

**GOVERNMENT OF INDIA
BHABHA ATOMIC RESEARCH CENTRE
WASTE MANAGEMENT DIVISION
WASTE MANAGEMENT FACILITY, TROMBAY**

Ref: **WMD/ETP/EEI/CABLING/53036**

Date: 08.07.2022

NOTICE INVITING TENDER

Sealed quotations are invited on behalf of President of India by 'Supdt., ETP & DC, WMD, Nuclear Recycle Group, Trombay' for the following work from contractors having adequate experience and capabilities to execute such magnitude of similar works and who have similar experience with different units of Department of Atomic Energy (DAE), Nuclear Power Corporation of India Ltd., Public sector undertakings etc.

Name of work:

Minor works w.r.t. **Cabling works related to Ion-Exchange PLC system at ETP Trombay**, as per details given in Annexure No. '**WMD/ETP/EEI/CABLING//Work-details**'.

Terms & Conditions -

- a. The tenderer may contact telephonically on '**022-25594127**' for clarifications, if any w.r.t. scope and details of the works. Last date for entertaining such queries shall be **15.07.2022** up to **16:00 hrs**, only on working days.
- b. Tenderer shall send the quotation in attached proforma and printed on letter-head with GST, etc. and break-up of Taxes, duties, levies, other charges, if any.
- c. Sealed quotation should clearly indicate Name of Work, Reference No. & Due date of submission of quotation. Address on the envelope should read:

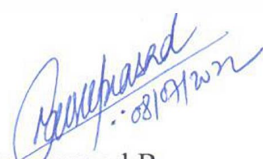
Kind attention: Guruprasad R., SO/E,
Room No - 122, Effluent Treatment Plant (ETP),
Bhabha Atomic Research Centre, Trombay, Mumbai-400085

Such sealed quotation should reach above address through '**registered post/speed post**' only through Indian Postal Service. **Last date for receipt of sealed quotation is 22.07.2022 up to 15:00 hrs.**

- d. The Sealed Quotations will be opened on **22.07.2022 at 16:00 hrs** in Divisional office, WMD, BARC, Trombay.
- e. **Supdt., ETP & DC, WMD, Nuclear Recycle Group, Trombay**, reserves the right to accept / reject any or all the quotations, without assigning any reason thereof.
- f. Quoted offer by the tenderer shall be valid for **minimum 60 days** from the date of opening and also the quoted price shall remain firm during the period of execution of the order.

Encl: Annex- '**WMD/ETP/EEI/CABLING//Work-details**'.

: Format proforma for quotation


Guruprasad R.,
SO/E.

GENERAL NOTES:

1. Guarantee:

All the installation works carried out site shall be guaranteed against faulty material and poor workmanship for a period of **12 months from the date of completion of work.**

2. Important Note:

The bidder shall have past experience of executing similar orders at any of DAE units and / or Private / Public sector companies.

In future, if the case desires, the bidder will have to:

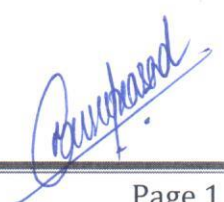
- i. Provide name & contact details of the concerned officers (previous clients) who can be contacted for obtaining feedback regarding work carried / being carried out.
- ii. Submit a feedback certificate from their previous clients for their satisfactory work completion and performance over a period of at least 1 year.
- iii. Arrange a site visit for the department representative at the previous client's works / factory.

3. Notes (Commercial):

- 3.1 Offer shall be **valid for minimum 60 days** from the date of opening and quoted price shall remain firm during the period of execution of the order.
- 3.2 **Free Issue Material (FIM)** will be issued by B.A.R.C. for this work.
- 3.3 Payment will be made within **45 days** of completion of the work.
- 3.4 Work shall be completed within **90 days** of release of work order.
- 3.5 Quoted price shall be exclusive of all taxes & taxes – rate and amount shall be columned separately.

