

## QUALIFICATION ENVIRONMENTAL TEST

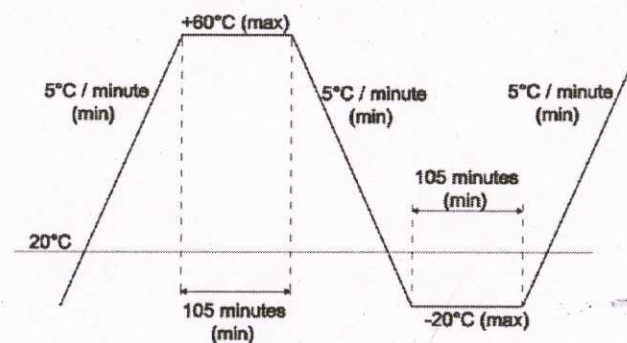
TEST NAME	SPECIFICATION	REMARKS
1 ENVIRONMENTAL STRESS SCREENING TEST (ESS)	12 NUMBER OF CYCLES (8 DEFECT FREE CYCLES) SHALL BE DONE SO THAT TOTAL DURATION AT HIGH TEMPERATURE AND AT LOW TEMPERATURE WILL BE AT LEAST 1260 MINUTES RESPECTIVELY.  EACH THERMAL CYCLE SHOULD BE DONE AS PER FIGURE ENCLOSED IN APPENDIX - 'L'. AFTER COMPLETION THERMAL CYCLING RANDOM VIBRATION TO BE CARRIED OUT.	1. SYSTEM ON DURING POSITIVE CYCLE AND SYSTEM OFF DURING THE NEGATIVE CYCLE.(CYCLE 5SEC ON/ 300 SEC OFF)  2. LIMITED PERFORMANCE CHECK DURING EACH POSITIVE CYCLE OF THE TEST WHEN THE UNIT IS INSIDE THE CHAMBER.  3. PERFORMANCE CHECK AFTER RECOVERY.
2 VIBRATION TEST	RANDOM VIBRATION IN 3 AXIS $10(M/S^2)^2/HZ$ DURING 20 TO 500 HZ FALLING TO $1(M/S^2)^2/HZ$ AT 2000 HZ FOR 2 HOURS IN EACH AXIS.	1. SYSTEM OFF DURING THE TEST  2. LIMITED PERFORMANCE CHECK DURING THE TEST  3. PERFORMANCE CHECK AFTER RECOVERY
3 HIGH TEMPERATURE (OPERATIONAL)(*)	100°C +/- 3°C FOR 24 HOURS	1. SYSTEM OFF DURING THE TEST  2. LIMITED PERFORMANCE CHECK DURING LAST HALF AN HOUR
4 HIGH TEMPERATURE (STORAGE)(*)	85°C +/- 3°C FOR 24 HOURS	1. SYSTEM OFF DURING THE TEST  2. PERFORMANCE CHECK AFTER RECOVERY
5 LOW TEMPERATURE	-30°C +/- 3°C FOR 24 HOURS	1. SYSTEM OFF DURING THE TEST  2. SYSTEM ON DURING LAST HALF AN HOUR 3. LIMITED PERFORMANCE CHECK DURING LAST HALF AN HOUR  4. PERFORMANCE CHECK AFTER RECOVERY
6 DAMP HEAT	40°C +/- 2°C FOR 16 HOURS. RH>95%	1. SYSTEM OFF DURING THE TEST  2. PERFORMANCE CHECK DURING LAST HALF AN HOUR
7 DROP TEST	HEIGHT OF DROP = 100MM; NO OF DROPS/FACE=1 ON ALL FACES EXCEPT CONNECTOR SIDE.	PERFORMANCE CHECK AFTER TEST
8 DUST TEST	CHEMICAL COMPOSITION: SiO <sub>2</sub> :97-99% Fe <sub>2</sub> O <sub>3</sub> :0-2%:Al <sub>2</sub> O <sub>3</sub> : 0 to1%: TiO: 0 TO 2% : MgO : 0 TO 1% : IGNITION LOSSES : 0 to 1% ONE HOUR. TEMP 40°C +/- 3 RH<50%	PERFORMANCE CHECK AFTER RECOVERY
9 BUMP TEST	4000 BUMPS AT 25g; PULSE DURATION: 6ms, HALF SINE WAVE.	1. SYSTEM OFF DURING THE TEST  2. PERFORMANCE CHECK AFTER RECOVERY
10 SHOCK TEST	40g, 2 SHOCKS PER DIRECTION, PULSE DURATION : 18 ms.	1. SYSTEM OFF DURING THE TEST  2. PERFORMANCE CHECK AFTER RECOVERY
11 WATER IMMERSION TEST	6 METER WATER COLUMN DEPTH (PR - 58.7 KPA), DURATION 2 HOURS	1. SYSTEM OFF DURING THE TEST  2.PERFORMANCE CHECK AFTER RECOVERY
12 MOULD GROWTH TEST	30°C +/- 1°C AND RH > 90 %, DURATION: 28 DAYS (TEST NO.21).	1. SYSTEM OFF DURING THE TEST  2. PERFORMANCE CHECK AFTER RECOVERY

