QUALITY ASSURANCE DOCUMENT

QAD - R03

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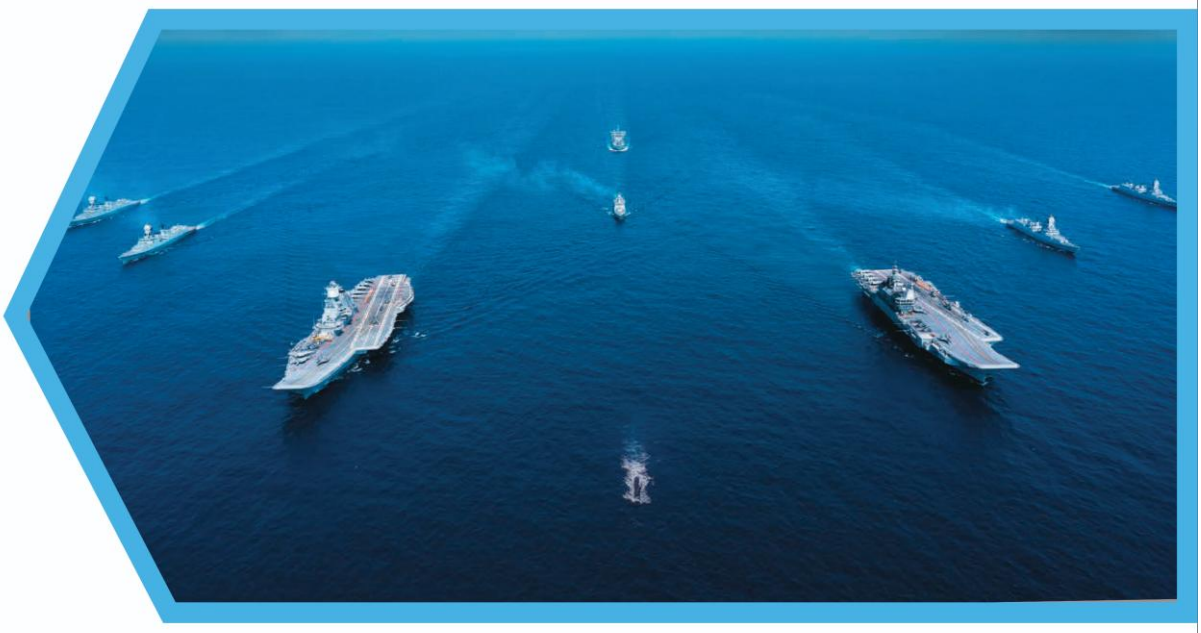

Guidelines for Quality Assurance of Equipment onboard Indian Naval Warships and Submarines

Issued by

Directorate of Quality Assurance
(Warship Project and Naval)
New Delhi


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CONDITIONS OF RELEASE

1. This Document (**QAD-R03)** has been prepared and issued to enable all stakeholders to have the same understanding and appreciation of various facets of Quality Assurance coverage provided by the Naval Directorates of DGQA. The provisions of this document are for guidance and compliance by all concerned.

3. It is pertinent to mention that meeting the QAP requirement does not guarantee the desired output from the equipment which is associated with the design of the system However, meeting the QAP does guarantee **conformance to approved drawings**.

4. **QAD-R03** guidelines are not an alternative to the Quality Management system of the firm. It is taken as a premise that all products manufactured by a firm meet the international standards of quality. The guidelines specify additional QA requirements that are essential to meet the quality standards and performance criteria required for making the equipment “Warship Complaint”. Therefore, these guidelines essentially add a dimension to the existing QA process and cannot be considered as a quality standard in isolation.

5. Unless otherwise specified, a Reference Document highlighted in the **QAD-R03** shall always imply the latest version and all amendments to that document, current as on the date of reference.

6. As the provisions of **QAD-R03** are for compliance, any ambiguity or differences in perceptions between two agencies are to be referred to Directorates of Quality Assurance (DsQA) for clarification.

7. **QAD-R03** is not to be released, reproduced or published without written permission of DQA(WP).

8. DQA(WP) reserves the right to amend or modify the contents of **QAD-R03** without consulting or informing any holder.


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FOREWORD

1. The Directorate of Quality Assurance (Warship Project) – DQA(WP) and the Directorate of Quality Assurance (Naval) – DQA(N) are two of the 13 Directorates functioning under the Directorate General of Quality Assurance (DGQA), Department of Defence Production, Ministry of Defence, Government of India. These Directorates play a pivotal role in ensuring the quality assurance (QA) for orders placed by Defence Shipyards, Naval Procurement Agencies, Indian Coast Guard, DRDO and ATVP/DMDE. To ensure stringent QA oversights, DQA(WP) & DQA(N) operate through field establishments, strategically located across the country, reinforcing compliance with quality standards at every stage.

2. The *Quality Assurance Document (QAD)* serves as a comprehensive reference, consolidating policies and guidelines essential for QA inspections conducted by DQA(WP) and DQA(N). The release of 'QAD R03' marks the third edition of this document, reflecting the continuous evolution of QA policies and practices. The first edition was introduced in Apr 2017, followed by the second edition in July 2022, with each iteration incorporating advancements in QA methodologies and policy updates to align with emerging requirements in defence manufacturing and procurement.

3. The latest edition, *'QAD R03'* incorporates all policy updates issued after the release of QAD R02 and introduces two new chapters covering: -

(a) Nomination and Sub-nomination of Inspection Authorities and Inspection Agencies.

(b) Supply Order Monitoring Portal

4. These additions aim to enhance QA by streamlining the nomination process for Order Placing Authorities (OPAs), improving supply order tracking mechanisms, and reinforcing process audits to ensure compliance with prescribed quality standards.

