

Tele : 011-26193307  
Fax No. : 011-26192870  
E-mail : naval-dgqa@nic.in  
Website : www.dgqadefence.gov.in

भारत सरकार  
Government of India  
रक्षा मंत्रालय (गु.आ.म.नि.)  
Ministry of Defence (DGQA)  
गुणता आश्वासन निदेशालय (नौ सेना)  
Dte of Quality Assurance (Naval)  
पश्चिमी खंड - 5, आर.के. पुरम  
West Block – 5, RK Puram,  
नई दिल्ली - 110 066  
New Delhi – 110066

No.: 66301/Policy-14/DQA (N)/QA-14

14 Jun 2013

All the Establishments under DQA (N)

**GUIDELINES FOR ENVIRONMENTAL TESTING AT  
CQAE (WE), BANGALORE LABORATORY**

1. A Testing Laboratory for conduct of Environmental Tests as per JSS-55555 and other Defence Specifications, as a part of Type Testing on Defence Equipment/ components has been setup and is operational at CQAE (WE), Bangalore. The Laboratory also provides the Environmental Test facility to Private Industries, whenever the facility can be spared.

2. A comprehensive document titled "Guidelines for Testing at CQAE (WE), Bangalore" indicating the following aspects has been prepared and placed at Encl. for reference and compliance: -

- |     |  |                 |
|-----|--|-----------------|
| (a) | Organisation Structure                     | - Section - I   |
| (b) | Procedure for Technical Financial Approval | - Section - II  |
| (c) | Guidelines for Testing                     | - Section - III |
| (d) | Procedure for Undertaking Tests            | - Section - IV  |
| (e) | Applicable Rates for Testing               | - Section - V   |

3. It is requested that all equipment/ subunits/ components requiring testing at the laboratory be forwarded to CQAE (WE), Bangalore as per procedure specified in the guidelines ibid.

4. All DQA (N) orders issued earlier on the above subject are hereby superceded by this letter.



(अजय सिंह बिसेन )

कप्तान, भा.नौ.

उप महानिदेशक, गु.आ.नि.(नौसेना)

कृते अपर महानिदेशक गु.आ.म.नि . (नौसेना)

Encl.: As above

Copy to:

The Addl. DGQA (WP)  
Directorate of Quality Assurance (WP)  
'H' Block, DHQ Post  
New Delhi- 110011

Enclosure to DQA (N) letter No 66301/Policy-14/DQA (N)/QA-14  
dated 14 Jun 2013

## **GUIDE LINES FOR TESTING**

**AT**

**CQAE (WE), BANGALORE**

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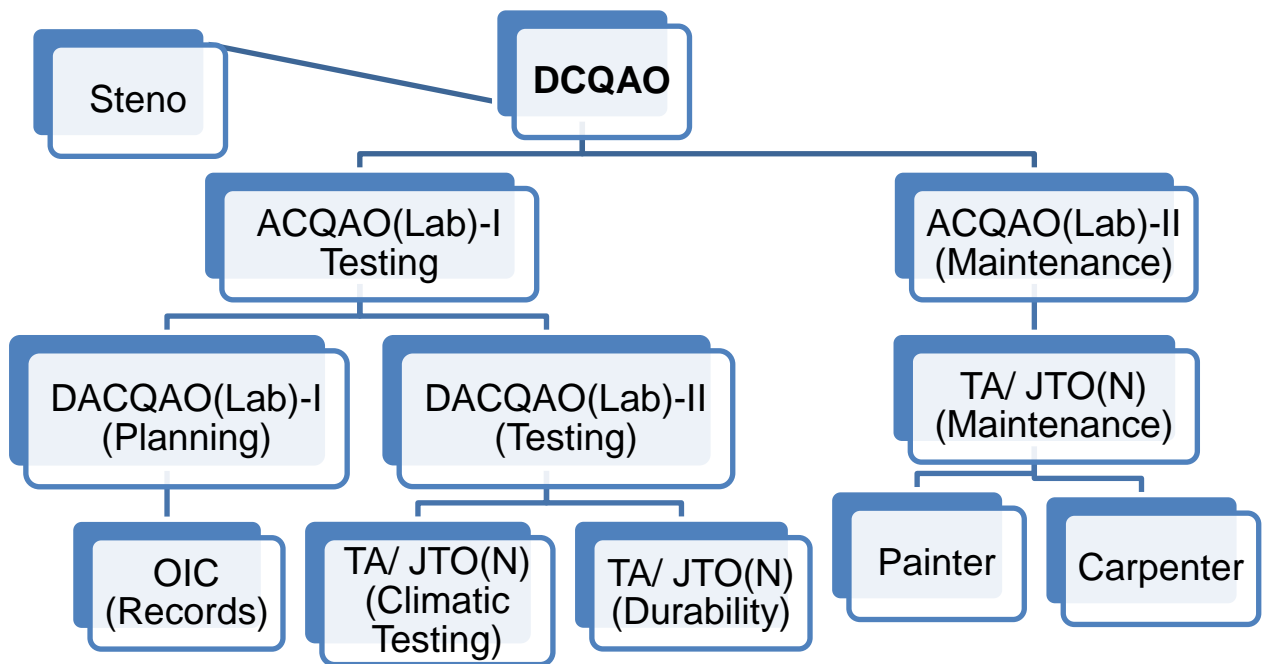
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**SECTION - I**

