system has been designed as a closed loop to ensure multi-directional flow with isolation valves at strategic locations for maintenance & other purposes. Fire protection system Ring Main header will be charged with water to designated pressure (recommended as 7 kg/sq.cm.). In the event of fire, when any hydrant/hose reel/water monitor or any other fire protection system such as Sprinkler System operate or any leakages in any part of the network, the resultant fall in ring main header pressure will initiate the automatic sequential operation of Pumps:

Electrical Motor driven Jockey pump will start first to maintain the pre-set system pressure. In case of further fall of header pressure, Electrical motor driven main pump will cut-in to operation automatically to supply water to the system. Failure to start of main pumps on demand will result in further fall in header pressure or if the header pressure still falls even when pumps are running then this signal will actuate the stand-by diesel engine driven pump to start automatically. Stopping of the Main & Diesel engine driven pumps shall be manual after confirming that there is no necessity of water any further.

This complete sequential operation of fire pumps will be done through pressure switches to be installed in the delivery header of pumps.

Each Pump can also be started manually from local control panel during emergency and/or testing. If the Pumps are in running condition then it will be stopped manually. When the pump will run, fire siren installed in pump house shall automatically activate. The control panel shall have the provision to keep the fire siren in off condition while running the pumps for testing.

Pressure Switches will be mounted on main discharge/delivery headers of fire pumps for automatic operation of pumps as mentioned below in tabular form.

| Pumps | Pressure | ON | OFF |
|------------|-------------|------|--------|
| Jockey | 8 KG/ SQ.CM | Auto | Auto |
| Electrical | 5 KG/ SQ.CM | Auto | Manual |
| Diesel | 4 KG/ SQ.CM | Auto | Manual |

4.2 Hydrant Ring Main Piping along with Valves (refer drawing)

Pump House shall deliver water into the connected ring main piping covering the entire premises. The ring main piping (150 NB Size) shall run over ground taking support from boundary wall and on sleepers (where it is away from wall), adequately clamped and, necessary tap offs are provided on the ring main for individual protection of areas like Temperature Controlled Warehouse, Office Building, Refrigeration Plant Room etc. As per site requirement, the pipe shall be buried with wrapping and coating while taking necessary tap offs from hydrant ring main to the warehouse and other buildings. It will also be laid underground at places where it interrupts can cause obstruction for vehicular traffic movement especially in gate crossing area. The ring main shall maintain a designated pressure of 7 kg/cm² all the time i.e. 24 x 7 days and loss in pressure shall be compensated by auto starting of the Jockey Pump.

4.3 Fire Fighting Equipment

- a) Yard Hydrants will be provided at approx. 30 mtr. interval though as per TAC providing hydrants at 45 mtr interval is sufficient for ORDINARY/MODERATE HAZARD category.
- b) RRL hose of 15 mtr length confirming to IS: 14933-2001 along with standard branch confirming to IS: 2871 will be provided in Hose Box near hydrant points.
- c) Water monitor will be provided at strategic location (near the corner of the plot) as per system requirement.
- d) Wet risers with 10 KL Terrace tank has been considered for Office Building. Booster Pump will be installed at the terrace. Landing valves will be provided at each floor of the building confirming to IS: 5290. Hose Reel with hose box will also to be provided. Fire Escape Hydrants will be provided in landings.
- e) Hose Reel confirming to IS: 884-1985 will be on each floor in the Staircase landing in office buildings, anteroom, Docking area, terrace of anteroom, Plant Room, Substation Building, Sorting/grading area of Potato Storage etc.
- f) Fire Brigade inlet connection will be provided near both the entry gates of the plot for filling the Firewater tank as well as fire network.

4.4 Sprinkler Systems

Automatic Sprinkler System will be provided in following areas.

- ❖ Docking area, ante room, Sorting/grading areas of Potato storage
- ❖ 2 floors of Office Building

The tap off for Sprinkler System is taken from the main pump discharge header located in Pump Room. The sprinkler network is fully charged with water. The installation is pressurised with the Isolation control valve (including Alarm Valve Gong and Bells) secured in the open position. Quartzoid Bulb Pendant type spray water sprinklers will be fixed on the ceiling with proper structural tie-rod arrangement. When a firesprinkler is exposed for a sufficient time to a temperature at or above the temperature rating of the heat sensitive element (glass bulb) it will release, allowing water to flow from only the affected sprinkler. Additional fire sprinklers may also operate if they too are exposed to sufficient heat. When this occurs, water from the water supply will pass through the alarm valve to the affected fire sprinkler and actuating the alarm bell.

A flow switch will also operate in the affected section of the fire sprinkler system, indicating the location of the water flow. The flow switch will indicate its location in a fire indicator panel.

The water supply may be isolated (stopping the flow of water to the affected fire sprinklers) by closing the stop valve.

| | |
|----------------------------|--------------------------------------|
| Design standard | : As per IS 15105-2002 |
| Sprinklers proposed | : QB type rated temperature 68 Dec C |
| Design density | : 5 LPM/ Sq. M. |
| AMAO considered | : 360 Sq. M. |
| Coverage of each sprinkler | : 9 – 12 Sq. M. |

5.0 DESIGN BASIS

As per TAC, the COLD STORAGE occupancy falls under "ORDINARY HAZARD" category.

Pump sizing

Method (1) -

| | | <u>Eq. No. of SFH</u> |
|-------------------|-------|-----------------------|
| No. of Hydrants | | 12 Nos. |
| No. of Super Jets | 2 X 3 | 6 Nos. |
| Total | | 18 Nos. |

The Pump capacity as per nos. of Hydrants in ORDINARY /MODERATE hazard for less than 20 nos of Single Headed Fire Hydrants) 137 M³/hr, Head 70MWC.

As no building is exceeding 15 mts in height . System is designed to attain a minimum pressure of 3.5 kg/sq cm at the farthest end from the pumping station in deciding the head of the pumps.

Method (2) – Maximum demand requirement as per IS 15105, for Moderate Hazard Occupancy

| | |
|---|---|
| Design density | : 5 LPM/ Sq. M. |
| Assumed Maximum Area of Operation (AMAO) considered | : 360 Sq. M. |
| Total water Demand | : 360M ² x 5LPM/ Sq. M.= 1800 LPM=108 Cum /Hr. |

So, maximum demand in sprinkler as per AMAO is 108 Cum/hr.

From the observations of Method (1) & (2) a higher size pump of 137 Cum/hr. flow and 70 MWC head is selected.

This selection also satisfies the criteria laid down in NBC. (Refer Table 7 –STORAGE BUILDINGS H of NBC 2016 Pat IV).

Recommended pumping and storage system for Hydrant and Sprinkler System considered as follows.

- ❖ Common pumping capacity for Hydrant & Sprinkler - 137M³/Hr@7bar (70 MWC)
- ❖ Common standby Diesel Engine Driven Pump - 137M³/Hr@7bar (70MWC)
- ❖ Common Jockey Pump - 10.8 M³/Hr @8.0 bar (80MWC)
- ❖ Booster Pump to be located terrace of admin building for wet riser - 27 M³/Hr @3.5 bar
- ❖ Fire Water Tank (RCC tank) capacity for 1 hour back-up - 100 KL
- ❖ Fire Water Terrace Tank on the Admin building -10 KL
- ❖ Mild steel air vessel of adequate size will be provided to take care of pressure surges during operation of the system and venting of entrapped air in the system shall be complete with air relief valve, pressure gauge, drain valve and shut off valve at the inlet.

6.0 FIRE DETECTION AND ALARM SYSTEM

Addressable fire detection and alarm system Designed and installed as per National Building Code and IS 2189.

Major Equipment are;

- ❖ Addressable Fire detection & alarm control panel – to be installed near entrance of main office
- ❖ Fire Repeater Panel- to be installed in gate office
- ❖ Smoke, Heat & Multi detectors
- ❖ Field devices like modules.
- ❖ Manual Call Points (break glass type)
- ❖ Electronic Hooters cum strobes
- ❖ Conduits / wiring with with 1.5 sq mm 2 core FRLS Cu armored cable.
- ❖ Coverage per Detector is considered approx. 50 sq. mts
- ❖ Manual call points and Hooters are provided at strategic locations.
- ❖ All detectors and Manual call points looped in class – A wiring to Control panel.

7.0 FIRE EXTINGUISHERS

Fire extinguishers has been worked out in such a way that the occupants shall not travel more than 15m to reach a Fire extinguisher. Also there shall be a Fire extinguisher for every min. 100 Sq. M. of floor space / rooms of suitable type / size. Additional to utility areas, Extinguishers to be provided at Transformers / electrical installations and at/near landings of Staircase of buildings. Fire Buckets will be installed in Transformer and Di-pole area.

All Fire extinguishers will be portable, hand held and an operating instruction should be pasted on the extinguisher body. Trolley mounted extinguishers shall also be provided for Cold Storage chambers.

Portable fire extinguishers are provided at locations mentioned below;

- ❖ DCP/ABC powder type fire extinguisher conforming to IS: 15683 in anteroom, Docking area of TCW, Sorting /grading area of Potato Storage, office buildings.
- ❖ Carbon dioxide type fire extinguishers conforming to IS: 15683, located in electrical panel room, pump room, refrigeration plant room, server room in office building.
- ❖ Mechanical foam type fire extinguishers at HSD storage, and near Diesel Tank of DG.

8.0 SIGNAGES

Illuminated Signages such as ' FIRE EXIT', ' FIRE EXTINGUISHER', ' NO SMOKING', ' DANGER' etc. shall be fixed on building walls at strategic locations. Floor indication (eg. Ground floor, 1st floor..) shall be provided in office building. Fire Notice Board/ action chart indicating actions to be taken while fire along with emergency contact nos. shall be displayed near gate office, office building.

9.0 LIST OF DRAWINGS

| SN. | Title | Drawing No. | Sheet | Rev | Date |
|-----|--|-------------------|--------|-----|----------|
| 1 | Fire Hydrant Layout | EP/TCW/BHU/FPS/05 | 1 of 1 | 1 | 25-09-19 |
| 2 | Layout of Fire Sprinklers System, Fire Detection & Alarm System and Fire Extinguishers | EP/TCW/BHU/FPS/06 | 1 of 2 | 1 | 25-09-19 |
| 3 | Layout of Fire Sprinklers System, Fire Detection & Alarm System and Fire Extinguishers | EP/TCW/BHU/FPS/06 | 2 of 2 | 1 | 25-09-19 |
| 4 | Schematic of Water Distribution Diagram | EP/TCW/BHU/FPS/07 | 1 of 1 | 1 | 25-09-19 |
| 5 | Layout of Pump Room | EP/TCW/BHU/FPS/08 | 1 of 1 | 1 | 25-09-19 |

10.0 Codes and Standards

| | | |
|-------------------|---|--|
| NBC | : | National Building Code of India Part IV for Fire Protection System |
| TAC | : | Tariff Advisory Committee |
| IS : 15105 | : | Code of Practice for Automatic Sprinkler System |
| IS : 2189 | : | Code of practice for automatic fire alarm system |
| IS-1239 / IS 3589 | : | Specification for Mild Steel Pipes |
| IS-14846 | : | Sluice Valve for Water Works Purposes (50 to 1200 mm) |
| IS: 5312 | : | Swing Check Type Reflux (NRV for Water Works Purpose) |

| | | |
|-------------------------------------|---|---|
| IS : 10221 | : | Coating and wrapping of underground mild steel pipelines |
| API 600 / BS 5163 IS778/780/2906 | : | Specifications for Gun Metal gate, globe & check Valves for water supply. |
| IS-800 | : | Specifications for Structural steel |
| IS-814 | : | Specifications for covered electrodes for metal arc welding of structural steel. |
| BS-5155 | : | Specifications for C.I. butterfly valve. |
| IS-903 | : | Specifications for Branch pipes Fire hose Couplings and auxiliary equipment |
| IS-5290 | : | Specifications for hydrant landing valves. |
| IS: 8442 | : | Stand post type water and foam monitor for fire fighting |
| IS: 884 | : | Specification for first aid hose reel |
| IS-636 | : | Non-percolating flexible fire fighting delivery hose |
| IS-2198 | : | Control Panels. |
| IS 1554 | : | PVC insulated (heavy duty) electric cables |

TECHNICAL SPECIFICATION

1.0.0 GENERAL

1.1.0 Intent of Specification

1.1.1 This specification is intended to cover residual engineering, supply, fabrication, erection, testing and commissioning of the fire-protection system, as per enclosed Schedule of Work, drawings and tender terms & conditions inclusive of the supply of all labour, supervision, tools, equipment and erection materials as necessary.

1.1.2 The specification shall be read in conjunction with the Conditions of Contract, Schedule of Work/Bill of Quantity as enclosed with this Specification. **However, in the event of any conflict between Schedule of Work/Bill of Quantity and Technical Specification or data sheets, item description mentioned in Schedule of Work/Bill of Quantity shall prevail.**

1.2.0 Standards & Codes

The complete supply and installation work for the equipment and accessories covered under this specification shall be designed, manufactured, erected, tested and commissioned in accordance with the latest IS. In cases where IS are not available, the equipment and accessories shall conform to the latest publication of recognized National Standard Institutions.

All fire-protection equipment and installation work shall also conform to National Building Code and local Fire Department. Fire Department and Fire Insurance Regulations as regards safety, earthing and other essential provisions specified therein for installation and operation of the systems. Nothing in this specification shall be construed to relieve the CONTRACTOR of this responsibility.

2.0.0 SCOPE OF WORK

2.1.0 The details of various equipment relevant to the Fire Protection system have been elaborated in the subsequent sections of this document.

2.1.1 All equipment, materials, hardware and accessories to be supplied by the bidder shall be brand new ones and make specified in the technical data sheet. For other approved equivalent make, prior written approval of the owner shall be obtained for which detail technical document & Data sheet for all such items with make etc. shall be furnished along with application for owner review and acceptance.

2.1.2 All relevant drawings, technical data sheets and technical leaflets/catalogues, Test Certificates of major items shall be submitted.

- 2.1.3 Furnishing of all labour, skilled and unskilled, supervisory personnel, tools and tackles for fabrication/erection, testing equipment, implements, supplies, consumables and hardware for timely and efficient execution of the site work.
- 2.1.4 The item of work to be performed on all equipment and materials shall include but not be limited to the following:
Receiving, unloading of the materials at site
Opening, inspection and reporting all damages and short supply of items.
Arranging to repair and/or re-order all damaged and short supply items.
Storing at site with suitable all weather protection.
Side-Shifting of materials as directed by Engineer-in Charge
Assembly, erection and complete installation.
Necessary co-ordination between works done by the other contractors.
Final check-up, testing and commissioning in presence of owner's representative.
Trial run for seven days, rectification of defects, if any and adjustment as necessary.
- 2.1.5 Field modification carried out shall be marked up red on one set of drawing. Based on the mark up, as built drawing will be prepared.
- 2.1.6 Preparation of cable schedule for Fire Detection & Alarm System
- 2.1.7 Preparation of AS BUILT DRAWINGS and submission of the same in soft copies (in Auto cad 2004 / Microsoft Word/excel format) as well as in hard copies.
- 2.1.8 Reference shall be drawn to the "Schedule of Work" for quantity of major items.
- 2.1.9 Contractor will be given a place (only) for storing his materials, tools, tackles. Contractor shall construct a store (at his own cost) at that designated place to keep his materials, tools & tackles. Contractor shall make proper security arrangement for his materials till the installation is taken over by the owner. Owner will not be responsible for any theft/loss of materials.
- 2.1.10 Construction Power and water: Contractor shall arrange for water and construction power at his own cost. However, if power is available during execution same may be provide to the contractor on chargeable basis.

3.0.0 TESTS

3.1.0 Pre-commissioning Tests at site

- 3.1.1 The installation work shall be tested by the contractor after completion of his erection/installation work with an advance notice to the engineer so that he or his authorized representative may witness the same also.

The contractor shall carry out Test as per relevant codes & standards and record the same in proper format. All piping after installation shall be tested for a hydrostatic test pressure of **12 Kg/Sq cm maintained for 24 hours**. All joints and valves shall be checked for leaks and rectified and retested. During testing all valves except drain & air valves shall be kept fully open. After completion of the tests, the recorded test results shall be submitted to the owner for his approval and acceptance.

- 3.1.2 The test result of any installation or equipment or its part, if considered not satisfactory to the engineer, the concerned installation / equipment and its accessories shall be properly rectified by the contractor and shall be tested again to the satisfaction of the engineer by the contractor at his own cost.

4.0.0 DESIGN BASIS

Please refer the 'Design Basis Report'.

5.0.0 FIRE HYDRANT SYSTEM

- 5.1.0 Without restricting to the generality of the foregoing, the fire hydrant system shall include the following:
- 5.1.1 Fire Fighting Pumps, suction / delivery pipes, Valves, control panel and Instrumentation.
- 5.1.2 Mild Steel Iron (M.S.), ERW, Black (Heavy Grade) Pump house / Mild Steel Iron (M.S.), ERW, Black Class "C" (Heavy Grade) / ring mains / riser main within the building and as well outside the building.
- 5.1.3 Landing valves, external hydrant valves, hose reels, Hose cabinets, fire brigade connections and connections to pumps and appliances as required.
- 5.1.4 All materials shall be of the best quality and brand new, conforming to these specifications / standards and subject to the approval of the Client / consultant.
- 5.1.5 Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.
- 5.1.6 Pipes and fittings shall be fixed to walls and ceilings by suitable clamps at intervals specified. Only approved types of anchor fasteners shall be used for RCC ceilings and walls.
- 5.1.7 Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat manner. The pipes shall be supported by structural steel fabricated (like, channel / angle /

flat / plate etc.) supports with suitable anchor fasteners / suspended thread rods not less than M16 in size.

- 5.1.8 Valves and other appurtenances shall be as located that they are easily accessible for operation, repairs and maintenance. Valves / other equipment fitted above the false ceiling shall be provided with trap / access doors.
- 5.1.9 Pipes for wet risers within the Building shall be M.S. tubes conforming to **IS 1239** (Heavy 'C' class) with flanged/welded joints.
- 5.1.10 Fittings for steel pipes shall be malleable iron or forged iron fittings with screwed / welded joints.

5.2.0 PUMPS, ENGINE AND ACCESSORIES

The pumps shall be exclusively used for firefighting purposes. One set for system shall be of electrical motor driven direct couple centrifugal pump of adequate discharge and the Standby Diesel engine driven direct coupled centrifugal pump of adequate discharge and head shall be provided as per technical requirement. The pumping capacity of main and stand by system pumps shall be as per Data sheet.

5.2.1 GENERAL REQUIREMENT

The pumps shall be horizontal centrifugal back pull out type; pump designed for continuous operation and shall have a continuously dropping head characteristic without any zone of instability. The power capacity characteristic shall be non-over loading type. The head vs. capacity, input power vs. capacity characteristics, etc., shall match to ensure load sharing and trouble free operation throughout the range. In case of accidental reverse flow through the pump the driver shall be capable of bringing the pump to its rated speed in the normal direction from the point of maximum possible reverse speed. The contractor under this specification shall assume full responsibility in the operation of the pump and the drive as one unit. The pump shall be capable to discharge 150 percent of rated capacity at a total head of not less than 65 percent of the total rated head. The total shut off head shall not exceed 120 percent of total rated head on the pump. An automatic air release valve shall be provided to vent air from the pump discharge and also to admit to the pump to dissipate the vacuum there, upon stopping of the pump.

This valve shall be located at the highest point in the discharge line between the pump and the discharge check valve. Pump coupled with motor or engine on a common base plate shall perform smoothly without any excessive noise or vibration. Also pump shall be provided with re-circulation piping with valves.

5.2.2 PUMP CASING

The casing shall be cast iron to IS 210 and capable of withstanding to the maximum pressure developed by the pump at the pumping temperature.

