

A.1 BILL OF QUANTITY TO BE ORDERED												
A.1.1 BILL OF QUANTITY FOR 400KV CONNECTORS TO BE ORDERED												
Sl No.	BOQ. Item No.	Item Description	Terminal Type		Clamp Type	Material	Bimetallic	Current rating (A)	S.C. Current(kA)	400KV S/S AT SINGARENI		TOTAL QTY (IN NOS.)
			Type	Material						Reqd Qty. (in Nos.)	Spare Qty. (in Nos.)	
1	1	400 kV Circuit Breakers, Expansion type, Tube connection.	ALSTOM: H.PALM,AL. ALLOY 125MMX125MM,25MM THK - 4 HOLES 50x50, DIA14 BHEL:V.PALM 28Thk(PERP TO PHASE) - 6x2 (50mm), 14dia	AL. ALLOY	TEH	AL. ALLOY	-	2000	50kA for 1 second	36	1	37
2	1A	400 kV Circuit Breakers, Expansion type, Tube connection.	SAME AS IN BOQ ITEM NO.1		TEH	AL. ALLOY	-	3150	50kA for 1 second	36	7	43
3	1B	400 kV Circuit Breakers, suitable for Twin Moose	SAME AS IN BOQ ITEM NO.1		2SH	AL. ALLOY	-	2000	50kA for 1 second	6	1	7
4	2	400 kV Isolators, Rigid type, Tube connection	SIEMENS: V. TUBE 110MM LONG, DIA 40MM O.D.,DIA 24MM I.D. HIVELM: V. TUBE 145MM LONG, DIA 45MM, 7.5MM THK G.R. POWER: V. TUBE 110MM LONG, DIA 40MM O.D.,DIA 24MM I.D.	COPPER	TRH	AL. ALLOY	YES	2000	50kA for 1 second	56	1	57
5	2A	400 kV Isolators, Rigid type, Tube connection	SIEMENS: V. TUBE 110MM LONG, DIA 40MM O.D.,DIA 24MM I.D. HIVELM: V. STUD 175MM LONG, DIA 45MM, 10MM THK G.R. POWER: V. ROD 110MM LONG, DIA 50MM O.D.	COPPER	TRH	AL. ALLOY	YES	3150	50kA for 1 second	50	1	51
6	3	400 kV Isolators for Twin Moose connection	SAME AS IN BOQ ITEM NO.2		2SH	AL. ALLOY	YES	2000	50kA for 1 second	52	1	53
7	3A	400 kV Isolators for Quad Moose connection	SAME AS IN BOQ ITEM NO.2A		4SH	AL. ALLOY	YES	3150	50kA for 1 second	34	1	35
8	6	400 kV Bus Post Insulators, Rigid/Sliding, through Tube Conn.	4 x M16 (22 deep) tapped holes - 127 PCD	MCI/SGI	TH. TUBE	AL. ALLOY	-	-	-	36	0	36
9	6A	400 kV Bus Post Insulators, Tube Conn. suitable for accomodating welding sleeve	SAME AS IN BOQ ITEM NO.6		TH. TUBE	AL. ALLOY	-	-	-	18	0	18
10	7	400 kV Bus Post Insulators, suitable for through Twin Moose	SAME AS IN BOQ ITEM NO.6		2SH	AL. ALLOY	-	-	-	15	0	15
11	7A	400 kV Bus Post Insulators, Double Expansion type, Tube	SAME AS IN BOQ ITEM NO.6		TEH	AL. ALLOY	-	3150	50kA for 1 second	12	0	12
12	9	400KV –Corona bell for Tube	-	-	-	AL. ALLOY	-	-	-	28	1	29
13	10	400 kV Flexible Spacers for 400 kV Twin moose conductor(for strung buses only)	-	-	-	MS HDG	-	-	-	503	0	503
14	11	400 kV Rigid Spacers for 400 kV Twin moose conductor	-	-	-	MS HDG	-	-	-	198	0	198
15	12	400 kV Flexible Spacers for 400 kV Quad moose conductor (for strung buses only)	-	-	-	MS HDG	-	-	-	374	0	374
