

Sl.	BOQ_ANNEXURE_1: STANDARD TECHNICAL NOTES & BIDDER'S SCOPE
1	Bidder to note GIS is outdoor type and provision for GIS Hall is not considered. Hence to facilitate GIS installation in outdoor area, Bidder to provide Temporary dust & moisture proof room with net and floor mat for GIS Installation, size of the same shall be 7m(H)X8m(W)X8m(D) for GIS & 5m(H)X4m(W)X4m(D) for GIB. Cost of the same shall be deemed included in the scope. This shall be returned back after 3 months of operation after commissioning of GIS.
2	Testing of GIS in the scope of GIS Manufacturer, however all necessary manpower support, T&P is in the Bidders scope. Please refer Annexure: Bidder_Scope_Tools , for bidder supplied tools & plants Annexure: Manufacturer_Supplied_Tools , for the list of tools & plants being supplied by GIS manufacturer on returnable basis. Use of the same shall be as per directives of manufacturers supervision only and for GIS Installation, Testing & Commissioning Purpose only.
3	Bidder Supplied Material - For approved make of supply items, please visit "POWERGRID COMPENDIUM OF VENDORS OF THE EQUIPMENT" at following website address. https://apps.powergridindia.com/ims/50-0001-002.aspx Bidder to offer items from powergrid approved make only (as applicable). Bidder to supply material of proven design and make, which have already been extensively used and tested. Bidder to obtain approval from BHEL Engineer incharge / Customer prior to supply. Quantity of supply items are provisional and shall be finalised during contract stage. Qty of supply item may vary upto any extend and and even may get deleted.
4	All consumables required for sucessful erection testing & commissioning of present scope of work is in bidders scope, such as (not limited to) Welding Electrodes, Low hydrogen content welding electrode, Ferruls, Cable Lug, cable ties, , Paint, bitumen compound, Zinc riched enamel paint, red oxide and zinc chromate ..etc complete in all respect.
5	All pre/commissioning activities for substation equipment shall be carried out in accordance "Pre- Commissioning procedures for Switchyard Equipments (Doc. No. D-2-01-03-01-03)" .
6	The storage instructions of the equipment manufacturer/ Employer shall be strictly adhered to. POWERGRID Field Quality Plan shall be followed alongwith the provision of Technical Specification for storage.

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7	<p>ETC of Power / Control / Instrument Cable: Scope includes Cable Laying tagging , dressing, ferruling, lugging, installation of cable gland ,soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates- laying can be either on trays, hanger, supports, underground, buried in ground or through GI/PVC pipe over/under ground, through wall etc. All erection materials viz. Cable Lug, ferrules, cable ties / straps, Al. tags, route markers, GI / PVC wall sleeves with rubber / nylon bushes etc shall be supplied by bidder. excluding supply of Cable Gland which are covered separately (as a separate BOQ item / free supply by BHEL). Machine ferruling shall be adopted.</p>
8	<p>ETC of Directly Buried Cable (including sand bed & brick cover) - Scope includes laying of cables, directly in buried cable trench. All civil & erection activities such as excavation, supply and placement of sand, bricks, backfilling, compaction, tagging , dressing, ferruling, lugging, installation of cable gland ,soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates etc shall be in contractor's scope. All erection materials viz. Sand, Bricks, Cable Lug, ferrules, cable ties / straps, Al. tags, route markers, GI / PVC wall sleeves with rubber / nylon bushes etc shall be supplied by bidder. excluding supply of Cable Gland which are covered separately (as a separate BOQ item / free supply by BHEL). Machine ferruling shall be adopted.</p>
9	<p>For Directly Buried Cable (as mentioned above) bidder to supply & install cable route marker. Location of cables laid directly underground shall be clearly indicated with cable route marker made of galvanised iron plate. The cable route marker shall project 150 mm above ground and shall be spaced at an interval of 30 meters and at every change in direction. They shall be located on both sides of road and drain crossings as per relevant standard.</p>