5.2.3 IMPELLER

The impeller shall be of standard bronze. The impeller shall be secured to the shaft with hydraulically balanced and shall be retained against circumferential movement by keying, pinning or lock rings. All screwed fasteners shall tighten in the direction of normal rotation.

5.2.4 SHAFT

Shaft size shall be selected on the basis of maximum combined shear stress. The shaft shall be of stainless steel AISI-410 ground and polished to final dimensions and shall be adequately sized to withstand all stresses from motor weight, hydraulic loads, vibrations and torque's coming in during operation. Pump Shaft-Motor Shaft Coupling shall be connected with adequately sized flexible couplings with spacer of suitable approved design. Necessary guards shall be provided for couplings. Pump shall be consisting with Gland plate for gland packing.

5.2.5 BASE PLATE

A common base plate for mounting both the pump and drive shall be provided. The base plate shall be of rigid construction, shall be fabricated by M.S. channels. Base plate and pump supports shall be so constructed, the pumping unit shall be mounted so as to Minimize misalignment caused by mechanical forces such as normal piping strain, hydraulic piping thrust etc.

5.2.6 VIBRATION AND BALANCING

The rotating elements shall be so designed to ensure least vibration during start and throughout the operation of the equipment. All rotating components shall be statically dynamically balanced at workshop. All the components of pumps of identical parameters supplied under these specifications shall be interchangeable.

5.2.7 MOTORS

Electrical motors shall be Totally Enclosed Fan Cooled (TEFC) induction motors. Motors shall be equivalent to the horse power required to drive the pumps at 150 % of its rated discharge and shall be designed for continuous full load duty.

Motors shall be suitable for 415 Volts, 3 phase, 50 cycles AC supply and the protection shall be as per IP 55. The motors shall be as per IS: 325.

5.3.0 MOTOR CONTROL CENTRES

Switch board cubicles of approved type shall be fabricated from 14 gauge MS sheet with dust and vermin proof construction. It shall be painted with one coat of red oxide primer and two coats of synthetic enamel paint of red colour and suitably marked for identification. It shall be fitted with suitable etched plastic identification plates for each motor. The cubicle shall comprise of the following:

- i) Incoming main switch fuse unit of required capacity.
- ii) Isolation switch fuse unit one for each motor.
- iii) Automatic Star delta starter for the main pumps and DOL starter for the jockey pump, with push buttons one for each motor and ON / OFF / Trip indicating neon lamps.

- iv) Single phasing preventer of appropriate rating for each motor.
- v) Rotary duty selector switch.
- vi) Panel type ampere meters one for each motor.
- vii) Panel type voltmeter on incoming main with rotary selector switch to read voltage between phase to neutral and phase to phase.
- viii) LED Phase indicating lamps for incoming main and on / off indicating lamps for each motor.
- ix) Rotary switch for auto / manual operation.
- x) Fully taped separate copper bus bars of required capacity.
- xi) Necessary contactors and relays.
- xii) Spare feeders to be provided.
- xiii) The panel shall be pre-wired with colour coded wiring including all interconnecting wiring from incoming main to switch gear, meters and accessories within the switchboard panel.
- xiv) Switch board cubicles shall be floor mounted as recommended by manufacturer and approved by client.
- xv) The control panel should operate in such a way that the starting and stopping of the jockey has to be automatic in nature. Starting of the main pumps and the diesel engine operated pump has to be automatic in nature whereas the stopping of these pumps is to be done manually.

5.4.0 PIPING

All pipes inside the building and where specified, outside the building shall be M.S. conforming to IS: 1239 - Heavy. Pipes 200 mm dia. and above shall be M.S. as per IS: 3589 with minimum 6 mm wall thick & fittings shall be fabricated from pipes conforming to IS 3589. Pipes shall be carefully laid to the alignment, levels and gradients and great care shall be taken to prevent any sand, earth or other matter from entering the pipes during laying. Pipes shall be kept thoroughly clean during the course of laying. The ends of pipes shall be blocked with wooden plugs wedged home, at the end of each days work to prevent dirt and rodents, insects etc., entering the pipe.

Pipes up to 50mmdia, tapered screwed / Socket welded / Butt welded type jointing shall be adopted, while for pipes above 50mmdia welded or flanged connections shall be used. Flanged joints shall be made with 3 mm thick insertion rubber washer / Gaskets. All bolt holes in flanges shall be drilled & making hole by using gas cutting is not acceptable. The drilling of each flange shall be in accordance with relevant Standards provided in Data Sheet.

Flanged joints shall be used for connections to vessel, equipment, flanged valves and also on suitable straight lengths of pipeline at strategic points to facilitate erection and subsequent maintenance work. The Bolts /Nuts / Washers used in the system shall be in accordance with relevant Standards provided in Data Sheet.

5.4.1 PIPE PROTECTION

5.4.1.1 ABOVE GROUND PIPES

All pipes above ground and in exposed locations shall be painted as follows,
Surface Preparation: As per data sheet.

5.4.1.2 UNDER GROUND PIPES

The pipes (buried) should be initially brushed to remove all foreign matter and apply the primer over the pipe. Primer is allowed to dry until the solvent evaporates and surface becomes tacky. The tape 4mm thick and 150/250mm wide shall then be wound in a spiral fashion and bonded completely to pipe by thermo fusion process. The overlap is to be maintained at 15mm.

5.4.2 PIPE SUPPORTS

Bidders shall note that the ring main (150 mm NB Pipe) shall be laid along the boundary wall, taking support from wall. The pipe support shall be fabricated from structural steel of suitable sections and to be fixed with the boundary wall with bullet type anchor fasteners. Accordingly, the cost for supply and fixing of bullet type anchor fasteners shall be included in 'Item no B.1.0-Overground Piping' of Schedule of Work. The supports shall be painted with coats as mentioned in the data sheets. Suitable type hangers shall support pipes below 50 mm dia with clamps, anchor fasteners and suspended rods etc.

5.5.0 VALVES

5.5.1 BUTTERFLY VALVES

Butterfly valves shall be as per BS 5155 & provided for pipes 50mmdia and above on downstream (delivery side) of the pumps. The valves shall be CI construction, seat shall be black nitrile rubber with in situ molding. The valves shall be PN 1.2 rating. All valves shall be connected with supervisory switch for monitoring at Fire alarm panel. Cabling shall be measured and paid under Fire alarm system.

5.5.2 NON – RETURN VALVES

Non – return valves shall be reflux swinging disc type with C.I. body and bronze / brass internals as per Technical data sheet enclosed and as per IS: 5312.

5.6.0 HOSE REEL

Hose reel shall be swinging type for 180 deg with mounting base plate. Hose reel shall consist with 19mm dia high-pressure rubber braided hose of 30M length with gunmetal nozzles. Hose

reel water shall be tapped off from the wet riser with Ball valve. The hose reel shall be installed in fire hose duct inside the building.

5.7.0 HYDRANT VALVE

The Hydrant valve shall be gunmetal single headed type conforming to IS: 5290 complete with hand wheel, quick coupling, spring and blank cap. 2 Nos. of RRL type hose pipe of 63mmdia and 15M length as per IS: 636 with 63mmdia instantaneous type SS heavy duty couplings & SS Branch pipe and nozzle to be provided. Fire hoses and branch pipes shall be mounted inside the fire shaft with suitable supports.

5.8.0 FIRE HOSE

Fire hoses shall be Reinforced Rubber Lined (RRL) type as per IS: 636 & 63mmdia and 15M long. Hoses shall be bounded by G.I. wire to heavy-duty instantaneous gunmetal couplings as per IS 903.

5.9.0 BRANCH PIPE & NOZZLE

Branch pipe shall be gunmetal, 63mmdia with Nozzle of 19mmdia made as per IS: 903 and suitable fitted with hoses as specified elsewhere in this specifications.

5.10.0 HOSE CABINET

Hose cabinet shall be fabricated by CRC sheet 18swg and size shall be 750mm x 600mm x 250mm. Hose cabinet shall have glass fronted door fitted with 4mm thick clear glass & powder coated finish of red outside & white inside. Cabinet shall be suitable for stand mounting / wall mounted as specified in Schedule and shall have built in breakable glass type feature to keep key.

5.11.0 FIRE BRIGADE INLET CONNECTION (FBIC)

FBIC shall be as per IS 5131 & gunmetal four way connecting head with 4 x 63mmdia instantaneous type inlets with built in check valve and 150mmdia outlet connection to the fire main grid with 150mmdia Butterfly valve and non – return valve. The fire brigade inlet shall be feed water in to the system as well as to the fire water tank.

5.12.0 AIR RELEASE VALVES

Air release valve is 25mm screwed inlet GM single acting type and shall be fixed on all high points in the system (wet riser) with Ball valves or as shown on drawings.

5.13.0 DRAIN VALVES

Gun metal Gate / Ball valve of 15 / 25 / 40 / 50mmdia as per IS; 778 with fittings as required for instruments / draining any water in the system / Risers in low points.

6.0 Fire Sprinkler System

The sprinkler system shall be installed as per tender drawings complete with sprinkler Installation Control Valves, Sprinkler main, branch and internal piping, valves, alarms and supporting arrangements, Sprinkler heads with spare sprinklers, Flow switches, and Connections to risers etc. All material shall be of the best quality conforming to specifications and subject to the approval of the Engineer-in-Charge. Pipes and fittings shall be fixed truly vertical/horizontal or on slopes required in a neat manner. Pipes shall be fixed in such a manner so as to provide easy accessibility for repair and maintenance. Pipes shall be securely fixed to walls and ceilings by suitable clamps at intervals specified. Only approved types of anchor fasteners shall be used for RCC ceilings and walls. Valves and other equipment shall be so located that they are easily accessible for operation, repairs and maintenance.

6.1 The sprinkler system shall incorporate one (as shown on drawings) installation Control valve assemblies comprising:

- i) A main gate valve
- ii) In and out pressure gauge
- iii) Test connection of adequate size with valve and orifice plate with pressure connections.
- iv) Water motor and gong with necessary piping isolating valve and strainer and drain.

6.2 The installation valve shall be straight through type suitable for wet pipe sprinkler systems. Valves shall be of cast iron with gun metal internals and suitable for vertical or horizontal installation. The valve clack shall be of cast gun metal with neoprene seal and retaining ring and shall incorporate a suitable non-return device to compensate for pressure fluctuations which should not mal-operate the clack. The gun metal internals shall provide for smooth waterways for:

- i) Water valve through a retard chamber
- ii) Test connection and drain

6.3 There shall be two pressure gauges, one for the mains side and another for the installation side. Each gauge shall have pressure damping brass piping with gun metal gauge and drain.

6.4 A test connection of adequate size as shown on drawings or as approved shall be provided with a shut-off gate valve, an orifice plate with pressure connections. The discharge from the test connection outlet shall be let to the nearest sump or drain as shown on drawings or as directed.

6.5 The mains water motor and gong shall preferably be of cast gun metal body and internals. The valve shall have an associated gun metal gate valve, strainer preceding the

- water motor. The water motor and gong shall be located on the discharge lead as shown in drawings or as directed.
- 6.6 Flow switches shall be as specified under 'Fire Hydrant System'.
- 6.7 All piping shall be mild steel heavy duty as specified under "Piping for Fire Fighting". Necessary line flushing valves shall be provided as shown on drawings or as required to.
- 6.8 The sprinkler heads shall be UL listed fixed temperature type with a quartzoid bulb containing liquid having high vapor pressure held in position by a forged GM yoke and deflector. The rated temperature of quartzoid bulb shall be 68 deg. C. The spacing shall however conform to the detailed drawing, in Co-ordination with electrical and other allied services at the ceiling level. An inspection test connection shall be provided on the down streamside of the system. Sprinklers for below false ceiling shall be fixed with recessed (two piece) type Rosette plate.

7.0.0 Fire Detection & Alarm System

The scope of work consists of Supply, Installation, Testing, Commissioning & handing over the Micro Processor based Fire Alarm System as detailed in the following specifications, Schedule of Work and the drawing.

7.1.0 General Description

The Fire Alarm System shall be two wires, electrically supervised including Manual Call Points, automatic detectors, and alarm sounding devices, Fire Alarm Control Panel, power supply, batteries and wiring.

Upon actuation of an automatic detector, visual and acoustic signaling at the main fire alarm control panel shall indicate the address where acknowledgement by the operator shall cancel the acoustic signal only. Two types of alarm sound shall be required.

The evacuation signal should be continuous and the alert signal should be intermittent. Provisions shall be made for changing the "Alert" signal to "Evacuation" signal in any sector panel manually.

After an alarm has been initiated it should continue until normal conditions have been restored. Manually operating silencing devices shall be provided for transferring or limiting the alarm to a control sounder. The operation of the silencing device should not cancel the visual indication until a reset operation is provided after the alarm condition has been restored. Automatic silencing of alarm shall not be used. The complete system shall be suitable for operation a 24 V, DC supply with all necessary batteries, battery charger, etc. All parts, components and accessories necessary for the complete installation shall be provided.

The wiring for the Fire Alarm System with the building shall be with armoured copper cables with all necessary terminations and wiring accessories. The number of junction boxes shall be kept to the minimum. Where junction boxes are required, equivalent insulating material sleeves shall be used for the wiring in the junction boxes. PVC cables shall be rated at 1100 V as per the latest IS.

7.2.0 Fire Alarm Control Panel

The Main Fire Alarm Control Panel shall have the following features. The Main Fire Alarm Control Panel shall be microprocessor based flush / wall mounting type and shall be suitably located as per the direction of Engineer-in-Charge. It shall be constructed of MS sheet (powder coated) (16 SWG) with multi character LCD display and lockable door.

The Main Fire Alarm Panel shall work on 230 Volts A.C. 50 Hz, 1 phase. The Main Fire Alarm Panel shall be capable of working on batteries also i.e., (24 Volts D.C.) maintenance free batteries of specified make. The FACP shall have its own Battery Backup of a minimum of 48 hours in normal run and then 30 minutes in alarm condition. The back up time calculation shall be done as per IS 2189 standards. The Battery shall be 2*12V (24V) DC and of sealed lead acid rechargeable maintenance free type. Whenever the A.C. Power fails, the batteries shall automatically take over the system, thus operating the system 24 hrs. a day. There shall be 2 Nos. of 12 Volts batteries supplied along with the panel and shall be accommodated in a proper enclosure.

The Main Fire Alarm Panel shall sound whenever fire/ fault occur. Whenever 'Fire' Signal comes, panel hooter shall sound with wailing sound and whenever 'Fault' signal comes the panel shall sound continuously i.e., the audio sound produced shall be differentiated between Fire / Fault signal.

The panel shall be capable of handling multiple alarms with alarms in queue displayed. The panel shall have multi-character LCD display interface to display all events, menu driven software to program the zone details of sector panels and a programmable keypad to enter the zone description. Any Fire / Fault in any zone of the sector panel shall be annunciated in English language description of the event with date, time, panel number, zone number & description of alarm/trouble and zone details.

It shall be capable of being networked with the sector panels located at different part of the premises through a single multi-drop RS485 data bus.

7.3.0 Photo Electric Smoke Detectors (PED)

PED shall be of surface / flush mounted solid state, operating on the principle of photoelectric detection of light scattered by smoke particles. The sensor shall be of silicon photocell. PEDs shall be Analog intelligent addressable with programmable addressing feature. The detectors shall be of Soft Addressing Feature; hence the Fire Alarm Control

panel shall automatically and sequentially assign an address to the detectors. The detector chamber shall be protected with a continuous precisely perforated screen, which eliminates even the small insects to penetrate inside the smoke chamber.

Detectors shall be provided with blinking bi-colour LED to visually indicate the healthiness of the detector / alarm condition. Detectors shall be suitable for an operating temperature -30° C to 70° C and relative humidity of 0% to 95 % (non-condensing). The detector shall have inbuilt intelligence to detect the fire conditions via the inbuilt algorithms in the microprocessor, as well shall have the inbuilt intelligence to detect software and hardware faults or malfunction as well if double addressing is assigned by mistake on the loop.

PEDs shall be with In-built short circuit isolator in each device for avoiding multi-device failures in case of short circuit in loop cable. The detector can support independent output from the base which can be used for Remote LED, which can be assigned from the Fire Alarm Control Panel. Each detector will be complete with an interchangeable mounting base that includes a terminal box into which the detector can be plugged in. Also there shall be an external terminal box to terminate the field cable. The base for the detector shall be from the same manufacturer of the detector and should be imported. This detectors/base shall be traceable to manufacturer's batch certificate. Detectors shall be suitable for a supply voltage of 15 to 40 V DC without affecting the sensitivity.

7.4.0 Heat Detectors

Heat Detectors shall be of rate-of-rise cum fixed temperature type. These detectors shall be capable of detecting fire by responding to the rate of temperature rise in the surroundings and also when the temperature exceeds a preset value. The detectors shall operate when the rate of temperature rise is slow and yet the surrounding temperature has gone up beyond the preset value the detector should actuate.

PEDs shall be Analog intelligent addressable with programmable addressing feature. The detectors shall be of Soft Addressing Feature; hence the Fire Alarm Control panel shall automatically and sequentially assign an address to the detectors.

The detector chamber shall be protected with a continuous precisely perforated screen, which eliminates even the small insects to penetrate inside the smoke chamber Detectors shall be provided with blinking LED to visually indicate the healthiness of the detector/alarm condition.

Detectors shall be suitable for an operating temperature -30° C to 70° C and relative humidity of 0% to 95% (non-condensing).

The detector shall have inbuilt intelligence to detect the fire conditions via the inbuilt algorithms in the microprocessor, as well shall have the inbuilt intelligence to detect software and hardware faults or malfunction as well if double addressing is assigned by mistake on the loop.

Detectors shall be with In-built short circuit isolator in each device for avoiding multi-device failures in case of short circuit in loop cable.

The detector can support independent output from the base which can be used for Remote LED, which can be assigned from the Fire Alarm Control Panel.

Each detector will be complete with an interchangeable mounting base that includes a terminal box into which the detector can be plugged in. Also there shall be an external terminal box to terminate the field cable. The base for the detector shall be from the same manufacturer of the detector and should be imported. These detectors/base shall be traceable to manufacturer's batch certificate. Detectors shall be suitable for a supply voltage of 15 to 40 V DC without affecting the sensitivity.

7.5.0 Response Indicator

Response Indicator shall be of surface mounted with LED indication in MS/ABS sheet box. RI shall light up as soon as one of the connected Fire Detectors, which are connected in parallel to the Response Indicator, gives an alarm. They shall be suitable for operation of 24 V DC.

7.6.0 Manual Call Points

The unit must be intelligent analogue addressable manual call point. Fully complying with EN54 11 and can be connected on the same two core loop and loop powered. The device shall be equipped with the latest state of the art microprocessor which shall hold the fire algorithms, hardware and software monitoring capability. The microprocessor shall have the intelligence to announce the alarm directly to the fire alarm control panel in case if the MCP is called for alarm. This process shall not take more than 2 second in total. The unit shall be embedded with protocol for safe and fast communication between the device and the Fire Alarm Control Panel, The Microprocessor shall allow Soft Addressing Features; this allows the Fire Alarm Control.

7.7.0 Hooters

The Electronic Hooters shall be housed in MS enclosure of 1.5mm sheet metal. The Hooters shall be with built on oscillator & amplifier. The Hooters shall give two tones, wailing sound whenever it receives 24 V supply from panel on receipt of Fire signal. The range of Hooter shall be 85db approx. at 1 mtr. The MS box shall be painted with Fire Red (Powder Coated). Hooter shall be of wall / ceiling mounted to suit the interiors.