5. Furthermore, *QAD R03* incorporates key policy directives on:-

(a) Utilisation of Quality Assurance Plans (QAPs)

(b) Remote Inspection Methodology

6. These directives promote a structured and systematic approach to QA while integrating modern inspection techniques. Notably the adoption of remote inspection methodologies demonstrates a shift towards technology – driven solutions, improving accessibility and operational efficiency.

7. The stringent quality requirements for naval defence equipment surpass those found in commercial or land-based applications due to the challenging operational environments and mission-critical nature of these systems. By adhering to the guidelines outlined in *QAD R03*, stakeholders including manufacturers, procurement agencies and QA personnel, can ensure the highest standards of reliability, safety and operational effectiveness in naval defence equipment.

8. The Directorates of Quality Assurance (Warship Project and Naval) remain committed to continuously strengthening the QA framework to meet the evolving needs of the Defence Sector. The publication of *QAD R03* is a testament to this commitment, and it is hoped that all stakeholders will find this document an invaluable resource in ensuring excellence in the procurements and manufacturing of equipment for warships and submarines.

New Delhi
07 Feb 25

(Iqbal Singh Grewal)
Rear Admiral
Addl Director General
DQA(WP)


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ABBREVIATIONS USED

AIS	Action Information system
APMS	Automatic Power Management System
ASNT	American Society for Non-destructive Testing
ASW	Anti-Submarine Warfare
ATP	Acceptance Test Procedure
AVR	Automatic Voltage Regulator
BINDT	British Institute of Non-Destructive Testing
BIS	Bureau of Indian Standards
BOM	Bill of Material
CDA	Controller of Defence Accounts
CHP	Customer Hold Point
CNC	Contract Negotiation Committee
CoC	Certificate of Conformity / Certificate of Conformance
COMINT	Communications Intelligence
COO	Country of Origin
COTS	Commercially Off TheShelf
CPRO	Controller of Procurement
CQAE	Chief Quality Assurance Establishment
CQAO	Chief Quality Assurance Officer
DBOM	Detailed Bill of Material
DGS&D	Director General of Supply and Disposals
DGQA	Directorate General of Quality Assurance
DMDE	Defence Machinery Design Establishment
DME	Directorate Marine Engineering
DP	Delivery Period
DPM	Defence Procurement Manual
DPT	Dye Penetrant Testing
DPRO	Directorate of Procurement
DQA	Directorates of Quality Assurance {i,e DQA(WP) & DQA(N)}
DQA(N)	Directorate of Quality Assurance (Naval)
DQA(WP)	Directorate of Quality Assurance (Warship Project)
ECDIS	Electronic Chart Display and Information system
EMI / EMC	Electromagnetic Interference / Electromagnetic Compatibility
ET	Environmental Testing
ESS	Environmental Stress Screening
EUT	Equipment Under Testing
EW	Electronic Warfare
FAC	Fast Attack Craft
FATs	Factory Acceptance Trials
FCL	First Contact Letter
FCM	First Contact Meeting
FCS	Fire Control System

FD	Forced Draught
FFF	Form, Fit and Function
GA	General Arrangement
GCS	Green Channel Status
GCC	Green Channel Committee
GMDSS	Global Maritime Distress and Safety System
HP	High Pressure
IFATs	Integrated Factory Acceptance Trials
IFF	Identification of Friend or Foe
IN	Indian Navy
INCO	International Commercial
I-Note	Inspection Note
ISNT	Indian Society for Non-destructive Testing
JRI	Joint Receipt Inspection
JSG	Joint Services Guide
LCU	Landing Craft Utility
LP	Low Pressure
LST	Landing Ship Tank
MAR	Manufacturer's Application for Registration
MCMV	Mine Counter Measure Vessel
MIL Std	Military Standard
MO	Material Organisation
MPT	Magnetic Particle Testing
MQAP	Master Quality Assurance Plan
MTC	Manufacturer's Test Certificate
NABL	National Accreditation Board for Testing and Calibration Laboratories
NAI	Naval Armament Inspection
NAVAIDS	Navigational Aids
NBC	Nuclear Biological Chemical
NBCD	Nuclear Biological Chemical Damage
NCAGE	NATO Commercial and Governmental Entities
NCD	Naval Construction Document
NDT	Non-Destructive Testing
NEC	Naval EMI/EMC Center
NES	Naval Engineering Standards
NHQ	Naval Headquarters
NLC	Naval Logistics Committee
NSQR	Naval Staff Qualitative Requirement
NSS	Naval Shock Specifications
NTG	Naval Technical Group
OEM	Original Equipment Manufacturer
OGT	Ocean Going Tugs
OPA	Order Placing Authority

OPV	Offshore Patrol Vessel
PAC	Proprietary Article Certificate
PC	Purchase Committee
PCB	Printed Circuit Board
PCN	Personnel Certification in Non-destructive Testing
PDI	Pre-Dispatch Inspection
PIL	Parts Identification List
P&ID	Piping and Instrumentation Diagram
PO	Purchase Order
POL	Petroleum Oil and Lubricants
POTS	Purchase Order Technical Specification
PTS	Purchase Technical Specification
PSPP	Part Supply Part Payment
QA	Quality Assurance
QAE	Quality Assurance Establishment
QAO	Quality Assurance Officer
QAP	Quality Assurance Plan
QAD	Quality Assurance Document
QC	Quality Control
RFP	Request for Proposal
RT	Radiographic Testing
RVSS	Random Vibration Stress Screening
SCADA	Supervisory Control and Data Acquisition
SCQA	Standard Conditions for Quality Assurance
SDB	Seaward Defence Boat
SDoC	Supplier’s Declaration of Conformity
SO	Supply Order
SOTR	Statement of Technical Requirement
SQAP	Standard Quality Assurance Plan
STC	Supplier’s Test Certificate
TC	Test Certificate
TCSS	Thermal Cycling Stress Screening
TE	Tender Enquiry
TEC	Technical Evaluation Committee
TNC	Technical Negotiation Committee
TSP	Technical Specifications
UT	Ultrasonic Testing
UUT	Unit Under Test
UWT	Underwater Telephone
VCI	Vapour Corrosion Inhibitor
VPCI	Vapour Phase Corrosion Inhibitor
WESEE	Weapons & Electronics System Engineering Establishment