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10	<p>CABLE LUG: Supply of cable lug is in bidders scope. cable lugs shall be tinned copper solderless crimping type conforming to IS-8309 & 8394 for all control Cables and cables with copper wire.</p> <p>For Aluminium Bimetallic lugs for power cables as required shall be used depending upon type of cables and terminations. Solderless crimping of terminals shall be done by using corrosion inhibitory compound.</p> <p>The cable lugs shall suit the type of terminals provided. The bidder shall cover the exposed part of all cable lugs whether supplied by him or not with insulating tape, sleeve or paint.</p> <p>Bidder to supply cable lug from manufacturer's authorised representative / dealer. Make of cable lug is to be approved by Powergrid site i.e. DOWELLS /COMET/ JAIN ELECTRONICS/ JAICO ELECTRIC/ SI METAL WORKS / powergrid approved make etc. Please refer "powergrid compendium of vendors of the equipment" for details.</p>
11	<p>Cable TAGS & Markers - Bidder to supply and install cable tag & markers. The tag shall be of aluminium with the number punched on it and securely attached to the cable conduit by not less than two turns of 20 SWG GI wire conforming to IS:280. Cable tags shall be of rectangular shape for power cables and of circular shape for control cables.</p>
12	<p>Cable Gland: Tin/ Nickel, Nickel/chromium - Plated (coating thickness not less than 10 microns) Powergrid approved / Sunil & Co. / Arup/ Comet / QPIE make brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc. Bidder to offer the gland from authorised representative of manufacturer. Cable gland shall be subject to customer approval prior to dispatch. Cable glands shall match with the sizes of different HT/LT/Control cables.</p>
13	<p>Power and control cables shall be securely fixed to the trays/supports with self locking type nylon ties with de-interlocking facility at every 5 metre interval for horizontal run. Vertical and inclined cable runs shall be secured with 25 mm wide and 2 mm thick aluminium strip clamps at every 2m.</p>
14	<p>Vertical run of cables on equipment support structure shall be supported on perforated cable trays of suitable width which shall be suitably bolted/clamped with the equipment support structure. Tray shall be supplied by BHEL.</p>

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15	<p>Modular Multi-diameter Cable sealing system consisting of Openable frames, blocks and accessories shall be installed where the underground and over-ground cables enter or leave concrete bay kiosks /Switchyard panel room & control rooms in the substations. Cable sealing system shall consist of Multi-diameter type peel-able or adjustable blocks of different sizes to suit the various cables. It should be simple, easy and quick to assemble & re-assemble the cable sealing system. Solid blocks shall not be used on frame. Openable frames & stay-plate material shall be of galvanized steel and for compression single piece wedge with galvanized steel bolts shall be used. Cable sealing system should have been tested for fire/ water/ smoke tightness. All the accessories of cable sealing system shall be suitable for mounting after the laying of cable.</p> <p>Modular Multi-diameter Cable sealing system should conformed relevant IS/IEC.</p>
16	<p>Modular Multi-diameter Cable sealing system</p> <ol style="list-style-type: none"> 1) Scope shall include all the items which are necessary for successful installation (including nuts and bolts, if required) and satisfactorily working/maintenance of the offered cable. 2) Compression tools and accessories necessary in the installation shall be considered in the supply scope that shall be required at a later stage for new cable. 3) The Contract shall be on lump-sum basis for the package. Within the scope of the contract, no variation shall be admissible to the Contractor so far the input remains unchanged. In case of change in scope after award of the contract, the additions/ deletions to the scope shall be as per the breakup unit rates for all the equipment and services furnished by the bidder in his offer. 4) Minor Civil work with brick masonry required for installation is in the scope of bidder. 5) Solid blocks shall not be used on frame. Frames & stay-plate material shall be of galvanized steel and for compression, single piece wedge with galvanized steel bolts shall be used. 30% spare blocks on the frame shall be provided for expansion in future. Cable sealing system should have been tested for fire/water/smoke tightness. 6) Cable sealing system shall consist of multi-diameter type peel-able or adjustable blocks of different sizes to suit the various cables. It should be simple, easy and quick to assemble & re-assemble the cable sealing system.