7.8.0 Power Supply

The Main Control Panel/ Sector panel shall be provided with operating power from 240 V, 50 Hz single phase AC source. This power shall be converted into 24 VDC for system operation by a power supply unit. In the event of failure of the operating supply, the system shall be automatically transferred to standby battery supply. The batteries shall be of the maintenance free type and shall be housed in an appropriate housing. well as trickle charging and shall have sufficient capacity to operate the system with A.C. power

disconnected for 48 hours and at the end of this period to operate all alarm sounding devices simultaneously with loads caused by operation of detectors operating on 25% of the zone circuits of the system with a minimum of two zones for a period of 30 consecutive minutes. Interconnecting wiring between Fire Alarm Control Panel and batteries shall be supervised for open and short circuit conditions. Batteries shall also be supervised for an under voltage condition.

Alarm receiving and alarm signaling circuits shall be of two wire system and the system shall be partly with armoured cu cable.

LIST OF APPROVED MAKE

| Sl. No. | Item Description | Approved Make |
|---------|---|--|
| 1 | Cable & Wires | : CCI/ RPG Asian/ Universal/Fort Gloster/ Nicco Torrent /Finolex/ Polycab/ Havells/RR |
| 2 | Pump | : Mather & Platt / Kirloskar |
| 3 | Engine | : Greaves / Cummins/Kirloskar |
| 4 | Motor | : Crompton /Kirloskar/ ABB / Bharat Bijlee /equivalent approved make (E.A.M) |
| 5 | Gate Valves | :KBL/H sarkar / Fluid Control /Upadhya/ Kalpana/ (E.A.M) |
| 6 | Pipes | : Tata / Jindal /SAIL / (E.A.M) |
| 7 | Pressure Switch & Gauge Pricol/Fiebig(E.A.M) | : ANI/H Guru/Waree/Wika/Indfoss/ |
| 8 | Control Panel Component | : ABB / Universal / Khatau Junkar/L&T/ (E.A.M) |
| 9 | Relays | : Alstom / ABB / Siemens / GE / (E.A.M) |
| 10 | Hydrant valve & water monitor, Branch Pipe with Nozzle | :GEI / Newage / Shah Bhogilal / ASCO/Fire Shield/Sh Fire(E.A.M) |
| 11 | Non- Return Valves | : KBL/ H sarkar / Fluid Control /Upadhya/ Kalpana/ Venus/ Hawa/ InterValve / (E.A.M) |
| 12 | Butterfly Valves | : KBL/H sarkar / Fluid Control /Upadhya/ Kalpana/ Venus/ Hawa / (E.A.M) |
| 13 | Pipe Fittings | : Bharat Forge/ Tube Products/M.S. Fittings/ Sanjay Forge/ VS Brand/ (E.A.M) |
| 14 | Gate Valves, screwed end | : Leader/Zoloto/ITAP/ Hawa (E.A.M) |
| 15 | Ball Valves, screwed end | : Leader/Zoloto/ITAP/ Hawa (E.A.M) |

| | | |
|-----|--|--|
| 16 | Strainer | : Gujrat OTO Filt/ Grand Prix/Tel Flow/ Jaypee/H Sarkar (E.A.M) |
| 17 | PI | : Fiebig/H Guru / Pricol/ Waree/ (E.A.M) |
| 18 | Anti Corrosive Material | : IWL/ Rustech/ (E.A.M) |
| 19 | Fire Hose & Hose Coupling | : Newage / CRC/ GEI/BRG/Fire Shield(E.A.M) |
| 20 | Air Release Valve | : Leader/ Bajaj/ Hawa/ (E.A.M) |
| 21 | Welding Electrodes | : ESAB/ ADVANI/Best Arc/ (E.A.M) |
| 22. | FDA Parts such as detectors , RI , MCP, Fire Alarm Panel, Modules etc. | : Apollo / Edwards / Honeywell/Bosch |
| 23. | Steel | : SAIL/RINL/TATA/JINDAL/ESSAR/BHUSAN |
| 24. | Isolation Control Valve (ISI) | :Safe Spray/HD |
| 25. | Sprinkler head (UL Listed) | :HD/Viking/Tyco |
| 26. | Paint | :Berger/Asian Paints/Nerolac/ CDC Carboline/ Jenson Nicholson/ Shalimar Paints/Bombay Paints |

Besides above mentioned make **equivalent approved make (EAM)** may also be used. The Contractor shall also obtain prior approval from Owner for the 'Make' and 'Rating' of any other major item not mentioned above.

ANNUAL MAINTENANCE CONTRACT**(To be enforced after expiry of Defect Liability/Performance guarantee Period)**

- i) Regular check-up of the Fire Hydrant, Sprinkler and Fire Detection & Alarm system shall be carried out by the contractor during AMC period including manpower, tools tackles etc. required for maintenance.
- ii) The charges to be paid on prorated basis against quarterly invoices raised after completing the inspection/ maintenance calls and submitting the inspection report duly verified by the Plant-in-Charge. The charges of consumables and spares shall be paid separately or will be sourced by BL.
- iii) The Supplier has to carry out 4 (four) Quarterly Preventive Maintenance Schedules and attend unlimited breakdown calls through specially trained staff during the year.
- iv) The break down calls shall be attended at the earliest or maximum within 2 working day.

**TECHNICAL DATA SHEETS
(Attached as Enclosure-II)**

INDEX OF DATA SHEETS-Enclosure-II

| Document No. | Title |
|---------------------|---|
| TCW/BHU/FPS/1 | Branch Pipe & Nozzles |
| TCW/BHU /FPS/2 | Fire Hose with couplings |
| TCW/BHU/FPS/3 | Hose Box |
| TCW/BHU/FPS/4 | Landing / Hydrant |
| TCW/BHU/FPS /5 | Water Monitor |
| TCW/BHU/FPS / 6 | Pressure Gauge |
| TCW/BHU/FPS /7 | Pipe fittings, flanges etc. |
| TCW/BHU/FPS /8 | CI Gate Valves |
| TCW/BHU/FPS /9 | CI Non Return Valves |
| TCW/BHU/FPS /10 | Wrapping & Coating material |
| TCW/BHU/FPS/11 | Painting of Piping, Equipment & Structure |
| TCW/BHU/FPS/12 | Sprinklers |
| TCW/BHU/FPS/13 | Flow Switch |
| TCW/BHU/FPS/14 | Flexible Hose for Sprinklers |
| TCW/BHU/FPS/15 | FRLS Cable |
| TCW/BHU/FPS/16 | Fire Pump Set (Motor Driven) |
| TCW/BHU/FPS/17 | Fire Pump Set (Engine Driven) |
| TCW/BHU/FPS/18 | Jockey Pump Set |
| TCW/BHU/FPS/19 | Terrace Pump (Motor Driven) |

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|-----------------|---|--|----------------|-----------------------|-------------------|--|
| | | | | | | |
| TITLE : | TECHNICAL DATA SHEET FOR BRANCH PIPE & NOZZLES | | DOC NO. | TCW/BHU/FPS/01 | | |
| PACKAGE: | FIRE PROTECTION SYSTEM | REV. | 0 | DATE: | 15-01-2020 | |
| PROJECT: | TCW at Khorda, Odisha | SHEET | 1 | OF | 1 | |
| 1.0 | Manufacturer | SHAH BHOGILAL / NEWAGE / GEI / ASCO/ : Fire Shield/ Equivalent Approved | | | | |
| 2.0 | Code & Standard | | | | | |
| 2.1 | Branch pipe | : IS:903 & IS:2871 | | | | |
| 2.2 | Nozzle | : IS:903 | | | | |
| 2.3 | Type | : Solid stream type (For areas except Universal Type (Only for transformer yard)) | | | | |
| 2.4 | Size (Branch pipe & nozzle) | | | | | |
| | Inlet | : 63 mm dia | | | | |
| | Outlet | : 20 mm dia | | | | |
| 2.5 | End Connection | : Instantaneous Male | | | | |
| 3.0 | Material of Construction | | | | | |
| 3.1 | Branch pipe | : SS to IS:3444 Gr. 01 | | | | |
| 3.2 | Nozzle | : SS to IS:3444 Gr. 01 | | | | |
| 3.3 | Washer | : Rubber to IS : 937 Type 2 B | | | | |
| 3.4 | Quick coupling end / Hose coupling | : Fire Hose Coupling (By Hose Supplier) | | | | |
| 4.0 | Hydrotest Pressure | : 21 Kg/cm ² | | | | |
| 5.0 | Above items accepted by TAC | : Yes | | | | |
| 6.0 | Quantity | : As per Approved drawings | | | | |

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|-----------------|--|--|-----------------------|--------------|-------------------|
| | | | | | |
| TITLE : | TECHNICAL DATA SHEET FOR FIRE HOSE WITH COUPLINGS | DOC NO. | TCW/BHU/FPS/02 | | |
| PACKAGE: | FIRE PROTECTION SYSTEM | REV. | 0 | DATE: | 15.01.2020 |
| PROJECT: | TCW at Khorda, Odisha | SHEET | 1 | OF | 1 |
| 1.0 | Manufacturer | NEWAGE / Fire Shield / BRG / CRC / GEI / Equivalent approved | | | |
| 2 | Confirms to IS Code | : IS:14933-2001 together with end GM couplings (ISI Marked). The general design and construction of instantaneous end couplings, | | | |
| 3 | Type | : As per IS:14933-2001 | | | |
| 4 | Quantity | : As per Engg. | | | |
| 5 | Burst Pressure | : 38 Kg/cm ² | | | |
| 6 | Operating Pressure | : 12 Kg/cm ² | | | |
| 7 | Proof Pressure | : 22 Kg/cm ² shall be conducted along with coupling duly bound on hose pipe by GI Wire | | | |
| 8 | Size | : 63 mm x 15 M long | | | |
| 9 | Type of Coupling | : Instantaneous as per IS:14933-2001 | | | |
| 10 | Hoses shall have ISI certification marks | : Yes | | | |
| 11 | Material of Hose | Rubber lined, woven jacketed type conforming to IS: 636 Type A | | | |
| 11.1 | Material of hose coupling | : SS | | | |
| 12 | Whether approved by TAC | : Yes | | | |
| 13 | Marking | : IS:14933-2001 Year of Manufacturer Manufacturers name of trademark | | | |

| | | | | | |
|-----------------|--|---|-------------------------|-------------|-------------------|
| | | | | | |
| TITLE : | TECHNICAL DATA SHEET FOR HOSE BOX | | | | |
| | | DOC NO. | : TCW/BHU/FPS/03 | | |
| PACKAGE: | FIRE PROTECTION SYSTEM | REV. | 0 | DATE | 15.12.2020 |
| | | | : | | |
| PROJECT | TCW at Khorda, Odisha | SHEET | 1 | OF | 1 |
| 1.0 | Manufacturer | : REPUTED MAKE. Catalogue / specification to be approved by owner before placement of order. | | | |
| 2.0 | Code/Standard | : Manufacturer's standard | | | |
| 3 | Material of Construction | : Sheet fabricated from 18 SWG MS sheet | | | |
| 4 | Hose Box (External) | : l) Accomodating 2 nos. of 63mm x 15 m long hose and 1 no. of branch pipe coupling, spanner & nozzle (JET type/Universal typ) for external hydrant valve branch pipe coupling, spanner & nozzle (JET type/Universal type) for external hydrant valve branch pipe with nozzle | | | |
| 5 | Type | : Wall/column mounted (for fire escape hydrant) with key box Pedestal mounting (for external hydrant) with key box Glass fronted door fitted with 4mm thick clear | | | |
| 6 | Size | : 750mm x 600mm x 250mm | | | |
| 7.0 | Quantity | : As per BOQ/Schedule of Work | | | |
| 8.0 | Painting (Inside & Outside) | : powder coated finish of red out side & white | | | |
| 9 | Marking | : Fire in 150mm size letter on glass | | | |
| 10 | Locking arrangement | : Built in lock, reputed make with 2 keys | | | |
| 11 | Approval | : Owner's approval | | | |
| 12 | Drawings enclosed | : Yes | | | |
| 13 | Canopy provided | : Yes, only for external hose box | | | |
| 14 | Accessories provided | : Yes, as per specification (Small container having as | | | |
| 15 | Catalogue/Drg enclosed | : Drawing of selected vendor will be attached | | | |
| Note: | HOSE BOX SHALL INCLUDE: 1. Key box will be with hammer & chain 2. For leg mounted: Suitable height of pedestal w.r.t. local ground level and the location as per | | | | |

| TITLE : | TECHNICAL DATA SHEET FOR HYDRANT VALVES | DOC NO. | TCW/BHU/FPS/04 | | |
|----------|--|--|----------------|-------|------------|
| PACKAGE: | FIRE FIGHTING SYSTEM | REV. | 0 | DATE: | 15.12.2020 |
| PROJECT: | TCW at Khorda, Odisha | SHEET | 1 | OF | 1 |
| 1.0 | Manufacturer | GEI / Newage / Shah Bhogilal / Fire Shield / Sha Engg /Equivalent | | | |
| 2.0 | Type | Female Oblique type outlet angled towards ground | | | |
| 3.0 | Code / Standard | : IS:5290 Type A | | | |
| 4.0 | Hydrostatic Pressure of Test Body | : 21 Kg/cm ² (g) | | | |
| 5.0 | Water tightness test at valve | : 14 Kg/cm ² (g) | | | |
| 6.0 | Flow | : 54 m ³ / Hr at 7 | | | |
| 7.0 | Size | : Inlet 100 NB for double headed , 80 NB for single headed & Outlet 63 NB | | | |
| 8.0 | Bonnet Type | : Screwed / Bolted | | | |
| 9.0 | Stem type | : As per IS:5290 (Rising) | | | |
| 10.0 | Operation | Handwheel | | | |
| 11.0 | Inlet | : Flanged (Flat Faced) drilled as per ANSI B 16.5, class 150 FF | | | |
| 11.1 | Outlet | : Female instantaneous coupling with spring lock type coupling as per IS:5290 with blank cap & chain | | | |
| 12.0 | MATERIAL OF CONSTRUCTION | | | | |
| 12.1 | Column Pipe | : MS Black to IS:1239 (Part -I) Heavy | | | |
| 12.2 | Body | : SS to IS:3444 Gr.01 | | | |
| 12.3 | Bonnet | : SS to IS:3444 Gr.01 | | | |
| 12.4 | Stop valve | : SS to IS:3444 Gr.01 | | | |
| 12.5 | Seat | : Neoprene Rubber | | | |
| 12.6 | Check nut & Gland Nut | : SS to IS:3444 Gr.01 | | | |
| 12.7 | Spindle | : IS:6603-1972 Gr04 Cr. 04 18 Ni 10 | | | |
| 12.8 | Hand Wheel | : CI to IS:210 Gr. 20 | | | |
| 12.9 | Instantaneous coupling | : SS to IS:3444 Gr.01 | | | |
| 12.10 | Spring | : Phosphor Bronze as per IS :7608 | | | |
| 12.11 | Gland packing | : Asbestos as per IS : 4687 | | | |
| 12.12 | Washer, Gasket | : Rubber to IS:937 | | | |
| 13.0 | Approval | : ISI Marked | | | |

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|-----------------|---|--------------|---|-----------------------|-------------------|
| | | | | | |
| TITLE : | TECHNICAL DATA SHEET FOR WATER | | DOC NO. | TCW/BHU/FPS/05 | |
| | MONITOR | | | | |
| PACKAGE: | FIRE PROTECTION SYSTEM | REV. | 0 | DATE: | 15.12.2020 |
| PROJECT: | TCW at Khorda, Odisha | SHEET | 1 | OF | 1 |
| 1 | Manufacturer | : | HD Fire/ Newage/GEI / Shah Bhogilal / Equivalent Make | | |
| 2 | Confirms to IS Code | : | IS: 8442 | | |
| 3 | Type | : | Stand post 4 " NB | | |
| 4 | Size Barrel/Nozzle | : | 63 mm | | |
| 5 | Discharge Capacity | : | 1750 ltr/min. At 7 kg/cm2 | | |
| 6 | Hydrostatic Test Pressure(without nozzle) | : | 23m kg/cm2 (leakproof) | | |
| 7 | Throw (at 7 kg/cm2) | : | | | |
| 7.1 | Min. Horizontal | : | 53 m | | |
| 8 | Rotation | : | Horizontal- 360 deg | | |
| 8.1 | Horizontal | : | 360 Deg. In either direction | | |
| 8.2 | Vertical | : | Vertical- 125 deg (Upward + 80 Deg.; Downward – 45 Deg) | | |
| 9 | Material of construction | : | | | |
| 9.1 | Water Barrel | : | MS seamless pipe to IS:1239 | | |
| | Elbow (Bend) & Reducer | : | IS 4310 & IS 1239 Part II Gr A | | |
| 9.2 | Male & Female Swivel Joint | : | Gun Metal to IS: 318 Gr. LTB 2 | | |
| 9.3 | Locking Nut | : | Brass IS:291 - 1 | | |
| 9.4 | Handle | : | Steel round bar - MS | | |
| 9.5 | Nozzle | : | Bronze IS:318 LTB 2 | | |
| 9.6 | Base Flange | : | M.S. to IS: 2062 | | |
| 9.7 | Flange drilling dimension | : | As per ASA 150#, B 16.5 , 4" NB | | |
| 10 | Acceptability to TAC | : | ISI marked | | |
| 11 | Inspection & Testing | : | As per approved QAP | | |
| 12 | Accessories | : | Nozzle Spanner & Blank cap | | |
| 13 | Anti Corrossive Treatment | : | Hot Dip Galvanising for ferrous items & all items with 3 coats of fire red colour as per IS . | | |

| | | | | | |
|-----------------|---|--|----------------------|--------------|-------------------|
| | | | | | |
| TITLE : | TECHNICAL DATA SHEET FOR PRESSURE GAUGES | DOC NO. | TCW/BHU/FPS/6 | | |
| PACKAGE: | FIRE FIGHTING SYSTEM | REV. | 0 | DATE: | 15.12.2020 |
| PROJECT: | TCW at Khorda, Odisha | SHEET | 1 | OF | 1 |
| 1.0 | Manufacturer | Fiebig/H Guru / Pricol/ Warea/ Equivalent | | | |
| 2.0 | Type | Bourden Type / Glycerine Filled | | | |
| 3.0 | Quantity | As per approved drawing | | | |
| 4.0 | Location | Direct mounting on the pipe | | | |
| 5.0 | Accuracy | + - 1% of FSD | | | |
| 6.0 | Size of Dial | 150 mm | | | |
| 7.0 | Scale | Liner (270 Deg.Arc) | | | |
| 8.0 | Range | 0 - 14 Kg / cm ² | | | |
| 9.0 | Material of Construction | | | | |
| 10.0 | Movement | AISI SS 304 | | | |
| | Burdon Material | AISI SS 316 | | | |
| 11.0 | Sensing Element | Burdon Type | | | |
| | Connection Size | 1/2" NPT (Male) Threaded | | | |
| 11.1 | Connection | Screwed | | | |
| | Connection Material | Carbon steel | | | |
| 11.2 | Case Construction | Die Cast Aluminium Weather Proof IP - 65 Stove Enamelled Black Finish | | | |
| | Pointer Type | Micro Zero Adjustment Type | | | |
| 12.0 | Over range protection | 125% of the Full Scale Range | | | |
| | Over range pointer stopper | Yes, provided | | | |
| 12.1 | Identification Tag Plate | Yes, provided (Material - Aluminium) | | | |
| 12.2 | Snubber Screw | Yes, provided | | | |
| NOTES | 1) For TAG Nos. of Pressure Gauge P & I Diagram 2) Isolation Valves for Pressure Gauges shall be provided 3) All mounting accessories shall be provided | | | | |