**ORGANISATIONAL CHART  
OF LABORATORY**



## **SECTION - II**

### **PROCEDURE FOR TECHNICAL APPROVAL AND FINANCIAL SANCTION**

#### **Technical Approval**

1. Technical approval for various tests to be carried out is approved by CQAE(WE) Bangalore in consultation with DQA(N) HQ on a case to case basis , depending upon the specification and end user requirement as laid down in the Purchase Order.

#### **Financial Sanction**

2. The financial sanction for purchase of new test facilities, repair and calibration of existing equipment as well as involved expenditure in conducting various tests will be obtained as per the delegation of financial powers by Schedule to Ministry of Defence Letter No. 63921/Delegation/ DGQA/ADM/RMD/BUDGET/ 1798/D(QA) dated 25 Aug 2011.

3. The delegated financial powers are also referred in revised DGQA Standing Order (Admin) (Chapter - IV, Section 1, Annexure to Appendix 'J' Para 4.1.3.14 refers).

4. The delegated financial powers by DGQA may be amended from time to time based on MoD orders in force.

## **SECTION – III**

### **GUIDELINES FOR TESTING**

1. Test Laboratory at CQAE (WE), Bangalore is primarily meant for conducting environmental tests as per JSS - 55555 and other related defence specifications, as a part of 'Type Testing' on defence equipment/ components. This laboratory also provides environmental test facility to other private industries, as and when the facility can be spared. The list of test facilities available in the laboratory is placed at Appendix - A. Limited Environmental Stress Screening (ESS) can also be carried out in the laboratory at CQAE (WE) in reference to latest ESS guidelines. Details of ESS are given in Appendix - B. These in fact are extracts of DQA (N) document 66301/Policy-17/DQA (N)/QA-11 dated 15 Mar 2012. The guidelines for undertaking the tests are enumerated in the succeeding paragraphs.

2. The laboratory will undertake environmental testing free of cost, for the Navy/ Army equipment/ components for which Supply Orders of MOD/ IHQ, MoD(N)/ DRDO/ Shipyards exist and where DGQA organization has been assigned the responsibility of Inspection Agency (IA)/ Inspecting Officer (IO), unless otherwise specified in the Supply Orders. In case the tests have to be repeated due to failure of equipment/ components, the tests will be repeated free of cost only once.

3. The Laboratory will undertake testing on payment basis in the following events:-

(a) The equipment/ components not ordered by IHQ, MOD (N)/ Army authorities or by DGQA organizations (unless otherwise specified in the Purchase Orders). In case tests have to be repeated due to failure of EUT, tests will be repeated at no additional charge only once.

(b) ESS Tests as a part of Production Process are chargeable.

