

**(Re-conducting Package OH01)**  
**Technical Data Sheets**  
**(For 400 KV HTLS Conductor, associated clamps & accessories)**

**Volume – III**

**Contents**

Schedule – 1	HTLS conductor
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Schedule – 7	Rigid Spacer for HTLS Conductor
Schedule – 8	T-Connector for HTLS Conductor

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF HTLS CONDUCTOR**

Sl.	Description	Unit	Value guaranteed by the Bidder
1.	Name & address of Manufacturer		
2.1	Type of HTLS Conductor (HTLS Technology)		
2.2	Construction of conductor/ Designation of conductor as per IEC:1089		
3.1	<b>PARTICULARS OF RAW MATERIALS</b>		
3.1	Outer Layers a) Applicable Standard(if any) b) Type of Aluminum alloy c) Minimum purity of aluminum d) Maximum Copper content e) Zirconium content i) Maximum ii) Minimum e) Other elements----- i) ----- ii) -----	   % %  % %  % %	
3.2	Inner Core  a) Applicable Standard(if any) b) Material of core c) Chemical composition of core i) ----- ii) -----	    % %	
3.3	Zinc used for galvanization of inner core (if applicable)  a) Minimum purity of zinc	  %	
3.4	Chemical Composition of Misch Metal coating on core wires (if applicable) i) Zinc ii) Aluminium iii) Other elements----- -----	 % % %  	
3.5	Aluminium used for Aluminium Cladding (if applicable)  a) Minimum purity of aluminum b) Maximum Copper content c) Other elements----- i) ----- ii).....	  % %  % %	

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF HTLS CONDUCTOR**

Sl.	Description	Unit	Value guaranteed by the Bidder
4.	<b>OUTER STRANDS AFTER STRANDING</b>		
4.1	Number of outer layers	Nos.	
4.2	Number of strands a) 1 <sup>st</sup> Layer from core b) 2 <sup>nd</sup> Layer from core c) 3 <sup>rd</sup> Layer from core .....	Nos. Nos. Nos. .....	
4.2	Diameter of strands a)Nominal b)Maximum c)Minimum	mm mm mm	
4.3	Minimum Breaking load of strand a)Before stranding b)After stranding	kN kN	
4.4	Resistance of 1m length of strand at 20 deg. C	Ohm	
4.5	Minimum Conductivity of strand at 20 deg. C	%	
4.6	Final Modulus of elasticity	Kg/sq. mm	
4.7	Final Coefficient of linear expansion	Per °C	
5	<b>INNER CORE STRANDS/ INNER CORE AFTER STRANDING</b>		
5.1	Number of layers in inner core (excluding central wire)		
5.2	Number of strands a) 1 <sup>st</sup> Layer from centre (excluding central wire) b) 2 <sup>nd</sup> Layer from centre c) 3 <sup>rd</sup> Layer from centre .....	Nos. Nos. Nos. .....	
5.3	Diameter a)Nominal b)Maximum c)Minimum	mm mm mm	
5.3	Minimum Breaking load of strand/Core a)Before stranding b)After stranding	kN kN	
5.4	Resistance of 1m length of strand at 20 deg. C	Ohm	
5.5	Minimum Conductivity of strand at 20 deg. C	%	
5.6	Final Modulus of elasticity	Kg/sq. mm	
5.7	Final coefficient of linear expansion	Per °C	
5.8	Minimum no. of twists in a guage length equal to 100 times diameter of wire which the strands can withstand in the torsion test		
	a)Before stranding	Nos.	
	b)After stranding	Nos.	

