

 <u>BHARAT HEAVY ELECTRICAL LIMITED</u> <u>UNIT'S ADDRESS:</u> <u>UNIT'S PHONE NOS.</u> <u>CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL</u> <u>(FROM PURCHASE DEP'T.)</u>	Enquiry No. : Due Date : Supplier Qtn. No.: Date :				
<u>SPECIFICATION CUM COMPLIANCE CERTIFICATE FOR DEEP FREEZER (SUB ZERO TREATMENT CHAMBER)</u>					
NOTE:- 1. Vendor must submit complete information against all clauses. 2. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance. 3. The offer and all documents enclosed with offer should be in English language only.					
ADDRESS OF THE SUPPLIER :	ADDRESS OF THE INDIAN AGENTS :				
TELEPHONE NOS.:	TELEPHONE NOS.:				
FAX NOS.:	FAX NOS.:				
E-MAIL ADDRESS :	E-MAIL ADDRESS :				
SCOPE: SUPPLY, ERECTION & COMMISSIONING OF DEEP FREEZER (SUB ZERO TREATMENT CHAMBER) COMPLYING WITH SPECIFICATION AS BELOW					
Sl. No	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED BY	OFFERED	DEVIATIONS	REMARKS
1.0	PURPOSE & WORK PIECE MATERIAL				

Sl. No	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED BY	OFFERED	DEVIATIONS	REMARKS
1.1	Purpose: (Operations/Jobs involved)	Required to freeze the bearing races for contraction in diameter to enable assembly in journal housings, PGB assemblies, Mill Drive & Drive Shaft etc. and also to store adhesives etc.			
1.2	Work Piece Material: (Material detail, Hardness etc.)	Bearing Steel			
2.0	Technical Data:				
2.1	Bearing race storage temperature	-30° C (minus 30 deg. Centigrade)			
2.2	Pull down time	6 hours			
2.3	Bearing entry temperature	40° C			
2.4	Maximum bearing weight (Charge material)	1000 Kg			
2.5	Number of compartments	2 - With separate lids for opening.			
2.6	Size of larger compartment.	900 (L) x 750 (W) x 750 mm (Depth)			
2.7	Size of smaller compartment	400 (L) x 750 (W) x 360 mm (Depth)			
2.8	Over all size of freezer (excluding lid) to accommodate the larger compartment & smaller compartment sizes as per Cl. Nos. 2.7 & 2.8.	Specify			
2.9	Material of construction	Stainless Steel (SS 316)			
2.10	Inbuilt thermometer (DIGITAL type)	(-) 50° C to (+) 100° C			
2.11	Refrigerant used in the system	Non “ CFC”			
2.12	Specification of Refrigerant	Specify			

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3.0	CONSTRUCTION (STRINGENT REQUIREMENTS)				
3.1	The bearing locating surface and lid sealing surface shall be rigidly stiffened at bottom of SS sheets to with stand mass of 1 ton load, so that no deformation takes place when the refrigerator is charged for full capacity.	Confirm			
3.2	The work space shall be made of SS 316 material, outer is Cold rolled cold annealed (CRCA) & in between space is filled with polyurethane foam (PUF) insulation.	Confirm			
3.3	Door (lid) outer is cold rolled cold annealed (CRCA), Inner is Hylam material & in between space is filled with polyurethane foam (PUF) insulation.	Confirm			
3.3.1	Door gasket shall made up of silicone rubber and shall with stand the temperature variation throu' out the range.	Confirm			
3.3.2	Slow motion Lid opening : Pneumatic door opening system consisting of Double acting cylinder, Flow control valve, Service unit, Solenoid valve, Hand lever valve, Non return valve etc. The lowering & rising shall be adjusted by means of flow control valve (Festo Make).	Confirm			
3.4	Heavy duty castor wheels shall be provided for easy mobility of the equipment with locking facility where ever required.	Confirm			
3.5	All hardware's like hinges & latches etc. shall be of SS 304	Confirm			
3.6	Whole chamber shall be chemically cleaned, primed and finished with two tone NC paint.	Confirm			
3.7	Refrigeration System :				
3.7.1	Mechanical Single stage cascade refrigeration system working on CFC free refrigerant, Air cooled condenser eliminating the need of water, with standard features like Oil separator, Expansion device, Filter driver, Suction line accumulator etc. to give the required cooling.	Confirm			