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17	<p>Insulating Rubber Mats - The scope covers supply and laying of insulating mats of class-A conforming to IS: 15652-2006. These insulating mats shall be laid in front of all floor mounted ACDB, CRP, SAS (As applicable under present scope) in control room building/ Switchyard panel room. The insulating mats shall be made of elastomer material free from any insertions leading to deterioration of insulating properties. It shall be resistant to acid, oil and low temperature. Upper surface of the insulating mats shall have small aberration (rough surface without edges) to avoid slippery effects while the lower surface shall be plain or could be finished slip resistant without affecting adversely the dielectric property of the mat. The Insulating mat shall be of pastable type, to be fixed permanently on the front of the panels except for the chequered plate area which shall not be pasted as per requirement. The insulating mats shall generally be fixed and joints shall be welded as per recommendations in Annexure-A of IS: 15652. Width of insulating mats shall generally be of 1.5 meters or as per site requirements. Length shall be supplied as per site requirements.</p>
18	<p>Cable ends shall be kept sealed to prevent damage. In cable vault, fire resistant seal shall be provided underneath the panels. Wherever cable pass through floor or through wall openings or other partitions, GI/PVC wall sleeves with bushes having a smooth curved internal surface so as not to damage the cable, shall be supplied, installed and properly sealed by the Contractor at no extra charges.</p>
19	<p>All arc welding shall be done with low hydrogen content electrodes for all earthing works i.e. MS Rod, GI Flat & MS Flat</p>
20	<p>The welds on 40MM MS Rod should be treated with red oxide primer and afterwards coated with two layers bitumen compound to prevent corrosion.</p>
21	<p>50mm x 6mm MS flat shall run on the top tier and all along the cable trenches and the same shall be welded to each of the racks. Further this flat shall be earthed at both ends and at an interval of 30 mtrs. The M.S. flat shall be finally painted with two coats of Red oxide primer and two coats of Zinc riched enamel paint.</p>

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22	Connection between equipment earthing lead and main earthing conductors and between main earthing conductors shall be welded type. For rust protections, the welds should be treated with red oxide primer and afterwards coated with two layers bitumen compound to prevent corrosion.
23	All welding done at site for equipment and structures, shall be painted with zinc rich paint immediately to avoid corrosion.
24	Cable racks and supports shall be painted after installation with two coats of metal primer (comprising of red oxide and zinc chromate in a synthetic medium) followed by two finishing coats of aluminium paint. The red oxide and zinc chromate shall conform to IS:2074.
25	Supply of 110 MM & 50mm dia. PVC PIPES CLASS-IV PIPES including Bend and Tee etc shall be as per technical specification TB-XXX-316-041. (Supply of PVC Pipe (class 4) as per IS 4985, alongwith accessories like sockets, bends, tees etc, Customer accepted make.)
26	Supervision of testing and commissioning of Relay / Protection / SAS / Automation / Bus Bar Panles (as applicable) is in the scope of BHEL/ panel supplier. Necessary manpower support, tools, tackles and testing equipment to be in scope of ETC contractor
27	Minor Civil works such as modification of civil foundations, making holes in the trenches/ control room building, grouting, fixing of trench material will be in the scope of ETC contractor.
28	Removal of gravel, if gravelling is already done, for connection of Equipment earthing strip to the existing mat (wherever earthing mat is already laid), and after completion of earthing , contractor should place the gravel to bring it in original shape.

