GURANTEED TECHNICAL PARTICULARS OF ISOLATOR(11kV) (CHAPTER-E21)			
Sl.No	**Particular**	**Desired Value**	**Bidder's Offer**
1	Main switch	Double end break Centre post rotating, gang operated	
2	Service	Outdoor	
3	Applicable standard	IS : 9921 / IEC-129/IEC-62271-102	
4	Pole	3 pole gang operator	
5	Rated voltage nominal/ Maximum	11/12 kV	
6	Rated Frequency	50 Hz $\pm$ 5%	
7	System earthing	Effectively earthed	
8	Temperature rise	As per relevant IS/IEC publication	
9	Insulation level impulse with stand voltage		
	a) Across Isolating distance	85 kV_{peak}	
	b) To earth & between poles	75 kV_{peak}	

10	1 minute power frequency withstand voltage		
	a) Across Isolating distance	32 kV_{peak}	
	b) To earth & between poles	28 kV_{peak}	
11	Rated current in Amp	1250	
12	Short time current for 3 sec	25kA	
13	Operating mechanism	Manual	
14	Auxiliary voltage	11kV	
	a) Control & Inter lock	48 DC 80% to 110%	
15	Safe duration of overload		
	a)150% of rated current	5 minute	
	b)120% of rated current	30 minute	
16	Minimum creepage distance of support and Rotating insulator	500mm	
	i) Mounting structure	Upright on G.I structure	
	ii) Terminal connector type	Bimetallic clamp size as per	
	iii) Control	Local	

INSULATOR PIN TYPE (CHAPTER-E21)			
Technical Parameters			
Sl No.	**Parameters**	**11kV**	**Bidder's Offer**
1	Make	To be Specified by Bidder	
2	Type	Confirming to IEC 273 (solid core)	
3	Voltage class (kV)	12	
4	Dry and wet one minute withstand voltage (kV rms)	28	
5	Dry lightning impulse withstand voltage (kV p)	75	
6	Wet switching surge withstand voltage (kV p)	NA	
7	Max. RIV at corona extinction voltage (micro volts)	NA	
8	Corona extinction voltage (kV rms)		
9	Total minimum cantilever strength (kg)	Not < 300	
10	Minimum torsion moment	As per IEC 273	
11	Total height of insulator (mm)	254	
12	Minimum PCD (mm) top/bottom	57	
13	No. of bolts top/bottom	04-Aug	
14	Diameter of Bolt holes (mm) top/ Bottom	M12	
15	Pollution level as per IEC 815	Heavy	
16	Minimum total creepage distance (mm)	450	

33 KV V CROSS ARM (CHAPTER-E21)			
GURANTEED TECHNICAL PARTICULARS			
(To be submitted along with offer)			
Sl. No.	**Description Unit**	**Unit**	**Bidder's offer**
			33 Kv
1	Type of crossarm		
2	Grade of steel		
3	Steel standard		
4	Fabrication Standard		
5	Dimensions	Mm	
6	Steel section utilized		
7	Steel tensile strength	N/cm^2	
8	Working load	Kg	
9	Details of Galvanising Methods utilised and Standard/Specification		
10	Weight of cross arm	kg	
11	Whether drawing has been submitted with the bid		

GURANTEED TECHNICAL PARTICULARS OF ISOLATOR(33kV) (CHAPTER-E21)			
Sl.No	**Particular**	**Desired Value**	**Bidder's Offer**
1	Main switch	Double end break Centre post rotating, gang operated	
2	Service	Outdoor	
3	Applicable standard	IS : 9921 / IEC-129/IEC-62271-102	
4	Pole	3 pole gang operator	
5	Rated voltage nominal/ Maximum	33/36 kV	
6	Rated Frequency	50 Hz $\pm$ 5%	
7	System earthing	Effectively earthed	
8	Temperature rise	As per relevant IS/IEC publication	
9	Insulation level impulse with stand voltage		
	a) Across Isolating distance	195 kV_{peak}	
	b) To earth & between poles	170 kV_{peak}	