4. Equipment will be tested on a 'First Come First Served' basis. However, the priority of the testing will be accorded as given below in the event of concurrent requests from various agencies, unless otherwise directed by DQA (N).

(a) Items ordered for Navy by MOD / NHQ / DQA (N)/ DQA (WP) Units / Shipyards.

(b) Items ordered by DRDO as part of Development Projects for Navy.

(c) Items ordered by Coast Guard authorities for Coast Guard.

(d) Items ordered by Army.

(e) Items of other Central Government Agencies/ Private agencies, on payment.



## **SECTION – IV**

### **PROCEDURES FOR UNDERTAKING THE TESTS**

#### **Free of Cost Testing**

1. The procedure followed for undertaking the tests free of cost will be as follows:-

(a) The items to be tested should be forwarded by the respective QAOs to the Laboratory with specified Test Requisition Form. The copy of Test Requisition Form is placed at Appendix - C. The Test Requisition should contain the list of tests to be conducted, Test Specifications along with details / reference to Test name, Test procedure, Test number and Test conditions. Details of pre and post performance tests as applicable will also be specified by the firms through the respective CQAOs/ QAOs and ratified by the CQAOs/ QAOs. ATPS and test reports

(b) The Laboratory will scrutinise the Test Requisition with reference to the Test Specifications and availability of test facilities. If all the details of the tests to be conducted are clearly mentioned, the Laboratory will carryout the tests according to the Test Plans and monitor the progress. In case of any specific technical difficulty, the Lab will seek clarification from the firm/ respective CQAOs/ QAOs. Specific pre- performance and post- performance tests beyond the capability/ capacity of the lab (on account of lack of instrumentation, requirement of special setups etc.,) will be arranged by the respective CQAOs/ QAOs, assisted by the firm as necessary.

(c) The firm will provide test jigs for conducting the tests. Concerned CQAOs/ QAOs will authorise and intimate to the Manger (Lab) details of firm's reps who will liaise with the lab during the conduct of the tests.

(d) On completion of the tests, the Test Reports will be retained at the lab with two copies to the respective CQAOs/ QAO. One copy of the test report will be handed over to OEM by the respective CQAO/ QAO. However, the test records will be maintained at the lab for reference and future use.

#### **Payment Testing**

2. The following procedure will be adhered to for undertaking the tests on payment basis: -

(a) The firm will submit their request in the specified Test Requisition Form along with the relevant specifications, Test name, Test procedure, Test number and Test conditions, directly to CQAE (WE) lab or through the regional CQAOs/ QAOs, ATPS and test reports.

(b) CQAE (WE) Lab will scrutinize the requisition of the firm with reference to Test Specifications and availability of test facilities. If all the details of tests to be conducted are clearly mentioned, the rates for conducting the available test facilities will be forwarded by CQAE (WE) lab to the firm.

(c) On receipt of the rates sent by CQAE (WE) Lab, the firm will submit the items to the lab along with the test charges through Demand Draft drawn in favour of CQAO, CQAE (WE), Bangalore.

(d) The firm will provide Test Jigs for conducting the tests. The representative of the firm can be present during the conduct of the tests, with prior intimation of the Manager (Lab).

(e) On completion of the tests, Test Report will be forwarded to the firm.

(f) The test charges thus received from firms will be credited through MRO to Major Head XL VII, sub major head I, Army Main head IV, Sub head F. other miscellaneous of the Defence Services Estimates.

Appendix - A  
(Refers to Para 1 of Section -III)