REV. NO.	NO. OF PLACES	CHANGE/ECN NO.	SIGNATURE & DATE
			REVISED APPROVED

TEST NAME	SPECIFICATION	REMARKS
13 SALT SPRAY TEST	35°C +/- 2°C, RH 90-95%, DURATION 3 DAYS (TEST NO.: 9, PROCEDURE 2).	1. SYSTEM OFF DURING THE TEST  2. PERFORMANCE CHECK AFTER RECOVERY
14 CONTAMINATION TEST	ONE OR MORE OF THE FOLLOWING CONTAMINATING FLUIDS TO BE SPRAYED-PARAFFIN,PETROL,LUBRICATION OIL, HYDRAULIC FLUIDS AND ESTER BASED LUBRICATING OILS. AFTER SPRAYING, MAINTAIN TEMPERATURE 50°C FOR 48 HRS.	1. SYSTEM OFF DURING THE TEST  2. PERFORMANCE CHECK AFTER RECOVERY

## ENVIRONMENT STRESS SCREENING (ESS)

## BURN-IN-TEST



THERMAL CYCLE SHALL BE AS FOLLOWS, (MIL STD 2164)

- 12 NUMBER OF CYCLES SHALL BE DONE SO THAT TOTAL DURATION AT HIGH TEMPERATURE AND AT LOW TEMPERATURE WILL BE AT LEAST 1260 MINUTES EACH
- AFTER COMPLETION OF THERMAL CYCLING RANDOM VIBRATION TEST TO BE CARRIED OUT AS FOLLOWS:
  - RANDOM VIBRATION ON 3 PERPENDICULAR AXIS.
  - $10(M/S^2)^2/HZ$  DURING 20 TO 500 HZ FALLING TO  $1(M/S^2)^2/HZ$  AT 2000 HZ FOR 2 HOURS IN EACH AXIS

## NOTE:

- (\*) APPLICABLE FOR SYSTEMS FITTED IN ENGINE COMPARTMENT. FOR SYSTEMS FITTED OUTSIDE ENGINE COMPARTMENT, HIGH TEMPERATURE (OPERATIONAL) IS 550°C AND HIGH TEMPERATURE (STORAGE) IS 850°C
- TESTS 2 TO 14 ARE TO BE CONDUCTED AS PER JSS 55555: 2012 REV3, L2J AND L3 CLASS.
- DURING TESTING, THE SYSTEM'S POWER ON/OFF PERIODS MAY BE ADJUSTED/DECIDED BASED ON THE SYSTEM/UNIT DESIGN CRITERIA.
- BEML WILL SUPPLY UUT, RELATED CABLES, AND REQUIRED ACCESSORIES TO POWER 'ON/OFF' THE UNIT. THE SUPPLIER IS RESPONSIBLE FOR PROVIDING THE MOUNTING ARRANGEMENT/TEST SETUP FOR TESTING THE UNIT.
- TEST REPORTS ARE TO BE SUBMITTED FOR EACH TEST ALONG WITH COC (CERTIFICATE OF CONFORMANCE).