10	1 minute power frequency withstand voltage		
	a) Across Isolating distance	80 kV_{peak}	
	b) To earth & between poles	70 kV_{peak}	
11	Rated current in Amp	1250	
12	Short time current for 3 sec	25kA	
13	Operating mechanism	Motorised	
14	Auxiliary voltage	33kV	
	a) Control & Inter lock	48 DC 80% to 110%	
15	Safe duration of overload		
	a)150% of rated current	5 minute	
	b)120% of rated current	30 minute	
16	Minimum creepage distance of support and Rotating insulator	900mm	
	i) Mounting structure	Upright on G.I structure	
	ii) Terminal connector type	Bimetallic clamp size as per	
	iii) Control	Local	

INSULATOR PIN TYPE			
Technical Parameters (CHAPTER-E21)			
Sl No.	**Particulars**	**Desired Value**	**Bidder's Offer**
1	Make	To be Specified by Bidder	
2	Type	Confirming to IEC 273 (solid core)	
3	Voltage class (kV)	36	
4	Dry and wet one minute withstand voltage (kV rms)	70	
5	Dry lightning impulse withstand voltage (kV p)	170	
6	Wet switching surge withstand voltage (kV p)	NA	
7	Max. RIV at corona extinction voltage (micro volts)	NA	
8	Corona extinction voltage (kV rms)		
9	Total minimum cantilever strength (kg)	Not < 300	
10	Minimum torsion moment	As per IEC 273	
11	Total height of insulator (mm)	508	
12	Minimum PCD (mm) top/bottom	76	
13	No. of bolts top/bottom	04-Aug	
14	Diameter of Bolts Hole (mm) top /Bottom	M12	
15	Pollution level as per IEC 815	Heavy	
16	Minimum total creepage distance (mm)	1050	

Technical particulars of ACSR – ZEBRA (CHAPTER-E21)

A P P E N D I X – I

	ACSR CONDUCTOR:	ZEBRA	Bidder's Offer
1	Size of conductor:	54/7/3.18 mm	
2	Stranding and wire diameter		
	Aluminum	54/3.18 mm	
	Steel	7/3.18 mm	
3	Sectional area of Aluminum (in $mm^{2)}$	428.9	
4	Approximate total mass (in Kgs/KM)	1622	
5	Calculated resistance at 20°C Max.:(in Ohms/Km.)	0.06868	
6	Calculated breaking load of: composite conductor (in KN)	130.32 KN.	
	(U.T.S.) (Min)		
7	Lay Rating :-		
	Steel core	Max- 28	
		Min-13	
	Aluminium Layers		
	12 Wire Layer	Max-17	
	(Innermost Layer)	Min - 10	
	18 Wire Layer	Max - 16	
	(Lay immediately beneath outside Layer:	Min - 10	
	24 wire layer (outside layer)	Max - 14	
		Min - 10	
8	Modulus of elasticity (in Kg / mm^2):0.7036 x 106 Kg x CM^2	8158	
9	Co-efficient of linear expansion of conductor per degree centigrade.	----------19.3 x 10^{-6} ---------	
10	Standard area of Cross Section in Sq. mm of	484.5 mm^2	
11	Diameter of complete conductor in	28.62 mm	

A P P E N D I X – II			
Solid Steel and Aluminum Wires used in Steel cored			
Aluminum Conductors			
ZEBRA			
1	Diameter	Steel Aluminum	
	Standard (in mm)	3.18 3.18	
	Maximum (in mm)	3.24 3.21	
	Minimum (in mm)	3.12 3.15	
2	Cross Sectional Area of nominal Diameter Wire (in mm2)	7.942 7.942	
3	Weight (in Kg/KM)	61.95 21.47	
4	Minimum tensile strength:As per relevant ISS		
5	Minimum breaking load before stranding (in KN)	10.43 1.29	
6	Minimum breaking load: after stranding (in KN)	9.91 1.23	
7	Zinc coating of steel strands		
	Number and duration: of	3 dips of 1min	
	Minimum Weight of (A s per IS-4826 –1979)	260 Coating (in gm/ $m^{2)}$	
8	Maximum resistance at: (in Ohms / KM)	3.626 2.974 20°C of Aluminum strands	
9	Minim Purity of aluminum rod:	99.50%	