| | | DOC NO. | TCW/BHU/FPS/7 | | |
|----------|--|---|---------------|-------|------------|
| TITLE : | TECHNICAL DATA SHEET FOR PIPE, FITTINGS & FLANGES | | | | |
| PACKAGE: | FIRE PROTECTION SYSTEM | REV. | 0 | DATE: | 15.01.2020 |
| PROJECT: | TCW at Khorda, Odisha | SHEET | 1 | OF | 1 |
| 1.0 | Manufacturer | : JINDAL / TATA / SAIL/ Equivalent Make | | | |
| 2.0 | PIPING (UNDERGROUND / ABOVE GROUND / IN TRENCHES) (NORMALLY FILLED WITH WATER) | | | | |
| 2.1 | Standard | : IS : 1239 (Part-I), IS : 3589, Gr 330 | | | |
| 2.2 | Type | : ERW / Spiral Weld | | | |
| 2.3 | Class & Grade | : | | | |
| | | a Up to 150NB MS Black Heavy grade to IS : 1239 (Part-1) | | | |
| | | b 200 NB TO 400 NB M S Black to IS : 3589 Grade 410 | | | |
| 2.4 | Thickness | : a. Up to 150 NB As per IS 1239 (Part-1), Heavy | | | |
| | | b. 200 NB to 400 NB – 6.4 mm thk. | | | |
| 2.5 | Detail of end connection | : Plain ends or Beveled ends | | | |
| 3.0 | PIPING – NORMALLY EMPTY | | | | |
| 3.1 | Standard | : IS : 1239 Part-I (Galvanised) / IS:3589 Gr. 330 (Galvanised to IS : 4736) | | | |
| 3.2 | Type | : ERW | | | |
| 3.3 | Class & Grade | : M.S Galvanised to medium grade to IS : 1239 Part – I and MS Galvanised, 6mm thk to IS 3589 Gr.410 | | | |
| 3.4 | Thickness | : a. Up to 150 NB As per IS 1239 (Part – I) Heavy | | | |
| | | b. 200 NB as per IS: 3589, Gr.410, 6mm wall thickness | | | |
| 3.5 | Detail of end connection | : Screwed | | | |
| 4.0 | Inspection & Testing | : As per appd.QAP | | | |
| 5.0 | Type of protective coating | : <u>For U/G Pipes</u> PYPKOTE As per IS -10221– 4mm THK Ref-Data Sheet : Wrapping & Coating Material | | | |
| 6.0 | M.S.Fittings | | | | |
| 6.1 | Manufacturer | Bharat Forge/ Tube Products/M.S. Fittings/ Sanjay Forge/ VS Brand / Equivalent approved make | | | |
| 6.2 | Material Standard | IS: 1239 , Part II | | | |
| 6.3 | Dimensional Standard | 50 NB & Below ASME B 16.11, CL 3000 65 NB to 150 NB Butt welded as per ASME B 16.9 200NB to 400 NB | | | |
| 7.0 | Galvanised Fittings | | | | |
| 7.1 | Manufacturer | H.B. INDUSTRIES/ equivalent | | | |
| 7.2 | Material Standard | Malleable cast iron to IS 2108 Grade BM-300 as per IS 14329 | | | |
| 7.3 | Dimensional Standard | IS 1879 | | | |
| 7.4 | Galvanising | IS 4759 | | | |
| 7.5 | Flanges & Blind flanges | | | | |
| | Material Standard | SA 105 | | | |
| | Drilling Standard | Confirming to ASME B 16.5, 150 #, SORF | | | |
| 7.60 | Bolts and nuts & Washers | | | | |
| | | Machine Bolts, For Size M 16 & Below IS : 1367 Gr. 8.8. & For Size M 20 & Above IS : 1367 Gr. 6.8. | | | |
| | | Heavy Hexagonal Nut For Size M 16 & Below IS : 1367 Gr. 8.0. & For Size M 20 & Above IS : 1367 Gr. 6.0. All nut, bolt & washers shall be galvanised. | | | |
| 7.70 | Gaskets | Champion AF 120 - 3 mm Thk. Non Asbestos | | | |
| Note : | FLANGES AND BOLTS & NUTS FOR G.I. PIPE LINES SHALL BE GALVANISED AS PER IS : 4736 | | | | |

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| TITLE : | TECHNICAL DATA SHEET FOR C I GATE VALVES | DOC NO. | TCW/BHU/FPS/8 | | |
| PACKAGE: | FIRE PROTECTION SYSTEM | REV. | 0 | DATE: | 15.01.2020 |
| PROJECT: | TCW at Khorda, Odisha | SHEET | 1 | OF | 1 |
| 1.0 | Manufacturer | KBL/ H sarkar / Fluid Control /Upadhya/ Kalpana/ Hawa or EAM | | | |
| 2.0 | Type | Rising Spindle | | | |
| 3.0 | Size | All sizes with Flanged ends | | | |
| 4.0 | Quantity | As per approved drawings | | | |
| 5.0 | Code/ Standard | IS-14846 | | | |
| 6.0 | Material of construction | | | | |
| 6.1 | Body | CI to IS:210 FG 260 | | | |
| 6.2 | Bonnet | CI to IS:210 FG 260 | | | |
| 6.3 | Hand wheel | CI to IS:210 FG 200 | | | |
| 6.4 | Stem | SS , IS: 6603, GR 12 CR 13 | | | |
| 6.5 | Wedae | CI to IS:210 FG 200 | | | |
| 6.6 | Gland | CI to IS:210 FG 200 | | | |
| 6.7 | Packing | Jute & Hemp IS:5414 | | | |
| 6.8 | Body seat ring | Leaded to Bronze to IS:318 Gr. LTB2 | | | |
| 6.9 | Wedae seat ring | Leaded to Bronze IS:318 Gr. LTB2 | | | |
| 6.10 | Gaskets | Rubber to IS: 638 Type – B | | | |
| 6.11 | Counter flange | IS:2062 drilled to ANSI B 16.5 # 150 (By others) | | | |
| 7.0 | Hydrostatic test pressure (as per mfr drg) | | | | |
| 7.1 | | PN 1.6 | PN 1.0 | | |
| a) | Body | 24 Kg/cm2 | 15 Kg/cm2 | | |
| b) | Seat | 16 Kg/cm2 | 10 Kg/cm2 | | |
| 8.0 | End connection | Flanged connection (B16.5 150 #, FF) | | | |
| 9.0 | Hand wheel | Provided | | | |
| 10.0 | Spur gear reduction unit | Provided (For size 350 & above | | | |
| 11.0 | Accessories provided | | | | |
| 11.1 | Position indicator | Provided | | | |
| 11.2 | Locking arrangement | As required | | | |
| 12.0 | Painting | Two coats of epoxy painting on internal & external unlined surface of valve | | | |

| TITLE : | TECHNICAL DATA SHEET FOR CI NON RETURN VALVES | DOC. No. | TCW/BHU/FPS/09 | | |
|----------|--|--|----------------|-------|------------|
| PACKAGE: | FIRE PROTECTION SYSTEM | REV. | 0 | DATE: | 15.01.2020 |
| PROJECT: | TCW at Khorda, Odisha | SHEET | 1 | OF | 1 |
| 1.0 | Manufacturer | KBL/H sarkar / Fluid Control /Upadhya/ Kalpana/ Venus/ Hawa/ InterValve/ Hawa/Equivalent approved make | | | |
| 2.0 | Type | : Reflex Swing Disc type | | | |
| 3.0 | Quantity | : As per approved drawings | | | |
| 4.0 | Working pressure/Design temp. | : 10.5 Kg/cm ² / 50 Deg. C | | | |
| 5.0 | Size | : 65 NB & above | | | |
| 6.0 | Code/Standard | : IS: 5312, PN 1.6 | | | |
| 7.0 | End connection | : Flanged to ANSI B 16.5 (CI 150 Flat Face) | | | |
| 8.0 | Material of construction | | | | |
| 8.1 | Body | : CI IS:210 Gr. FG260 | | | |
| 8.2 | Cover | : CI IS:210 Gr. FG260 | | | |
| 8.3 | Door | : CI IS:210 Gr. FG260 | | | |
| 8.4 | Body Seat Ring | : Bronze IS: 318 LTB 2 | | | |
| 8.5 | Hinge | : CI IS:210 Gr. FG260 | | | |
| 8.6 | Hinge pin | : SS to IS: 1570(PT- 5),GR 12, CR 13 | | | |
| 8.7 | Bolts & Nuts | : CS IS:1367, CL-4.6 & CS IS:1367, CL-4.0 | | | |
| 8.8 | Gaskets | Rubber to IS: 638 Type – B | | | |
| 8.9 | Counter flange | IS:2062 drilled to ANSI B 16.5 # 150 | | | |
| 9.0 | Hydrostatic test pressure | | | | |
| 9.1 | For PN 1.6 Rating | | | | |
| a) | Body | 24 Kg/cm ² | | | |
| b) | Seat | 16 Kg/cm ² | | | |
| 9.2 | Disc Facing Ring | : Rubber to IS : 638 Type A | | | |
| 9.3 | Gaskets | : CAF, IS:2712, Gr. W/3 | | | |
| 9.3 | Hydrostatic Test Pressure | | | | |
| a | Body | : 24 kg/cm ² | | | |
| b | Seat | : 16 kg/cm ² | | | |
| 9.4 | Indication for direction flow | : Permanently marked arrow on the valve body | | | |
| 9.5 | Marking | : ISI Marked | | | |
| 9.6 | Painting | Two coats of epoxy painting on internal & external unlined surface of valve (100 micron thickness) | | | |

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| | | | DOC NO. | TCW/BHU/FPS/10 | | |
| TITLE : | TECHNICAL DATA SHEET FOR | | | | | |
| | WRAPPING AND COATING MATERIAL | | | | | |
| PACKAGE: | FIRE PROTECTION SYSTEM | REV. | 0 | DATE: | 15.01.2020 | |
| PROJECT: | TCW at Khorda, Odisha | SHEET | 1 | OF | 1 | |
| 1.0 | Manufacturer | : | M/s IWL/ Rustech | | | |
| 2.0 | Type | : | "PYPEKOTE' (Branded Product)/ EAM | | | |
| 3.0 | Application | : | Wrapping & Coating on underground pipelines | | | |
| 4.0 | Brand Name | : | "PYPEKOTE" (4mm thk. +/-0.2 mm) / Equivalent | | | |
| 5.0 | Code / Standard | : | IS : 10221 | | | |
| 5.0 | SPECIFICATION OF TYPEKOTE 4mm TAPE | | | | | |
| 5.1 | Width | : | 100 to 500 mm (depends on pipe size & mfr) | | | |
| 5.2 | Length | : | 10 m | | | |
| 5.3 | Tensile Strength (N/5cm) | : | 300 (Min.) - Length wise 100 - Cross wise | | | |
| 5.4 | Elongation | : | 20% (Min.) - Length wise 30% - Cross wise | | | |
| 6.0 | SPECIFICATION OF PYPEKOTE PRIMER | | | | | |
| 6.1 | Viscosity | : | 35 to 100 seconds | | | |
| 6.2 | Drying Time | : | 15 to 30 minutes | | | |
| 6.3 | Flash Point | : | 23 Deg. C (Min.) | | | |
| 6.4 | Drying Time | : | 15 to 30 minutes | | | |
| 6.5 | Density (gm/cm ³) | : | 0.9 to 0.95 | | | |
| 7.0 | Quantity | : | As per approved layout drawings | | | |

| | | | | | | |
|----------|--|--|---------|----------------|-------|------------|
| | | | DOC NO. | TCW/BHU/FPS/11 | | |
| TITLE : | PAINTING OF PIPING, EQUIPMENT & STRUCTURE | | | | | |
| PACKAGE: | FIRE PROTECTION SYSTEM | | REV. | 0 | DATE: | 15.01.2020 |
| PROJECT: | TCW at Khorda, Odisha | | SHEET | 1 | OF | 1 |

PAINTING OF PIPING, EQUIPMENT AND STRUCTURE

1.0 GENERAL

This specification describes requirements of supply an application of paints for equipment, piping, structural etc. for over ground surface.

2.0 GENERAL INFORMATION

2.1 All external or exposed surface of mechanical & electrical equipment, vessels, tanks, ducts, piping, valves, accessories and surfaces of all structures, platforms, galleries etc. shall be provided with required primer and finish painting after necessary surface preparation.

2.2 Quality of primer shall be chosen that they are suitable for withstanding maximum expected surface temperature and they type of atmosphere it is exposed to.

2.3 Application of primer and finish paints shall be done at site of far as possible except for finished machine and equipment such as diesel engine, pumps, compressor etc . For such finished equipment and components there of, the painting may be completed at shop and transported to site with paint duly protected. For items such as structures, plates, tank shells, pipe pieces etc. shop coat of protective paint shall be given before dispatch to site.

However, touch-up paints shall be done at site after erection and commission as per the instruction of the purchaser.

2.4 The Bidder shall follow the provisions of TAC, Indian Standards or equivalent approved other National Standards in selection of paints, application and surface preparation

3.0 PAINTING SCHEME

3.1 The scheme of painting to be followed for various equipment are furnished in Appendix. The Bidder may suggest any alternative painting scheme if the same is superior to the suggested scheme. The final scheme of painting to adopted shall be subjected to purchaser's approval.

3.2 When material or paint is specified or described by the name of a particular brand, manufacturer or vendor, the specific time mentioned shall be understood as indicating the function and quality desired. Other manufacturer's product shall be

approved provided specific information is given to allow the purchaser to evaluate the product proposed.

3.3 Surface Preparation

Anyone of the following surface preparation methods shall be adopted as stated below.

Power Wire Brushing

All surface shall be manually cleaned of rust/mill scale by power wire brush, carborundum tips etc. User of chopping hammer, emery paper shall be done to clean pitted areas to the satisfaction of site in-charge.

4.0 PAINTING SEQUENCE

4.1 The surface preparation by Power Wire Brushing

4.2 COATS

A. Prime Coat

2- coats of Red Oxide Primer : 30 Micron DFT / coat

B. Finish Coat

2- coats of synthetic enamel paint (Minimum 50 microns dry DFT per coat).

Total DFT is minimum 160 micron.

Contractor shall bring Elcometer for checking paint thickness.

5.0 RECOMMENDED PARTS MANUFACTURER

- a) BERGER PAINTS (I) LTD.
- b) CDC CARBOLINE
- c) ASIAN PAINTS (I) LTD.
- d) GOODLAS NEROLAC PAINTS LTD.
- e) JENSON & NICHOLSON
- f) SHALIMAR PAINTS
- g) BOMBAY PAINTS

| | | |
|-----------------|---|---|
| TITLE : | TECHNICAL DATA SHEET FOR SPRIINKLERS | DOC NO.: TCW/BHU/FPS/12 Rev 0 |
| PACKAGE: | FIRE PROTECTION SYSTEM | Date: 15/01/2020 |
| PROJECT: | TCW at Khorda, Odisha | Sheet: 1 of 1 |
| | | |
| S.No. | Description | Details |
| 1 | Make | HD/Viking/Tyco or equivalent approved make |
| 2 | Response & Coverage | Standard |
| 3 | Mounting Type | Pendent |
| 4 | Temperature Rating | 68 ⁰ C (155 ⁰ F) |
| 5 | Material of Construction | Brass |
| 6 | Finish | Chrome Plated |
| 7 | Approvals | UL Listed/ FM Approved |
| 8 | Temperature Response | Standard Response with 5mm glass Bulb |
| 9 | Nominal Oriffice Size | 1/2" (12.7 mm) |
| 10 | K-Factor | 5.6 US (80 Metric) |
| 11 | Nominal thread size | 1/2" NPT/ BSPT |
| 12 | Maximum Work Pressure | 175 PSI (12 Bar) |
| 13 | Factory Hydrostic Test Pressure | 500 PSI (35 Bar) |
| 14 | Min Operating Pressure | 7 PSI (0.5 Bar) |
| 15 | Glass Bulb colour | Red |
| 16 | Deflector | ASTM C22000 B 36 |
| 17 | Bulb | Glass with glycerine solution |
| 18 | Bulb Nominal Diameter | Std. Response 5.0 mm |
| 19 | Load Screw | ASTM C36000 B 16 |
| 20 | Cap | Copper |
| 21 | Seal | Belleville Washers Coated on both sides with Teflon |
| 22 | Frame | ASTM C37700 B124 |

Above specifications are indicative only.

| | | |
|--------------|--|---|
| TITLE : | TECHNICAL DATA SHEET FOR FLOW SWITCH | DOC NO.:TCW/BHU/FPS/13 Rev 0 |
| PACKAGE: | FIRE PROTECTION SYSTEM | Date: 15/01/2020 |
| PROJECT: | TCW at Khorda, Odisha | Sheet: 1 of 1 |
| | | |
| S.No. | Description | Details |
| 1 | Make | System Sensor or Equivalent Approved make |
| 2 | Static Pressure Rating | 450 PSI (Max) |
| 3 | Triggering Threshold Bandwidth (Flow Rate) | 4-10 GPM |
| 4 | Maximum Surge | 18 Feet Per Second (FPS) |
| 5 | Operating Temperature Range | 32 ^o F to 120 ^o F(0 ^o C TO 49 ^o C) |
| 6 | Enclosure Rating | NEMA 4 -Suitable for Indoor Outdoor use |
| 7 | Compatible Pipe | Steel Water Pipe, Schedule 10 through 40 |
| 8 | Contact Rating | Two Sets of SPDT (FormC)10.0A. 1/2 HP@125/250VAC 2.5A@6/12/24VDC |
| 9 | Conduit Entrances | Two Opening for 1/2"conduit, One Open, One Knock out type |
| 10 | Mounting Position | Vertical or Horizontal position |
| 11 | Pipe Size | Size 2" to 8" |
| 12 | Service Use | Automatic Sprinkler: NFPA-13 One or Two Family Dwelling: NFPA 13D Residential Occupancies up to 4 Stories: NFPA 13R National Fire Alarm Code: NFPA-72 |
| 13 | Cover Tamper Switch | Standard with ULC Models , Optional for UL Models |

Above specifications are indicative only.

