3X660 MW NORTH KARANPURA SCTPS, NTPC

TECHNICAL SPECIFICATION FOR

415V LOW VOLTAGE SANDWICHED TYPE BUSDUCT

BHEL DOCUMENT NO. : EPD-SBD-CPBG-14015, REV-0

BHARAT HEAVY ELECTRICALS LIMITED

ELECTROPORCELAINS DIVISION

BANGALORE – 560012

Sandwiched Type 415V LT Bus duct

Scope:

The specification covers design, manufacturing, supply, & testing of Sandwich type Three phase Bus trunking system conforming to IEC 60439 (Parts 1 & 2) / IS 8623 (Parts 1 & 2).
The Bus trunking system shall be provided for connecting the Main and Standby DG sets to Unit Emergency Switchgears.

System details:

The bus duct shall be suitable for operation in an 1100V system, with frequency of 50 Hz and internal/external earth. The bus duct shall be designed for an Ambient of 45 deg C as per IS 8623.

Standards:

The bus bar shall be designed and manufactured in accordance with the Following international standards for bus bar trunking:

- BS 5486 part : Particular requirement of bus bar trunking systems
- IEC 60439 -2 : Particular requirement of bus bar trunking systems
- IEC 60529 : Degree of protection

The bus duct shall conform to IEE/NEMA/BUI/JIS for seismic protection Certification.

Type Test:

The sandwiched type bus duct shall be type tested at a reputed national/international test laboratory for short circuit withstand (50KA for 1 sec). Tests shall be performed over a range of current ratings, covering the different frame sizes of the manufacturer.

Degree of ingress protection (IP rating) shall also be tested at any reputed Independent laboratory. This test shall be for IP55 for indoor application for sandwiched bus bars.

Manufacturer:

The manufacturer must have an established track record in design and Manufacture of sandwich bus bar trunking. The manufacturer must have ISO 9001 certification for design, manufacturer and Testing of bus bar systems.

Design & Construction requirements – Sandwich bus bars :

The bus bars shall be of sandwich construction, non-ventilated design. It shall be Possible to mount the bus bar system in any orientation, without affecting the Current rating.

The sandwiched type bus duct shall consist of three phases bus bar permanently positioned dust & Vermin proof and the degree of enclosure protection shall be IP55 for indoor installation.

The enclosure shall be made of CRCA (1.6mm thick) / GI (1.6mm thick) / Aluminium (2.5mm thick) sheet. The design of the bus duct enclosure shall be of sturdy construction such that it shall withstand the internal or external forces resulting from the various operating conditions.

The entire bus duct shall be designed for dust, vermin and weather proof construction. A suitable aluminium sheet flange-protection hood shall be provided to cover all outdoor bus duct enclosure joints to facilitate additional protection against rain water ingress. All horizontal runs of bus ducts shall have a suitable sloped enclosure top to prevent retention of water for both indoor and outdoor portion of bus ducts. Bus duct enclosure shall have a Degree of protection of IP-55.

The bus duct exterior paint shade shall be RAL 5012.

Enclosures shall be provided with flanged ends with drilling dimensions to suit the flanges at the switchgear and DG terminals. Any adapter boxes required for this purpose are in the contractor's scope of supply. The flanges shall be provided with gaskets, nuts, bolts, etc.

EPDM / Neoprene gaskets shall be provided so as to satisfy the operating conditions imposed by temperature, weathering, durability etc. Flange gaskets shall be provided at the equipment terminal connections.

Necessary earthing arrangement as applicable shall be provided with clamps to receive station earthing bus. All accessories and hardware required for the earthing arrangement shall be provided by the contractor. This shall be a GI strip of adequate size, continuously running along the bus duct and shall be earthed at both ends. Bus duct enclosures shall be bolted type.

The material of the conductor shall be high conductivity aluminium / copper. The busbars shall be rated in accordance with the service conditions and the rated continuous and short time current ratings specified elsewhere.

All steel structures required for bus duct support shall be hot dip galvanized.

Unless otherwise specified, in the external surface of enclosures of bus bar compartment which shall be accessible but do not need to be touched during normal operation, maximum temperature rise limits of 40· C above ambient temperature shall be permissible for metal surface and of 50· C above ambient temperature for insulating surfaces as per IS 8623(Part-1) 1993. Maximum temperature of bus bars shall be restricted to 85 deg C.