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF HTLS CONDUCTOR**

Sl.	Description	Unit	Value guaranteed by the Bidder	
5.9	Minimum elongation of strand for a gauge length of 250 mm (at break)	%		
5.10	<b>Aluminum cladding of core (if applicable)</b>			
	a) Thickness of cladding			
	i) Maximum	mm		
	ii) Minimum	mm		
	b) Minimum Conductivity	%		
5.11	<b>Galvanising/ Misch Metal coating (if applicable)</b>			
	a) Minimum mass of zinc / Misch metal coating per sqm. of uncoated wire surface.	gm		
5.12	<b>Composite core (if applicable)</b>			
a)	Flexural Strength of core	N/mm <sup>2</sup>		
b)	Glass Transition temperature of core (Tg)	Deg C		
c)	Galvanic protection barrier layer thickness	mm		
6	<b>FILLER (if applicable)</b>			
6.1	Type & Designation of Filler			
6.2	Chemical composition of Filler			
6.3	Mass of Filler	Kg/km		
7	<b>COMPLETE HTLS CONDUCTOR</b>			
7.1	Cross section drawing of the offered conductor enclosed	Yes/No		
7.1.1	Cross section area of Conductor	mm <sup>2</sup>		
7.1.2	Cross section area of aluminium/ aluminium alloy	mm <sup>2</sup>		
7.1.3	Cross section area of Core	mm <sup>2</sup>		
7.2	Diameter of conductor			
	a)Nominal	mm		
	b)Maximum	mm		
	c) Minimum	mm		
7.2.1	Diameter of core			
	a)Nominal	mm		
	b)Maximum	mm		
	c) Minimum	mm		
7.3	UTS (minimum) of Conductor	kN		
7.3.1	UTS (minimum) of Conductor at design max. temp.	kN		
7.3.2	UTS (minimum) of Core	kN		
7.4	Lay ratio of conductor		Maximum	Minimum
	a) 1 <sup>st</sup> layer from centre (excluding central wire)			
	b) 2 <sup>nd</sup> Layer			
	c) 3 <sup>rd</sup> Layer			
	d) 4 <sup>th</sup> Layer			
7.5	DC resistance of conductor at 20 deg C	Ohm/km		

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF HTLS CONDUCTOR**

Sl.	Description	Unit	Value guaranteed by the Bidder
7.6	Final Modulus of elasticity		
	a) Upto transition temperature	Kg/sq. mm	
	b) Above transition temperature	Kg/sq. mm	
7.7	Coefficient of linear expansion		
	a) Upto transition temperature	Per deg C	
	b) Above transition temperature	Per deg C	
7.8	Calculation for transition temperature enclosed	Yes/No	
7.9	Minimum Corona Extinction Voltage (line to ground) under Dry condition	kV(rms)	
7.10	RIV at 1MHz and 305 kV (rms) under dry conditions	Micro-volts	
7.11	Maximum permissible conductor temperature for continuous operation	Deg C	
7.12	Maximum permissible conductor temperature for short term operation	Deg C	
7.13	Permissible duration of above short term operation	Minutes	
7.14	Conductor surface temperature corresponding to conductor current of 1516 A and under Ambient conditions detailed in Clause 1.4 of Section-II of the Technical Specification (Vol-II)	Deg C	
7.15	Conductor core temperature corresponding to the designed maximum temperature of the conductor	Deg C	
7.16	Details of Creep characteristic for HTLS conductor enclosed	Yes/No	
7.17	<b>Sag Tension Calculation (for ruling span of 400 Meter)</b>		
7.17.1	Sag Tension Calculation enclosed (clause 1.3 of Sec-II of TS)	Yes/No	
7.17.2	<b>Sag- Tension under condition-I</b>		
i)	Tension at 32 deg. C & no wind condition	Kg	
ii)	Sag & tension at minimum temperature & no wind condition	Meters & Kgs	
iii)	Sag & tension at designed maximum temperature & no wind condition	Meters & Kgs	
iv)	Tension at 32°C and full wind condition (----- Kg/m <sup>2</sup> wind pressure)	Kgs	
v)	Tension at designed maximum temperature and full wind condition (----- Kg/m <sup>2</sup> wind pressure)	Kgs	
vi)	Transition temperature & tension at transition temperature	Deg C & Kgs	

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF HTLS CONDUCTOR**

Sl.	Description	Unit	Value guaranteed by the Bidder
7.17.3	<b>Tensions under Condition-II</b>		
i)	Tension at 32 deg. C & no wind condition	Kg	
ii)	Sag & tension at minimum temperature & no wind condition	Meters & Kgs	
iii)	Sag & tension at designed maximum temperature & no wind condition	Meters & Kgs	
iv)	Tension at 32°C and full wind condition (----- Kg/m <sup>2</sup> wind pressure)	Kgs	
v)	Tension at designed maximum temperature and full wind condition (----- Kg/m <sup>2</sup> wind pressure)	Kgs	
vi)	Transition temperature & tension at transition temperature	Deg C & Kgs	
7.18	Direction of lay for outside layer		
7.19	Linear mass of the Conductor a)Standard b)Minimum c)Maximum	Kg/km Kg/km Kg/km	
7.20	Standard length of conductor	M	
7.21	Maximum length of conductor that can be offered as single length	M	
7.22	Tolerance on standard length of conductor	%	
7.23	Drum is as per specification	Yes/No	
7.24	No. of cold pressure butt welding equipment available at works	Nos.	