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| TITLE : | TECHNICAL DATA SHEET FOR FLEXI DROPS | DOC NO.: TCW/BHU/FPS/14 Rev 0 |
| PACKAGE: | FIRE PROTECTION SYSTEM | Date: 15/01/2020 |
| PROJECT: | TCW at Khorda, Odisha | Sheet: 1 of 1 |
| | | |
| S.No. | Description | Details |
| 1 | Make | Safex Fire Services Ltd |
| 2 | Type | UL Approved Flexible Hose |
| 3 | Dimension | 1500 mm /1000 mm |
| 4 | Material Body | Non Braided type Stainless Steel |
| 5 | Inlet / outlet | Stainless Steel (1": 1/2") |
| 6 | Hose Diameter | 3/4"Size |
| 7 | Pressure Rating | 175 PSIG |
| 8 | Maximum Ambient Temp | 300 ⁰ F |
| 9 | Minimum Bend Radius | 4 " |
| 10 | Label | UL Label |
| | | |
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Above specifications are indicative only.

| | | |
|-----------------|--|---|
| TITLE : | TECHNICAL DATA SHEET FOR FRLS CABLE | DOC NO.:TCW/BHU/FPS/15 Rev 0 |
| PACKAGE: | FIRE PROTECTION SYSTEM | Date: 15/01/2020 |
| PROJECT: | TCW at Khorda, Odisha | Sheet: 1 of 1 |
| | | |
| S.No. | Description | Details |
| 1 | Make | |
| 2 | Size of Cable | 2c X 1.5 Sq.mm |
| 3 | Conductor | ABC (Conductor Class 5 of is:8130-1984) |
| 4 | Minimum Number of Twists/Meter | 16 |
| 5 | Core Insulation | Type A |
| 6 | Colour of Core Insulation | Red , black |
| 7 | Outer Diameter | 11.4mm(Max) |
| 8 | Maximum Resistance of Conductor | 12.1 Ω /Km |
| 9 | Shielding/Unshielding | Un Screened |
| 10 | Voltage Rating | 1100 Volts |
| 11 | Outer Sheathing | FRLS |
| 12 | Armoured /Unarmoured | Armoured /0.9GI Wire |
| 13 | Colour of Outer Cheath | Red |
| 14 | Standard of Construction | Confirm IS Standard |
| 15 | FRLS/ LSHF | FRLS |
| 16 | Temperature Index | \geq 250 Degree C |
| 17 | Oxygen Index | \geq 30% |
| 18 | Acid Gas Generation | \leq 20% |
| 19 | Smoke Density Rating | \leq 60% |
| 20 | Period of Buring after removal of flame | \leq 60% |
| | | |

Above specifications are indicative only.

| | | | | | |
|----------|--|---|----------------|-------|------------|
| TITLE : | TECHNICAL DATA SHEET FOR FIRE PUMP SET (MOTOR DRIVEN) | DOC NO. | TCW/BHU/FPS/16 | | |
| PACKAGE: | FIRE PROTECTION SYSTEM | REV. | 0 | DATE: | 15.01.2020 |
| PROJECT: | TCW at Khorda, Odisha | SHEET | 1 | OF | 1 |
| 1.0 | Manufacturer | : Matther & Platt, Kirloskar for Pump Crompton /Kirloskar/ ABB / Bharat Bijlee /Equi. App. Make for Motor | | | |
| 2.0 | Capacity | 137 M3/Hr | | | |
| 3.0 | Head | 70 MWC | | | |
| 4.0 | Fluid Handled | Water | | | |
| 5.0 | Temperature | Ambient | | | |
| 6.0 | Speed (RPM) | 2900 | | | |
| 7.0 | No of Stages | Single | | | |
| 8.0 | Type of Motor | Min 75 HP TEFC, Squirrel Case Induction motor (Star Delta Type Starting) | | | |
| 9.0 | Shut off Head | Bidder to Confirm | | | |
| 10.0 | Efiiiciency | Bidder to Confirm | | | |
| 11.0 | Type of Suction Available | Negative | | | |
| 12.0 | Approx BKW required at shaft at duty point | Bidder to Confirm | | | |
| 13.0 | Approx BKW required at shaft at 150 % Flow | Bidder to Confirm | | | |
| 14.0 | Material of Construction | | | | |
| | Casing | 2.5 % Ni Ci (IS:210 FG 260) | | | |
| | Impeller | Bronze IS:318 | | | |
| | Shaft | AISI 410 | | | |
| | Shaft Sleeve | SS ASTM A 276 Type 410 | | | |
| | Casing Wear Ring | Bronze (IS:318) | | | |
| | Sealing Arrangement | Gland Packed | | | |
| 15.0 | Accessories Provided | | | | |
| | Priming Connection | Yes | | | |
| | Vent Cock | Yes | | | |
| | Coupling | Yes | | | |
| | Casing Drain | Yes | | | |
| | Base Plate | Yes | | | |
| | Coupling Guard | Yes | | | |
| | Foundation Bolts | Yes | | | |
| | Companion Flange with Gasket | Yes | | | |
| | Anti Vibration Pad | Yes | | | |
| 16.0 | Hydrostatic Test Pressure | 1.5 Times Shut off Pressure | | | |

| TITLE : | TECHNICAL DATA SHEET FOR FIRE PUMP SET (ENGINE DRIVEN) | Doc No | TCW/BHU/FPS/17 | | |
|----------|---|---|----------------|-------|------------|
| PACKAGE: | FIRE PROTECTION SYSTEM | REV. | 0 | DATE: | 15.01.2020 |
| PROJECT: | TCW at Khorda, Odisha | SHEET | 1 | OF | 1 |
| 1.0 | Manufacturer | : Matther & Platt, Kirloskar for Pump Greaves/Cummins/Kirloskar for Engine | | | |
| 2.0 | Capacity | 137 M3/Hr | | | |
| 3.0 | Head | 70 MWC | | | |
| 4.0 | Fluid Handled | Water | | | |
| 5.0 | Temperature | Ambient | | | |
| 6.0 | Speed (RPM) | 1800 | | | |
| 7.0 | No Of Stages | Single | | | |
| 8.0 | Type of Engine | Min 65 BHP Radiator Cooled Engine (Bidder to Confirm) | | | |
| 9.0 | Shut off Head | Bidder to Confirm | | | |
| 10.0 | Efficiency | Bidder to Confirm | | | |
| 11.0 | Type of Suction Available | Negative | | | |
| 12.0 | Approx BKW required at shaft at duty point | Bidder to Confirm | | | |
| 13.0 | Approx BKW required at shaft at 150 % Flow | Bidder to Confirm | | | |
| 14.0 | Material of Construction | | | | |
| | Casing | 2.5 % Ni Ci (IS:210 FG 260) | | | |
| | Impeller | Bronze IS:318 | | | |
| | Shaft | AISI 410 | | | |
| | Shaft Sleeve | SS ASTM A 276 Type 410 | | | |
| | Casing Wear Ring | Bronze (IS:318) | | | |
| | Sealing Arrangement | Gland Packed | | | |
| 15.0 | Accessories Provided | | | | |
| | Priming Connection | Yes | | | |
| | Vent Cock | Yes | | | |
| | Coupling | Yes | | | |
| | Casing Drain | Yes | | | |
| | Base Plate | Yes | | | |
| | Coupling Guard | Yes | | | |
| | Foundation Bolts | Yes | | | |
| | Companion Flange with Gasket | Yes | | | |
| | Anti vibration Pad | Yes | | | |
| 16.0 | Hydrostatic Test Pressure | 1.5 Times Shut off Pressure | | | |
| 17.0 | Exhaust Pipe | To be supplied & installed | | | |

| | | | | | |
|-----------------|---|--|-----------------------|--------------|-------------------|
| | | | | | |
| TITLE : | TECHNICAL DATA SHEET FOR JOCKEY PUMP SET | DOC NO. | TCW/BHU/FPS/18 | | |
| PACKAGE: | FIRE PROTECTION SYSTEM | REV. | 0 | DATE: | 15.01.2020 |
| PROJECT: | TCW at Khorda, Odisha | SHEET | 1 | OF | 1 |
| 1.0 | Manufacturer | : Matther & Platt, Kirloskar for Pump Crompton /Kirloskar/ ABB / Bharat Bijlee/Siemens for Motor or Equivalent Approved Make | | | |
| 2.0 | Capacity | 10.8 M3/Hr | | | |
| 3.0 | Head | 88 MWC | | | |
| 4.0 | Fluid Handled | Water | | | |
| 5.0 | Temperature | Ambient | | | |
| 6.0 | Speed (RPM) | 2900 | | | |
| 7.0 | No Of Stages | Single | | | |
| 8.0 | Type of Motor | Minimum 12.5 HP, Squirrel Cage Induction motor (DOL Starter) | | | |
| 9.0 | Shut off Head | Bidder to specify | | | |
| 10.0 | Efficiency | Bidder to specify | | | |
| 11.0 | Suction available | Negative | | | |
| 12.0 | Approx BKW required at shaft at duty point | Bidder to specify | | | |
| 13.0 | Approx BKW required at shaft at 150 % Flow | ` | | | |
| 14.0 | Material of Construction | | | | |
| | Casing | IS:210 FG 260 | | | |
| | Impeller | Bronze IS:318 | | | |
| | Shaft | AISI 410 | | | |
| | Shaft Sleeve | SS ASTM A 276 Type 410 | | | |
| | Casing Wear Ring | Bronze (IS:318) | | | |
| | Sealing Arrangement | Gland Packed | | | |
| 15.0 | Accessories Provided | | | | |
| | Priming Connection | Yes | | | |
| | Vent Cock | Yes | | | |
| | Coupling | Yes | | | |
| | Casing Drain | Yes | | | |
| | Base Plate | Yes | | | |
| | Coupling Guard | Yes | | | |
| | Foundation Bolts | Yes | | | |
| | Companion Flange with Gasket | Yes | | | |
| 16.0 | Hydrostatic Test Pressure | 1.5 Times Shut off Pressure | | | |

| | | | | | |
|----------|---|---|----------------|-------|------------|
| | | DOC NO. | TCW/BHU/FPS/19 | | |
| TITLE : | TECHNICAL DATA SHEET FOR TERRACE PUMP (MOTOR DRIVEN) | | | | |
| PACKAGE: | FIRE PROTECTION SYSTEM | REV. | 0 | DATE: | 15.10.2020 |
| PROJECT: | TCW at Khorda, Odisha | SHEET | 1 | OF | 1 |
| 1.0 | Manufacturer | : Matther & Platt, Kirloskar for Pump Crompton /Kirloskar/ ABB / Bharat Bijlee /Siemens/ Equi. | | | |
| 2.0 | Capacity | 27 M3/Hr | | | |
| 3.0 | Head | 35 MWC | | | |
| 4.0 | Fluid Handled | Water | | | |
| 5.0 | Temperature | Ambient | | | |
| 6.0 | Speed (RPM) | 2900 | | | |
| 7.0 | No Of Stages | Single | | | |
| 8.0 | Type of Motor | (Bidder to confirm) Min 7.5 HP Squirrel Cage Induction motor (DOLType Starting) | | | |
| 9.0 | Shut off Head | Bidder to Confirm | | | |
| 10.0 | Efficiency | Bidder to Confirm | | | |
| 11.0 | NPSH (Required) at duty piont | Bidder to Confirm | | | |
| 12.0 | Approx BKW required at shaft at duty point | Bidder to Confirm | | | |
| 13.0 | Approx BKW required at shaft at 150 % Flow | Bidder to Confirm | | | |
| 14.0 | Material of Construction | | | | |
| | Casing | 2.5 % Ni Ci (IS:210 FG 260) | | | |
| | Impeller | Bronze IS:318 | | | |
| | Shaft | AISI 410 | | | |
| | Shaft Sleeve | SS ASTM A 276 Type 410 | | | |
| | Casing Wear Ring | Bronze (IS:318) | | | |
| | Sealing Arrangement | Gland Packed | | | |
| 15.0 | Accessories Provided | | | | |
| | Priming Connection | Yes | | | |
| | Vent Cock | Yes | | | |
| | Coupling | Yes | | | |
| | Casing Drain | Yes | | | |
| | Base Plate | Yes | | | |
| | Coupling Guard | Yes | | | |
| | Foundation Bolts | Yes | | | |
| | Companion Flange with Gasket | Yes | | | |
| | Anti Vibratin Pad | Yes | | | |
| 16.0 | Hydrostatic Test Pressure | 1.5 Times Shut off Pressure | | | |

TENDER DRAWING
(Attached as Enclosure-III)

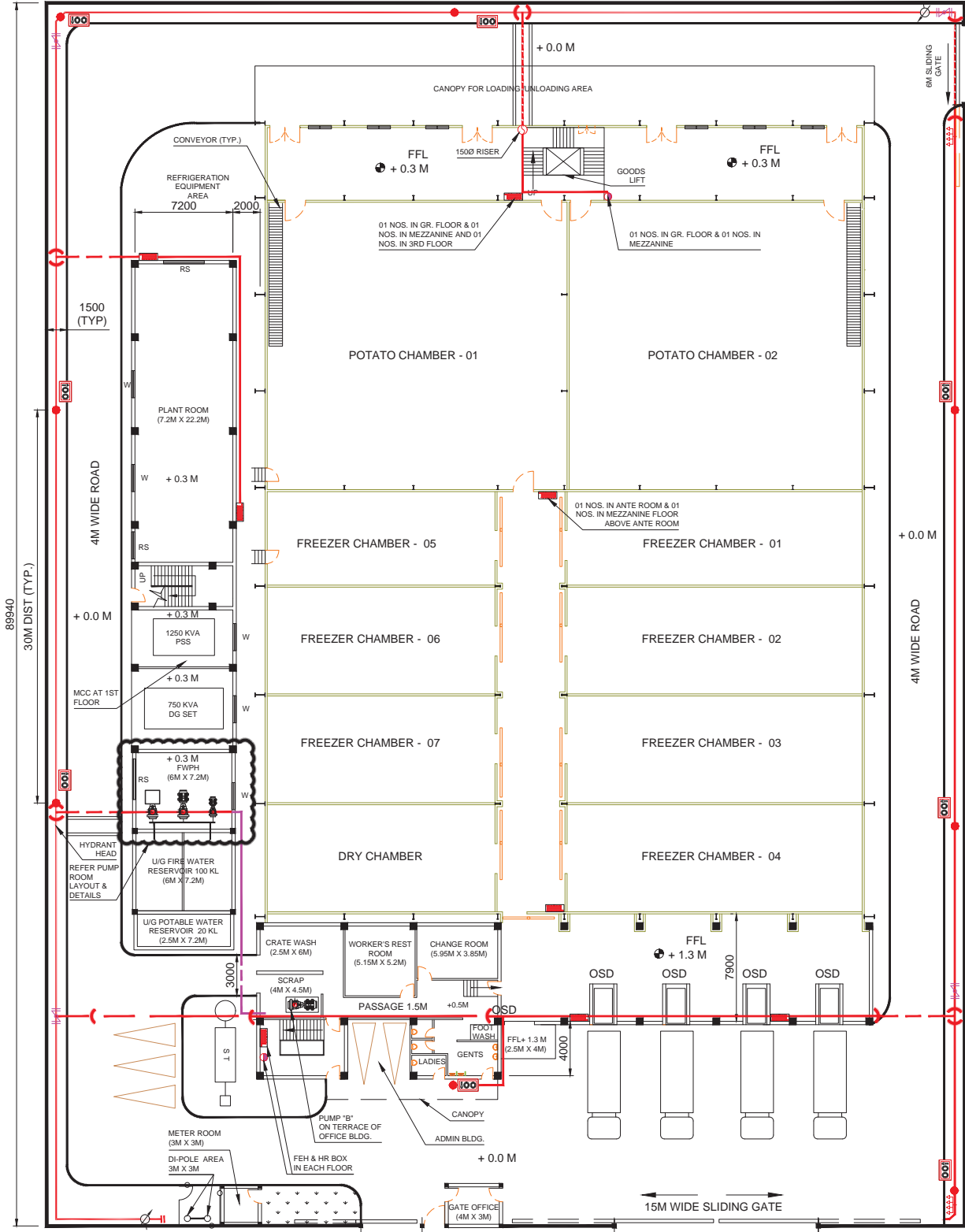
List of Drawings

| SN. | Title | Drawing No. | Rev | Date | Sheet |
|-----|---|-------------------|-----|------------|--------------|
| 1 | Fire Hydrant Layout Plan | EP/TCW/BHU/FPS/05 | 1 | 25-09-2019 | Sheet 1 of 1 |
| 2 | Layout of fire sprinklers system, fire detection & alarm system and fire extinguisher | EP/TCW/BHU/FPS/06 | 1 | 25-09-2019 | Sheet 1 of 2 |
| 3 | Layout of fire sprinklers system, fire detection & alarm system and fire extinguisher | EP/TCW/BHU/FPS/06 | 1 | 25-09-2019 | Sheet 2 of 2 |
| 4 | Water Flow Schematic Diagram | EP/TCW/BHU/FPS/07 | 1 | 25-09-2019 | Sheet 1 of 1 |
| 5 | Layout of Pump Room | EP/TCW/BHU/FPS/08 | 1 | 25-08-2019 | Sheet 1 of 1 |

All above mentioned drawings are attached as **Enclosure-II**

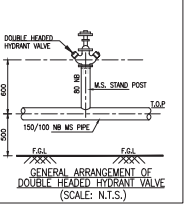
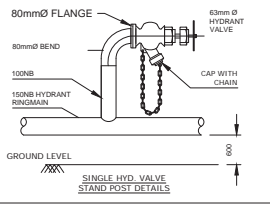
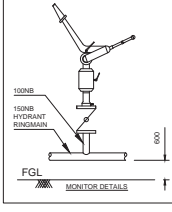
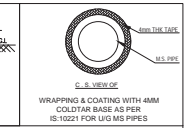
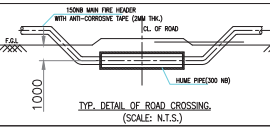
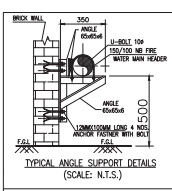
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enclosure-III



18.3M WIDE IDCO ROAD

18.3M WIDE IDCO ROAD



| FIRE HYDRANT & SPRINKLER SYSTEM | | |
|---------------------------------|-----------------------------|------|
| SYM. | DESCRIPTION | QTY. |
| | FIRE FIGHTING PUMP | 04 |
| | FIRE HYDRANT LINE | LOT |
| | FIRE SPRINKLER LINE | LOT |
| | UNDER GROUND WRAPPED PIPE | LOT |
| | SINGLE HEADED HYDRANT VALVE | 08 |
| | HOSE REEL DRUM 30MTR | 12 |
| | 4 WAY FIRE BRIGADE INLET | 02 |
| | HOSEBOX WITH HOSES AND BP | 12 |
| | WATER MONITOR | 02 |
| | NON RETURN VALVE | - |
| | BUTTERFLY VALVE | - |
| | GATE VALVE | - |
| | FIRE ESCAPE HYDRANT | 04 |

| SCHEDULE OF PUMPS | | | | | | | |
|-------------------|--|--------|------------------------|----------|--------|-------|-------------------------------|
| S.NO. | DESCRIPTION | DESIGN | Capacity | HEAD (M) | HP | QTY. | LOCATION |
| 1. | FIRE PUMP DIESEL ENGINE DRIVEN | D | 137m ³ /hr | 70 | 65 BHP | 1 NO. | PUMP HOUSE |
| 2. | FIRE MAIN PUMP(ELECTRICAL) | E | 137m ³ /hr | 70 | 75 | 1 NO. | PUMP HOUSE |
| 3. | JOCKEY PUMP | J | 10.8m ³ /hr | 80 | 12.5 | 1 NO. | PUMP HOUSE |
| 4. | BOOSTER PUMP FOR TERRACE TANK 10KL | B | 450 LPM | 35 | 7.5 | 1 NO. | OFFICE TERRACE |
| 5. | OPEN WELL SUBMERSIBLE PUMP (RAW WATER SUPPLY TO OH TANK) | P1/P2 | 10m ³ /hr | 22 | - | 2 NO. | WITHIN RAW WATER STORAGE TANK |
| 6. | OPEN WELL SUBMERSIBLE PUMP (RAW WATER SUPPLY TO RO TANK) | P3/P4 | 5m ³ /hr | 35 | - | 2 NO. | WITHIN RAW WATER STORAGE TANK |