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RECORD OF AMENDMENTS

Ser	Date of Amendment	Amendments	Authority	Remarks
1	03 Apr 2017	QAD – R01	DQA(WP)	Initial Issue
2	27 Jul 2022	QAD – R02	DQA(WP)	First Revision

Chapter 1

Chapter 1

INTRODUCTION

0101. All systems and equipment including Naval Stores and their spares procured for installation/ use onboard Indian Naval ships and submarines are required to meet stringent quality standards so that they can operate at optimal levels under adverse conditions in which Indian Naval Ships operate. This warrants that the critical equipment/ systems undergo Quality Assurance (QA) norms/ inspections in accordance with the provisions contained in this document.

0102. An order can be for a system, equipment or spares. For clarity and uniform understanding by all stake holders, these are defined as under:-

(a) **System**. System refers to any combination of equipment interconnected through pipes, cables, wires, belt, hanger, couplings etc and designed to perform as a composite unit to meet an intended and pre-defined performance; like, Propulsion System, Power Generation System, Navigation System, Air Conditioning System, Weapon and Radar System, Communication System, Combat Management Systematic.

(b) **Equipment**. Equipment refers to a combination of assemblies, sub-assemblies and components which are interconnected and linked together to independently perform a specific and defined function within any system like; Pump, Diesel Engine, Air Compressor, Motor, Generator, Valve, Heat Exchanger, Radar, Antenna, Navigation sensors including Gyro, Log, ECDIS, Echo Sounder, Gear Box, various sensors, , Launchers, Communication Equipment, Sonars etc.

(c) **Spares.** Following can be categorised as spares:-

(i) **Assemblies**. These are parts of equipment and are combination of components that would constitute standalone functional equipment by itself; like Turbo Chargers, Engine Driven Pumps, Relief Valves, Rectifiers, Convertors, Multi-function Consoles etc.

(ii) **Sub-Assemblies**. These are also combination of components but would not constitute any standalone functional equipment by themselves; like Rotor Assembly, Tube Stack Assembly, Impeller Assembly etc.

(iii) Independent and individual components.

0103. **Inspection Authority**. Directorate of Quality Assurance (Warship Project) and Directorate of Quality Assurance (Naval) {i.e. DQA(WP) & DQA(N)} are the Inspection Authority for *IN* warship projects / equipment / spares, as nominated by the Order Placing Authority (OPA).

0104. **Quality Assurance Officers**. The Chief Quality Assurance Establishments (CQAEs) and Quality Assurance Establishments (QAEs), located at various regions of the country, are the field establishments of DQA(WP) and DQA(N). The Heads of these establishments are designated as Chief Quality Assurance Officers (CQAOs) and Quality Assurance Officers (QAOs) respectively. They are responsible for undertaking Quality Assurance (QA) activities to assure that stipulated parameters in the governing

specifications / SOTRs are met. The QA cover is a process which commencing with the issue of Purchase Order (PO) and culminates with delivery of product to the customer.

0105. The 'Supplier', at any point from receipt of RFP/TE, may seek clarifications on QA related aspects from the concerned Inspection Agency (the local CQAE/ QAE) or also from Inspection Authority {DQA(WP)/ DQA(N)}, if necessary. Contact details of various QA agencies are available at the DGQA website (http://www.dgqadefence.gov.in). The addresses of correspondence for the Inspection Authorities are as furnished below:-

DQA(WP)	**DQA(N)**
B-Block, 6th Floor	West Block – 5
Defence Offices Complex	Sector-1
Africa Avenue Marg	RK Puram
New Delhi - 110 023	New Delhi - 110 066
e-mail- dqawp@navy.gov.in	e-mail- naval-dgqa@nic.in

0106. **Dual Inspections**. Certain platform level inductions are done through registered Third Parties. In such cases, mission critical equipment is inspected under Dual Inspection norms. For equipment covered under dual inspections by Class and Naval QA Agencies, the QA coverage according to QAP approved by DQA(WP)/DQA(N) is mandatory. On successfully completion of inspections as per the approved QAP, 'Inspection Completion Certificate' is to be issued by the CQAE / QAE. The OEM may associate the Class whilst QAE is undertaking inspection for economy of efforts. The Inspection Note shall be issued by the nominated Third Party.