4. Other General Notes:

- 4.1 Contractor personnel shall have **police verification clearance** and adhere to all Security norms of the department.
- 4.2 All the health & safety norms as stipulated by the department shall be followed by the contractor personnel. All the safety wears required for the job and tools, tackles shall be arranged by the contractor.
- 4.3 Injury, if any to the contractor's personnel shall be the responsibility of the contractor and not of the department. Contractor will bear all the medical expenses however First-aid help will be given by the department as far as possible.



CABLING

This part of the specification covers all the cabling details, defining the technical specifications, procedures to be followed, cable tray specification. The work involved includes the cabling between various control panel and PLC panel, cable termination, installation of junction boxes as per the details in this section.

The contractor shall be responsible for cable glanding, saddling, ferruling of each core of the cable.

Cabling:

Scope of work:

The scope of work includes installation of:

- 1) Junction boxes.
- 2) Laying of
 - a) Armoured signal cables, earth strip and earthing cable.
 - b) Pulling of cable and wires in trays.
 - c) Terminating both ends of each wire in suitable terminals housed in control panels.

Cable system installation work:

The engineer-in-charge's drawing, cable schedules, instructions and recommendations shall be correctly followed by the contractor in handling laying, testing and commissioning of the cabling system. In case of any queries as to correct interpretation of drawings / instructions, necessary clarification shall be obtained by the contractor from the engineer-in-charge.

Any changes in the routes of cables which are required to be made to suit site conditions shall be carried out by the contractor in consultation with the engineer-in-charge and after his approval. The cable shall be laid in, on cable trays, vertical raceway, clamped on structures / walls / ceilings etc., as per the relevant cable installation practice covered in this section and Indian standards.

The scope of the cable laying shall include laying, pulling cables as above, proper dressing of cables on cable trays, racks & vertical raceways.

Cables shall be protected at all the time from mechanical injury and from absorption of moisture at unprotected ends. Damaged cables shall be replaced at the contractor's expenses.

Sharp bending and kinking of cables shall be avoided. The **bending radii** for various types of cables shall **not be less than 12 times outside diameter of the cable**. If shorter radius appears necessary, no bend shall be made until clearance and instructions are obtained from engineer-in-charge.

When signal cables are to be laid in the proximity of power cables, minimum separation between power and cables **shall be not less than 500 mm**. Power and control / signal cables shall, as far as possible, **cross at right angles to each other**.

Cable in cable racks, in cable trays and upon emerging from conduit shall be formed to avoid bearing against edges of trays, racks, conduits or their supports upon entering or leaving trays, racks or conduits. Cable in horizontal runs in trays shall be neatly dressed in the cable trays. Sequence of cables transversely in tray shall avoid unnecessary crossing of the cables when some of the cables make turn into the lateral trays or upon entering or leaving a run of tray. Cable shall be laid flat in trays, with allowance

for angles, offset and branches. Cables shall then be restrained temporarily in an approved manner on one side of each angle, branch or offset in turn, cables shall be formed to the change in tri-direction so that the finished cable will lie flat and straight in the tray in a neat and approved manner without restraint and without looping out of the tray along straight runs of trays, on any change of direction. Where excess cable length of cable has been fed into a tray, such excess length shall be backed out of trays as cable is formed at bends and is trained flat and straight in the trays, and finally cut to correct length up to its terminal point. Where cabinet, cubicle, or other terminal points for cables are equipped with cable or wiring trays, the contractor shall pull sufficient length each cable to permit neat arrangement of all the entering cables, with leads formed and clamped as each conductor is brought to its terminal connection.

The arrangement and interval of dressing of cables shall be 500 mm. It will be the responsibility of the contractor to check the neatness of such cable runs and to see that horizontal / vertical runs of cables are parallel to fixed axes in respective plans.

Cables will be installed in trays, racks. Any change if necessary after obtaining prior approval of the purchaser shall be carried out at site by the contractor and shall be clearly marked by him on as built drawing.

Cables to each circuit shall be laid in one continuous length. Cable jointing and splicing shall be done after obtaining site engineer-in-charge's permissions.

The shield / drain wires are to be properly terminated to the earth strip in the Panels. The contractor should take the following precautions while routing the cables to minimize the electrical interferences.