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29	Compleete ETC package is under the scope of bidder. All T&P required to complete the job shall be provided by bidder only. Bidder to arrange MAN LIFTER for 765kV & 400kV equipment erection & testing. Height of manlifter shall be 14m approcah for 765kV Yard & 8m approach for 400KV Yard.
30	Any other item i.e. Portable Flood Light Panel etc if handling is in the scope of bidder - Receipt of material, unloading, proper storage, material reconciliation, safe keeping handing over to BHEL / Customer is in bidders scope. Mode of payment shall be made on unit weight basis in BOQ item "FIRE PROTECTION SYSTEM (material handling)".
31	Testing instruments (duly calibrated) have to be arranged by ETC Contractor at it's own cost on returnable basis (List is only provided for information , if any other instrument not mentioned below but required for sucessful completion of ETC work shall be in ETC contractor's scope)
31.01	OMICRON or equivalent kit for Numerical relay testing
31.02	DCRM (Dynamic Contact Resistance Measurement kit) OPERATIONAL ANALYZER
31.03	CRM (Contact Resistance Measurement kit)
31.04	Relay test kit
31.05	Capacitance and Tan delta measurement Kit
31.06	Dew Point Measurement kit
31.07	5kV/1kV Insulation tester

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31.08	Primary current Injection Kit
31.09	Secondary current/Voltage Injection kit
31.1	1Ph Variac
31.11	Multimeters
31.12	Clamp on meter
31.13	14/16 ton Hydra with lifting tools (Shackle, slings etc) for GIS Bay & accessories shifting from store to GIS room
31.14	Power supply sockets with extension board near GIS area Qty-1 nos.
31.15	Necessary numbers of fire extinguisher
31.16	Please refer Annexure: Bidder_Scope_Tools (for T&P required for installation of GIS.)

BIDDERS SCOPE

SIZE -

For GIS: (7HX8WX8D)

For GIB: (5HX4WX4D)

Temporary Dust proof house with net & floor mat 7m(H)X8m(W)X8m(D) - to be provided by bidder. Cost of the same shall be deemed included in GIS scope. This shall be returned back after 3 months of operation after commissioning of GIS.

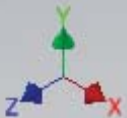
INSIDE THE ASSEMBLY AREA, VINYL MAT SHOULD BE PROVIDED

THIS AREA IS COVER WITH VINYL COVER(TRANSPARENT) AND IS POSSIBLE TO ACCESS CRANE WHILE IN OPERATION

POLYETHYLENE OR VINYL SHEET

TRANSPARENT VINYL COVER FOR VISIBILITY TO CRANE ACCESSING PERSONNAL

CLEAN ROOM SHOWER/DUST PROOF ENTRY



DUST PROOF ROOM IS IN BIDDERS SCOPE OF SUPPLY AND INSTALLATION (ON RETURNABLE BASIS)