0107. The Order Placing Authorities (OPAs) to forward copy of POs (along with technical specifications / SOTR and TNC minutes) to concerned CQAE / QAE and also to concerned DQA. These POs are to be forwarded through fastest available means like e-mail (in addition to registered post), to ensure that the PO is available with Inspection Agency / Inspection Authority within 48 hours, post issue of PO. Subsequently, the Supplier to contact CQAE/QAE **within five working days** of the receipt of PO, to initiate QA cover. The First Contact Letter (FCL) by respective CQAE/QAE to be issued to the Supplier **within 07 working days** of receipt of PO. The FCL is to be forwarded to Supplier by e-mail in addition to registered post. Further, the First Contact Meeting (FCM) is to be held between the Supplier and CQAE/QAE **within 15 working days** of receipt of PO. The FCM may be conducted through any of the available means such as Video or Tele-Conferencing etc., and a need for physical meeting is to be kept to minimum inescapable cases only. Copy of Minutes of FCM is to be forwarded to the OPA and DQA, clearly mentioning the timelines for submission of various documents by Supplier and plan of action to execute PO within the Delivery Period (DP). Issues, if any meriting OPA / DQA intervention is to be mentioned explicitly in the FCM. The CQAE/ QAE shall issue 'Delay Notice' to the firm under intimation to OPA, in case it is assessed that the PO is unlikely to be completed within the DP. A reasonable time frame for issue of 'Delay Notice' is to be worked out during the FCM depending on the type of system/ equipment to be inspected. Towards streamlining the process for better understanding, planning of activities and seeking commitment from the firm at the beginning of the project, an 'Annexure', seeking information/ details wrt PO is placed at **Appendix 'A'**. The field unit to forward this Annexure as 'Encl' to the First Contact Letter (FCL). The details/ inputs provided by the firm are to be discussed during the FCM for finalisation of Inspection Coverage schedule so as to meet the PO timelines/ take-up necessary amendments in DP.

0108. Manufacturing is to commence only on availability of approved QAP issued by the Inspection Authority. In case the Supplier intends to supply equipment/ spares which are manufactured and are already held in their store (prior to the date of issue of PO) or intends to use previously manufactured assemblies/ sub-assemblies/ components to manufacture the ordered equipment/ system, the same should be approved by the OPA and indicated in the PO, Minutes of TNC, NLC, PC etc.

Chapter 2

Chapter 2

PRE - REQUISITES

0201. Quality Assurance cover is provided by the Inspection Authority, through the local Inspection Agency only when the PO mandates and authorises the Inspection Authority and the specific Inspection Agency to provide the QA cover. The pre-requisites for undertaking QA inspections are as follows:-

(a) A valid PO.

(b) Complete set of drawings, approved by designated agencies as provided at Chapter 3.

(c) Quality Assurance Plan (QAP) approved by the Inspection Authority and valid for the instant PO or Approved Inclusion / exclusion of SQAP (if SQAP is available for the equipment / spares).

Or

Approved Part Identification List (PIL / DBOM) in case of inspection against OEM Technical Specifications.

(d) Acceptance Test Plan (ATP) approved by the Professional Directorates of NHQ / Command Headquarters, if applicable.

0202. Each of the equipment / item mentioned in the PO should be unique and traceable by unique Part No and/or unique drawing(s).

0203. QA coverage is not necessary for items procured against supplier's warranty/ guarantee. Therefore, DQA(WP)/ DQA(N) have no role to play in such procurement cases. The Order Placing Authorities (OPAs) are not required to forward such POs to the QA Directorates or the Field Units.

0204. Conformity to the details provided in PO and those submitted by the OEM/ Supplier viz., Part Identification List (PIL), approved OEM documents etc, is important. Quality Assurance (QA) cover will be provided with respect to the specifications in the PO and hence any mismatch of details may impair further progress of QA cover. Wherever approved drawings and PILs of equipment are available, the same are to be specified in the PO.

0205. Necessity for Type Testing and Qualification Testing (like Shock Test, Environmental Tests, EMI/ EMC Tests, Endurance Trials, Ingress Protection Test, etc) are to be clearly indicated in the PO. All equipment is mandatorily required to be Type Tested, if not done earlier. The responsibility for this rests on the OPA. Type testing has its own financial implications and hence it is important that this requirement is catered at RFP stage itself and accordingly the bidder need to indicate the costing for type testing in the quotation. Benchmarking of the type test costing is to be done by procurement committee in consultation with relevant stake holders, prior issuance of RFP. Further, the undertaking of Type Test is to be mandatorily discussed during TEC/ TNC and CNC and recorded in Minutes. OPAs may obtain inputs in this regard from the local QA agency during the RFP and/or order placement stage. Further, type testing need to be considered for replenishment / MO orders also (e.g. for ABER replacement, Indigenised

spares etc). In such cases, it needs to be ensured that type test is considered as part of the MO order and that the applicability of type test is clearly mentioned in such MO POs.

0206. Requirement of conducting Functional Trials/ FATs/ IFATs of the system/ equipment is to be specified in the PO.

0207. Order Placing Authorities (OPAs) are to include the latest version of QAD-R03 as reference document for QA in the RFPs and POs.

0208. **Pre - Requisites**. The OPAs, wherever feasible, may include the scope under 'Remote Inspection' as part of the RFP and in Contract/PO, so that the firm(s) can quote/ prepare accordingly and it becomes binding on them. The Inspection Agency shall provide QA coverage / undertake the 'Remote Inspections' for the said scope.

Chapter 3

Chapter 3

DRAWINGS

0301. The drawings are to have all details as necessitated to ensure compliance to the requirements of PO and are to be in compliance to BIS-SP 46 as amended from time to time. The version of BIS Standard ibid that is in force at the time of order placement shall be used for approving drawings.

0302. The drawings for induction/shipyard orders are to be approved in accordance with the procedure placed at **Appendix 'B'**, by authorities as under:-

(a) By Professional Directorate for compliance to NSQR / SOTR.