Date:

(Signature).....

Place:

(Printed Name).....

(Designation).....

(Common Seal).....

SCHEDULE -2

Page 1 of 2

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF SUSPENSION HARDWARE FITTINGS**

Sl.	Description	Unit	Value guaranteed by the Bidder
1.	Name & address of Manufacturer		
2.	Address of Manufacturer		

3.	Drawing enclosed	Yes/No	
4.	Maximum magnetic power loss of suspension clamp at sub-conductor current of .....amperes	Watt	
5.	Slipping strength of suspension assembly (clamp torque Vs slip curve shall be enclosed)	kN	
6.	<b>Particulars of standard/AGS Standard / AGS preformed armour rod set for suspension assembly</b>		
	a) No. of rods per set	No.	
	b) Direction of lay		
	c) Overall length after fitting on conductor	mm	
	d) Actual length of each rod along its helix	mm	
	e) Diameter of each rod	mm	
	f) Tolerance in		
	i) Diameter of each rod	±mm	
	ii) Length of each rod	±mm	
	iii) Difference of length between the longest and shortest rod in a set	±mm	

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF SUSPENSION HARDWARE FITTINGS**

Sl.	Description	Unit	Value guaranteed by the Bidder
	g) Type of Aluminium alloy used for manufacture of PA rod set		
	h) UTS of each rod	Kg/mm <sup>2</sup>	
7.	<b>Particulars of Elastomer (For AGS Clamp only)</b>		
	a) Supplier of elastomer		
	b) Type of elastomer		
	c) Shore hardness of elastomer		
	d) Temperature range for which elastomer is designed		
	e) Moulded on insert		Yes/No
8.	UTS of suspension clamp		Yes/No
9.	Purity of Zinc used for galvanising	%	
10.	Minimum corona extinction voltage under dry condition	kV (rms)	
11.	Radio interference voltage at 1 Mhz for phase to earth voltage of 305 kV (dry condition)		
12.	Maximum permissible continuous operating temperature of		
	i) Clamp body		
	ii) Standard/AGS preformed rods		

Date:

(Signature).....

Place:

(Printed Name).....

(Designation).....

(Common Seal).....

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF TENSION HARDWARE FITTINGS**

Sl.	Description	Unit	Value guaranteed by the Bidder	
1.	Name of Manufacturer			
2.	Address of Manufacturer			
3.	Drawing enclosed		Yes/ No	
4.	Purity of aluminum used for aluminum sleeve	%		
5.	<b>Material for steel sleeve</b>			
	(i) Type of material with chemical composition			
	(ii) Range of Hardness of material (Brinell Hardness)	BHN	From to	
	(iii) Weight of zinc coating	gm/m <sup>2</sup>		
			<u>Aluminium/ Alloy</u>	<u>Steel</u>
6.	<b>Outside</b> diameter of sleeve <b>before</b> compression	mm		
7.	<b>Inside</b> diameter of sleeve <b>before</b> compression	mm		
8.	Length of sleeve before compression	mm		
9.	Dimensions of sleeve <b>after</b> compression			
	(a) Corner to Corner	mm		
	(b) Surface to Surface	mm		
10.	Length of sleeve <b>after</b> compression	mm		
11.	<b>Weight of sleeve</b>			
	(a) Aluminium/ aluminum Alloy	kg		
	(b) Steel	kg		
	(c) Total	kg		

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF TENSION HARDWARE FITTINGS**

Sl.	Description	Unit	Value guaranteed by the Bidder
12.	Electrical resistance of dead end assembly as a percentage of equivalent length of Conductor	%	
13.	Slip strength of dead end assembly	kN	
14.	UTS of dead end assembly	kN	
15.	Purity of Zinc used for galvanising	%	
16.	Minimum corona extinction voltage under dry condition	kV (rms)	
17.	Radio interference voltage at 1 Mhz for phase to earth voltage of 305 kV (dry condition)		
18.	Maximum permissible continuous operating temperature of dead end assembly		

Date:

(Signature).....

Place:

(Printed Name).....

(Designation).....

(Common Seal).....