Balmer Lawrie & Co. Ltd.
 ENGINEERING & PROJECTS
 PROJECT: TCC/ BHUBANESHWAR
 OWNER: BALMER LAURIE & CO. LTD. SBU-LOGISTICS
 TITLE: FIRE HYDRANT LAYOUT PLAN
 SCALE: DRAWN: JSD 25.08.19 CHECKED: ABE 25.08.19 DESIGNED: JSD 25.08.19
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 DWG NO: EPT/CWB/H/PPS/05
 SHEET 1 OF 1
 REV: 00

| FACILITIES | | |
|------------|---------------------|------------------|
| SL. | DESCRIPTION | SIZE |
| 1. | DOCKING AREA | 27.075 M X 7 M |
| 2. | CHANGE ROOM | 5.95M X 3.85M |
| 3. | WORKER'S REST ROOM | 5.15M X 5.2M |
| 4. | CRATE WASH | 6M X 2.5M |
| 5. | SCRAP | 4.5M X 4 M |
| 6. | PASSAGE | 12.85 M X 1.5 M |
| 7. | CONFERENCE ROOM | 6.325 M X 3.85M |
| 8. | OFFICE SPACE | 5.95M X 3.85M |
| 9. | SERVER ROOM | 2.5M X 2.2 M |
| 10. | STORE ROOM | 2.5M X 2 M |
| 11. | PANTRY AREA | 2.5 M X 2.3 M |
| 12. | UNIT HEAD ROOM | 4.125 M X 3 M |
| 13. | ACCT. ROOM | 4.125M X 2.425M |
| 14. | TRANS. OFFICER ROOM | 4.125M X 2.4M |
| 15. | DISCUSSION ROOM | 4.475M X 2.775 M |

| FIRE HYDRANT & SPRINKLER SYSTEM | | |
|---------------------------------|----------------------------|------|
| SYM. | DESCRIPTION | QTY. |
| — | FIRE SPRINKLER LINE | 02 |
| — | NON RETURN VALVE | 01 |
| — | BUTTERFLY VALVE | 02 |
| — | GATE VALVE | 01 |
| — | INSTALLATION CONTROL VALVE | 01 |
| — | PENDENT SPRINKLER | 86 |

| FIRE DETECTION & ALARM SYSTEM | | |
|-------------------------------|---------------------------------|----------|
| SYMBOL | DESCRIPTION | QTY. |
| ⊙ | BELOW SMOKE DETECTOR | 32 |
| ⊙ | ABOVE SMOKE DETECTOR | 17 |
| ⊙ | MULTI DETECTOR | 01 |
| ⊙ | RESPONSE INDICATOR | 17 |
| ⊙ | HEAT DETECTOR | 01 |
| ⊙ | MANUAL CALL POINT | 07 |
| ⊙ | HOOTER CUM STROBE | 07 |
| ⊙ | CONTROL MODULE | AS REQD. |
| ⊙ | MONITOR MODULE | AS REQD. |
| ⊙ | CONTROL RELAY MODULE | AS REQD. |
| ⊙ | ISOLATOR MODULE | AS REQD. |
| ⊙ | FRLS CABLE, ARMOURD 1.5sq.mmx2C | AS REQD. |
| ⊙ | FIRE ALARM CONTROL PANEL | 01 |
| ⊙ | REPEATER ANNUNCIATION PANEL | 00 |

| HAND APPLIANCES | | |
|-----------------|--|------|
| SYMBOL | DESCRIPTION | QTY. |
| ⊙ | FIRE EXTINGUISHER DCP TYP. 4 KG. | 06 |
| ⊙ | FIRE EXTINGUISHER ABC TYP. 4 KG. | 08 |
| ⊙ | FIRE EXTINGUISHER CO2 TYP. 4.5 KG. | 01 |
| ⊙ | FIRE EXTINGUISHER MECH. FOAM TYP. 6 LTR. | 00 |

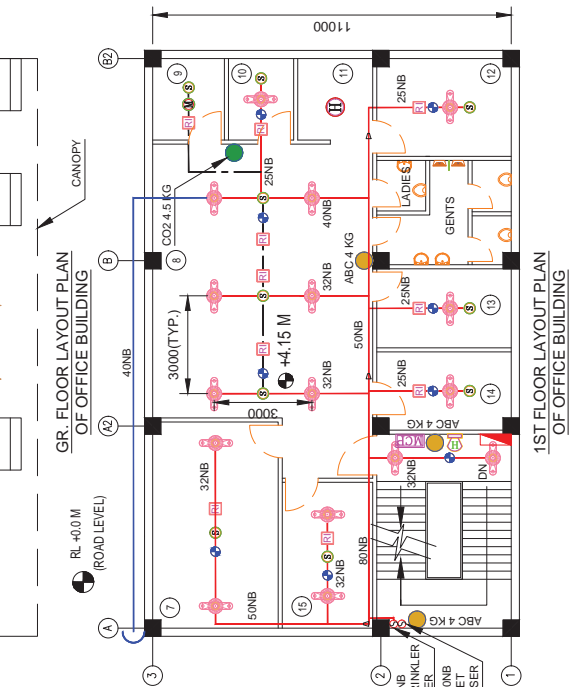
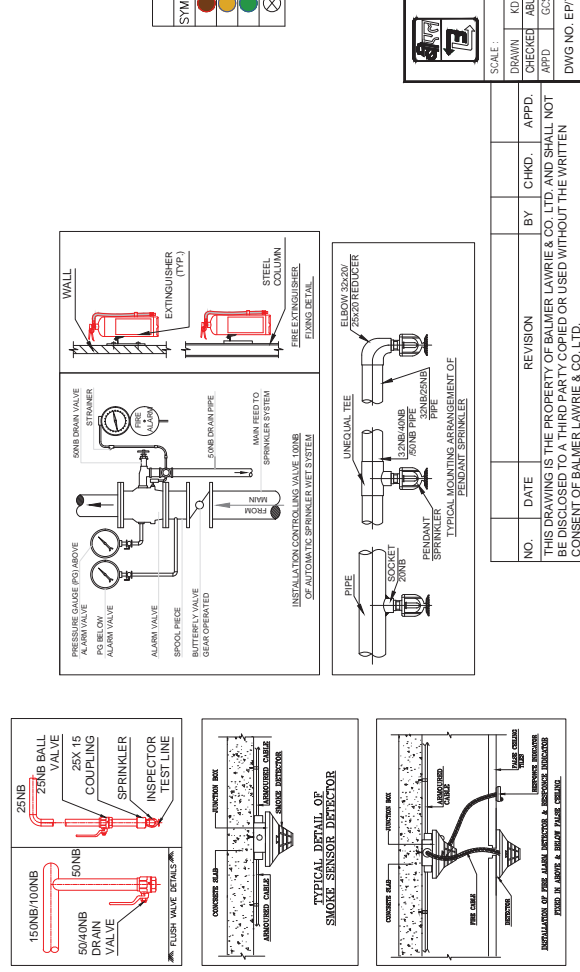
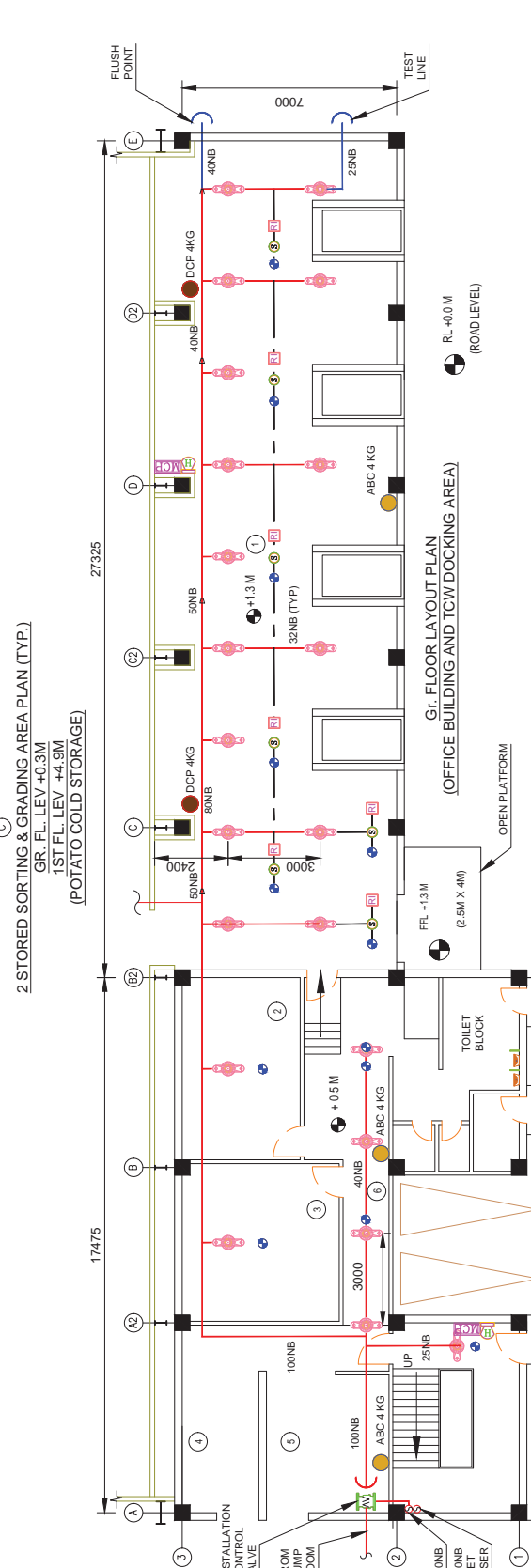
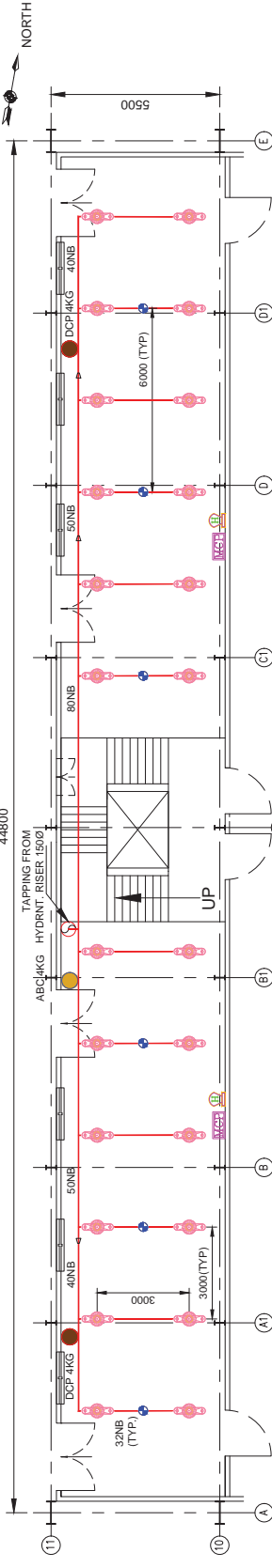
Balmer Lawrie & Co. Ltd.
ENGINEERING & PROJECTS

PROJECT: TOW. BHUBANESWAR
OWNER: BALMER LAWRIE & CO. LTD. SBU-LOGISTICS

SCALE: DRAWN: KD 25.09.19
CHECKED: ABU 25.09.19
APPD: GCS 25.09.19

TITLE: LAYOUT OF FIRE SPRINKLERS SYSTEM FIRE DETECTION & ALARM SYSTEM AND FIRE EXTINGUISHER

DWG NO. EP/TOW/BHUFFS/06
SHT 1 OF 2
REV:00



| NO. | DATE | REVISION | BY | CHKD. | APPD. |
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| | | | | | |

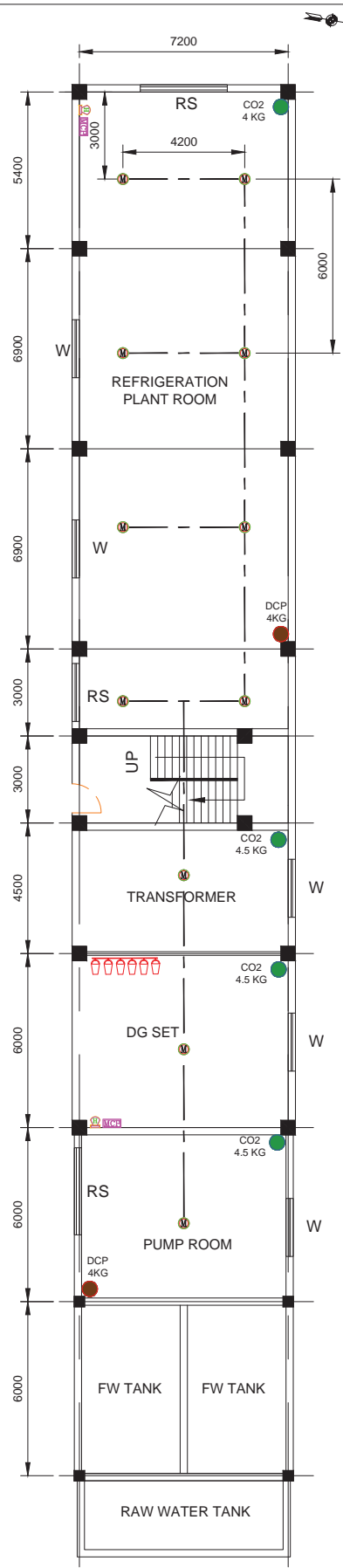
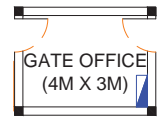
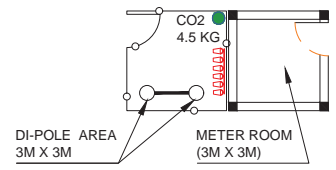
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| FIRE DETECTION & ALARM SYSTEM | | |
|-------------------------------|------------------------------------|----------|
| SYMBOL | DESCRIPTION | QTY. |
| | BELOW SMOKE DETECTOR | 05 |
| | ABOVE SMOKE DETECTOR | 05 |
| | MULTI DETECTOR | 15 |
| | RESPONSE INDICATOR | 05 |
| | HEAT DETECTOR | - |
| | MANUAL CALL POINT | 04 |
| | HOOTER CUM STROBE | 04 |
| | CONTROL MODULE | AS REQD. |
| | MONITOR MODULE | AS REQD. |
| | CONTROL RELAY MODULE | AS REQD. |
| | ISOLATOR MODULE | AS REQD. |
| | FRLS CABLE, ARMoured 1.5sq.mm x 2C | LOT |
| | FIRE ALARM CONTROL PANEL | 0 |
| | REPEATER ANNUNCIATION PANEL | 1 |

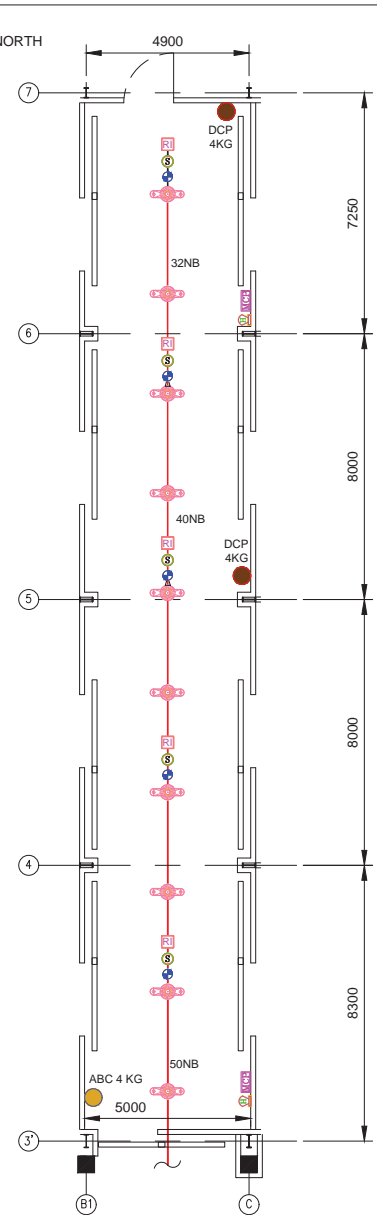
| SPRINKLER | | |
|-----------|-------------------|------|
| SYMBOL | DESCRIPTION | QTY. |
| | PENDENT SPRINKLER | 10 |

| HAND APPLIANCES | | |
|-----------------|---|------|
| SYMBOL | DESCRIPTION | QTY. |
| | FIRE EXTINGUISHER DCP TYP 4 KG. | 09 |
| | FIRE EXTINGUISHER ABC TYP 4 KG. | 05 |
| | FIRE EXTINGUISHER CO2 TYP 4.5 KG. | 09 |
| | FIRE EXTINGUISHER MECH. FOAM TYP 6 LTR. | 02 |
| | SAND BUCKET - 6 BUCKET SET | |

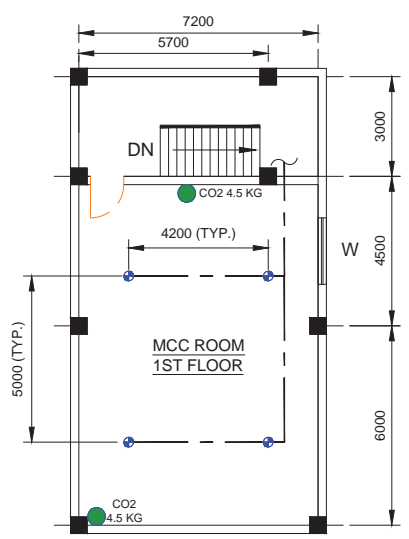
- NOTE: - (LOCATIONS OF FIRE EXTINGUISHER NOT INDICATED ON DRAWING)
- MECH. FOAM TYPE - IN DIESEL STORAGE AREA & FOR ANY OTHER CLASS A/B FIRE.
 - ON MEZZANINE FLOOR ABOVE ANTE ROOM AND PIPE CORRIDOR :
 - DCP 4 KG - 02 NOS.
 - ABC 4 KG - 02 NOS.
 - ON PIPE CORRIDOR OF POTATO STORAGE AREA
 - DCP 4 KG - 01 NOS.
 - ABC 4 KG - 01 NOS.
 - ON LAST LANDING LEVEL AT STAIRCASE OF POTATO STORAGE
 - DCP 4 KG - 01 NOS.
 - ABC 4 KG - 01 NOS.
 - ON PLANT ROOM /ELEC. ROOM TERRACE
 - CO2 4.5 KG - 01 NOS.
 - DCP 4 KG - 01 NOS.



