TENDER DOCUMENT

NIT No.- DLI / C&E / WI-665 / 761 (R)

Tender for Design, Engineering, Manufacturing, Testing at Works & Supply of Instrumentation Cables of various sizes’ for the project of “Augmentation of Raw Material Receipt & Handling Facilities with new OHP, Part-B (Package- 061) of Bhilai Steel Plant (SAIL)”.

VOLUME- 2B

(Scope of Work & Technical Specification)

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Scope of Work & Technical Specification–Instrumentation Cables

Scope of Work
Scope of work of bidder for Instrumentation Cables shall include (but not limited to) supply, testing and inspection at works, packing, dispatch, transportation, delivery at site getting approval of drawings & documents from BSP/MECON/EPI before manufacturing as specified in technical specification, providing drawings & documents, datasheets in requisite sets, quality assurance plan, internal test reports and handing over to Bhilai Steel Plant.

The scope of supply of the bidder shall be deemed to include all such items which although are not specifically mentioned in the specification, but are needed to make the supply complete in all respect for its safe, reliable, efficient and trouble free operation.

Any modifications/deletions/additions/alteration in design/drawings/documents as required by BSP/MECON/EPI shall be in the scope of bidder.

General

1. Standards

The design, manufacture, assembly and testing as well as performance (including safety, earthing and other essential provisions) of cables covered under this specification shall, in general, comply with the latest issue of:

Latest applicable Standards and Codes of Practices published by Indian Standards Institution (BIS).
Latest IPSS (Interplant Standards for Steel Industry)
Latest Indian Electricity Rules & statutory requirements of Central Govt. and State Govt.

In case, the tenderer is not in a position to comply fully with certain IS / IPSS specifications or in respect of certain items for which there are no IS / IPSS specifications, the tenderer may base his proposals on IEC recommendations or other reputed national or international standards subject to the approval of the BSP/MECON/EPI.

The components and materials used and the equipment supplied shall conform to high standards of design, engineering and workmanship and shall be suitable for efficient operation and reliable service in steel plant conditions.
All Cables supplied including design and detailed engineering shall also comply with the statutory requirements of Govt. of India and the respective governments of state in which the plant is situated. The installation shall also confirm to Indian Electricity Act and Indian Electricity Rules.

2.0 GENERAL TECHNICAL SPECIFICATIONS

2.1 General.

This General Technical Specification (GTS) covers the technical requirement of Instrumentation cables for BSP 7.0 Mt. expansion. (Refer clause 2.5 below)

2.2 SCOPE:

The scope of work includes complete design, engineering, supply and testing at works for Instrumentation cables of various sizes as given below.

Instrumentation cable of various sizes-

<table>
<thead>
<tr>
<th>S.No</th>
<th>Cable Size</th>
<th>Qty (in meter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>2P x 1.5 sq mm</td>
<td>16000</td>
</tr>
<tr>
<td>ii</td>
<td>5P x 1.5 sq mm</td>
<td>3000</td>
</tr>
</tbody>
</table>

2.3. TESTS

All cables shall be fully tested in accordance with the relevant clauses of the applicable standards.

Applicable test certificates shall be submitted to the Purchaser for all cables as stipulated in the relevant standard. Type tests shall be carried out as per the relevant standards in the presence of Purchaser’s representative for those items stipulated in the Technical Specification/data sheet and agreed with the Purchaser to ascertain compliance.

Routine tests as per relevant standards shall be carried out on all cables in the presence of Purchaser’s representatives at manufacturers works. In all the cases, test certificates shall be submitted. No cables or other materials shall be dispatched unless the test certificates are accepted by the Purchaser.

2.4 GUARANTEE

The tenderer shall stand guarantee for the trouble free operation and satisfactory performance of all the cables supplied by him. The material used shall be new and best of its kind available and shall conform to relevant latest Indian standards.
The guarantee shall also cover faulty design or materials or workmanship. The supplier shall do all rectification or replacement under the guarantee free of cost.

The supplier will replace cables without any cost implication to purchaser in case of any failure during testing and commissioning.

The supplier shall replace the wrong/defective cables supplied by them, missing items (observed during inspection at site after receipt of materials) or any damages caused to cables during transportation free of cost after receipt of information from the Purchaser. In case of any dispute, decision of purchaser shall be final. The supplier shall depute his representative to site for replacement/rectification work without any extra cost to purchaser.