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF MID SPAN COMPRESSION JOINT FOR HTLS CONDUCTOR**

Sl.	Description	Unit	Value guaranteed by the Bidder	
1.	Name of Manufacturer			
2.	Address of Manufacturer			
3.	Drawing enclosed		Yes/No	
4.	Suitable for conductor size	mm		
5.	Purity of aluminium used for aluminium sleeve	%		
6.	<b>Material for steel sleeve</b>			
	(i) Type of material with chemical composition			
	(ii) Range of Hardness of material (Brinell Hardness)	BHN	From to	
	(iii) Weight of zinc coating	gm/m <sup>2</sup>		
			<u>Aluminium/ alloy</u>	<u>Steel</u>
7.	<b>Outside</b> diameter of sleeve <b>before</b> compression	mm		
8.	<b>Inside</b> diameter of sleeve <b>before</b> compression	mm		
9.	Length of sleeve before compression			
10.	Dimensions of sleeve <b>after</b> compression			
	<u>(a) Corner to Corner</u>			
	<u>(b) Surface to Surface</u>			
11.	Length of sleeve <b>after</b> compression			

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF MID SPAN COMPRESSION JOINT FOR HTLS CONDUCTOR**

Sl.	Description	Unit	Value guaranteed by the Bidder
12.	<b>Weight of sleeve</b>		
	(a) Aluminium	kg	
	(b) Steel	kg	
	(c) Total	kg	
13.	Slip strength	kN	
14.	Resistance of the compressed unit expressed, as percentage of the resistivity of equivalent length of bare conductor.	%	
15.	Minimum Corona extinction voltage under dry condition	kV (rms)	
16.	Radio interference voltage at 1 MHz for phase to earth voltage of 305 kV under dry condition	Microvolt	
17.	Maximum permissible continuous operating temperature of mid span compression joint	Deg. C	

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Date: \_\_\_\_\_ (Signature).....

Place: \_\_\_\_\_ (Printed Name).....

\_\_\_\_\_ (Designation).....

\_\_\_\_\_ (Common Seal).....

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF REPAIR SLEEVE FOR HTLS CONDUCTOR**

Sl.	Description	Unit	Value guaranteed by the Bidder
1.	Name of Manufacturer		
2.	Address of Manufacturer		
3.	Drawing enclosed		Yes/ No
4.	Suitable for conductor size	mm	
5.	Purity of Aluminium / Al Alloy type	%	
6.	Dimension of sleeve before compression		
	i) Inside diameter of sleeve	mm	
	ii) Outside dimensions of sleeve	mm	
	iii) Length of sleeve	mm	
7.	Dimension of sleeve after compression		
	i) Corner to Corner	mm	
	ii) Surface to Surface	mm	
	iii) Length of sleeve	mm	
8.	Weight of sleeve	Kg	
9.	Minimum Corona extinction voltage under dry condition	kV (rms)	
10.	Radio interference voltage at 1 MHz for phase to earth voltage of 305 kV dry condition)	$\mu$ V	
11.	Maximum permissible continuous operating temperature of Repair Sleeve	Deg. C	

NOTE: Tolerances, wherever applicable, shall also be specified.

Date: \_\_\_\_\_ (Signature).....

Place: \_\_\_\_\_ (Printed Name).....

\_\_\_\_\_ (Designation).....

\_\_\_\_\_ (Common Seal).....

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF SPACER DAMPER FOR HTLS CONDUCTOR**

Sl.	Description	Unit	Value guaranteed by the Bidder
1.	Name of Manufacturer		
2.	Address of Manufacturer		
3.	Drawing enclosed		
	(a) Design Drawing		Yes/ No
	(b) Placement Chart		Yes/ No
4	Suitable for conductor size	mm	
5.	<b>Material of component parts</b>		
	(a) Clamp		
	(b) Main body		
6.	Type of Clamps		
7.	Type of Damping element		
8.	<b>Manufacturing process for</b>		
	(a) Clamp		
	(b) Main body		
	(e) Weight	kg	
9.	<b>Elastomer</b>		
	(a) Contractor		
	(b) Type		
	(c) Moulded on insert		
	(d) Shore hardness		
	(e) Thickness on insert	mm	
	(f) Temp. range for which designed	°C	

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF SPACER DAMPER FOR HTLS CONDUCTOR**

Sl.	Description	Unit	Value guaranteed by the Bidder	
10.	Minimum ultimate tensile strength of spacer			
	(a) Compressive load	kN		
	(b) Tensile load	kN		
11.	Weight of Spacer	kg		
12.	Designed clamping torque(if applicable)	kg.m		
13.	Slipping strength of spacer clamp	kN		
14.	Magnetic power loss per spacer for Watts ..... Amps, 50 Hz Alternating Current	watt		
			<u>Maximum</u>	<u>Minimum</u>
15.	Electrical resistance of elastomer cushioned spacer	ohm		
16.	Minimum corona Extinction voltage kV (rms) under dry condition	kV (rms)		
17.	Radio Interference Voltage at 1 MHz for phase to earth voltage of 305 kV (rms) Microvolts under dry condition	$\mu$ V		
18.	Maximum permissible continuous operating temperature of spacer damper	Deg. C		

NOTE: Tolerances, wherever applicable, shall also be specified.