(b) By Production Directorate wrt to installation

(c) By Inspection Authority wrt to Quality Assurance

0303. The process flowchart for approval of drawings is depicted in **Figure 1 & 2**.

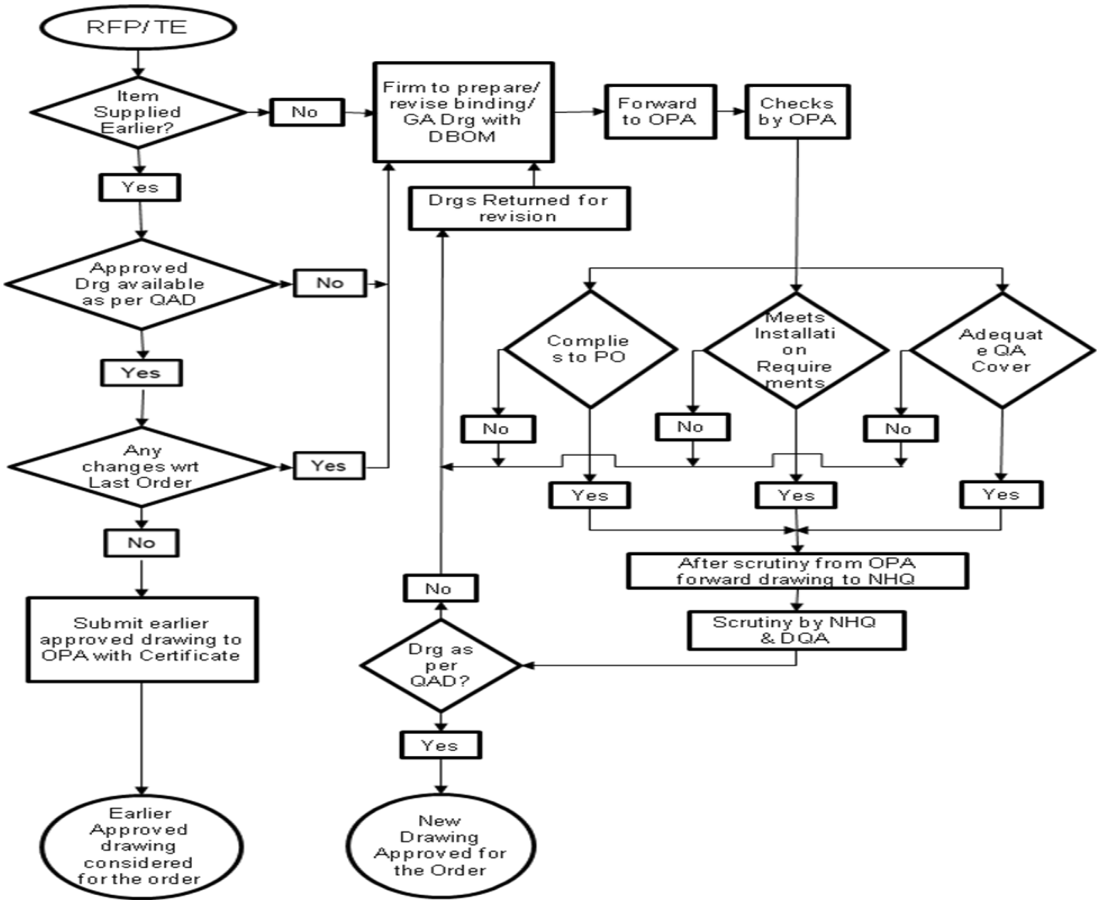


Fig 1 : Process Flowchart for Approval of Drawings – Shipyard Orders

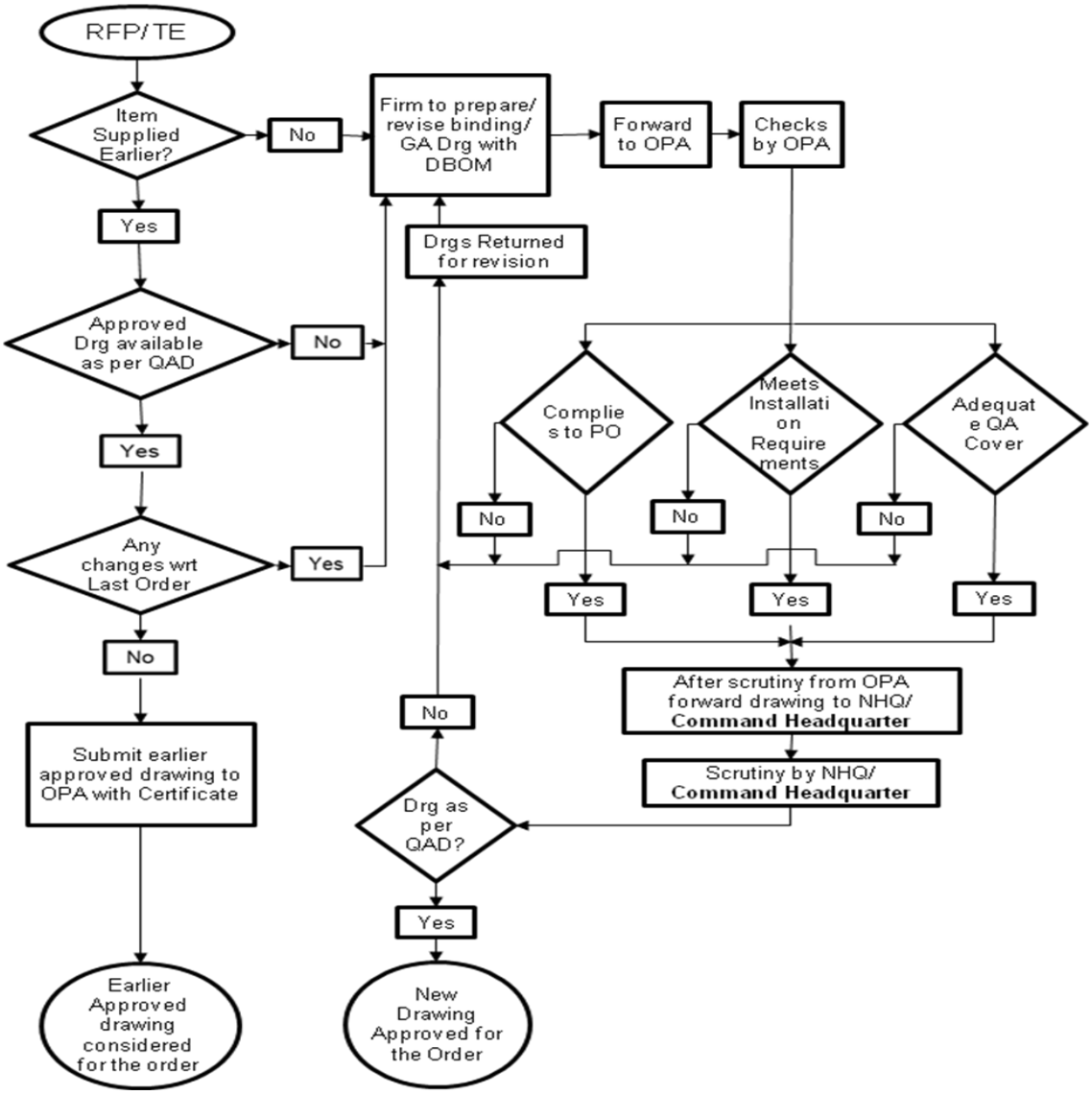


Fig 2 : Process Flowchart for Approval of Drawings - MO Orders

0304. Drawings for orders placed by NHQ and Material Organisations are to be approved by concerned Professional Directorates at NHQ or by the Command Headquarters. When equipment/ systems of same make and model are used across two or more Commands, drawings approved by one of the Command Headquarters will be acceptable. Drawings approved by Indigenisation Units during the development/ prototype stage are to be approved by the respective Command Headquarters for bulk production.

0305. Applicability of drawings, including for repeat or replenishment orders placed by Shipyards and/or Navy (NHQ/MOs) will be governed by the provisions provided at **Appendix 'C'**. Details and methodology for submission and reference of drawings for replenishment orders are placed at **Appendix 'D'**. Repeat/Replenishment orders for equipment/ systems that have been inducted into the Navy through Third Party/Class QA cover in the past, will be treated as first time inductions for the purpose of QA cover through DGQA.

0306. All previously approved drawings and QAPs being used is to be the latest approved version available, irrespective of the fact that the present equipment/ item in use has been accepted against a previous version. Similarly, all governing standards and specifications related to inspection methodology will be of the latest revision/edition irrespective of the fact that the present equipment/item in use has been accepted against previous version.

0307. Equipment, already qualified type approval tests, need not mandatorily be subjected to repeat Type test and abridged type test can be undertaken. The repeat type test, if deemed necessary, is applicable for only those independent functional units, which have undergone changes. However, in case such changes do not affect equipment specifications, an "Abridged Type Test" protocol can be proposed, giving due justification, by the OEM.

0308. In cases where detailed drawings are to be submitted in accordance with the provisions at Appendix ‘B’, the drawings should be submitted as a complete set with GA drawing and Manufacturing drawings (Sub assembly/Component drawings, Component Layout Drawing, Wiring Chart, Cable Schedule, Connector Details etc). The GA and manufacturing drawings are to be mutually identified and duly linked with one another.

