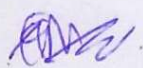
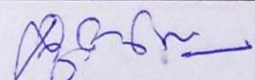


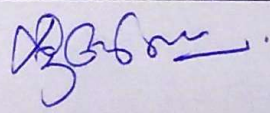
Annexure 1				
Specification for 60 kVA UPS for Thermal ageing oven				
		BHEL Specification		Vendor Acceptance/Remarks/ Deviation
1	Power			
	1.1	Rating	60 KVA	
	1.2	Nominal power in KW	48 kW	
	1.3	Topology	60 KVA operating in Standalone configuration with minimum 60 minutes battery backup time.	
	1.4	Make and Model	To be specified by vendor	
2	Electrical Input			
	2.1	Nominal Input Voltage	Three Phase: 415 V, 3Phase + Neutral + Ground with +/- 15 % tolerance	
	2.2	Input Voltage Range	(+/-) 15% from nominal at 100% load without depleting battery	
	2.3	Operating Frequency	50 Hz (40 to 72 Hz)	
	2.4	Input Power Factor	> 0.99 (full load)	
	2.5	Input Current Distortion	< 5%	
	2.6	DC Voltage Ripple	< 3 % without Battery, < 1 % with Battery	
	2.7	DC Current Ripple	< 5%	
	2.8	Input Source	Mains and Local DG Set compatibility required.	
3	Electrical Output			
	3.1	Nominal Output Voltage	Three Phase : 415 V, 3 Phase + Neutral + Ground	
	3.2	Output Voltage Regulation	Steady State +/-1%	
	3.3	Voltage harmonics Distortion	<2% (linear load)	
	3.4	Frequency	50 Hz +/- 0.1 Hz	
	3.5	Output Wave Form	Sine Wave	
	3.6	Controller	DSP based	


 श्रीनिवासु जी / SREENIVASU. G
 लाब प्रबंधक (आई सी एच) / Lab Manager (ICH)
 बी.एच.ई.एल., अनु.एवं.वि. / BHEL CORP. R&D
 विकासनगर / VIKASNAGAR
 हैदराबाद / HYDERABAD-500 093.



	3.7	Dynamic Response	+5% (for 0 -100% load), +3% (for 0 - 50% load)	
	3.8	Recovery time	98% recovery within 20ms	
	3.9	Power Factor handling Capacity	0.6 to unity within KVA & KW rating	
	3.10	Crest Factor	03:01	
4	Battery			
	4.1	Battery Type	12V SMF/ VRLA , 150 AH	
	4.2	Battery Replacement	Field-replaceable	
	4.3	Battery Backup with rated load condition	60-minute minimum. Number of batteries to be selected accordingly.	
	4.4	Battery Rack	Rack shall be provided by BHEL. Vendors need not quote for the same. Available rack for battery: 1500X420X1200 (LXBXH) Nos: 02 Partition in each racks: 04 nos. each. Please mention the suitability of batteries to the available racks.	
5	Display, Indications and Alarm			
	5.1	LCD Display	The display shall display the following: Input voltage Output voltage Input current Output current Battery voltage Output KVA Battery current Output KW Bypass voltage Output PF Bypass frequency Output frequency Temperature Output Load in % Date & time	


 श्रीनिवासु जी / SREENIVASU. G
 लाब प्रबंधक (आई सी एच) / Lab Manager (ICH)
 बी.एच.ई.एल., अनु.एवं.वि. / BHEL CORP. R&D
 विकासनगर / VIKASNAGAR
 हैदराबाद / HYDERABAD-500 093.



	5.2	Indication	LED indications for notice and alarms for the following: Rectifier ON / OFF Load ON Inverter ON / OFF Float Charge Bypass available Boost Charge Manual bypass ON Battery low Inverter Switch ON Battery Charging/Discharging Bypass Switch ON	
	5.3	Audible Alarms	Required for fault conditions	
6	Protection			
	6.1	Protection	Input Under Voltage/Over Voltage Battery current limit Rectifier Over Voltage Output Under Voltage /Over Voltage Battery low Output overload Over temperature Output short circuit Battery Over Voltage.	
	6.2	Ingress Protection	IP 20 or better	
	6.3	Emergency Power Off	Local and remote	
	6.4	Maintenance Bypass Switch	Required	
	Environmental			
7	7.1	Operating Temperature	UPS: 0 to 40 deg. C	
	7.2	Relative Humidity	Up to 95% RH Non-Condensing	
	7.3	Audible Noise	< 70 dB at a distance of 1 meter.	
8	Suitability			
	8.1	Parallel	Suitable for parallel operation up to 3 units	
	8.2	Battery backup	Required battery backup : 60 minutes. Should be capable of increasing the existing battery backup of 60 minutes to 120 minutes after suitable addition of numbers of batteries.	

श्रीनिवासु जी / SREENIVASU. G
 लाब प्रबंधक (आई सी एच) / Lab Manager (ICH)
 बी.एच.ई.एल., अनु. एवं. वि. / BHEL CORP. R&D
 विकासनगर / VIKASNAGAR
 हैदराबाद / HYDERABAD-500 093.

9	General			
	9.1	Efficiency	92% or more	
	9.2	UPS Bypass	Automatic on overload or UPS failure	
	9.3	Overload	110 % for 60 min, 125 % for 10 min, 150 % 60 sec	
	9.4	Duty	Continuous	
	9.5	Installation	Free Standing, Floor Mounting	
	9.6	Cable entry	BHEL will provide input cable through trench. Vendor shall suitably select the cable entry.	
	9.7	Warranty	24 months for both UPS and batteries from the date of commissioning at BHEL R & D.	
	9.8	Erection and Commissioning	The offer shall include the erection and commissioning charges at BHEL R & D. E & C at BHEL R & D has to be completed within 07 working days from the receipt of item at BHEL R & D. A written intimation regarding receipt of item at BHEL will be provided.	
	9.9	Delivery time	To be specified by Vendor.	
	9.10	Installation, demonstration and training.	The vendor shall install and demonstrate the operation of the UPS after integrating with existing thermal ageing oven. Vendor shall also provide necessary training to BHEL employee for operation and maintenance of the UPS. Payment will be processed only after successful demonstration of the UPS in integration with thermal ageing oven at BHEL R & D.	
	9.11	Manual	Circuit , schematic and PCB drawings along with operation and maintenance manual to be provided at the time of delivery.	
	9.12	Manufacturer's Test certificate	Manufacturer's test certificate to be provided at the time of delivery.	


श्रीनिवासु जी / SREENIVASU. G
 लाब प्रबंधक (आई सी एच) / Lab Manager (ICH)
 बी.एच.ई.एल., अनु.एवं.वि. / BHEL CORP. R&D
 विकासनगर / VIKASNAGAR
 हैदराबाद / HYDERABAD-500 093.