Insulation:

The bus bars shall be insulated throughout their length by epoxy coating/Mylar. The insulation material used shall be of minimum Class F (155 deg. C). The insulation must comply to UL 94 V-o. It shall be Halogen Free.

Tests:

The following tests shall be carried out at vendor works and test results to be recorded:

a. Insulation resistance shall be tested with 1000 V Megger and shall be not less than 100 mega ohms.
b. Earth continuity test
c. Visual Inspection
d. 1 min power frequency voltage withstand test.

Vendor shall furnish test certificate of CPRI

1) 50KA Short circuit capacity for1 sec
2) Temperature rise
3) Degree of protection IP-55

Measurement of Bus Duct:

Unless otherwise specified measurement for bus duct and supports shall be on the basis of centre line measurements.

Bus shall be measured in units of length along the centre line of the installed bus duct including bends, end flanges, end feed units.

Vendor to submit the following Document with Technical bid.

- Short circuit type test 50KA for 1Sec.
- Temperature rise /Heat Run test.
- Degree of Protection IP-55 Type test.
- Bidder shall duly fill all attached formats (NTPC FORMATS) and submit along with technical offer.

SUB-SUPPLIER QUESTIONNAIRE
(To be filled in by the Proposed Sub Supplier)

Name of Equipment / Item / Process with Model/ Type/ Rating / Capacity/ Size/ Tonnage etc. (As applicable):

Trade Name of Product (if any) : -NIL-

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1. **Name of Proposed Sub-Supplier**:

   Website:

2. **Address of Regd. Office:**

   Details of contact person:
   Name:
   Mobile no.
   Desig.
   E-mail:

3. **Branch/ Liaison office in Delhi/NCR**

   Details of contact person:
   Name_____
   Mobile no._____
   Desig._____
   E-mail:

   Weekly off day Sunday

4. **Address of Works where Item is being manufactured**

   Details of contact person:
   Name
   Mobile no. Desig.:
   E-mail:

5. **Details of Proposed Works:**

a. Year of Establishment of present works :
b. Year of Commencement of Manufacturing at the above works :
c. Details of change in works address in past, if any :-nil-

d.. TotalArea / Covered Area :
e. Details of covered area like no. of sheds, Area of each shed etc. :
f. Electric power- Connected load:
Electric power- Stand by load & system

6. **Annual Turnover & Profit in past three years** :

7. **Do you have in-house Department for:**

a) Design Yes/No
b) Research & Development Yes/No
c) Quality control/Inspection Yes/No
d) After Sales Service Yes/No

8. **Shift works per day** One/Two/Three

9. **Present Manpower Status:**

Division Status	**Graduate**		**Diploma**	**Skilled**	**Un-Skilled**	**Remarks**
	Technical	**Non-Technical**				
Design						
Production						
Quality Control/ Inspection						
After Sales Service						

a. Organization chart of the proposed works is enclosed as Annexure:
b. b Organization chart of QA / QC Deptt. is enclosed as Annexure:
c. c. List of Qualified Welders with process etc. is enclosed as Annexure:
d. d. List of Qualified NDT personnel with area of specialization is enclosed as Annexure:

10. **Brief details of items manufactured:**

Sl. No.	Item & Material (Type/Size/Rating/Model/ Capacity /Tonnage , as applicable)	Installed Capacity	Annual Production Capacity	Annual Production for last Three years		

11. **Details of foreign Collaboration, if any:**

Sl. No.	Product	Name & Address of Collaborator	Collaboration		
			Scope	Year	Valid upto
		-			

12. **Type Test report for the proposed product (similar or higher rating)if applicable is enclosed as Annexure:**

13 **Approval / Certification by National / International standards / Accredited agency for the proposed product (if applicable) is enclosed as Annexure:**

14. **Statutory / mandatory certification for the proposed product (if applicable) is enclosed as Annexure:**

15. **Supply Experience list of the proposed product (similar or higher rating) is enclosed as Annexure:**

[List shall include Item description, (Type/Size/Rating/Model/Capacity/Tonnage, as applicable), Customer name, Quantity, Year of Supply and Year of commissioning]

16. **End User's operational feedback certificate for the proposed product is enclosed as Annexure**:

17 **List of equipment & machinery specific to the proposed product is enclosed as Annexure:**

(List shall include name of equipment, capacity & nos. etc.)