Temporary dust proof room for GIS Installation

BIDDERS SCOPE

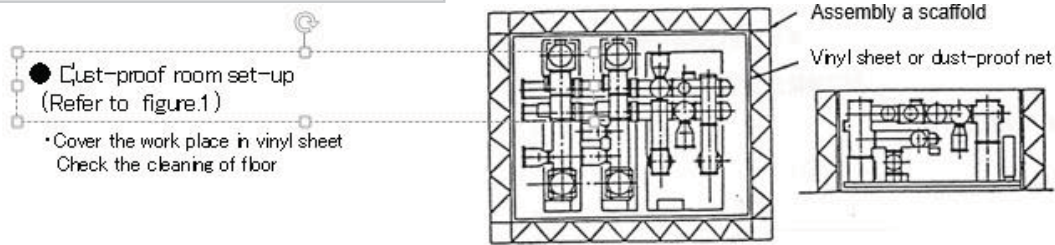


Figure 1. Simple dust-proof room

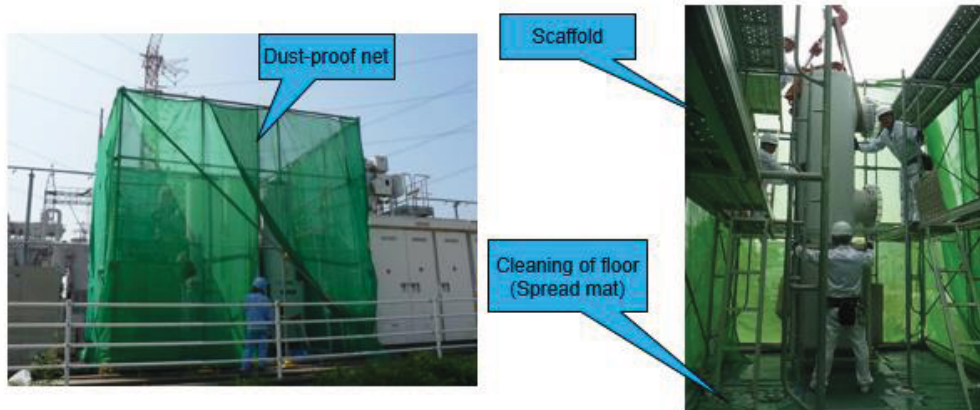


Figure-1: Reference picture for temporary dust proof room

Room dimensions: It is constructed as per GIS height and working conditions by using **scaffold**, the dimensions (meters) of same are as follow

For GIS: (7HX8WX8D)

For GIB: (5HX4WX4D)

Dust proof net: Flexible Wind Dust Net with good flexibility, purpose of same is for controlling dust pollution and wind flow.

Hole size in dust net not more than 1mm and **dimensions as per room size (as mentioned above)**

Floor mat: Green rubber mat anti-static for workplace, widely used in electronic assembly, cleanroom, production lines work table/floor

Purpose of same is to maintain clean workspace in room and prevent dust accumulation.

TOSHIBA

FOR INFORMATION ONLY

List of Tools/Equipments for GIS Installation & Commissioning @ OUTDOOR to be Arranged By Bidder on returnable basis					
No	Designation	Description	Quantity	Purchaser/ Others	Purpose
1	Transit Compass with Tripod	Magnification x15 Min. Sight Dis. 0.8m	1	●	Floor Level Measurement
2	Staff	Length 2m Minimum Unit 1mm	1	●	Floor Level Measurement
3	level measurement	Scale Error ± 0.1 deg.	2	●	Measurement of Unit level
4	Measuring tape	Length-5m	1	●	Measuring Length
		Length-10m	1	●	
5	Linen Measuring tape	Length- 50m	1	●	Measuring Length
6	Plumb Bob	Strings : 5m Weight 100g	6	●	Locating Perpendicular
7	Steel ruler	30cm, 50cm & 100cm	1	●	Marking Center Line on the Floor
8	India Ink	Color Black-100ml	1	●	Marking Center Line on the Floor
9	Nylon String (thin)	Length-100m	1	●	Marking Center Line on the Floor
10	Safety Belt		5	●	Height Work
11	Safety Helmet	Electrically Insulated Type	8	●	Safety Goods
12	Rubber Gloves	Electrically Insulated Type (should withstand minimum 3kV)	3	●	Safety Goods
13	Scaffold	W:1200-1800	1set	●	Footing High location Work
		D: 900-1200			
		H:1600-1700			
14	Scaffold Floor	W:1200-1800	1set	●	Footing High location Work
		D: 500-600			
15	Step Ladder	H-1200	2	●	High Location Work
		H-2000	2		
16	Ladder	H-3000	1	●	High Location Work
17	Safety Rope (Nylon)	Length-100m	1set	●	Locating Safety
18	Safety Net, floor mat and scaffold	2mX10m	1set	●	for clean working condition as applicable
		Height-1.5-2m			
19	Trolley	Max. Load-300kg	1	●	Carrying Material
20	Chain Block	Permissible weight			Lifting
		1000kg	4	●	
		5000kg	4	●	
		2000kg	4		
21	Lever block	5 ton	2	●	Docking assembly