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3.8	The compressor shall have over pressure relief mechanism, sealed hermetically & works on 3 phase power supply (Imported Dan Foss Maneurop is preferred).	Specify the Type, Make & Model Number (Details of over pressure relief mechanism to be provided by the vendor for approval)			
3.8.1	Capacity of Compressor	Specify			
3.9	Type, Make & Model Number of Condenser	Specify			
3.9.1	Cooling capacity of Condenser	Specify			
3.9.2	Condenser motor shall have ball bearing for maintenance free operation.	Confirm			
3.10	Evaporator shall be high efficient tube configuration system bonded on out side of SS 316 tank.	Confirm			
3.10.1	Type, Make & Model Number of Evaporator	Specify			
3.11	Refrigeration control system / features : There should be two separate refrigeration systems for bigger & smaller compartments. The condenser is common and each compartment is controlled by separate expansion valves (ON / OFF Type).	Specify (Type, Make & Model no. etc.)			
3.12	Solid state micro processor based Temperature controller with LED display (digital), working on PT 100 sensor & Auto tuning, press to set type. Two separate controllers for two compartments.	Confirm			
3.12.1	Type, Make & Model no. of Digital temperature controller (2 Nos.)	Yokogawa / Eurotherm			
3.12.2	Type, Make & Model no. of thermo meter	Specify			
3.12.3	Type of fixing Digital temperature controller & thermo meter	Front panel			
3.12.4	Temperature senser, PT 100- Duplex (2 Nos.)	Specify			
3.13	Imported Pressure gauge shall be provided for both high and low side (like CPS Make etc.)	Confirm			
3.13.1	Type, Model & make of Pressure Gauges	Specify			

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3.14	Ammeter 0to 50 Amps	Specify the Make & Model			
3.15	Volt meter	Specify the Make & Model			
3.16	Power meter	Specify the Make & Model			
3.17	Hour meter	Specify the Make & Model			
3.18	Indication lamps (bulbs) with different colours shall be provided to indicate the status of operation / non operation of components like Compressor, Condenser, fan motor, Control circuit, Temperature reached, pressure switch cuts (ON / OFF) etc. to know the working condition of the refrigeration of the unit.	Confirm			
3.19	Control panel shall be provided with Temperature controller, Ammeter, Volt meter, Power meter, Hour meter, Indication lamps (bulbs) etc. Inside panel shall be MCBS, Contractors, Connectors, Solid state relays, Timer etc. are mounted as per DIN Standards.	Confirm			
3.20	Features of the Equipment :				
	a) Time delay in starting of compressors	Confirm			
	b) Pressure switches in refrigeration system	Confirm			
	c) Adjustable low temperature cut out in case of temperature over shoot.	Confirm			
	d) Microprocessor based temperature recorder - 6 Channel -	Yokogawa make - µR10,000 or equal model Chino make - AL4,000 or equal model			
	e) Electrical terminals / connectors.	Confirm			
	f) Mechanical timer for temperature cycling chamber.	Confirm			
4.0	Protection Class no. (IP / Nema)	Specify			
5.0	Painting:				
5.1	Paint details / manufacture's name	Specify			
6.0	Electrical :				

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6.1	415V (+ 10%V to - 15%V), 50HZ +/-3 HZ, 3 Phase AC (4 wire system with neutral & Ground).	Electrical drawing clearly indicating the connections			
6.2	Tropicalisation: All electrical / electronic parts shall be tropicalized	Confirm			
6.3	Cables / wiring and other electrical material shall meet relevant BIS standards	Specify & shall be of reputed make			
	a) Contactors	Specify the Make & Model			
	b) MCBS	Specify the Make & Model			
	c) Connectors	Specify the Make & Model			
	d) Indicator lamps	Specify the Make & Model			
	e) Main Switch	Specify the Make & Model			
	f) Control Switch	Specify the Make & Model			
	g) Cables & wires	Specify the Make & Model			
	h) Transformer	Specify the Make & Model			
	i) Fan motor over load	Specify the Make & Model			
	j) Fan motor	Specify the Make & Model			
	k) Panel cooling fan	Specify the Make & Model			
7.0	SAFETY ARRANGEMENTS & ENVIRONMENTAL PERFORMANCE OF THE MACHINE ::				
7.1	Equipment should have adequate and reliable safety interlocks / devices to avoid damage to the equipment, work piece and the operator due to the malfunctioning or mistakes. Equipment functions should be continuously monitored and alarm / warning indications through lights.	Details to be furnished			