	A P P E N D I X – III		
	ACSR CONDUCTOR:	**ZEBRA**	
1	Conductor	Steel cored Aluminum-	
	Copper equivalent: mm^2	54/7/3.18	
	Stranding (in mm)	320 Meters	
2	Normal Span.		
	Wind Span.	320 Meters	
	Weight Span.		
	Max.	500 Meters	
	Min.	50 Meters	
3	Wind Pressure on full project area.	52 Kgf per M^2	
4	Temperature		
	(a) Minimum	5 ° C	
	(b) Maximum	67 ° C	
	(c) Every day	32°C	
5	Factors of safety : Minimum		
	Every day temperature and no wind.	4	
	Minimum temperature and 2/3 maximum wind :	2	
	Every day temperature and no wind.	2	
	This is as per Indian Electricity Rules, 1956.		
6	Relative Humidity.		
	Maximum.	100 Percent	
	Minimum.	60 Percent	
7	Isoceramic level.	100/Years	
8	Number of rainy days per year.	100 days	
9	Average rainfall per year	1150 mm. approx.	
10.	Altitude.	Less than 350 mtr	

BACK CLAMP FOR "V" CROSS ARM (CHAPTER-E21)				
GURANTEED TECHNICAL PARTICULARS				
(To be submitted along with offer)				
Sl. No.	**Description Unit**	**Unit**	**Bidder's offer**	
			33 Kv	**11 kV**
1	Type of Clamp			
2	Grade of steel			
3	Steel standard			
4	Fabrication Standard			
5	Dimensions	Mm		
6	Steel section utilized			
7	Steel tensile strength	N/cm^2		
8	Working load	Kg		
9	Details of Galvanising Methods utilised and Standard/Specification			
10	Weight of back clamp	kg		
11	Whether drawing has been submitted with the bid			

GURANTEED TECHNICAL PARTICULARS OF CLAMPS (CHAPTER-E21)

TENSION CLAMPS (CHAPTER-E21)

Sl. No.	Particular	Desired Value (Suitable for AAAC 148/100mm²)	Bidders Offer
1	Type	Compression type tention clamp	
2	Material	Ext. Al.Alloy/Ext. Al.	
3	Breaking Strenght	95% of UTS of Conductor	
4	Slipping Strenght	95% of UTS of Conductor	
5	Galvanising		
6	Ferrous Parts	Hot Dip Galvanised	
7	Spring Washers	Electro Galvanised	
8	Quality of Zinc used	99.50%	
9	Number of dips which the clamp can withstand	4/ 1 minute dips	
10	Standard to which Conforming	IS 2633	
11	Electrical conductivity		
12	Results of heating cycle test carried out	T.C. Attached	
13	Electrical Resistance	Not more than 75% of equivalent length of conductor	
14	Reference to type tests and other test reports attached	T.C. Attached	
15	Make of bolts and Nuts used	Local Make	

SUSPENSION CLAMPS

Sl. No.	Details (SUSPENSION CLAMPS)	Requirement: Suitable for AAAC (150/100mm2)	Bidders Offer
1	Type of material used for retaining rod for AGS assembly giving reference of ISS	Alluminium Alloy 6061/Equivalent	
2	Minimum tensile strength of retaning rod material	35 Kg/mm2	
3	Chemical composition of retaning rod materials	As per IS:733	
4	Electrical conductivity of Armour Rod material(In percentage of the conductivity of IACS i.e. International Annealed Copper Standard	Not less than 40 %of IACS	
5	Slipping strength of cushioned suspension assembly	8% to 15% of UTS of Conductor	
6	Breaking strength of suspension Clamp	6000 Kgf	
7	Minimum Tensile Strenght	2000 Psi	
8	Minimum ultimate Elongation	300%	
9	Ageing (guaranteed life of the assembly)	40 Years	
10	Hardness	65 to 80 A	

FLEXIBLE COPPER BOND

Sl. No.	Particular	Desired Value	Bidders Offer
1	Drawings enclosed	Yes	
2	Stranding	37/ 7/ 0.417	
3	Cross sectional area(Sq.mm)	75.6	
4	Minimum copper equivalent area(sq.mm)	34(each individual wire)	
5	Length of copper cable(mm)	500	
6	Material Lugs	Tinned copper	
7	Bolt Size		
	(i)Diameter(mm)	16	
	(ii)Length(mm)	40	
8	Resistance(ohm)	0.0004(as per IS.2121)	
9	Total weight of Fexible copper bond(kg)	0.45(approx)	

EARTHING COIL (CHAPTER-E21)