16	13	400 kV Rigid Spacers for 400 kV Quad moose conductor	-	-	-	MS HDG	-	-	-	78	0	78
17	14T	400 KV TEE Connectors-Tube- Twin moose cond	-	-	T-2S-T	AL. ALLOY	-	2000	50kA for 1 second	8	0	8
18	15T	400 KV TEE Connectors-Tube- Quad moose cond	-	-	T-4S-T	AL. ALLOY	-	2000	50kA for 1 second	20	0	20
19	16T	400 KV TEE Connectors- Twin moose-Twin moose cond	-	-	2S-2S-2S	AL. ALLOY	-	2000	50kA for 1 second	57	0	57
20	17T	400 KV TEE Connectors- Quad moose-Quad moose cond	-	-	4S-4S-4S	AL. ALLOY	-	2000	50kA for 1 second	54	0	54
21	18T	400 KV TEE Connectors- Quad moose-Twin moose cond	-	-	4S-2S-4S	AL. ALLOY	-	2000	50kA for 1 second	24	0	24
22	21	400 kV Current Transformers, Expansion type, Tube connection	Primary Terminals P1 & P2,1 no. H.Stud each, DIA49.5mm, 100 long , Copper ,Silver Plated	COPPER	TEH	AL. ALLOY	YES	2000	50kA for 1 second	36	0	36
23	21A	400 kV Current Transformers, Expansion type, Tube connection	Primary Terminals P1 & P2, 2 no. H.Stud each 250mm apart, DIA49.5mm, 100 long , Copper ,Silver Plated	COPPER	TEH	AL. ALLOY	YES	3000	50kA for 1 second	30	1	31
24	22	400 kV Current Transformers, Rigid type, Tube connection	SAME AS IN BOQ ITEM NO.21		TRH	AL. ALLOY	YES	2000	50kA for 1 second	24	0	24
25	22A	400 kV Current Transformers, Rigid type, Tube connection	SAME AS IN BOQ ITEM NO.21A		TRH	AL. ALLOY	YES	3000	50kA for 1 second	24	1	25
26	23	400 kV Current Transformers, Twin Moose conductor	SAME AS IN BOQ ITEM NO.21		2SH	AL. ALLOY	YES	2000	50kA for 1 second	18	0	18
27	23A	400 kV Current Transformers, Quad Moose conductor	SAME AS IN BOQ ITEM NO.21A		4SH	AL. ALLOY	YES	3000	50kA for 1 second	6	0	6
28	24	400 kV Capacitor Voltage Transformers, Connector suitable for through Twin Moose	V.Stud, Dia30mm, 100 long	COPPER	2SH	AL. ALLOY	YES	-	50kA for 1 second	12	1	13
29	27	400 kV Connector suitable for twin ACSR Moose conductor for HV Bushing of 315MVA ICT	Dia 60 and 125mm length GM Stud (V)	GUN METAL	2SH	AL. ALLOY	YES	2000	50kA for 1 second	3	0	3
30	28	400 kV Connector suitable for twin ACSR Moose conductor for HV Bushing of 63MVAR Reactor	V.Stud, Dia60mm, 125 long	GUN METAL	2SH	AL. ALLOY	YES	2000	50kA for 1 second	3	0	3
31	29	400 kV PG connector for Twin Moose conductor	-	-	2S-2S	AL. ALLOY	-	2000	50kA for 1 second	36	0	36
32	30	400 kV Connector suitable for twin ACSR Moose conductor for HV Bushing of Generator Transformer	V.Stud, Dia 60.0, 125 long	GUN METAL	2SH	AL. ALLOY	YES	2000	50kA for 1 second	6	0	6
33	31	400 kV Connector suitable for twin ACSR Moose conductor for HV Bushing of Station Transformer	SAME AS IN BOQ ITEM NO.30		2SH	AL. ALLOY	YES	2000	50kA for 1 second	6	0	6