18. **Process Flow Diagram indicating in-house & outsourced process enclosed as Annexure:_____**

19 **General manufacturing facilities available in-house**:

Sl. No.	**Description of machine**	**Type /Capacity / Size / Rating etc as applicable**	**Number**
a)	Material Handling Mobile Crane Fork Lift Over Head Cranes		
b)	Metal Cutting & Bending		
c)	Casting		
d)	Forging		
e)	Fabrication		
f)	Welding		
g)	Machining		
h)	Heat Treatment		
i)	Surface Cleaning Sand Blasting Shot Blasting Pickling		
j)	Painting		
k)	Metal Coating		

l)	Packing		
m)	Other, if any		

20.

a. **Inspection & Testing Facilities available in-house:**

Sl. No.	Description	Capacity & Nos.	Make & year of Mfg.	Calibration Status	Validity period

b. List of Testing & Inspection Facilities outsourced, if any with Source of testing and Description enclosed as Annexure:

21. **Storage of finished goods (covered / open) :**

22 **List of the source / make with location of major raw material, bought out items and out sourced process enclosed as Annexure:**

23. **Quality management:**

23.1 **General**

23.1.1. Work Instruction for different processes available. (Y/N).

If yes, enclose list as Annexure:

23.1.2. Evaluation system for raw material/bought out item's supplier is available. (Y/N):

23.1.3. Records generated during inspection maintained & available for review (Y/N)

23.1.4 Statistical quality control techniques used (Y/N)

23.1.5 ISO certificate for the works available (Y/N). Y If yes, enclose copy as Annexure

23,2 **Corrective action**

23.2.1 Specifically confirm whether System for identification & disposition of Non Conformity in the process / product is available. (Y/N)

23.2.2 Specifically confirm whether System for Customer complains & their satisfactory disposal is available. (Y/N)

23.3. **Documentation Control**

23.3.1 Procedure available for documentation control (Y/N)

23.4. **Control of Inspection, Measuring & Testing equipments**.

23.4.1 Procedure for calibration of testing & measuring instrument available. (Y/N)

24**.** Any Special Information**:**

26. **I CERTIFY THAT THE INFORMATION SUPPLIED HEREIN (INCLUDING ALL PAGES ATTACHED) IS CORRECT TO THE BEST OF MY KNOWLEDGE.**

SEAL **SIGNATURE**
NAME
M/S. **DESIGNATION**
PLACE **MOBILE NO** _____
EMAIL _____
DATE :

LIST OF ENCLOSURE:

Certification by Main Supplier: Above information have been verified and found in order / minor changes which have been marked and initialed on this form itself / observed the following discrepancies.

Name : **Designation : _____Signature : _____Date :_____**

NOTE :

1. ***COLUMN SHALL NOT BE LEFT UNFILLED..IN CASE OF NOT APPLICABLE / NOT AVAILABLE, THE SAME SHALL BE INDICATED IN THE PROVIDED SPACE.***
2. ***IN CASE PROVIDED SPACE IS NOT ADEQUATE, INFORMATION SHALL BE PROVIDED AS AN ATTACHMENT.***
3. ***PRODUCT CATALOGUE FOR THE PROPOSED EQUIPMENT/ITEM/PROCESS,IF AVAILABLE, SHALL BE ENCLOSED***

PRICE BID FORMAT FOR 3000A SANDWICHED BUSDUCT

SL.NO.	MATL. CODE	DESCRIPTION	QTY	UNIT	PRICE	TOTAL
1	ELNKSCTS190193	3000A ,3P,3W AL conduct Sandwich busduct	550	MTR		
2	ELNKSCTS190194	Vertical/Horizontal Bend for sandwich busduct	40	EA		
3	ELNKSCTS190195	End Flange for sandwich busduct	20	EA		
4	ELNKSCTS190196	Adopter Box for sandwich busduct	20	EA		
5	ELNKSCTS190197	Aluminium Flexible for sandwich busduct	6	SET		
6	ELNKSCTS190198	Copper Flexible for sandwich busduct	6	SET		
7	ELNKSCTS190199	Rubber Bellow at panel & DG End	12	EA		
8	ELNKSCTS1901100	Steel structure with hardwares	1	TON		
					TOTAL	-