0309. The detailed/component drawings, irrespective of being submitted for approval or presented at site for inspection, should include (may not be limited to) the following:-

(a) Dimensions with units and tolerances.

(b) Surface finish.

(c) Main Assembly/ Sub-assembly details.

(d) Detailed Bill of Materials (DBOM)/Part Identification List (PIL) along with Material Specifications including grade, condition and specification number, ‘Make’ & ‘Model’ in case of COTS items, and condition of Indigenised, imported, bought out and COTS

(e) For Sub-component drawings, correlation details with the PIL & Main Assembly Drawing.

(f) Marking, Packaging & Preservation details.

(g) Weight with tolerance.

(h) Working/Test Pressures and working medium/testing medium.

(j) Product specific testing requirements and acceptance norms thereof.

(k) NDT zones and Quality level of NDT and acceptance norms thereof.

(l) ET/ESS and Type Test requirements.

(m) Details of Type testing along with validity, if already type tested

(n) Weld details and acceptance norms thereof.

(p) Manufacturing process/process flow chart for major components.

(q) Painting Procedure with specifications.

0310. In addition to above, following are mandatory for electrical system drawing:-

(a) Schematic diagram indicating inter-panel connectivity.

(b) The GA drawings that will establish the physical disposition of panels wrt each other.

(c) The GA drawings of subunits along with DBOM and relevant reference for wiring chart/cable schedule and component layout drawings.

(d) The DBOM is to form the basis of PIL up to component level and both BOM and PIL should map one to one as in case of mechanical items.

(e) Maintenance envelope requirement.

0311. Drawings should also clearly indicate items/components/sub-assemblies that are imported, bought out and COTS along with full details thereon. This should include the source of procurement/import, the make and model of the bought-out/COTS items. In case of electronic modules fabricated/assembled indigenously with imported/bought out components, requisite information to ensure quality, traceability and non-inclusion of any kind of malicious code is to be provided.

0312. The size of drawings presented are to be such that all indicated parts are clearly and unambiguously identifiable with a minimum letter font size of Arial 10, subject to minimum A3 size.