Sl. No.	Test	Chamber size	Max. Weight & permissible size of test sample (width X height X depth) (*)	Parameters and tolerance	Specificati on
1	2	3	4	5	6
1	Dry Heat (High Temperature)	1x1x1 m	200 kg, 0.5x0.5x0.5m	Amb to 300 <sup>0</sup> C +/-3 <sup>0</sup> C<100 <sup>0</sup> C +/-5 <sup>0</sup> C>100 <sup>0</sup> C	JSS 55555 IS 9000, DEF 133, MIL 810 & JSS 50101
2	Damp heat ( Steady state)	1.5x1.5x1.5m	300 kg 0.75x0.75x0.75m	40 <sup>0</sup> C+/-2 <sup>0</sup> C 95%RH(Min)	JSS 55555 IS 9000, DEF 133 & JSS 50101
3	Damp heat ( Cyclic) / Tropical exposure	1.5x1.5x1.5m	300 kg 0.75x0.75x0.75m	Amb to 55 <sup>0</sup> C+/-2 <sup>0</sup> C, 95% RH(Min)	JSS 55555 IS 9000, DEF 133, MIL 810 & JSS 50101
4	Damp heat (Moisture Resistance)	1.5x1.5x1.5m	300 kg 0.75x0.75x0.75m	Amb to 65 <sup>0</sup> C+/-2 <sup>0</sup> C, 95% RH(Min)	JSS 50101
5	Dry Cold (Low Temperature)	1x1x1m	300 kg 0.5x0.5x0.5m	Up to – 60 <sup>0</sup> C+/-3 <sup>0</sup> C	JSS 55555 IS 9000, DEF 133, MIL 810 & JSS 50101
6	Mould Growth/ Fungus Resistance	1.2x1.2x1.2m	200 kg 0.6x0.6x.0.6m	29 <sup>0</sup> C+/-1 <sup>0</sup> C 90%RH(Min)	JSS 55555 IS 9000, DEF 133, MIL 810 & JSS 50101
7	Corrosion (Salt)	1.5x1.5x1.5m	500 kg 0.75x0.75x0.75m	35 <sup>0</sup> C+/-2 <sup>0</sup> C 90 to 95% RH	JSS 55555 IS 9000, DEF 133, MIL 810 & JSS 50101
8	Rain	2x2x2m	1000 kg 1x1x1m	200kPa+/- 15% 450 litres+/- 10% per hour	JSS 55555 IS 9000, DEF 133, MIL 810 & JSS 50101
9	Drip proof	1.0x1.0m	NA 0.75 x 0.75m	1m from top of equipment	JSS 55555 DEF 133, JSS 50101

Sl. No.	Test	Chamber size	Max. Weight & permissible size of test sample (width X height X depth) (*)	Parameters and tolerance	Specificati on
1	2	3	4	5	6
10	Contamination	1x1x1m	200 kg 0.5x0.5x0.5m	50°C+/-2 °C	JSS 55555 DEF 133.
11	Rapid temperature cycling / Thermal shock	1x1x1m	100 kg 0.5x0.5x0.5m	- 40 to + 100 <sup>0</sup> C,+/-2°C 95% RH(Min)	JSS 55555 IS 9000, DEF 133, MIL 810 & JSS 50101
12	Shock	0.75x0.75m base size	500 kg for NSS-I & 800 kg for NSS-II including jig 0.75x0.75x1.0m	NSS I & II, Half Sine pulse only	JSS 55555
13	Vibration ( Manual sweep & Endurance at fixed frequencies )	i)1x1 m base size	i) 500 kg including jig 1x1x1 m	5 to 33 Hz 0.125 mm constant disp.	JSS 55555, DEF 133
14	Vibration ( Endurance by sweep)	0.15x0.15 m base size	2 kg including jig 0.1x0.1x0.1 m	7 to 350 Hz, 2G tolerance in accelerations <150Hz +/- 15% >150Hz +/- 25%	JSS 50101
15	Random/Sine Vibration	i)1x1 m base size	i) 400 kg including jig 1x1x1 m	5 to 2000 Hz, 100G	JSS 55555, MIL & DQAN Guideline
16	Bump Machine	1x1 m base size	250 Kg including jig 0.75x0.75x0.75 m	10, 40g, 6, 11 ms 1 or 2 bump per sec.	JSS 55555 IS 9000, DEF 133, JSS 50101
17	Bump Machine	1.3 x 1.3 mtr	1000 kgs	0 to 100g, 5 to 20 ms ,1 bump per sec.	
18	Ship motion	1.2x1.2 m base size	200 kg 0.9x0.9x0.9 m	+/- 15 deg fixed	--
19	High voltage Break Down	N. A.	N. A	10 KV	NES
20	Insulation	N. A.	N. A	Up to 1000 V DC	NES