2.5 TECHNICAL SPECIFICATION OF INSTRUMENTATION CABLES.

(i) 1.1 KV Grade Screened /Special Cable :-

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Voltage Grade</td>
<td>1.1 kV grade</td>
</tr>
<tr>
<td>2.0</td>
<td>Duty type</td>
<td>Heavy duty</td>
</tr>
<tr>
<td>3.0</td>
<td>No. of cores</td>
<td>As per requirement.</td>
</tr>
<tr>
<td>4.0</td>
<td>Cross sectional area</td>
<td>Shall be 1.5 sq.mm.</td>
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<tr>
<td>5.0</td>
<td>Conductor type</td>
<td>- Solid annealed circular stranded copper conductor.</td>
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<td></td>
<td></td>
<td>- For twisted pair cables, the conductors shall be of stranded tinned copper</td>
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<tr>
<td></td>
<td></td>
<td>having proper flexibility to provide limpness and extended flex-life as</td>
</tr>
<tr>
<td></td>
<td></td>
<td>required for these small diameter cables.</td>
</tr>
<tr>
<td>6.0</td>
<td>Insulation type</td>
<td>- PVC insulated, Type A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type ST-1 PVC shall be used for inner sheath.</td>
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<tr>
<td></td>
<td></td>
<td>- Both inner and outer sheath shall be extruded type.</td>
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<td></td>
<td></td>
<td>- Outer sheath made of PVC, abrasion resistant, oil resistant and flame</td>
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<td></td>
<td></td>
<td>retardant conforming to relevant standard, as amended upto date.</td>
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<tr>
<td>7.0</td>
<td>Screen</td>
<td>- Tinned annealed copper mesh over metalized tape, in a close woven braid.</td>
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<tr>
<td>8.0</td>
<td>Armouring</td>
<td>- All the cable shall be Armoured. Armouring shall be as per relevant</td>
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<tr>
<td></td>
<td></td>
<td>applicable standards</td>
</tr>
</tbody>
</table>
| 9.0 | Shielding | - Special aluminium foil to provide 100% shield coverage for optimum protection against radiated interference and ingress of audio and radio frequencies.  
- It shall have shorting fold for metal to metal contact and isolation fold to prevent adjacent shields from shorting to one another, so as to improve the voltage breakdown characteristics. The drain wire shall be of stranded tinned copper wire of 0.518 sq. mm. (20 AWG) cross-sections. |
| 10.0 | Spare Cores | - 20% spare cores but not less than 2 spares shall be provided in all the multi core cables. |
| 11.0 | Reference standard | As per relevant IS with latest amendments |
| 12.0 | Miscellaneous | The Tenderer shall furnish necessary calculations to show that the selected cable satisfy the criteria including for voltage drop.  
- Cables for temperature detectors shall be screened type of required technical parameters with core size not less 1.5 sq.mm.  
- The special twisted paired cables shall be of the type to provide balanced signal transmission and shall have good noise immunity. |
| 13.0 | Core identification | Cable identification will be provided by embossing on the outer sheath the following:  
Manufacturer’s name & trade mark  
Voltage grade  
Year of manufacture  
Type of insulation  
- Cores of the cables upto 5 cores shall be identified by colouring of insulation.  
- For cables having more than 5 cores, core identification shall be done by numbering insulation of core sequentially.  
- All the numbers shall be of same colour, which shall contrast with the colour of insulation.  
- Numbers shall be written in figures and words both.  
- The numerals shall be legible and indelible.  
- The numbers shall be repeated at regular intervals along the core, consecutive numbers being inverted in relation to each other.  
- When number is a single numeral a dash shall be blacked underneath.  
- If the number consists of two numerals, these shall be disposed one below the other and a dash placed below the lower numeral.  
- The spacing between consecutive numbers shall not exceed 100 mm. |
3.0 **List of drawings & documents to be submitted by bidder-**

(i) For Approval/Reference - To be submitted by successful bidder:

01. Detailed Specification/ datasheet for Instrumentation Cable (of various sizes).
02. Bill of Materials
03. GA drawing
04. Quality Assurance Plan
05. Internal test reports and certificates.
06. Any other drawings /documents as per manufacturer’s recommendation.
07. Drawings/documents as per the requirement of BSP/MECON.
08. Manufacturer’s test and guarantee certificates for cables.

(ii) Drawings/documents to be submitted along with bid during tendering stage-

01. Duly signed (with date and stamped) copy of unpriced copy of price bid (Volume 3).
02. Clause wise confirmation to Scope of Supply & Technical Specification of NIT(Volume -2B)
03. No deviation declaration to NIT technical and commercial terms and conditions.
04. Duly signed with date and stamped copy of NIT Vol-1, Vol-2 (2A & 2B) and Vol-3 as token of acceptance.