Date: (Signature).....

Place: (Printed Name).....

(Designation).....

(Common Seal).....

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF RIGID SPACER FOR JUMPER FOR HTLS CONDUCTOR**

Sl.	Description	Unit	Value guaranteed by the Bidder
1.	Name of Manufacturer		
2.	Address of Manufacturer		
3.	Drawing enclosed		
	(a) Design Drawing		Yes/ No
	(b) Placement Chart		Yes/ No
4.	Suitable for conductor size	mm	
5.	<b>Material of component parts</b>		
	(a) Clamp		
	(b) Main body		
6.	<b>Manufacturing process for</b>		
	(a) Clamp		
	(b) Main body		
	(e) Weight	kg	
7.	<b>Elastomer</b>		
	(a) Contractor		
	(b) Type		
	(c) Moulded on insert		
	(d) Shore hardness		
	(e) Thickness on insert	mm	
	(f) Temp. range for which designed	°C	

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF RIGID SPACER FOR JUMPER FOR HTLS CONDUCTOR**

Sl.	Description	Unit	Value guaranteed by the Bidder	
8.	Minimum ultimate tensile strength of spacer			
	(a) Compressive load	kN		
	(b) Tensile load	kN		
9.	Weight of Spacer	kg		
10.	Designed clamping torque(if applicable)	kg.m		
11.	Slipping strength of spacer clamp	kN		
12.	Magnetic power loss per spacer for Watts ..... Amps, 50 Hz Alternating Current	watt		
			<u>Maximum</u>	<u>Minimum</u>
13.	Electrical resistance of elastomer cushioned spacer	ohm		
14.	Minimum corona Extinction voltage kV (rms) under dry condition	kV (rms)		
15.	Radio Interference Voltage at 1 MHz for phase to earth voltage of 305 kV (rms) Microvolts under dry condition	$\mu$ V		
16.	Maximum permissible continuous operating temperature of rigid spacer	Deg. C		

NOTE: Tolerances, wherever applicable, shall also be specified.

Date: \_\_\_\_\_ (Signature).....

Place: \_\_\_\_\_ (Printed Name).....

\_\_\_\_\_ (Designation).....

\_\_\_\_\_ (Common Seal).....

Bidder's Name.....

Specification No.....

**GUARANTEED TECHNICAL PARTICULARS OF T-CONNECTOR FOR HTLS CONDUCTOR**

Sl.	Description	Unit	Value guaranteed by the Bidder
1.	Name of Manufacturer		
2.	Address of Manufacturer		
3.	Drawing enclosed		Yes/ No
4.	Suitable for conductor size	mm	
5.	Purity of Aluminium / Al Alloy type	%	
6.	Outside diameter of sleeve before compression	mm	
7.	Inside diameter of sleeve before compression	mm	
8.	Length of sleeve before compression		
9.	Dimension of sleeve after compression		
(a)	<u>Corner to Corner</u>	mm	
(b)	<u>Surface to Surface</u>	mm	
10.	Length of sleeve after compression	mm	
11.	Weight of T-connector	Kg	
12.	Axial Tensile strength of welded portion of T-connector	kN	
13.	Resistance of the T-connector unit expressed, as percentage of the resistance of equivalent length of bare conductor.	%	
14.	Minimum Corona extinction voltage under dry condition	kV (rms)	
15.	Radio interference voltage at 1 MHz for phase to earth voltage of 305 kV dry condition)	$\mu$ V	
16.	Maximum permissible continuous operating temperature of T-connector	Deg. C	

NOTE: Tolerances, wherever applicable, shall also be specified.

Date: \_\_\_\_\_ (Signature).....

Place: \_\_\_\_\_ (Printed Name).....

\_\_\_\_\_ (Designation).....

\_\_\_\_\_ (Common Seal).....