PLANT ROOM, FWPH & MCC ROOM GR. FLOOR (LEV +0.3 M)



GR. FLOOR PLAN OF ANTE ROOM OF COLD STORAGE (LEV +1.3M)



MCC ROOM 1ST. FLOOR (LEV +4.8 M)

| NO. | DATE | REVISION | BY | CHKD. | APPD. |
|-----|------|----------|----|-------|-------|
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ENGINEERING & PROJECTS

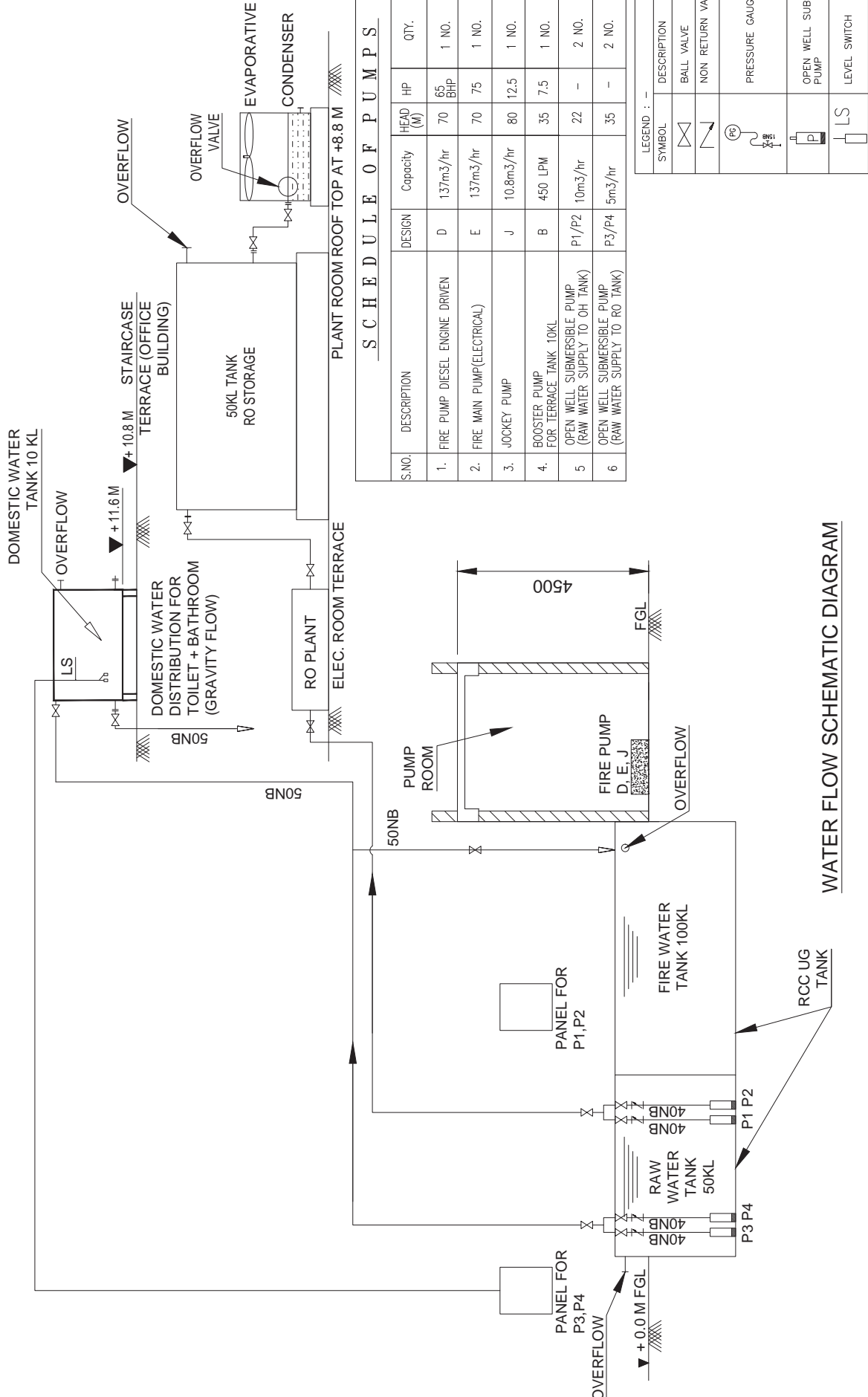
PROJECT : TCW, BHUBANESWAR
OWNER : BALMER LAWRIE & CO. LTD; SBU-LOGISTICS

TITLE : LAYOUT OF FIRE SPRINKLER SYSTEM, FIRE DETECTION & ALARM SYSTEM AND FIRE EXTINGUISHER FOR UNITY BLDG.

| | |
|------------------------|--|
| SCALE : | PROJECT : |
| DRAWN : KD 25.09.19 | OWNER : BALMER LAWRIE & CO. LTD; SBU-LOGISTICS |
| CHECKED : ABU 25.09.19 | TITLE : LAYOUT OF FIRE SPRINKLER SYSTEM, FIRE DETECTION & ALARM SYSTEM AND FIRE EXTINGUISHER FOR UNITY BLDG. |
| APPD : GCS 25.09.19 | |

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DWG NO. EP/TCW/BHU/FPS/06
SHT 2 OF 2
REV-00




WATER FLOW SCHEMATIC DIAGRAM

SCHEDULE OF PUMPS

| S.NO. | DESCRIPTION | DESIGN | Capacity | HEAD (M) | HP | QTY. | LOCATION |
|-------|---|--------|------------------------|----------|--------|-------|-------------------------------|
| 1. | FIRE PUMP DIESEL ENGINE DRIVEN | D | 137m ³ /hr | 70 | 65 BHP | 1 NO. | PUMP HOUSE |
| 2. | FIRE MAIN PUMP(ELECTRICAL) | E | 137m ³ /hr | 70 | 75 | 1 NO. | PUMP HOUSE |
| 3. | JOCKEY PUMP | J | 10.8m ³ /hr | 80 | 12.5 | 1 NO. | PUMP HOUSE |
| 4. | BOOSTER PUMP FOR TERRACE TANK 10KL OPEN WELL SUBMERSIBLE PUMP (RAW WATER SUPPLY TO OH TANK) | B | 450 LPM | 35 | 7.5 | 1 NO. | OFFICE TERRACE |
| 5. | OPEN WELL SUBMERSIBLE PUMP (RAW WATER SUPPLY TO RO TANK) | P1/P2 | 10m ³ /hr | 22 | - | 2 NO. | WITHIN RAW WATER STORAGE TANK |
| 6. | OPEN WELL SUBMERSIBLE PUMP (RAW WATER SUPPLY TO RO TANK) | P3/P4 | 5m ³ /hr | 35 | - | 2 NO. | TANK |

LEGEND : -

| SYMBOL | DESCRIPTION |
|--------|----------------------------|
| | BALL VALVE |
| | NON RETURN VALVE |
| | PRESSURE GAUGE |
| | OPEN WELL SUBMERSIBLE PUMP |
| | LEVEL SWITCH |



Balmer Lawrie & Co. Ltd.
ENGINEERING & PROJECTS

| | |
|--|------------|
| PROJECT : TCW, BHUBANESWAR | |
| SCALE : | |
| DRAWN : KD | 25.08.19 |
| CHECKED : ABU | 25.08.19 |
| APPD : GCS | 25.08.19 |
| DWG NO. : EP/TCW/BHU/FPS/07 | SHT 1 OF 1 |
| OWNER : BALMER LAWRIE & CO. LTD; SBU-LOGISTICS | REV-00 |
| TITLE : WATER FLOW SCHEMATIC DIAGRAM | |

| NO. | DATE | REVISION | BY | CHKD. | APPD. |
|---|------|----------|----|-------|-------|
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Balmer Lawrie & Co. Ltd.

(A Government of India Enterprise)

Engineering & Projects

21, Netaji Subhas Road

Kolkata - 700 001

Fire Protection System for Temperature Controlled Warehouse

at

IDCO Industrial Estate, Chhattabar, Dist-Khorda, Odisha

Tender No. EP/TCW/BHU/FPS/12

PRICED PART (PART-II)

NOTES:

- 1.0 Details of the items under this Schedule shall be read in conjunction with the corresponding Specifications, Drawings and other Tender Documents.
- 2.0 The work shall be carried out as per approved drawings, Specifications and the description of the items in this Schedule and/or Engineer's instructions. Drawings enclosed with these documents are only for providing some preliminary of the work involved.
- 3.0 Items of work provided in this Schedule but not covered in the Specifications shall be executed strictly as per instructions of the Engineer-In-Charge.
- 4.0 The Quantities of the various items mentioned in the Schedule of Items are approximate and may vary or may be deleted altogether. The Contractor, in his own interest, should get an indication of the probable extent of the work to be executed under any particular item in this Schedule before undertaking any preliminary and enabling work or purchasing bought out components related to the work.
- 5.0 Engineer's decision shall be final and binding on the Contractor regarding clarification of items in this Schedule with respect to the other sections of the Contract.
- 6.0 For extra items, rates shall be derived from similar item rates included in the schedule of work. Where there is no such similar item available in the schedule, rate shall be analyzed as follows:
Rate for extra item = Cost of material including transportation for delivery upto site (a) + cost of labour inclusive of all necessary tools, tackles, equipment, machinery and consumable (b) required to carry out the work + 15% of (a+b) towards profit and overhead + taxes, duties etc. as applicable.
- 7.0 Quoted Rate shall include cost of design, material procurement, fabrication, assembly, Painting, Supply (including Packing & Forwarding, Transportation upto project site , covering the materials under transit insurance), unloading at site with hiring of cranes/forklifts and manpower and safe storage at site, site shifting as required, site assembly, erection, alignment, testing, commissioning and handing over of the system. Necessary equipment, cranes, forklifts, tools & tackles, manpower and consumables required for erection and commissioning shall be included.
- 8.0 The price bid file in .xls format shall be downloaded from the website, bidder to fill in their item-wise rates, print, stamp, sign, scan and upload the same in 'Uploading Price Bid' under Bid Common Form in e-procurement portal of Balmer Lawrie.
- 9.0 Status of the bidders will be decided based on 'BASIS OF EVALUATION' clause of NIT.
- 10.0 Bidders shall check and change rate of GST as required while submitting their bid.
- 11.0 It is mandatory to quote for all the items of Schedule of Work/ Price Schedule. If any bidder does not quote for any item, their bid will be rejected. Bidders shall not change the unit or quantity of any item failing which may lead to cancellation of price bid.

Schedule of Work

Fire Protection System for Central Warehouse at at IDCO Industrial Estate, Chhattabar, Dist-Khorda, Odisha

Tender No: EP / TCW / BHU / FPS / 12

| Sl. No. | Description | Unit | Qty. | Supply + Installation | |
|---------|--|------|------|--------------------------|-------------|
| | | | | Unit Rate (Rs) | Amount (Rs) |
| | FIRE WATER PUMPING SYSTEM (A) | | | | |
| | Supply, Installation, Testing & Commissioning (SITC) of | | | | |
| 1.0 | Electric motor driven main fire water pump complete with Centrifugal pump set, energy efficient type electric motor, base frame, coupling, companion flange, coupling guard and all accessories as per specification and duty condition. [Capacity: 137 M3/ Hr, Head: 70 MWC, with a Motor of suitable HP]. Pump foundation with pocket (if required) will be carried-out by civil contractor. The pump shall be mounted on anti-vibraion pad. But the grouting of bolts of base frames included in this item. Refer data sheet. | No | 1 | DO NOT QUOTE HERE | - |
| 2.0 | Diesel engine driven fire water pump complete with pump set, suitably rated four stroke diesel engine, drive coupling, companion flange, common base frame, exhaust manifold, silencer, etc. as per specifications. [Capacity: 137M3/ Hr, Head: 70 MWC, Engine of 1800 RPM with power rating of minimum 65 BHP].Exhaust pipe for Diesel engine of with mineral wool insulation and aluminum sheet cladding with necessary Structural supports, the weather cowl at the top, clamps etc. up to 6 meter Height shall be included in the cost. The engine will be supplied with 4/6 Nos. of suitable Anti vibration pads.Pump foundation with pocket will be carried-out by civil contractor. But the grouting of bolts of base frames included in this item. Cost of initial fill of lube oil, coolant shall be included in this item. Refer data sheet. | No | 1 | | - |
| 3.0 | Diesel Engine Control Panel for above with 12V (or as per engineer manufacturer requirement) power back up with Battery Charger Unit, 1 set of battery cable & leads. | No | 1 | | - |
| 4.0 | Jockey pump complete with pump set, energy efficient type electric motor, base frame,companion flange and all accessories as per specifications and duty conditions. [Capacity : 10.8 M3/ Hr, (180 LPM) Head: 88 MWC, Motor Rating: Minimum 12.5 HP]. Pump foundation with pocket will be carried-out by civil contractor. The pump shall be mounted on anti-vibraion pad. But the grouting of bolts of base frames included in this item.Refer data sheet. | No | 1 | | - |
| 5.0 | Electric motor driven Booster Pump complete with pump set, energy efficient type electric motor, base frame,companion flange and all accessories as per specifications and duty conditions as per particular specifications. [Capacity : 27M3/ Hr (450 LPM), Head:35 MWC, Motor Rating: 7.5 HP]. The pump shall be mounted on anti-vibraion pad. DOL starter shall be supplied with the pump and starter shall be mounted on ground floor of office building near main entry. Refer data sheet. | No | 1 | | - |
| 6.0 | Sheet steel fabricated cubicle type, floor mounted MCC cum Annunciation Panel-IP 54 having main incomer section with fuse switch unit, Fire water pumps section (Motor Driven + Engine Driven) and Jockey pump section. All the 3- sections shall be compartmentalized. Please refer technical specification for detail. Fire panel comprising of of all accessories like relays, timers, hooters, contactors, indication lamps, annunciators, etc, for auto / manual operation of fire pumps (both motor & diesel engine driven) as per specifications. High level & low level alarm for water in fire water tank shall also be available in panel. Panel cable entry shall be from top. | Set | 1 | | - |

Schedule of Work

Fire Protection System for Central Warehouse at at IDCO Industrial Estate, Chhattabar, Dist-Khorda, Odisha

Tender No: EP / TCW / BHU / FPS / 12

| Sl. No. | Description | Unit | Qty. | Supply + Installation | |
|--|---|------|------|------------------------------|-------------|
| | | | | Unit Rate (Rs) | Amount (Rs) |
| 7.0 | Diesel day storage tank (8- hours continuous engine running capacity, min. 200 lit capacity, Mild Steel Tank) with support mounted , piping upto engine fuel pump, Level gauge, isolation valves, on line fittings, primer and final painting etc. Cost of initial fill diesel of 200 Ltr. in diesel tank shall be included in the offer. | No. | 1 | | - |
| | | | | DO NOT QUOTE HERE | |
| 8.0 | Supply and laying of Control / Power Cables - 1.1 KV Grade, XLPE, Cu/Aluminum Conductors, taped inner Sheathed, Overall FRLS Sheath, Armoured type with accessories between the fire panels and the electric motors, battery pack , siren, pressure switch etc. The power supply cable for incoming feeder of Fire Main Panel will be laid from LT PCC panel which is under scope of BL. | | | | |
| a) | Cu Cable-2 C x 1.5 mm ² | Mtr | 60 | | - |
| b) | Cu Cable 4 C x 35 mm ² along with 2x6 SWG GI wire | Mtr | 18 | | - |
| c) | Cu Cable 3/4 C X 4 mm ² along with 2x6 SWG GI wire | Mtr | 40 | | - |
| d) | Flexible Cu Cable 10/12C x 1.5 mm ² | Mtr | 20 | | - |
| 9.0 | Cable Termination: Cutting, peeling, terminating and Connecting the cables with brass cable gland and crimped copper lugs in respective Electrical panel and motor cable box. a) 4 x 35 Sq.mm cable. b) 4 x 4 Sq.mm cable c) 12x 2.5 Sq.mm cable | Lot | 1 | | - |
| 10.0 | Cable Trays :Supplying & installing GI slotted cable trays on walls/floors of Pump House fixing with necessary structural steel members like Rods, Angles/Channels for supporting the cable tray. The steel members will be grouted in ceiling/walls with Dash fasteners | Lot | 1 | | - |
| 11.0 | Dial type glycerine filled Pressure Gauge with 150 mm dial and range of 0-14 Kg./sq.cm. together with standard accessories and GI Barrel Nipples. | No | 8 | | - |
| 12.0 | Supply and installation of Pressure Switches together with accessories and GI Barrel Nipples. | No | 4 | | - |
| 13.0 | Air-cushion Mild Steel Tank of 300 mm dia, 2mtr height , both ends closed with dished end, internal design pressure 18 Kg/sq. cm (g), leg support, pedestals, inlet & vent nozzles, mounted with safety valve & pressure gauge, piping accessories complete in all respect along with test drain arrangement. Design shall be as per code requirement. | No | 1 | | - |
| 14.0 | Supply and Installation of PVC Priming Tank of 1 KL capacity with all accessories. The tank shall complete with its mounting stand, all nozzles, connecting fittings , level indicator and float valve. | No | 1 | | - |
| Subtotal (A)- Fire Water Pumping System | | | | | - |
| B | SITC of FIRE HYDRANT & SPRINKLER SYSTEM | | | | |

Schedule of Work

Fire Protection System for Central Warehouse at at IDCO Industrial Estate, Chhattabar, Dist-Khorda, Odisha

Tender No: EP / TCW / BHU / FPS / 12

| Sl. No. | Description | Unit | Qty. | Supply + Installation | |
|---------|--|------|------|-----------------------|--------------------------|
| | | | | Unit Rate (Rs) | Amount (Rs) |
| 1.0 | Supplying, laying, testing and commissioning of above-ground piping carried out of MS Class "C" ERW pipes as per IS : 1239 for pipes upto 150 mm NB and as per IS:3589 (6.35mm thick) with all online Pipe Fittings, flanges (ASA 150 class), nuts, bolts (Galvanised), gaskets, washers, U-clamp/Universal Clamp/ G-Clamp, anchor fasteners and tapping for gauges/instruments including cutting, welding, fixing in / on walls, ceiling by using suitable supports etc.,. The quoted rate shall also include for chasing / chipping walls, making bore holes in walls / floor and making them good with filler material etc. The item rate shall also include surface preparation of pipes by wire brushing, application of 2 coat red-oxide primer and 2 coat of synthetic enamel finish paint. complete. The ring main (150 mm NB Pipe) shall be laid along the boundary wall, taking support from wall. The pipe support (made of out of suitable structural steel section) shall be fixed with the boundary wall with bullet type anchor fasteners. Accordingly, the cost for supply and fixing of bullet type anchor fasteners. However, Steel work for supports shall be paid under separate item. All the fittings used in the pipe line shall be made from seamless pipe. | | | | DO NOT QUOTE HERE |
| a | 200 mm NB Pipes. | Mtr | 18 | | - |
| b | 150 mm NB Pipes. | Mtr | 415 | | - |
| c | 100 mm NB Pipes. | Mtr | 150 | | - |
| d | 80 mm NB Pipes. | Mtr | 90 | | - |
| e | 50 mm NB Pipes. | Mtr | 120 | | - |
| f | 40 mm NB Pipes. | Mtr | 65 | | - |
| g | 32 mm NB Pipes. | Mtr | 165 | | - |
| h | 25 mm NB Pipes. | Mtr | 58 | | - |
| i | 15 mm NB Pipes. | Mtr | 18 | | - |
| 2.0 | Cast Iron Butterfly Valve with companion Flanges, Bolts, Nuts and Gaskets as per BS 5155 The valves shall be CI construction, seat shall be black nitrile rubber with instant moulding. The valves shall be PN 1.6 rating & Leak proof. | | | | |
| a | 150 mm NB | No | 14 | | - |
| b | 100 mm NB | No | 3 | | - |
| c | 80 mm NB | No | 3 | | - |
| 3.0 | Bronze / Gun metal gate valve , threaded ends | | | | |
| a | 15 mm NB | No | 12 | | - |
| b | 25 mm NB | No | 4 | | - |
| c | 50 mm NB | No | 3 | | - |
| 4.0 | Ball valve , 150 # rating, flanged ends, ISI marked | | | | |
| a | 50 NB | No | 2 | | - |
| b | 25 NB | No | 2 | | - |
| c | 15 NB, screwed ends | No | 1 | | - |
| 5.0 | Y- Type Strainer , Cast Iron Double Flanged (CIDF), PN 1.6 along with companion flanges | | | | |
| a | 100 mm NB. | No | 1 | | - |
| b | 10/15 mm NB. (for diesel line) | No | 1 | | - |
| 6.0 | C.I. Non-return valves as per IS:5312 reflux swing check type with required flanges, nuts, bolts and gaskets etc. PN 1.6 | | | | |
| a | Size 150 mm NB | Nos | 6 | | - |
| b | Size 100 mm NB | Nos | 2 | | - |
| c | Size 80 mm NB | Nos | 2 | | - |
| d | Size 65/ 50 mm NB | Nos | 5 | | - |

Schedule of Work

Fire Protection System for Central Warehouse at at IDCO Industrial Estate, Chhattabar, Dist-Khorda, Odisha

