S. No.	BHEL Specification	Vendor acceptance (YES/NO)	Vendor Remarks
1.0	**APPLICATION:** These insulators shall be used for GIS application.		
2.0	**TYPE:** Epoxy insulator		
3.0	**SYSTEM VOLTAGE:** 145kV		
4.0	**PRODUCT TYPE:** CGSM 145		
5.0	**DRAWINGS:** 1) Epoxy Insulator : RDDG 435 1133 1000 2) LT Insert (HE30) : RDDG 435 1133 1002 3) HT Insert : RDDG 435 1133 1001		
6.0	**GENERAL:** This specification governs the quality of Alumina filled epoxy mouldings. This material shall especially suitable for use in SF6/ Arced SF6 gas media. Calcined alumina filler in epoxy resin has to be provided to enhance resistance to decomposed SF6 gas.		
7.0	**RAW MATERIALS :** The moulding shall consist of following raw materials. a) Epoxy System b) Filler c) Metal Inserts		
7.1	**EPOXY SYSTEM :** Epoxy system shall consist of resin, hardener and filler if necessary, a small amount of catalyst can be used. It should be a class-F, hot curing system. Standard and proven epoxy system shall be used. The system should be vacuumized under 5 torr. Automatic pressure gelation or equivalent shall be used for		

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	moulding the component and initial curing should be done at 130-140130 °C for 8 hours. The epoxy system shall be specified. Other properties should be as per section-7 of this specification. °C for 4 hrs under pressure. Post curing at		
7.2	**FILLER:** High purity (99%), fine grade calcined alumina with specific gravity around 3.8 shall be used as filler. Before processing filler materials is to be thoroughly dried at 800C for 8 hrs.		
7.3	**METAL INSERT:** Machined metal inserts (as per dwg.) shall be used while moulding and shall be retained firmly in the mould prior to injection of the mix. The surfaces of the insert in contact with the epoxy shall be conditioned prior to its placement in the mould to ensure good interface bonding between epoxy and inserts. The inserts shall be thoroughly degreased, using solvent, prior to use to promote adhesion. HT insert shall be silver plated to 10 to 12 microns. Supply of LT & HT inserts is in scope of supply of this enquiry.		
7.4	**MIX:** The resin, hardener and the filler shall be mixed in weight percentage as per requirement to get good mechanical, electrical and thermal properties. The mixture should be homogeneous and shall be evacuated to 5 mbar (torr) before transfer to the mould. The mix shall be heated uniformly to obtain good flow consistency.		

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7.5	**FINISH:** The moulded material shall be homogeneous, smooth, compact and free from cracks, blisters, gas pockets, and foreign inclusion. It should have uniformly distributed bond. Insulators shall be supplied in their natural colour.		
8.0	**MECHANICAL AND ELECTRICAL PROPERTIES:** Before processing the final product in multiples, it should be ensured that the epoxy insulator material shall meet the properties as per 10.1 and 10.2.		
9.0	**MACHINABILITY:** The component shall be freely machinable and without showing any signs of splitting, cracking or chipping.		
10.0	**PROPERTIES:** All the following properties shall be established for the sample generated with the above process. Values achieved shall be reported in the test certificate furnished by supplier.		
10.1	**MECHANICAL PROPERTIES:**		

S.No	Physical Properties at 23 ºC	Test Standard	Values
1)	Tensile strength	ISO/527	60-70 N/mm^2
2)	Compressive strength	ISO/604	200-220 N/mm^2
3)	Flexural strength	DIN 53452	100-110 N/mm^2

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	4)	Thermal/Heat distortion temperature		~ 100°C		
	5)	Water Absorption	--	Less than 0.1%		
	6)	Crack Resistance	--	Very high *		
	7)	Specific gravity	--	~2.0		
	8)	Hardness	--	80-90		
	9)	Thermal Conductivity	--	0.8 – 0.9 w/m 0k		

10.2 **ELECTRICAL PROPERTIES:**

S.No	Physical Properties at 23 ºC	Test Standard	Values
1)	Dielectric Constant	DIN 53483	~ 6.0
2)	Electric Strength	IEC 243	20kV/mm
3)	Tan Delta	--	< (2 to 3) %
4)	Electric Resistance (volume Resistance)	DIN 53482	>10 x 10^{14}

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	5) Comparative Tracking index (CTI) — ~ 600		
10.3	Insulators shall be tested in open air till flashover and specify this voltage for two samples.		
11.0 11.1	**ROUTENE AND ACCEPTANCE TESTS:** Component shall be checked for physical dimension 100%.		
11.2	Visual inspection for voids, cracks and non-uniformity.		
11.3	Cantilever withstand load shall be 500 kg on one of the sample.		
11.4	Leak proof test is to be conducted at 3.0 kg/cm^2 pressure difference. Necessary plate for leak test shall be prepared by vendor.		
12.0	**TEST CERTIFICATES :** Three copies of test certificates shall be supplied with each lot of components giving component name, drg No, BHEL P.O. No, Batch/ LOT No. and test values observed		

S. No.	BHEL Specification	Vendor acceptance (YES/NO)	Vendor Remarks
	against specified.		
13.0	**QUALIFICATION CRITERIA:** The supplier shall have supplied Epoxy insulators of sizes greater than 400mm dia meter, for the last 3 years.		
14.0	**PACKING:** Each insulator shall be packed in polyethylene bag, sealed and placed in a thermocol box; the box shall be packed in individual wooden boxes to avoid damage during transportation. A 50gm packet of moisture absorbent (silica gel) shall be placed with each component.		
15.0	**CLARIFICATIONS:** In case of doubts in specifications, the supplier shall contact BHEL for clarifications.		