- a) Signal cable shall be kept as far as possible from power cable with a separation of not more than 1% of the length of parallel run subject to minimum of 0.5 meters.
- b) All cable screens wherever provided shall be earthed at receiving instruments only.

It will be the responsibility of the contractor to remove surplus / waste materials and all other similar items after the installation work is completed.

Cable termination:

All cables that will be laid by the contractor shall be connected at both ends to panel, equipments, instruments or junction boxes, terminals as the case may be.

The scope of termination at each end shall include dressing and connection of all the cores of the cables. Making the requisite holes in the gland plate of the control panels / junction boxes / glands, fixing the junction boxes / glands, earthing the cable armour panel (only at one end), crimping the cable lugs on each core (bare conductor from the junction box shall be taped up to the lug) neatly clamping the cable inside panels cable alley, wiring troughs and connecting to correct terminals as per cables schedules.

All cable terminations shall be soldered less crimping type, proper **crimping tool of Dowells** or equivalent make shall be used by the contractor. The crimping tools used shall be subject to engineer-in-charge's approval.

Spare cores of control cables shall be connected to spare terminal blocks where available with appropriate ferrules. If there are no spare terminal blocks, the spare cores shall be bunched together and shall be neatly kept inside the panel.

A total of approx. 600 nos. of lugging, ferruling & termination is envisaged in the work.

Testing and Commissioning:

All checks and tests as per the manufacturer's drawings / manuals, relevant code of installation and the enclosed commissioning check lists for various types of equipments shall be carried out by the contractor as part of the installation work.

The department may ask for such additional test on site as in his opinion are necessary to determine that the works comply with the specification, manufacturer guarantee / instructions or the applicable code of installation. The contractor shall carry out such additional test also.

The contractor shall perform operating test on all equipments, instruments, panels to verify the correctness of all the interconnections between various items of the equipment. This shall include conducting instrument loop testing and operating the equipment for function checking.

Insulating resistance test shall be carried out by 500 V megger.

The department's authorized representative shall be present during every test as called for by the department. The contractor shall record all test values and furnish the required copies of the test data to the department. Electrical circuits and equipments shall be energized or used at nominal operating voltage only after such report have been accepted a satisfactory by the department.

Commissioning checklist for cables:

- 1) Continuity of Conductor
- 2) Megger Test
- 3) Megger test between each Core and Armour / Braiding.
- 4) Megger test between cores.
- 5) High Voltage Test
- 6) Earth Continuity of armour.
- 7) Identification.

Free Issue Material
(To be provided by the Department)

Sr. No.	Item Description	Qty
		(to be Installed)
1.	Tinned Copper strip (ETP grade) of size 25mm x 3mm.	40 Mtr.
2.	35 Sq.mm unarmoured single copper conductor cable (FRLS PVC sheathed)	65 Mtr.
3.	Junction Box (for Earthing distribution)	02 Nos.
4.	4-pair armoured CAT 6 cable	120 mtrs.
5.	0.75 Sq.mm conductor size, 24 Pair, FRLS PVC SHEATHED Signal Cable	70 mtrs.

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Sr. No.	Item Description	Qty	Rate	Total Cost
			(Rs)	(Rs)
			Installation	
1	Laying of Tinned Copper strip (ETP grade) of size 25mm x 3mm. (FIM)	40 Mtr.	/=	/=
2.	Laying of 35 Sq.mm unarmoured single copper conductor cable (FRLS PVC sheathed). (FIM)	65 mtr.	/=	/=
3.	Installation of Junction Box (for Earthing distribution) (FIM)	02 Nos.	/=	/=
4.	Laying of 4-pair Armoured CAT 6 cable (FIM)	120 mtr.	/=	/=
5.	Laying of 0.75 Sq.mm conductor size, 24 Pair, FRLS PVC SHEATHED Signal Cable (FIM)	70 mtr.	/=	/=
6.	Glanding, dressing, Ferruling and Termination of armoured signal cables (Approx. 600 terminations)	Lum-sum	/=	/=
7.	BASIC TOTAL			/=
8.	GST @ 18%			/=
9.	TOTAL COST			/=

Amrinder