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7.2	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Confirm			
8.0	SPARES:				
8.1	Itemized breakup of mechanical, Hydraulic, Pneumatic, electrical and electronic, instrumentation spares used on the equipment in sufficient quantity as per recommendation of Vendor for warranty period for trouble free operation on three shifts continuous running basis should be offered by vendor.	Confirm			
8.2	Vendor to confirm that complete list of spares for the equipment along with specification / type / model and name & address of the spare supplier shall be furnished along with documentation to be supplied with the equipment.	Confirm			
9.0	DOCUMENTATION :				
9.1	Five sets of following documents (Hard copies) in English language should be supplied along with the machine	Confirm			
9.2	Operating manuals of Equipment	Confirm			
9.3	Detailed Maintenance manual of the equipment including trouble shooting & maintenance schedule with all drawings of assemblies/sub-assemblies/parts including Electrical / Electronic circuit diagrams & wiring diagrams.	Confirm			
9.4	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.	Confirm			
9.5	Test & Calibration certificates of Ammeter, Volt meter, Power meter, Pressure gauge, Temperature controller, Thermo meters, Refrigerant, PT100, Temperature recorder, Compressor, Condenser, Evaporator, SS 316 material etc. to be provided at the time of pre inspection of the equipment.	Confirm			
10.0	TRAINING				

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10.1	BHEL Persons should be trained in the area of (a) Mechanical, Electrical & Electronic maintenance of the equipment (b) Operation of the equipment.	Confirm			
11.0	COMMISSIONING				
11.1	Supplier to take full responsibility for carrying out the commissioning, start up, testing of the equipment & it's controls etc.	Confirm			
11.2	Successful proving of BHEL components (Cl. No. 12.1) by the supplier shall be considered as part of commissioning. All tests, as mentioned at clause 13 (Machine Acceptance) shall form part of the commissioning activity.	Confirm			
11.3	Charges, duration, terms & conditions for Commissioning should be furnished in detail separately by vendor along with offer.	Confirm			
12.0	PROVE OUT OF BHEL COMPONENTS :				
12.1	Prove out of the equipment on components shall be done at BHEL works to the specified design accuracy after commissioning. Material for the prove out components shall be provided by BHEL. Vendor shall be fully responsible for prove out the equipment on components as specified by BHEL to the full satisfaction of BHEL. Clarifications, if any required by vendor, regarding requirements of the prove out components, whether specified or not, should be discussed and cleared by vendor during initial technical discussions.	Confirm			
13.0	MACHINE ACCEPTANCE: (Tests/Activities should be Performed by Vendor)				
13.1	Tests/Activities should be carried out at supplier's works on the machine before dispatch :	Confirm & Vendor to specify the applicable standard (IS / ISO / ISHREA, ASHREA /Any other)			
13.1.1	Demonstration of all features of the equipment, control system & accessories for efficient and effective use of the equipment	Confirm			

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13.1.2	Full load test to demonstrate the maximum capacity of the equipment.	Confirm			
13.1.3	Testing of the equipment as per applicable standard. Vendor to supply test piece	Confirm			
13.2	Tests/Activities should be carried out at BHEL works while commissioning the equipment :	Confirm & Vendor to specify the applicable standard (IS / ISO / ISHREA, ASHREA /Any other)			
13.2.1	Demonstration of all features of the equipment, control system & accessories to the satisfaction of BHEL for efficient and effective use of the equipment.	Confirm			
13.2.2	Full load test to demonstrate the maximum capacity of the equipment.	Confirm			
13.2.3	Prove out the equipment as per applicable standard. Active jobs will be supplied by BHEL	Confirm			
13.2.4	Supplier's engineer shall demonstrate for of 2 to 3 components.	Confirm			
13.2.5	Training of BHEL personal in operation of complete equipment by the supplier's experts / engineers during their stay at BHEL works	Confirm			
14.0	Packing	Specify			
15.0	GUARANTEE :				
15.1	As per BHEL Standard terms and conditions.	Confirm			
15.2	Service beyond guarantee period	Specify			
15.3	Supplier shall be responsible for after sales service of the equipment.	Confirm			
16.0	GENERAL :				
16.1	Equipment Model No.	Specify			
16.2	Total connected load (KVA):	Specify			

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16.3	Size of the equipment (Length, Width, Height) with complete equipment & accessories	Specify			
16.4	Painting of Equipment / Electrical Panels	Specify			
16.5	Total weight of the equipment	Specify			
16.6	Vendor to submit , along with offer, reference list of customers where similar or higher capacity Sub Zero Treatment Chamber have been supplied mentioning broad specifications of the supplied equipment, i.e. Model, Freezing temperature, Load Carrying Capacity etc.	Confirm			
16.7	Detailed catalogues , sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	Confirm			
16.8	Vendors shall submit his latest design. In case of any variance with the present Spec., BHEL reserves the right to study & make minor changes.	Confirm			
17.0	Delivery Time	Specify			