SL. NO.	PART NO.	NAME OF PART	QTY./ ASSLY.	MATERIAL	REMARKS	BE1500	-
General Tolerance To ISO 2768						Remove all burrs and break sharp edges.	Unspecified finish Ra12.5
All dimensions are in mm, Unless specified. Do not scale the drawing. If in doubt, ask.						MATERIAL SEE DWG	HEAT TREATMENT --
						Wt. of part (Kgs.) --	CASE DEPTH --
DESIGN REF.							
TITLE QUALIFICATION TEST (OIL PRIMING PUMP)						SIZE A3	SCALE NTS
APPROVED JAYAKUMAR HC						SURF. TREATMENT SEE DWG	
CHECKED JAYALAXMI KUMARI							
DRAWN SANSKRITI							
BEML LIMITED, Engine Division, Mysore.						SHEET 1/2	DRG.NO. 550 849 0773



REVN.	NO. OF PLACES	CHANGE/ECN NO.	SIGNATURE & DATE	
			REVISED	APPROVED

EMI AND EMC TESTS AS PER MIL 461G

TEST DETAILS	TEST DESCRIPTION	TEST DETAILS
CE102	CONDUCTED EMISSIONS, RADIO FREQUENCY POTENTIALS, POWER LEADS	THIS REQUIREMENT IS APPLICABLE FROM 10 KHZ TO 10 MHZ FOR ALL POWER LEADS, INCLUDING RETURNS, WHICH OBTAIN POWER FROM OTHER SOURCES NOT PART OF THE EUT.
CS101	CONDUCTED SUSCEPTIBILITY, POWER LEADS	THIS REQUIREMENT IS APPLICABLE FROM 30 HZ TO 150 KHZ FOR EQUIPMENT AND SUBSYSTEM AC, LIMITED TO CURRENT DRAWS ≤ 30 AMPERES PER PHASE, AND DC INPUT POWER LEADS, NOT INCLUDING RETURNS. THIS IS ALSO APPLICABLE TO SYSTEMS THAT DRAW MORE THAN 30 AMPS IF THE SYSTEM HAS AN OPERATING FREQUENCY 150 KHZ OR LESS AND AN OPERATING SENSITIVITY OF 1 MV OR BETTER (SUCH AS 0.5 MV). IF THE EUT IS DC OPERATED, THIS REQUIREMENT IS APPLICABLE OVER THE FREQUENCY RANGE OF 30 HZ TO 150 KHZ. IF THE EUT IS AC OPERATED, THIS REQUIREMENT IS APPLICABLE STARTING FROM THE SECOND HARMONIC OF THE EUT POWER FREQUENCY AND EXTENDING TO 150 KHZ.
CS114	CONDUCTED SUSCEPTIBILITY, BULK CABLE INJECTION	THIS REQUIREMENT IS APPLICABLE FROM 10 KHZ TO 200 MHZ FOR ALL INTERCONNECTING CABLES, INCLUDING POWER CABLES. FOR EUTS INTENDED TO BE INSTALLED ON SHIPS OR SUBMARINES, AN ADDITIONAL COMMON MODE LIMIT OF 77 DBMA IS APPLICABLE FROM 4 KHZ TO 1 MHZ ON COMPLETE POWER CABLES (HIGHS AND RETURNS – COMMON MODE TEST).
CS115	CONDUCTED SUSCEPTIBILITY, BULK CABLE INJECTION, IMPULSE EXCITATION	THIS REQUIREMENT IS APPLICABLE TO ALL AIRCRAFT, SPACE, AND GROUND SYSTEM INTERCONNECTING CABLES, INCLUDING POWER CABLES. THE REQUIREMENT IS ALSO APPLICABLE FOR SURFACE SHIP AND SUBMARINE SUBSYSTEMS AND EQUIPMENT WHEN SPECIFIED BY THE PROCURING ACTIVITY.
CS116	CONDUCTED SUSCEPTIBILITY, DAMPED SINUSOIDAL TRANSIENTS, CABLES AND POWER LEADS	THIS REQUIREMENT IS APPLICABLE FROM 10 KHZ TO 100 MHZ FOR ALL INTERCONNECTING CABLES, INCLUDING POWER CABLES, AND INDIVIDUAL HIGH SIDE POWER LEADS. POWER RETURNS AND NEUTRALS NEED NOT BE TESTED INDIVIDUALLY. FOR SUBMARINE APPLICATIONS, THIS REQUIREMENT IS APPLICABLE ONLY TO CABLES AND LEADS EXTERNAL TO OR THAT EXIT THE PRESSURE HULL.
RE102	RADIATED EMISSIONS, ELECTRIC FIELD	THIS REQUIREMENT IS APPLICABLE FOR RADIATED EMISSIONS FROM EQUIPMENT AND SUBSYSTEM ENCLOSURES, AND ALL INTERCONNECTING CABLES. FOR EQUIPMENT WITH PERMANENTLY MOUNTED ANTENNAS THIS REQUIREMENT DOES NOT APPLY AT THE TRANSMITTER FUNDAMENTAL FREQUENCY AND THE NECESSARY OCCUPIED BANDWIDTH OF THE SIGNAL. THE REQUIREMENT IS APPLICABLE AS FOLLOWS: A. GROUND 2 MHZ TO 18 GHZ
RS103	RADIATED SUSCEPTIBILITY, ELECTRIC FIELD	THIS REQUIREMENT IS APPLICABLE FOR EQUIPMENT AND SUBSYSTEM ENCLOSURES AND ALL INTERCONNECTING CABLES. THE REQUIREMENT IS APPLICABLE AS FOLLOWS: A. 2 MHZ TO 30 MHZ ARMY, NAVY AND OPTIONAL* FOR ALL OTHERS

