BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS ENGINEERING MANAGEMENT
NEW DELHI

DOCUMENT No.	TB-385-316-139	Rev	01		Prepared	Checked	Approved
CUSTOMER Doc. No.				NAME	JK	SK	AS
TYPE OF DOC.	TECHNICAL SPECIFICATION			SIGN	-SD-	-SD-	27.10.16
TITLE: 400KV COMPOSITE LONG ROD POLYMER INSULATORS STRING AND HARDWARE FITTING				DATE			
				GROUP	TBEM		
				W.O. No			
CUSTOMER	POWER GRID CORPORATION OF INDIA LIMITED						
PROJECT	Substation Package -SS01 for Construction of 765/400/220kV Bhuj Pool (New) S/S and Extension of 765kV Banaskantha S/S under Green Energy Corridors: Inter-State Transmission Scheme (ISTS) – Part C.						
NOA Ref:							

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Rev.	Date	Altered	Checked	Approved	REVISION DETAILS
01	17.12.16				BOQ in Section-1 Revised

Distribution	CUSTOMER	TBMM	O/C	
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SECTION - 1

1.1 SCOPE

This technical specification covers the requirements of design, manufacture, testing at works, packing and dispatch of 400kV composite long rod polymer insulators string and hardware fitting to site.

The specification comprise of following sections:

Section-1: Scope, Specific Technical Requirements & Bill of Quantities
Section-2: Detailed Technical Requirement - Equipment Specification
Section-3: Project Details & General Technical Requirements
In case of any conflict between various sections, order of precedence shall be in the same order as listed above

This section covers the scope and quantities of 400kV composite long rod polymer insulators string and hardware fitting. The Specific Technical Requirements for the above item as specified by the customer (PGCIL) are given in Section-2. The offered equipment shall also comply with the General Technical Requirements for the project as detailed under section-3 of this specification.

The equipment is required for the following project:
Customer: Power Grid Corporation of India Ltd.
Project: Substation Package -SS01 for Construction of 765/400/220kV Bhuj Pool (New) S/S and Extension of 765kV Banaskantha S/S under Green Energy Corridors: Inter-State Transmission Scheme (ISTS) – Part C.

1.2 SPECIFIC TECHNICAL REQUIREMENTS-

All equipments shall perform satisfactorily under various other electrical, electromechanical and meteorological conditions of the site of installation.

All equipment shall be able to withstand all external and internal mechanical, thermal and electromechanical forces due to various factors like wind load, temperature variation, ice & snow, (wherever applicable) etc for the equipment.

Equipment's and system shall be designed to meet the following major technical parameters as brought out hereunder.

SN	Parameters	400kV
1.	Max. System Voltage (kV)	420kV
2.	Lightning Impulse withstand voltage of string with corona control rings (dry) (kVp)	± 1550
3.	Switching surge withstand voltage of string with corona control ring (wet) (kVp)	± 1050
4.	Power frequency withstand voltage of the complete string with corona control rings (wet (kVrms)	680
5.	Minimum total creepage distance of the insulator string (mm)	**13020 mm (31mm/kV)**
6.	Max. Radio Interference voltage in micro volts of string with corona control rings across 300 Ohms resistor at 1 Mhz	1000(Max.) at 320kV
7.	Minimum Corona Extinction Voltage level of string with corona control rings (dry) (kV rms)	320
8.	Ball and sockets designation of the Insulator string in mm	**20**
9.	Hot dip galvanizing	As per IS 2633/2629
10.	Electro mechanical strength of composite long rod insulator unit in (kN)	**120**