GURANTEED TECHNICAL PARTICULARS

(To be submitted along with Offer)

Sl. No.	PARTICULARS	Bidder's Offer
1	Nominal diameter of wire	
2	No. of turns	
3	External dia of Coil	
4	Length of Coil	
5	Mass of Zinc	
6	Total weight of Coil	
7	Whether drawing enclosed (Yes/No)	

POLE TOP BRACKETS (F CLAMP) (CHAPTER-E21)				
GURANTEED TECHNICAL PARTICULARS				
(To be submitted along with offer)				
Sl. No.	**Description Unit**	**Unit**	**Bidder's offer**	
			33 Kv	**11 Kv**
1	Type of crossarm			
2	Grade of steel			
3	Steel standard			
4	Fabrication Standard			
5	Dimensions	Mm		
6	Steel section utilized			
7	Steel tensile strength	N/cm^2		
8	Working load	Kg		
9	Details of galvanizing method utilized and standard/specification			
10	Weight of F Clamp	kg		
11	Whether drawing has been submitted with the bid			

HT STAY SET (CHAPTER-E21)					
GURANTEED TECHNICAL PARTICULARS					
(To be submitted along with Offer)					
Sl. No.	**Item Description**	**Specified Parameters**			**Bidder's Offer**
		Section Tolerances	**Fabrication Tolerances**	**Material**	
1	Anchor Plate	8mm thick+2.5%-5%	300x300mm+1%	5 GIPlate 8 mm thick	
2	Anchor Rod	20mm dia +3%-2%	Length 1800mm +0.5% Round Eye 40mm inside dia + 3%. Threading 40mm =11%-5%	GI Round 20mm dia	
3	Turn Buckle Bow	16mm dia +5%-3%	Length180mm +1% 50x50x6mm Channel length 200mm + 1%	GI Round 16mm dia. GI Angle GI Channel 100x50x4.7mm	
4	Eye Bolt Rod	20mm dia + 3% - 2%	Length450mm +1%Threading 300mm +1% Round Eye 40 mm inside dia +3%	GIRound 20mm dia.	

GUARANTEED TECHNICAL PARTICULARS FOR (CHAPTER-E21)

(RS JOISTS of sizes 150x150mm)

Dimensions and Properties

Sl. No.	Particulars	150 x 150 mm ISHB	Bidder's Data
1	Length of Joist in Mtr with +1 00mm/-0% Tolerance	11 mtr	
2	Weight kg/m with±2.5% Tolerance	34.6	
3	Sectional Area (cm^2)	44.1	
4	Depth(D) of Section (mm) with +3.0mm/ - 2.0mm Tolerance as per IS 1852-1985	150	
5	Width (B)of Flange (mm) with ±2.5mm Tolerance for116 x 100 mm ISMB & ±4.0mm Tolerance for 150 x 150 mm ISHB IS 1852-1985	150	
6	Thickness of Flange (Tf) (mm) with±1 .5mm Tolerance	9	
7	Thickness of Web(Tw) (mm) with±1 .0mm Tolerance	11.8	
8	Corner Radius of Root (mm)	8	
9	Corner Radius of Tow (R2) (mm)	4	

10	Moment of Inertia		
	Ixx (cm^4)	1640	
	Iyy (cm^4)	495	
11	Radius of Gyration (cm)		
	Rxx	6.09	
	Ryy	3.35	
12	Modulus of Section		
	Zxx(cm^3)	218	
	Zyy(cm^3)	63.2	
13	Flange Slope(a) in Degree	94	
14	Tolerance in Dimension	As per IS:1 852	
15	Distinct Non-Erasable Embossings to be made on each R.S. Joist	a) Name & Logo of the Manufacturer.	
		b) B.I.S Logo(ISI Mark) if applicable.	
		c) Size	

PSC Pole (CHAPTER-E21)			
GUARANTEED TECHNICAL PARTICULARS			
(To be submitted along with offer)			
Sl No.	**Description**	**Unit**	
			10mtr X 300 Kg
1	Type of pole		
2	Factor of Safety		
3	Overall Length of Pole Meters	meters	
4	Working Load Kg	Kg	
5	Overall Dimensions		
	A.Bottom Depth	mm	
	B.Top Depth	mm	
	C.Breadth	mm	
6	Reinforcement Detail		