Tender No: EP / TCW / BHU / FPS / 12

| Sl. No. | Description | Unit | Qty. | Supply + Installation | |
|---------|--|------|------|--------------------------|-------------|
| | | | | Unit Rate (Rs) | Amount (Rs) |
| 7.0 | Supplying and fixing approved make of 25mm dia Gun Metal automatic air release valve of single ball or spring loaded type complete with unions etc. complete. | Nos | 6 | | - |
| | | | | DO NOT QUOTE HERE | |
| 8.0 | Cast Iron Gate Valve --Rising Spindle type (IS : 14846) with companion Flanges, Bolts, Nuts and Gaskets | | | | |
| a | Size 200 mm NB | Nos | 2 | | - |
| b | Size 150 mm NB | Nos | 6 | | - |
| c | Size 100 mm NB | Nos | 2 | | - |
| d | Size 80 mm NB | Nos | 2 | | - |
| e | Size 65/50 mm NB | Nos | 6 | | - |
| 9.0 | Supply, erection, testing & commissioning of Brass/ SS Foot Valve with SS Strainer with companion flanges, gaskets & nuts and bolts. | | | | - |
| a | Size 200 mm NB | Nos | 2 | | - |
| b | Size 80 mm NB | Nos | 1 | | - |
| 10.0 | Supplying and laying underground buried piping together with protective wrapping and coating for MS pipe as per IS : 1239 carried out of MS class "C" piping for pipes up to 150mm NB and as per IS : 3589 for pipes 200mm NB and above together with fittings and accessories as under : Rates shall include Excavation & Back filling in soft soil/murum and application of 4mm thick wrapping & coating material over underground piping. Refer data sheet of wrapping & coating material. | | | | - |
| a | 150 mm NB pipes. | Mtr | 60 | | - |
| b | 100 mm NB pipes. | Mtr | 12 | | - |
| 11.0 | SS Single Hydrant Oblique Valve as per IS 5290 , ISI marked of 63 mm dia (Yard + Escape). Refer data sheet | No | 12 | | - |
| 12.0 | Fire Hose Delivery 15 M long 63mm RRL Hose Pipe as per IS: 636, Type 'A' ISI marked with SS 63mm male and female hose coupling as per IS: 903, ISI marked with GI binding wire. | No | 24 | | - |
| 13.0 | Supply, fixing, testing & commissioning of ISI marked stainless steel water branch pipe with nozzle . The general design and construction of branch pipes and nozzles shall comply with IS: 903 (latest revision). Nozzles shall be constructed of Stainless Steel. | No | 12 | | - |
| 14.0 | Supplying and fixing Fire Hose Cabinet , made of CRC 18 SWG sheet for body and doors of size 750 X 600 X 250 double hinged double doors painted with Signal Red, with front glass, lock and key suitable for 1 branch pipe and 2 hoses including anchor fastening for fixing of box in wall/ or in foundation as per requirement. (Structural work shall be paid separately). | Nos | 12 | | - |
| 15.0 | Stand Post type Water Monitor made of C.S Body having 63/32 mm nozzle size with flow capacity of 1750lpm@7Kg/Cm2 as per IS:- 8442 Type- "I", ISI marked.-Refer data sheet. | No | 2 | | - |
| 16.0 | Hose Reels: First aid Hose reels consist of 30 Mtr Thermoplastic Type 2 Hose with Shut off valve, High density PVC Nozzle & hose drum and swivel bracket to accommodate 270 Deg. operation (min dia 19 mm) IS 884:1985. 25 mm dia Ball valves for First Aid Hose Reel along with companion flanges/necessary fittings shall be included in this item. | Each | 12 | | - |

Schedule of Work
Fire Protection System for Central Warehouse at at IDCO Industrial Estate, Chhattabar,
Dist-Khorda, Odisha

Tender No: EP / TCW / BHU / FPS / 12

| Sl. No. | Description | Unit | Qty. | Supply + Installation | |
|---------|---|------|------|--------------------------|-------------|
| | | | | Unit Rate (Rs) | Amount (Rs) |
| 17.0 | Fire Siren of 2 KM range to be installed on top of Fire Water pump house with cabling, mounting bracket etc. Power connection to be taken from MCC cum Annunciation Panel. A selector switch shall be provided in MCC to operate the siren in Off/Auto/Test Mode. Cabling cost for Siren shall be included under this head. | No. | 1 | DO NOT QUOTE HERE | - |
| 18.0 | Earthing as required for motors, panels, tanks and other installed system. Earth Pit /Main earthing grid shall be provided by other vendor near Pump House. The contractor shall do double earthing with 32 mm X 6 mm GI Strip and 10 swg GI wire. | Job | 1 | | - |
| 19.0 | Supply, fabrication, erection, alignment and fixing in position, true to line and level, structural steel work for structural support grating etc. made out of rolled steel angles, plates, steel tubes etc., including splicing, cutting, bending, drilling, welding, riveting, bolting etc., with all tools and tackles, plant and machinery including preparation of detailed shop drawings as per design drawings and specifications, wire brushing to remove mill scales etc and painting as per relevant data sheet. | Kg | 3000 | | - |
| 20.0 | Fire brigade inlet siamese connection (4way) manifold including valves and check valve of size 150mm size having gunmetal 4 nos. 63mm dia Gun Metal instantaneous inlet arrangements to the main header complete with required flanges, bolt, nut and washer, cap and chain etc. It shall be as per IS 5131 with built in check valve and 150mmdia outlet connection to the fire main grid with 150mm dia Butterfly valve and non – return valve. Butterfly valve & NRV shall paid under seprate item as mentioned above. | No | 2 | | - |
| 21.0 | Flow Switches to indicate and transfer signal to Fire Alarm Panel regarding the flow of the water in respective sprinkler system of each floor | Nos | 2 | | - |
| 22.0 | Inspection / Supervisory drain arrangement for sprinkler network system at extreme end of the sprinkler system in each of the floors, comprising of 25 mm Gate Valve and 3 Mtrs. of 25 mm dia piping, 25 mm dia 3 nos. sight glass. | No | 2 | | - |
| 23.0 | Supplying, installing, testing and commissioning K 80 conventional Pendent Sprinkler quartzoid bulb type of standard coverage and standard response with 15 mm screwed end connection of 68 deg. C. temperature rating and orifice shall not be less than 12.7mm. Sprinklers shall be UL Listed / FM approved with Chrome finished. | No | 100 | | - |
| 24.0 | Sprinkler Installation Control Valve (UL Listed) to control water supply. Valve set shall comprise of a) Alarm valve ; b) Water motor alarm & gong, c) Press. gauges; d) Drain & Test Valve etc. complete in all respect as per code requirement. Size: 150 mm. | Set | 1 | | - |
| 25.0 | Stainless steel corrugated flexible pipe(hose) for dropping sprinklers below false ceiling, pipe shall be 16 bar pressure rating and 1000/1500 mm long (as required) 25 mm dia with union / reducer collar, clamps etc. as required. | No | 50 | | - |
| 26.0 | Supply & fixing of approved type rosette plates (Surface mounted type, in two piece) for Sprinklers below false ceiling area. | No | 50 | | - |

Schedule of Work

Fire Protection System for Central Warehouse at at IDCO Industrial Estate, Chhattabar, Dist-Khorda, Odisha

Tender No: EP / TCW / BHU / FPS / 12

| Sl. No. | Description | Unit | Qty. | Supply + Installation | |
|---|---|------|------|--------------------------|-------------|
| | | | | Unit Rate (Rs) | Amount (Rs) |
| 29.0 | Structural, Hangers Supports with/ without Bracing for Sprinkler Pipes shall be provided for Office Building , Docking Area, Anteroom and Potato Sorting Area (2 floors) as per relevant code requirement. This will cover all common type of hanger equipment as per system design/ piping stability requirement. Mild Steel Structural requirement for Bracing shall be paid under Structural Steel Work. Scope shall also include Supply of U clamps, GI thread rods and Anchor fasteners etc as required . It is to be noted that in 1st floor of Potato sorting area, the sprinklers are to be hung from structures/rafters of Warehouse which will be at + 9mtr heingt (approx) from 1st floor level. | Job | 1 | DO NOT QUOTE HERE | - |
| Subtotal(B)- FIRE HYDRANT & SPRINKLER SYSTEM | | | | | - |
| C SITC of Fire Detection & Alarm System | | | | | |
| 1.0 | Supply, Installation, Testing & Commissioning of Microprocessor based Intelligent Analog Addressable Type Double (2) Loops Fire Alarm Control Panel (FACP) with 160 character LCD display, four access level. 1000 event historic logging, flash EPROM sufficient numbers of programmable relay control, 24 V DC standby & Battery backup/battery charger of 48 hrs. The FACP shall have provision of loop expansion, The FACP shall be networkable type. Total 640 Devices per loop 159 detectors/ 159 modular combination. | No | 1 | | - |
| 2.0 | Photo Detectors: Supply, Installation, Testing and Commissioning of Intelligent Addressable Photo Electric Type Smoke Detectors below/above False Ceiling with indicating lamp, mounting base and all other mounting accessories complete as required. The detector mounting base shall have inbuilt isolator. | No | 64 | | - |
| 3.0 | Heat Detector (Addressable): Supply, Installation, Testing and Commissioning of Intelligent Addressable Heat Detectors with indicating lamp, mounting base and all other mounting accessories complete as required. The detector mounting base shall have inbuilt isolator. | No | 1 | | - |
| 4.0 | Multi Sensor Detector: Supply, Installation, Testing and Commissioning of Intelligent Addressable Multi Sensor Detectors with indicating lamp, mounting base and all other mounting accessories complete as required. The detector mounting base shall have inbuilt isolator. | No | 18 | | - |
| 5.0 | Response Indicator: Supply, Installation, testing and commissioning of Response Indicator with all mounting accessories complete as required. | No | 24 | | - |
| 6.0 | Manual Call Points: Supply, Installation, testing and commissioning of Intelligent Addressable Manual Call Points with indicating lamp, mounting base and all other mounting accessories complete as required. | No | 14 | | - |
| 7.0 | Control Module for Hooter: Supply, Installation, testing and commissioning of Addressable Control Modules for activating hooters with all the mounting accessories complete as required. One CM shall provide one activation signals. | No | 16 | | - |
| 8.0 | Control Module for Hooter: Supply, Installation, testing and commissioning of Addressable Relay Modules for activating hooters with all the mounting accessories complete as required. One CM shall provide one activation signals. | No | 2 | | - |

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Fire Protection System for Central Warehouse at at IDCO Industrial Estate, Chhattabar, Dist-Khorda, Odisha

Tender No: EP / TCW / BHU / FPS / 12

| Sl. No. | Description | Unit | Qty. | Supply + Installation | |
|----------|--|------|------|--------------------------|-------------|
| | | | | Unit Rate (Rs) | Amount (Rs) |
| 9.0 | Monitor Module: Supply, Installation, testing and commissioning of Addressable Monitor Modules for Interfacing PFC/Dry Inputs of Fire Pump Signals, Sprinkler Line Flow Switch Status, Base builder fire alarm panel integration with all the mounting accessories complete as required. | No | 2 | | - |
| | | | | DO NOT QUOTE HERE | |
| 10.0 | Hooters with Strobes: Supply, Installation, testing and commissioning of Loop Powered Hooters with Strobes with all mounting accessories complete as required. No external power supply will be provided for hooters. | No | 14 | | - |
| 11.0 | Cabling : Supplying, installing, testing and commissioning of ISI certified 2 core x 1.5 sq. mm, annealed tin copper conductor, armoured FRLS outer sheathed PVC insulated Cable conforming to IS 1554 Part-1. with Ferrules, Lugs, saddles, saddles base, conduits (to be paid separately) & other accessories complete as required. Wherever the cable is laid inside the office, it shall be concealed as per the direction of Engineer-in-Charge. The job includes chipping of walls and making it good for concealed wiring. | Mtr | 1800 | | - |
| 12.0 | Supplying and Laying 25 mm Dia ISI marked PVC Conduit Pipe with fixture & fittings | Mtr | 200 | | - |
| | | | | | |
| | Subtotal (C)-FIRE DETECTION & ALARM SYSTEM | | | | - |
| | | | | | |
| D | Misc. Civil Work | | | | |
| | | | | | |
| 1.0 | Dismantling work (Plain Concrete/ Reinforced Concrete including cutting of reinforcement/Brick work) with all labour, tools and tackles complete as per direction of Engineer-In-Charge including cleaning the area of all spoils and carting debris outside the plant area or stacking the material as per direction of the Engineer-in-Charge. | CuM | 2 | | - |
| 2.0 | Excavation and back filling work with all materials, labour, tools and tackles complete as per direction of Engineer-In-Charge. | CuM | 4 | | - |
| 3.0 | P.C.C. work with all materials, labour, tools and tackles complete as per direction of Engineer-In-Charge for the supports | CuM | 2 | | - |
| 4.0 | R.C.C. work with all materials,labour, tools and tackles complete as per direction of Engineer-In-Charge for the supports. | CuM | 2 | | - |
| | | | | | |
| | SUB TOTAL (D)- Misc. Civil Work | | | | - |
| | | | | | |
| E | HAND APPLIANCES , PPE & SIGNAGES | | | | |
| | Supply, installation, transportation of Fire Extinguishers including supply of nuts, bolts, brackets etc. including making good of wall, wherever required, after installation and supply of all related material all complete as per codes, standards, specifications, documents and direction of Engineer-in-Charge. | | | | |
| 1.0 | CO2 type Fire Extinguisher-4.5 KG as per IS 15683 | No | 10 | | - |
| 2.0 | Mechanical Foam-6 Liter as per IS 15683 | No | 2 | | - |
| 3.0 | DCP type Fire Extinguisher -4 Kg as per IS 15683 | No | 14 | | - |
| 4.0 | ABC type Fire Extinguisher -4 Kg as per IS 15683 | No | 13 | | - |
| 5.0 | SITC of GI sand bucket with sand (Group of 6 Buckets on a MS fabricated stand). The fabricated stand shall be painted with Zinc Chromate Primer and painted with enamel paint of Post office red shade. | Set | 2 | | - |

Schedule of Work
Fire Protection System for Central Warehouse at at IDCO Industrial Estate, Chhattabar,
Dist-Khorda, Odisha

Tender No: EP / TCW / BHU / FPS / 12

| Sl. No. | Description | Unit | Qty. | Supply + Installation | |
|--|---|-------|------|-----------------------|-------------|
| | | | | Unit Rate (Rs) | Amount (Rs) |
| 6.0 | Self Illuminated Signages-Fire Exit, Fire Extinguishers, Danger, Fire Bucket and No Smoking, Size 300 x 150 mm Approx | No | 28 | DO NOT QUOTE HERE | - |
| 7.0 | Supply & fixing in position the signages with required texts on 3 mm thick 'Opaque' PVC foam board of computerized cut, PVC non-reflective self adhesive vinyle painted foam board.- Fire Notice Board in 600 X 450 mm or any other sizes as required. | Sq. m | 1 | | - |
| 8.0 | Self Illuminated Fire EXIT Signages 10 " X 12 " | No | 8 | | - |
| Subtotal (E)- Hand Appliances & Signanges | | | | | |
| F Potable Water System | | | | | |
| 1.0 | S.I.T.C of 1.5 HP (10 Cum/ Hr @20 mtr head) single stage, high speed, horizontal, centrifugal, open well Submersible pump (Kirlsokar KOS or euiavlent model of other approved make) to be installed in RCC water reservoir along with standard length suitable size power supply cable suitable for operation on Single phase,230 volts, 50 Hz, A.C Supply etc. complete as reqd. as per specifications below. The scope shall include suppply and fixing GI pipe line with necessary fittings at pump delivery with connection to CPVC water line laid by other contractor.The scope also covers supply and installation of outdoor duty sutiable IP-54 DOL starter (L&T or approved equivalent make) for the mentioned pump with contactors, overload realys, on-off switches etc.). (1 No Pump -Work + 1 No Pump- Stand By). [For transfer of Raw Water from Underground Stoarge Tank to Overhead Storage Tank] | Nos | 2 | | - |
| 2.0 | S.I.T.C of 2 HP (5 Cum/ Hr @35 mtr head) single stage, high speed, horizontal, centrifugal, open well Submersible pump (Kirlsokar KOS or euiavlent model of other approved make) to be installed in RCC water reservoir along with standard length suitable size power supply cable suitable for operation on Single phase,230 volts, 50 Hz, A.C Supply etc.complete as reqd. as per specifications below. The scope shall include suppply and fixing GI pipe line with necessary fiitings at pump delivery with connection to CPVC water line laid by other contractor.The scope also covers supply and installation of outdoor duty sutiable IP-54 DOL starter (L&T or approved equivalent make) for the mentioned pump with contactors, overload realys, on-off switches etc.). (1 No Pump -Work + 1 No Pump- Stand By). [For transfer of Raw Water from Underground Stoarge Tank to RO Plant] | Nos | 2 | | - |
| 3.0 | External work: Supplying & fixing Chlorinated Polyvinyl Chloride (CPVC) pipe as per ASTM F 441, Schedule 40 with all CPVC plain and brass threaded fittings, bends, tees, flanges,rubber gasket, reducers, nut bolts, sockets,unions end cap etc. as required including fixing of pipes with clamps at suitable regular spacing. The pipes shall be laid along drain wall/ overground/underground as required based on site condition.This item includes jointing the pipes and fittings with one step CPVC solvent cement trenching, refilling and testing the joints as required complete as per direction of Engineer-in-Charge. Piping network to be hydrottested at 8 Kg/sq. cm. pressure. | | | | |
| a | 50 mm nominal bore | Mtr | 40 | | - |
| b | 40 mm nominal bore | Mtr | 25 | | - |
| c | 25 mm nominal bore | Mtr | 10 | | - |
| d | 15 mm nominal bore | Mtr | 10 | | - |

Schedule of Work

Fire Protection System for Central Warehouse at at IDCO Industrial Estate, Chhattabar, Dist-Khorda, Odisha

Tender No: EP / TCW / BHU / FPS / 12

| Sl. No. | Description | Unit | Qty. | Supply + Installation | |
|--|---|------|------|--------------------------|-------------|
| | | | | Unit Rate (Rs) | Amount (Rs) |
| 4.0 | Supply, Installation, Testing and Commissioning of CPVC Sch 40 Brass threaded/plain end ball valves (pressure rating: 235 psi @ 23°C) based on end of pipe of following sizes | | | DO NOT QUOTE HERE | - |
| a | 50 mm nominal bore | No | 2 | | - |
| b | 40 mm nominal bore | No | 1 | | - |
| c | 25 mm nominal bore | No | 1 | | - |
| d | 15 mm nominal Size | No | 2 | | - |
| 5.0 | Supply, installation, testing & commissioning of level controller with 3 level sensors, Auto-Manual Switch, indication with necessary fittings and cable to control respective pump operation (ON/OFF) for Underground water tank and Overhead Raw water tank. Necessary cabling shall be included in this item. | No | 2 | | - |
| 6.0 | Supply and fixing of Emergency SS safety shower cum Eye wash fountain hand/foot operated. (SS 304)Model SS-6250/SS 1111/SS 1005/Equivalent | No | 1 | | - |
| Sub TOTAL (F) Potable Water System | | | | | - |
| G Approval from Fire Department | | | | | |
| 1.0 | Obtaining Provisional and final approval/No-Objection Certificate of the entire system from the Concerned Fire Department. The bidder has to prepare the layout, drawings and any other statutory requirements for getting the approval from the Fire Department. Statutory fees to the Department will be paid by Owner/BL. All other incidental expenses, visits and meeting expenses shall be included against this head the by the bidder. | Job | 1 | | - |
| SUB TOTAL (A+B+C+D+E+F+G) WITHOUT GST- Status of Bidder will be decided based on this | | | | | - |
| GST (A+B+C+D+E+F+G) (bidder to change if required) | | | 18% | | - |
| GRAND TOTAL (A+B+C+D+E+F+G) WITH GST | | | | | - |
| H Annual Maintenance Contract [AMC] | | | | | |
| 1.0 | Annual Maintenance Contract [AMC] (after expiry of 1-year guarantee period): Rectification & maintenance of the Fire Protection system including supply of man-power tools tackles, regularly consumable spares required for schedule maintenance, maintenance against calls and break down maintenance. The charges to be paid on monthly basis. Annual Maintenance Contract rate will include system inspection and running the Fire Hydrant & Sprinkler System and FDA System once in a month by the contractor. The Log book shall be signed by both Owner & Contractor. For details refer Scope of Work. | | | | |
| a | 1st year | LS | 1 | | - |
| b | 2nd year | LS | 1 | | - |
| SUB TOTAL (H) AMC | | | | | - |
| GST on AMC H (bidder to change if required) | | | 18% | | - |
| SUB TOTAL (A+B+C+D+E+F+G+H) WITHOUT GST | | | | | - |
| TOTAL GST (A+B+C+D+E+F+G+H) (bidder to change % if required) | | | | | - |
| GRAND TOTAL (A+B+C+D+E+F+G+H) WITH GST | | | | | - |