Chapter 4

Chapter 4

QUALITY ASSURANCE PLANS

0401. The QA cover will be provided in accordance with the approved QAP issued by the Inspection Authority. For each PO, either the approved QAPs will be specified in the PO or a new QAP will be drawn and approved afresh.

0402. Standard / Master Quality Assurance Plans (SQAPs/MQAPs) have been formulated and promulgated for large number of commonly used systems/ equipment/ components with participation of all stakeholders viz., Professional and Production Directorates at NHQ, Field Units of DQA(WP) / DQA(N) and the industry. Systems/ equipment for which SQAPs/MQAPs are not promulgated an existing approved QAP may be applicable with or without changes. In case approved QAPs are not existent, fresh QAP is to be drafted by the manufacturer, taking reference of below mentioned documents and submitted to the Inspection Agency for approval by the Inspection Authority. The documents under reference are to be taken for guidance only and the various tests and other requirements of Quality Assurance will be governed by the QAP as approved by the Inspection Authority based on PO/Purchase Technical Specification/TNC Minutes:-

(a) Guidelines for Quality Assurance for Engineering and Hull equipment for Indian Naval Warships.

(b) Generic QA guidelines for Electrical/Electronic equipment.

(c) QAPs issued previously.

(d) Various Standard / Master Quality Assurance Plans (SQAP/ MQAP).

0403. The approved QAP could be an SQAP/MQAP or a previously approved QAP or a new QAP. The applicability of the QAP will be as per the provisions placed at **Appendix 'E'**.

0404. The QAP is to cover all components, sub-assemblies and full assemblies including motors, control panels, consoles etc. The Customer Hold Point / Critical to Quality (CTQ) parameters in the QAP are to be identified and indicated accordingly along with other inspection criteria and parameters.

0405. The formulation and approval of QAPs for various types of order/procurements will be governed by the provisions enumerated in succeeding paragraphs.

0406. For a system/equipment for which SQAP/MQAP has been issued, only the relevant SQAP/MQAP shall be acceptable. Formal approval to use the QAP will be accorded as under:-

(a) Where SQAP/MQAP for the instant system/ equipment / item has been issued and uploaded on the DGQA website / available with RFP on the day of submission of offer by the firm, the relevant SQAP / MQAP will be the approved QAP for the instant order.

(b) In case the instant supply has components and/or processes not covered in the SQAP/MQAP or certain clauses of the SQAP/MQAP are not applicable due to material/ design/ manufacturing process aspects, the firm is to seek confirmation with respect to inspection aspect and norms of new introductions. The relevant SQAP/MQAP with these amendments/ introductions will then be the approved QAP for the instant order. SQAP/MQAP will subsequently be amended to incorporate these aspects during future reviews, whenever due.

0407. No other form or variant of QAP will be acceptable for equipment/system for which SQAP/MQAP has been issued and available. If certain inspection schedules of the SQAP are not applicable and/or certain inspection schedules needs to be included, the Supplying Agency is to seek approval for exclusion/ inclusion of the same from the Inspection Authority. In absence of a specific request, it would be deemed that use of SQAP/ MQAP is acceptable.

0408. **Previously Approved QAP for Replenishment Orders**. In case of replenishment orders, if the firm who had supplied the system/ equipment earlier is to be allowed to use the previously approved QAP, even if SQAP/MQAP is promulgated prior to placement of order; justification for the same is to be discussed and recorded during TEC/ CNC/ PC/ NLC. The PO is to be issued with the previously approved QAP No and date specified as the approved QAP for the order with directives for Supplying Agency to submit the approved QAP for ratification by DQA(WP)/DQA(N). The Supplying Agency in such cases has to submit an undertaking that the system/ equipment has not undergone any changes in terms of design, architecture, dimension, material specification, duty point, internal configuration, manufacturing process, governing standards/ specifications and environmental conditions to which the system has been proved earlier. Concurrence for use of the existing QAP with/ without changes will be issued by Inspection Authority on receipt of request from the Supplying Agency, provided the Part No, drawing No, description, SOTR/ technical specifications of the item mentioned in the current PO matches with the earlier POs issued for the same item. In case the system/ equipment have undergone changes warranting complete/ partial repeat of Type Testing, the inspections shall be undertaken as per the SQAP/MQAP.

0409. Where there are changes with respect to last supply, the drawings and/or DBOM needs to be amended and approved as per extant rules. Subsequently, the firm should submit draft QAP, incorporating changes where required with respect to existing QAP, through the Inspection Agency to seek approval. It will be imperative that validity of the Type Tests as per earlier design is ratified by Competent Authority without which all Type Tests, as applicable, will need to be undertaken for current production. Approval for use of the amended QAP with/without changes will be issued by Inspection Authority on receipt of request from the Supplying Agency. In case use of previously approved QAP is to be allowed, despite of the changes, the same is to be discussed and recorded during TEC/ CONC/ PC/ NLC. The PO is to be issued with the previously approved QAP No and date specified as the approved QAP for the order with directives for Supplying Agency to submit the approved QAP for ratification by DQA.

0410. In case of fresh QAP being drafted by the firm, it should conform to provisions of SQAP/ MQAP and/or latest version of approved QAPs issued earlier, where applicable. Whilst existing QAP for same/similar equipment/ system supplied earlier can be taken for guidance, any changes required in terms of addition/deletion of tests or modifications that has been necessitated view lessons learned and/or technological advancements, needs to be verified and confirmed from the Inspection Authority prior undertaking any manufacturing activity. Reference documents such as FATs protocol, ATP etc that are separately approved by Design Authority/Professional Directorates are to be explicitly specified in the draft QAP so as to obviate varied interpretation during inspection phase.