A.1.2 BILL OF QUANTITY OF BUS BAR ERECTION ITEMS FOR 400KV S/S AND 132KV S/S

Sl No.	BOQ. Item No.	Item Description						Current rating (A)	S.C. Current(kA)	400KV S/S AT SINGARENI		
										Reqd Qty.	Spare	
34	32	Welding Sleeves for Tube	-	-	4" IPS	AL. ALLOY	-	-	-	138	10	148
35	15	Strain Clamp for shield wire (Wire dia 10.98mm)	-	-	SWire	MS HDG	-	-	-	52	0	52
36	16	Clamp for shield wire on structure (Cleat type) for dia	-	-	SWire	MS HDG	-	-	-	619	0	619
37	17	PG Clamp for 2 Nos. shield wires of dia 10.98mm	-	-	SWire	MS HDG	-	-	-	34	0	34
38	18	Clamp for 10.98mm dia wire and 75x12mmGI Strip (Pad type)	-	-	SWire	MS HDG	-	-	-	35	0	35
39	19	Clamp for 75x12mm GI Strip for Pipe Structure	-	-	75X12	MS HDG	-	-	-	1212	0	1212
40	26	Earth Strip (75x12) Clamp for Lattice Structure	-	-	75X12	MS HDG	-	-	-	395	0	395

Note: Tube indicates 4" IPS (114.2mm OD) Aluminium Tube.

A.1.3 BILL OF QUANTITY OF MISCELLANEOUS ITEMS FOR 400KV S/S

Sl No.	BOQ. Item No.	Item Description						Current rating (A)	S.C. Current(kA)	400KV S/S AT SINGARENI		
										Reqd Qty.	Spare	
41	33	145kV Neutral Bushing of 63 MVAR Bus Reactor suitable for E/strip 75x12mm	Stud - DIA60MM, 125 long	Brass	E/Strip 75x12	AL. Alloy	YES	1250	50kA for 1 second	2	0	2
42	34	Neutral Bushing of 315MVA Transformer suitable for E/strip 75x12mm	V.PALM 10Thk- 2x2 holes (26mm), 14dia	Brass	E/Strip 75x12	AL. Alloy	YES	1250	50kA for 1 second	2	0	2
43	36	Trefoil Clamp for 1C, 630 SQ.MM XLPE Cable	OD 44.5 mm	-	CABLE	AL. Alloy	-	NA	-	1550	0	1550

Note: Trefoil clamps shall be pressure die cast aluminum or fibre glass or nylon and shall include necessary fixing accessories like G.I. nuts,bolts,washers,etc. Trefoil clamps shall have adequate mechanical strength,when installed at 1 meter intervals, to withstand the forces generated by the system s.c. current of 105kA peak.