7	Diameter of prestressing wire		
8	No. of Tensioned wires		
9	No. of Untensioned wire		
10	Length of each untensioned wire		
11	Concrete Detail		
	A.Cement Type		
	B.Grade		
	C.Type		
	D.Quantity	Cubic meter/pole	
	E.Standard confirming to:		
12	Steel Quality	Kg/Pole	
	A.Ultimate Tensile Strength (UTS)	Km/Cm^2	
	B.Weight		

GURANTEED TECHNICAL PARTICULARS of STAY WIRE (7/10 SWG) (CHAPTER-E21)		
Sl. No.	**PARTICULARS**	**Bidder's Offer**
1	Nominal diameter of wire	
2	Tolerance in diameter	
3	Sectional Area (In Sq. mm.)	
4	Tensile strength	
	A. Min. N/mm²	
	B. Max. N/mm²	
5	Minimum breaking load (KN)	

6	Type of coating Heavy/Medium/Light	
7	Variety Hard/Soft	
8	Weight of Zinc coating (Gms/Sq. Mtr.) Min.	
9	No. of dips the coating is able to withstand as 18 ± 20ºC	
10	Adhesion Test (Wrap Test at 1 turn per second coilingwhile stress not exceeding % nominal tensile strength)	
	A. Min. complete turn of wrap	
	B. Dia. Of Mandrel on each wrapped	

11	Bend Test	
	A. Angle	
	B. Dia round a format to be bent	
12	Freedom from defect	
13	Chemical composition the MS Wire used shall not exceed	
	A. Sulphur 0.060%	
	B. Phosphorous 0.065%	

GUARANTEED TECHNICAL PARTICULARS (CHAPTER-E21)			
SL. NO.	**CHARACTERISTICS**	**DESIRED VALUE**	**BIDDER'S OFFER**
(TO BE STATED BY TENDERER)			
1	Appearance	Clear and transparent free from suspended matter or sediments.	
2	Density at 29.5° C (Max) gm/cc	0.89	
3	Viscosity, Kinematic at 27° C (Max)	27	
4	Interfacial Tension at 27° C (Min) Newton / M	0.04	
5	Flash point, Pensky Marten (closed) in °C (min).	140	
6	Pour point in ° C (Max)	-6	
7	Neutralisation value		
	a) Total acidity, mg KOH/gm (Max)	0.03	
	b) Inorganic acidity / alkalinity	Nil	
8	Corrosive sulphur (Copper strip) 19 hours at 140°C	Non corrosive	
9	Electric strength (Breakdown Voltage) KV (rms).		
	a) New unfiltered oil (min).	60	
	b) After filteration (min).	60	
10	Dielectric dissipation factor (Tan Delta) at 90°C (Max).	0.002	
11	Specific resistance (resistivity)		
	a) at 90° C , ohm-cms (Min)	35×10^{12}	
	b) at 27° C , ohm-cms (Min)	1500×10^{12}	
12	Oxidation stability.		
	a) Neutralisation value, after Oxidation for 164 hours at 100°C mg KOH/gm (Max).	0.4	
	b) Total sludge, after 164 hours at 100°C wt. % (max).	0.1	

13	Ageing characteristics after accelerated Ageing (open beaker method with copper Catalyst) for 96 hours at 115°C		
	a) Specific resistance(resistivity)		
	i) at 27°C, ohm-cms (Min)	2.5×10^{12}	
	i) at 90°C, ohm-cms (Min)	0.2×10^{12}	
	b) Dielectric dissipation factor (Tan Delta) at 90°C, , ohm-cms (Min)	0.2	
	c)Total acidity, mg KOH/gm (max)	0.05	
	d) Total sludge value, Wt. % (max)	0.05	
14	Presence of oxidation inhibitor	The oil shall not contain anti oxidant additives.	
15	Water content, ppm (max)	20	
16	i) Proportion of classes of hydrocarbons in the crude oil including content of aromatic hydrocarbons.		
	ii) Details of barrel (Size, gauge inside/outside coating/weight of empty drum not less than 18 Kg.)		
	iii) List of equipments for testing of oil as per revised ISS		
	iv)Electric strength(breakdown voltage) KV (Min)		
	a) Value of the fresh sample in the supplied sealed drums KV(Min).		
	b) Value after filling in transformer upto & within 3 months (Min)		