Annexure: Bidder_Scope_Tools (for GIS)

List of Tools/Equipments for GIS Installation & Commissioning @ OUTDOOR to be Arranged By Bidder on returnable basis					
No	Designation	Description	Quantity	Purchaser/ Others	Purpose
22	Wire Rope	Φ 16x10m	4	●	Lifting
		Φ 12x8m	2	●	
		Φ 8 x6m	2	●	
23	Nylon Sling	For 1250kgx 8 m	2	●	Lifting
		For 3000kgx 8 m	2	●	
		For 5000kgx 8 m	2	●	
24	D- Shackle	Permissible weight			Lifting
		2000kg	4	●	
		5000kg	12	●	
25	Wire protection	Size 500x500	10	●	Wire protection
		Material Hemp			
26	Wood Chip	100x100x250	5	●	For docking
27	Truck crane	Max capacity 50ton	1	●	For handling heavy equipment/GIS
/Hydra					
29	Alternating Current Arc Welder	Out Put 200A~300A	1	●	Arc Welding
30	Electrode Holder		1	●	Arc Welding
31	Welding Rod	Φ5 x L450 Weight-20kg	1set	●	Arc Welding
32	Welding Blanket		1set	●	
33	Welding Mask		1	●	Arc Welding
34	I-Bolt	M10, M12, M16 & M20	each 4 No's	●	For lifting
35	I- Nut	M10, M12, M16 & M20	each 4 No's	●	For lifting
				●	
36	Sharp Hammer		1	●	General Tool
37	Wire Brush		4	●	Cleaning Welding Surface
38	Grinder	For Grinder stone- Φ 180	1	●	Grinding Metal Surface
39	Grinder stone	Φ 180	10	●	Grinding Metal Surface

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List of Tools/Equipments for GIS Installation & Commissioning @ OUTDOOR to be Arranged By Bidder on returnable basis					
No	Designation	Description	Quantity	Purchaser/ Others	Purpose
40	Sleeve Crimp	for 100~250mm ² wire Electrically Operated Hydraulic	1	●	Jointing Grounding Wire
41	Claw Bar & Nail Puller	Length-400mm	2	●	Unpacking Transportation Wooden Box
		Length-800mm	2	●	
42	Saw	Length-400mm	2	●	Unpacking Transportation Wooden Box
43	Steel Hammer	Weight: 1 Pound	2	●	Standard Tool
		Weight: 1/2 Pound	2	●	
44	Plastic hammer	Head- 35mm	2	●	Standard Tool
45	cutting Pliers	Length-200mm	2	●	Standard Tool
46	Screw Driver	Rod Length-100mm	4	●	Standard Tool
		Insulated Handle-200mm	4		
		Short(+) -70mm	2		
		Type (-) -70mm	2		
47	Adjustable Angle Wrench	Length-200mm	2	●	Standard Tool
		Length-300mm	2		
48	Open Ended Spanner	L=30mm	2	●	Standard Tool
		L=36mm	2		
		L=46mm	2		
49	Double Ended Spanner	L1 x L2= 10x13mm	2	●	Standard Tool
		L1 x L2= 17x19mm	2		
		L1 x L2= 24x30mm	2		
50	Pliers	Length=150mm	4	●	Standard Tool
51	Tools set	Ratchet wrench Handle with socket type and spanner type (M10, M12, M16, M20, M24) adjustable angle wrench	1set (Each 02 No's)	●	Standard Tool
52	Thickness Gauge/ Filler gauge	0.3mm~3.0mm	1	●	Standard Tool
53	Vernier Caliper	0mm ~300mm	1	●	Measuring
54	Tool Belt Electrician		4	●	Standard Tool
55	Flash Light	LED Type	2	●	Standard Tool
56	Electrical Drill (Floor drilling)	Drilling Capacity Max. 10mm	1	●	For drilling holes on floor
57	Drill bit	Φ 8	3	●	For drilling holes
		Φ 12	3		
		Φ 14	3		
		Φ 19	3		
		Φ 24	3		
		Φ 28	3		
58	Hacksaw	200 ~ 250	2	●	For Cutting