Sl. No.	Test	Chamber size	Max. Weight & permissible size of test sample (width X height X depth) (*)	Parameters and tolerance	Specification
1	2	3	4	5	6
21	Load Tank	N.A.	N.A.	40Kw, 3 phase	
22	Shock & Vibration Measurement System	N.A		0.7 to 3000 Hz , $\pm 600g$	
23	3 phase Variable Power Supply	N.A	N.A	0v – 460v AC , 2000Amp	
24	400Hz Variable Frequency Supply	N.A	N.A	0v – 250v AC, 40 – 450 Hz	
25	Multimeter	N.A	N.A	750v AC, 1000v DC	
26	Lux Meter	N.A	N.A	0.1mv – 200mv	
27	IR Laser Temperature Sensor	N.A	N.A	-20 to +65 Deg	
28	Clamp Meter AC/DC	N.A	N.A	0 – 400 amp, 1000v DC, 750v AC	
29	Clamp Meter AC	N.A.	N.A.	1000Amp, 750v	

(\*) - Following tolerances are permissible on the sample size mentioned in Col. 4 above.

- (i) +30% of any one side, if only one side of the sample exceeds the maximum permissible size of the sample.
- (ii) +15% of any two sides, if only 2 sides of the sample exceeds the maximum permissible size of the sample.
- (iii) +10% of all three sides, if all the three sides of the sample exceeds the maximum permissible size of the sample.

**Appendix- B**

(Refer to Para 1 of Section - III)

**DETAILS OF ENVIRONMENTAL STRESS SCREENING (ESS)**

<b>Sl. No.</b>	<b>Test</b>	<b>Severity</b>	<b>Applicability</b>
(a)	Thermal Shock	0- 50 degree C, 60 min (for commercial grade components)	100% on all PCBs
		-40 to 70 degree C, 60 min (for MIL components)	
		Change over time- 03 Min	
		No. of cycle-06 (Para 17 of guidelines for reference)	
(b)	Vibration Test	Random Vibration 20-2000 Hz, Power density 0.02 gsq/Hz in atleast two axis (as per Para 11 of the guidelines)	Fully wired card cages, power amplifiers, power supplies, modules, sub-assembly etc.
(c)	Endurance	168 hrs at room temperature for sonars, communication equipment AIO systems, NAV aid equipment etc. and 08 hrs for radar equipment with 04 hrs ON	Complete system/ set
(d)	Hemi sealing of PCBs	Conformal coating and Solder marking for all Equipment	On all PCBs and Equipment

**Appendix- C**

(Refers to Para 1 (a) of Section - IV)

**REQUISITION FOR TESTING AT CQAE (WE) BY GOVERNMENT ESTABLISHMENT**

1.	Name & Address of establishment Requesting for testing	
2.	Name & address of manufactures / Supplier	
3.	Supply Order No. & date	
4.	Equipment details (complete) (attach a Separate sheet if necessary) (i) Accessories if any (ii) Quantity (iii) Weight & dimensions	
5.	Whether Test Jigs forwarded with item/ will be arranged?	YES/NO (See note below)
6.	Preliminary inspection reports/ functional Test reports (to be enclosed with this requisition)	
7.	Inspection seal of Inspector	
8.	Tests to be conducted	Indicate in the format at the backside of the requisition
9.	Pre/ Post Performance checks to be carried out (Attach step by step Authenticated Test Procedure)	
10.	Free testing/ Payment testing	
11.	Purpose of conducting tests (In case of payment testing)	
12.	Any other details considered essential	

Note : It is mandatory that jigs and fixtures are to be provided by the firm for conducting shock, vibration and bump tests. However, usage of available jigs and fixtures in CQAE labs can be made. If not, information of local fabricators can be had from the laboratory.