NOTE:

1. DURING TESTING , THE SYSTEM'S POWER ON/OFF PERIODS MAY BE ADJUSTED/DECIDED BASED ON THE SYSTEM/UNIT DESIGN CRITERIA.
2. BEML WILL SUPPLY UUT, RELATED CABLES, AND REQUIRED ACCESSORIES TO POWER 'ON/OFF' THE UNIT. THE SUPPLIER IS RESPONSIBLE FOR PROVIDING THE MOUNTING ARRANGEMENT/TEST SETUP FOR TESTING THE UNIT.
3. TEST REPORTS ARE TO BE SUBMITTED FOR EACH TEST ALONG WITH COC (CERTIFICATE OF CONFORMANCE).

					BE1500		—	
SL. NO.	PART NO.	NAME OF PART	QTY./ ASSLY.	MATERIAL	REMARKS	APPLICATION	QTY.	
General Tolerance To ISO 2768			Remove all burrs and break sharp edges.		Unspecified finish Ra12.5			
All dimensions are in mm, Unless specified. Do not scale the drawing. If in doubt, ask.			MATERIAL		HEAT TREATMENT			
			SEE DWG		---			
DESIGN REF.			Wt. of part (Kgs.)		CASE DEPTH		SIZE A3	SCALE NTS
			---		---			
TITLE			QUALIFICTION TEST (OIL PRIMING PUMP)				SURF. TREATMENT SEE DWG	
APPROVED	JAYAKUMAR HC		30/1/24	BEML LIMITED, Engine Division, Mysore.		SHEET 2/2	DRG.NO. 550 849 0773	
CHECKED	JAYALAXMI KUMARI		30/1/2024					
DRAWN	SANSKRITI		30/1/2024					