

QUALIFICATION ENVIRONMENTAL TEST

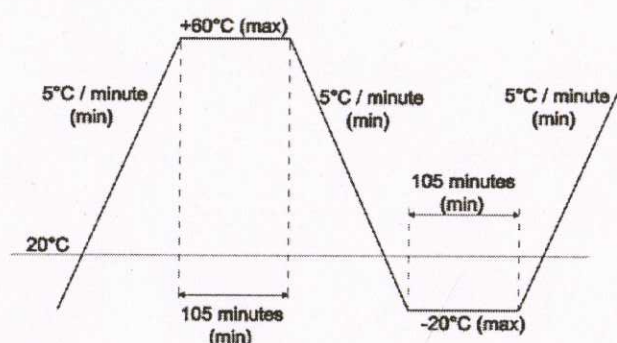
TEST NAME	SPECIFICATION	REMARKS
1 ENVIRONMENTAL STRESS SCREENING TEST (ESS)	12 NUMBER OF CYCLES (8 DEFECT FREE CYCLES) SHALL BE DONE SO THAT TOTAL DURATION AT HIGH TEMPERATURE AND AT LOW TEMPERATURE WILL BE AT LEAST 1260 MINUTES RESPECTIVELY. EACH THERMAL CYCLE SHOULD BE DONE AS PER FIGURE ENCLOSED IN 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 ₂ :97-99% Fe ₂ O ₃ :0-2%:Al ₂ O ₃ : 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

REVN.	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 --
DESIGN REF.						Wt. of part (Kgs.) --	CASE DEPTH --
TITLE QUALIFICATION TEST (STARTER MOTOR)						SIZE A3	SCALE NTS
APPROVED JAYAKUMAR HC						SURF. TREATMENT SEE DWG	
CHECKED JAYALAXMI KUMARI						SHEET 1	
DRAWN SANSKRITI						DRG.NO. 550 849 0798	

BEML LIMITED,
Engine Division,
Mysore.SHEET
1

DRG.NO.

550 849 0798