Details of tests required to be undertaken:

- (a) Specification
- (b) Tests in sequence

Sl. No.	Name of Test	Specification clause procedure condition & severity etc	Observations to be made during and after test

Date:  
 Designation  
 Place:  
 Agency

Signature and  
 of the Initiating

**FOR OFFICE USE ONLY (P&A)**

1. Approval for work by Technical Manager - Yes/No  
 Technical Manager
2. Job Card No. & date given
3. Commenced on.....completed on.....
4. Test Report No.....date.....dispatched on.....
5. Certified that the charges were realized in full vide Cheque/ Demand Draft No..... forwarded to ACQAO(Adm) vide ISM No..... date.....

Officer-in-Charge (P&A)  
 Manager  
 Date:

Technical  
 Date:



## **SECTION - V**

### **APPLICABLE RATES FOR TESTING**

1. The Present Rates for Testing the sample equipment are as per CQA (L) audited rates.
2. In this regard CQAL letter No. 108108/Policy/O Div dated 13 Nov 2012 and this revised charges have been approved by LAO(C), Bangalore vide their letter No. LA/C/CQA/SB dated 31 Oct 2012. Copy of revised charges is placed at Annexure 1.

**TEST CHARGES FOR ENVIRONMENTAL TESTING**

Sl. No.	Type of Test	Formula for Test charges	Remarks
1.	Vibration/ Ship Motion > 20 kgs	1165+N (1596)	
2.	Vibration/ Ship Motion < 20 kgs	1165+N (1237)	
3.	Bump	1165+N (805)	
4.	Shock	1165+N (1197)	
5.	Drop	1165+N	
<b>Climatic Tests</b>			
1.	Dry/ Damp Heat <4 CFT	1165+N (323)	
2.	Dry/ Damp Heat > 4 CFT	1165+N (374)	
3.	Dry/ Damp Heat when shared	1165+N (V*29)	
4.	Dry/ Damp Heat for components	1165+N (208)	
5.	Dry Cold < 4 CFT & < -20 deg C	1165+N (399)	
6.	Dry Cold < 4 CFT & up to -65 deg C	1165+N (578)	
7.	Dry Cold > 4 CFT & up to -30 deg C	2330+N (1488)	
8.	Dry cold for Small components (Upto -70 deg C)	1165 + N(216)	
9.	Mould growth for Equipment	1165+N(V*29)	
10.	Mould growth for Small components	1165+N(23)	
11.	Contamination	1165+N(467)	
12.	Thermal Shock	1165+N(1294)	
13.	Driving Rain	2330 +N(640)	
14.	Immersion/ drip Proof/ inclination	1165*N	
15.	Corrosion for Equipment Exclusively	1165+N(309)	
16.	Corrosion for Equipment, Shared	1165+N(V*21)	
17.	Corrosion for Components	1165+N(227)	
18.	Pre/ post Environmental (Electrical)	1165*N	
	(a) Labour charges per hour	466.00	
	(b) Charges @ 150 % of labour	699.00	
	Total Charges per hour (a + b)	1165.00	
	N = Number of hours (minimum is one hour)		
	V = Volume in CFT (Min 1 CFT to be charged where volume of subject item is found less than 1 CFT)		
	Service Tax @ 12.36 % to be added to the test charges		
	Volume in cubic meter = Length * Breadth * Height		
	Volume in CFT = (Volume in Cubic Meter/ 0.028)		
	Note: The duration of setting up time, time required to achieve set temperature is different for each test and these will be charged at		

Note:

1. In Column 4 'N' is the number of Hours for which facility is engaged. Full hour is charged even if partly used. The duration excludes setting up time/raising time/lower time
2. For tests at Sl. No. 1,2,3,4,5, the jigs, if required exclusively, have to be provided by the firm/Authority submitting samples for the test.
3. For tests at srl No. 7,8,9,10,11,17(b) & 19, the Dust/ Salts/ Acids/ Alkali and contamination, if required exclusively have to be provided by the firm/Authority submitting the samples for tests.
4. The 'V' in Sl. Nos. 3,9,16 is the volume of the specimen in cubic feet. Minimum of one CFT is charged. The higher whole no. volume is charge, if the calculated value obtained if is in fractions.