1.3 BILL OF QUANTITIES – FOR BHUJ SS

Sl. No	EKD ID	Description	Unit	Initial QTY	Addition	Total Qty
1.		**400kV, 120kN Composite long Rod polymer type insulator with creepage distance of 31mm/kV.**	Nos.	390	**72**	**462**
2.	D41	400 kV hardware assembly complete in all respect for through type **double tension string arrangement with turn buckle** (anchor spacing of 450mm) suitable for Quad BERSIMIS Conductor (sub conductor spacing 450mm). Suitable for 120kN Composite long Rod polymer type insulator.	Sets	84	**18**	**102**
3.	D42	400 kV hardware assembly complete in all respect for through type **double tension string arrangement without turn buckle** (anchor spacing of 450mm) suitable for Quad BERSIMIS Conductor (sub conductor spacing 450mm). Suitable for 120kN Composite long Rod polymer type insulator.	Sets	84	**18**	**102**
4.	D43	400 kV hardware assembly complete in all respect for **single suspension** string arrangement with **through type** suspension clamp (anchor spacing of 450mm) suitable for Quad BERSIMIS	Sets	6		6

		Conductor (sub conductor spacing 450mm). Suitable for 120kN Composite long Rod polymer type insulator.				
5	D44	400 kV hardware assembly complete in all respect for **single suspension** string arrangement with **drop type** suspension clamp (anchor spacing of 450mm) suitable for Quad BERSIMIS Conductor (sub conductor spacing 450mm). Suitable for 120kN Composite long Rod polymer type insulator.	Sets	33		33
6	D48	400 kV hardware assembly complete in all respect for **single suspension** string arrangement with **drop type** suspension clamp (anchor spacing of 450mm) suitable for **Twin BERSIMIS** Conductor (sub conductor spacing 450mm). Suitable for 120kN Composite long Rod polymer type insulator.	Sets	3		3
7	D49	400 kV hardware assembly complete in all respect for through type **double tension string arrangement with turn buckle** (anchor spacing of 450mm) suitable for **Twin ACSR MOOSE** Conductor (sub conductor spacing 450mm). Suitable for 120kN Composite long Rod polymer type insulator.	Sets	6		6

NOTE:

1) Individual quantity may vary up to any extend, however total contract value

may vary upto ±30%.

2) Supply of all the hardware are deemed to be included including corona rings whereas applicable.

1.4 TYPE TESTING-

Bidder shall submit valid type test reports (as per relevant IEC/IS Standard) for approval. The type test reports submitted shall be of tests conducted within last 10 years prior to the date of bid opening i.e. dated **07.04.2015.** The bidder should have conducted type test on identical or similar equipment/ components to those offered. In case type test reports are found to be technically unacceptable to BHEL/PGCIL, the type test shall be conducted without cost and delivery implication to BHEL.

1.5 QUALITY PLAN-

Bidder to follow valid PGCIL approved Quality Plan as per PGCIL procedure. In case the bidder don't have valid PGCIL approved QP, it will be the bidder's responsibility to get its QP approved directly from the ultimate customer.

1.6 QUALIFYING REQUIREMENTS OF COMPOSITE LONG ROD POLYMER INSULATOR STRING (400kV) -

The manufacturer whose composite long rod insulator strings are offered should have been manufacturing composite long rod insulator for the last five years as on the originally scheduled date of bid opening. The manufacturer(s) should have also designed , manufactured , tested and supplied composite long rod insulator strings of 120kN or above electro mechanical strength for specified voltage or above and the same should have been in operation as on the originally scheduled date of bid opening.

Further, the manufacturer should also have successfully completed the following tests on the insulator units and insulator strings (of composite long rod insulators) as on the originally scheduled date of bid opening dated **07.04.2015:**

i) Tests on individual units as per IEC 61109

ii) Following type tests on insulator strings assembly for the specified voltage or above class transmission lines/substations with 120kN or above electromechanical strength insulators:

-power frequency voltage withstand test (wet)

-Switching Surge voltage withstand test (wet)

-Lightning Impulse voltage withstand test (dry)

-Radio interference voltage test (dry)

iii) Accelerated ageing test of 5000 hours as described in appendix-C of IEC 61109 or test at multiples stresses of 5000 hours as described in Annex-B of IEC-62217.

Note: Originally scheduled date of bid opening is dated **07.04.2015**

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