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No	Designation	Description	Quantity	Purchaser/ Others	Purpose
59	Hacksaw Blades	Length 200~250	5	●	For Cutting
60	Pilot Inspection mirror		1	●	for assembly
61	Cable Cutter	Max. Cutting Capacity $\Phi 50\text{mm}$	2	●	Wiring
62	Radio Pliers	Length=150mm	4	●	Wiring
63	Insulated Cutter	Length=150mm	4	●	Wiring
64	Cable Stripper (with provision for adjusting)	0.9~5.0mm ² with stopper	4	●	Wiring
65	Cable Stripper	For Max. Cable dia. 50mm	3	●	Wiring
66	Insulated lug crimping tool	1.5sqmm, 2sqmm, 4sqmm	2 No's each	●	Wiring
67	Ferrule printing machine		1	●	
68	Polyethylene Bottle	500ml	5	●	Alcohol stroing and cleaning the docking area
69	Manual Pump		1	●	Alcohol
70	Cartridge Gun	L: 300mm	2	●	Clauking Grease
71	Adjustable Wrench	Length= 16~18mm	1	●	For assembly
72	Scissors		2	●	Cutting
73	Cutter	Length 100~150mm	3	●	Cutting
74	Electrical Vacuum Cleaner	For Wet & Dry 300W~400W	1	●	Cleaning of docking area

77	Dustproof Net	H2m x L10mX W5m	10	●	Dustproof Room
78	Vinyl Rope	$\Phi 6 \sim \Phi 10\text{mm} \times 50\text{m}$	3	●	Dustproof Room
79	Blower (Exhaust type only)	400W; $\Phi 280 \sim \Phi 320$	1	●	Ventilation
80	Flexible Duct (Should be able to attach blower)	$\Phi 280 \sim \Phi 320 \times 5\text{m}$	1	●	Ventilation
81	Polyethylene Sheet	$\pm 0.3\text{mm}$ W1800mmx100m	3	●	Protection to Docking Section
82	Metallic Straight Rule	Length 150mm	2	●	Measuring
		300mm	2	●	
		1000mm	2	●	
83	Dust pan		1	●	For cleaning
84	Broom		1	●	For cleaning

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Bidder on returnable basis

No	Designation	Description	Quantity	Purchaser/ Others	Purpose
85	Sling Tool Set for B'g	■ Nylon Sling 1500kg 6500mm	2	●	B'g Lifting
		■ Endless Nylon Sling 1000kg 650mm	1		
		■ Shackle Max. Load	2		
86	Socket Adapter	□ 12.7→□ 19.0	2	●	for assembly
		□ 12.7→□ 9.5	2		
87	Cable drum	Length 30 m 220 V AC	2	●	for power supply
88	Working Table		2	●	For Testing and Tools movement activities
92	Jack with toe	(M-100 10ton)	4	●	
93	Screw jack	10 Ton	4	●	For Checking the clean condition

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Bidder on returnable basis**

No	Designation	Description	Quantity	Purchaser/ Others	Purpose
94	Allenkey socket	M8-6mm	2	●	
		M10-8mm	2		
		M12-10mm	2		
		M16-14mm	2		
95	Crimp tool	(0.5 - 6 sqmm)	2	●	Yato YT 2296
96	Crimp tool	(0.25-6.64mm)	2	●	JST YHT-2210
97	Crimp tool	(2.63-6.64mm)	2	●	JST YNT-1210S
98	Crimp tool	(1.04-2.63mm)	2	●	JST YNT-1614
99	Crimp tool	(0.25-1.65mm)	2	●	JST YNT- 2216
100	Multimeter	--	2	●	

105	Power supply	--	1	●	0- 30 A AC/DC 0-250 V DC /AC
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110	Dust proof House with net & floor mat	7m (H) X8m (W) X8m (D)	1	●	docking of GIS
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NOTE: a] Descriptions/List above are general nature and shall be considered as standard.
b] Quantity indicated is estimated. Actual quantity depends on site schedule/sequence/progress time lines.