A.1.4 BILL OF QUANTITY FOR 132KV CONNECTORS TO BE ORDERED

Sl No.	BOQ. Item No.	Item Description	Terminal Type		Clamp Type	Material		Current rating (A)	S.C. Current(kA)	400KV S/S AT SINGARENI		TOTAL QTY (IN NOS.)
			Type	Material						Reqd Qty.	Spare	
44	51	132kV Circuit Breakers, suitable for Twin Moose	ALSTOM: H.PALM,AL. ALLOY 200MMX200MM,20MM THK - 8 HOLES 50x50, DIA14 AREVA: H.PALM,AL. ALLOY 200MMX200MM,20MM THK - 8 HOLES 50x50, DIA14	AL. ALLOY	2SH (Twin Moose Universal Type)	AL. ALLOY	-	1600	31.5kA for 1 second	6	6	12
45	52	132kV Circuit Breakers, suitable for Single Moose	SAME AS IN BOQ ITEM NO.51		SH (Single Moose Universal Type)	AL. ALLOY	-	1250	31.5kA for 1 second	18	1	19
46	53	132 kV Isolators for Twin Moose connection	SIEMENS: V. TUBE 110MM LONG, DIA 40MM O.D.,DIA 24MM I.D. HIVELM: V. STUD 140MM LONG, DIA 30MM, G.R. POWER: V. TUBE 110MM LONG, DIA 40MM O.D.,DIA 30MM I.D.	COPPER	SH	AL. ALLOY	YES	1250	31.5kA for 1 second	54	1	55
47	54	132 kV Isolators for Single Moose connection	SAME AS IN BOQ ITEM NO.1		2SH	AL. ALLOY	YES	1600	31.5kA for 1 second	12	1	13
48	55	132 kV Bus Post Insulators, suitable for through Twin Moose	4 x M16 (22 deep) holes - 127 PCD	MCI/SGI	TH 2SH	AL. ALLOY	-	-	-	2	0	2
49	56	132 kV Bus Post Insulators, suitable for through Single Moose	SAME AS IN BOQ ITEM NO.55		TH SH	AL. ALLOY	-	-	-	6	0	6
50	57	132kV Flexible Spacers for 132 kV Twin moose conductor	-	-	-	MS HDG	-	-	31.5kA for 1 second	159	0	159
51	58	132kV Rigid Spacers for 132 kV Twin moose conductor	-	-	-	MS HDG	-	-	31.5kA for 1 second	19	0	19
52	59	132kV TEE Connectors-Twin Moose- Single moose cond	-	-	2S-S-2S	AL. ALLOY	-	800	31.5kA for 1 second	18	0	18
53	59A	132kV TEE Connectors-Twin Moose- Twin moose cond	-	-	2S-2S-2S	AL. ALLOY	-	800	31.5kA for 1 second	6	0	6
54	60	132kV TEE Connectors-Single Moose- Single moose cond	-	-	S-S-S	AL. ALLOY	-	800	31.5kA for 1 second	18	0	18
55	61	132kV TEE Connectors-Line conductor(ACSR Panther)-S-Line conductor ((Line conductor(ACSR Panther)-Single Moose))	-	-	P-S-P	AL. ALLOY	-	800	31.5kA for 1 second	12	0	12
56	62	132 kV Current Transformers, Twin Moose conductor	Primary Terminals P1 & P2,1 no. H.Stud each, M42x3, 100mm long , Tinned Copper	COPPER	2SH	AL. ALLOY	YES	1600	31.5kA for 1 second	6	2	8
57	63	132 kV Current Transformers, Single Moose conductor	Primary Terminals P1 & P2,1 no. H.Stud each, DIA30mm, 82 long , Tinned Copper	COPPER	SH	AL. ALLOY	YES	800	31.5kA for 1 second	18	0	18
58	64	132 kV Capacitor Voltage Transformers, Connector suitable for through Single Moose	V.Stud, Dia30mm, 100 long	MSET	SH	AL. ALLOY	YES	-	31.5kA for 1 second	12	1	13
59	66	132kV PG connector for Single Moose conductor	-	-	S-S	AL. ALLOY	-	800	31.5kA for 1 second	21	0	21
60	68	132kV Connector suitable for single ACSR Moose conductor for IV Bushing of 315MVA ICT	Dia 60 and 125mm length Stud (V)	BRASS	SH	AL. ALLOY	YES	800	31.5kA for 1 second	3	0	3

LEGEND

- 2SH (Twin Moose Horizontal approach)
- SH (Single Moose Horizontal approach)
- TH. SH (Single Moose Horizontal approach through type)
- TH. 2SH (Twin Moose Horizontal approach through type)
- TH. TUBE (Al. Tube Horizontal approach through type)
- T-2S-T
- T-4S-T
- 4S-4S-4S
- 4S-2S-4S
- 2S-2S (Twin Moose-Twin Moose)
- 2S-2S-2S (Twin Moose-Twin Moose)
- 2S-S-2S (Twin Moose-Single Moose)
- S-S-S (Single Moose-Single Moose)
- P-S-P Line conductor(ACSR Panther)-S- Line conductor ((Line conductor(ACSR Panther)-Single Moose))
- S-S (Single Moose-Single Moose)