Annexure: Manufacturer_Supplied_Tools

Following list of Tools and Tackles shall be supplied by GIS Manufacturer on returnable basis for 400kV GIS installation purpose only

Item	Description	Unit	Quantity
A	List of Tools for Installation		
A.1	Torque Wrench (Open-ended M6, 8, 10, 12, 16, 20,24)	Set	2
A.2	Torque Wrench (Box Type M6, 8, 10, 12, 16, 20,24)	Set	2
A.3	Torque wrench for density switch final tightening (open spanner type)	Pcs	1
A.4	Torque Driver (M6) for G1D-b & G1B-b	Pcs	2
A.5	Depression Tool for Harting	pcs	4
A.6	Extension Bar (M8, M10, M12)	Set	2
A.7	Guide Bolt (M12,M16,M20)	Set	1
A.8	Guide Cap (M16,M20)	Pcs	4
A.9	Taper bolt (M12,M16)	Set	2
A.10	Taper Nut (M16)	Set	2
A.11	Hexagon Socket (M8, M10, M12, M16)	Set	1
A.12	Load Stakes	Set	1
A.13	Hunger	Pcs	1
A.14	Screw Jack	Pcs	4
A.15	Jack With Claw	Pcs	4
B	List of General Tools for Wiring		
B.1	Crimp Tool for Harting	Pcs	2
B.2	Crimp Tool for Vessel	Pcs	2
B.4	Crimp Tool (0.25~6.64mm ²)	Pcs	2

Following list of Tools and Tackles shall be supplied by GIS Manufacturer on returnable basis
for 400kV GIS installation purpose only

Item	Description	Unit	Quantity
B.5	Crimp Tool (2.63~6.64m ²)	Pcs	2
B.6	Crimp Tool (1.04~2.63m ²)	Pcs	2
B.7	Crimp Tool (0.25~1.65m ²)	Pcs	2
B.8	Crimp Tool (0.5-6sq.mm)	Pcs	2
B.9	Crimp Tool for Traffic	Pcs	1
C	List of General Tools for Gas Treatment and Site testing		
C.01	HV testing transformer and test kit,	Set	1
C.02	Partial discharge measurement Equipment (UHF measurement)	pcs	1
C.03	Clamp meter	pcs	1
C.04	Contact Resistance meter	pcs	1
C.05	Timing kit (with plot length of 15 Sec & Sampling 10kC @ 1 sec)with DCRM test kit	Set	1
C.06	CT analyzer	Set	1
C.07	Insulation tester 5kV	Set	1
C.08	Break down voltage tetster 5kV for Dielectric test	Set	1
C.09	CPC 100 Omicron for V.T testing	Set	1
C.10	Hoses and adapters (5M,10 M)	Set	1
C.11	Filter	pcs	5
C.12	Vacuum Meter (5~0.025 mmHg, AC 100~110V)	pcs	1
C.13	Gas Leak Detector	pcs	1
C.14	SF6 Gas Multi Analyzer	pcs	1

Following list of Tools and Tackles shall be supplied by GIS Manufacturer on returnable basis
for 400kV GIS installation purpose only

Item	Description	Unit	Quantity
C.15	Gas Handling unit and adapters for connection to GIS	pcs	1
C.16	Gas filling unit	pcs	1
C.17	Adaptor for gas filling	pcs	1
C.18	Standard Pressure gauge and adaptor	pcs	1
C.19	Termo/Hydro meter	1	