0411. All queries with regards to offering inspection as per SQAP/MQAP or using an existing QAP, with or without changes or submission of a draft QAP for fresh approval are to be through the local QAO for final approval by the Inspection Authority. Since the QAP flows from the PO and drawings therein, all queries and draft QAP shall be forwarded/submitted along with copy of PO and references/approved drawings, as per the provisions placed at **Appendix 'C'**.

0412. DQA and the Field Units will provide required clarifications and confirmation on applicability and/or validity of relevant SQAP/MQAP /previously approved QAP for a system/equipment/item as and when the relevant details like previous PO, I-Note reference, equipment/item specifications like drawing No and approved QAP etc are provided, even during the indenting or tendering stage. In addition, an intending Supplier can also seek these clarifications on receipt of RFP and before submitting their offer, if it so desires. All such clarifications are to be sought through the concerned local QAO under intimation to OPA and Inspection Authority. The Inspection Authority will accord concurrence or otherwise within seven working days of receipt of request from the firm.

0413. **Available SQAPs / MQAP / Approved QAPs**. Wherever SQAP/MQAP or previously approved inclusion & exclusion of SQAP/MQAP or previously approved QAPs are available, the same need to be discussed during PNC stage & during FCM, and be mentioned in the PO. The inclusion / exclusions of SQAP/ MQAP, if any, need to be approved from Inspection Authority, through Inspection Agency. Wherever the details of approved QAP are not provided in the PO, the approval is to be sought from the Inspecting Authority as per the applicable clauses placed at **Appendix 'E'**. The process for QAP approval is as follows:-

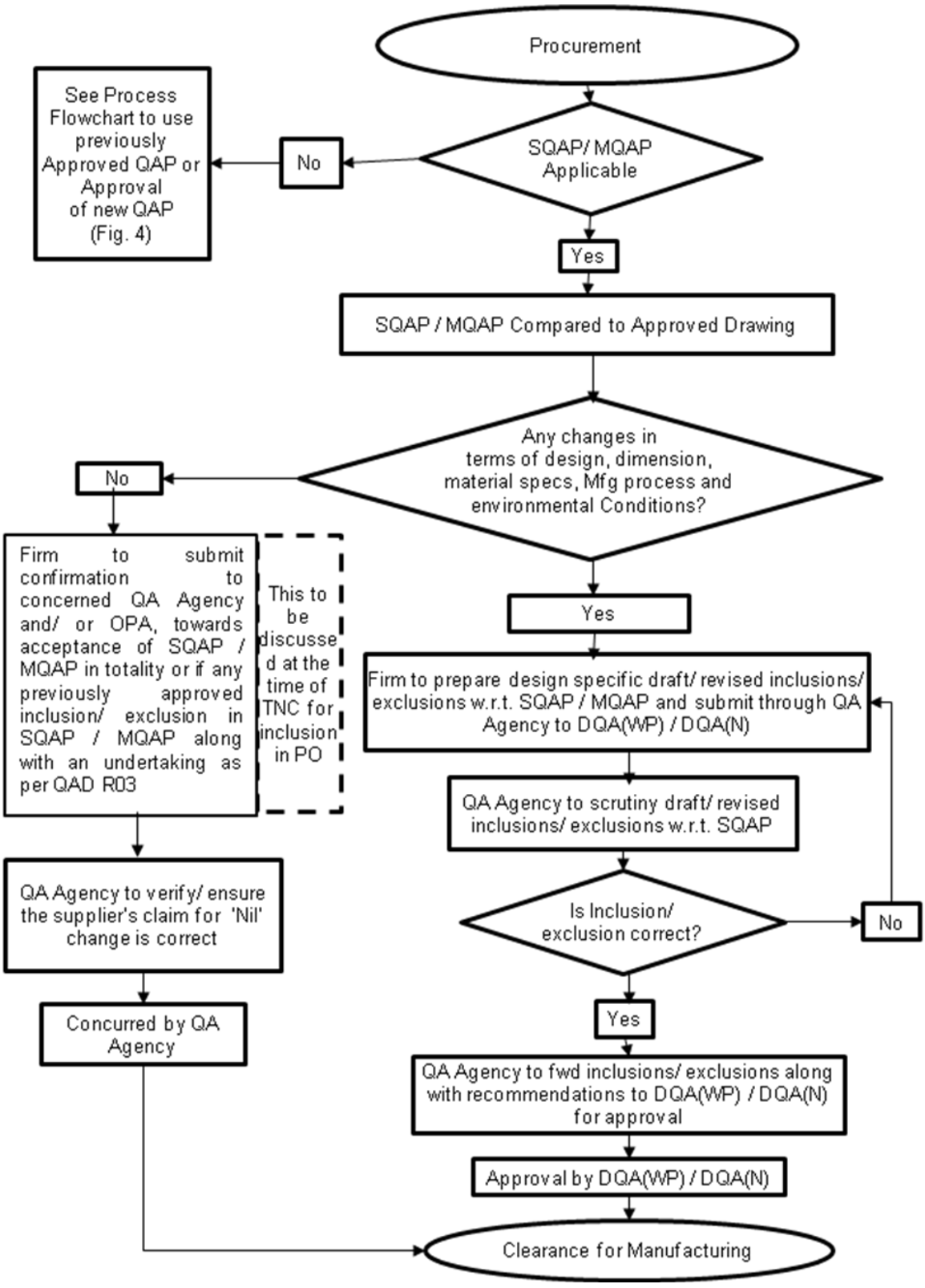


Fig 3 : Flowchart for use of SQAP/MQAP or Approval of its Inclusion / exclusion

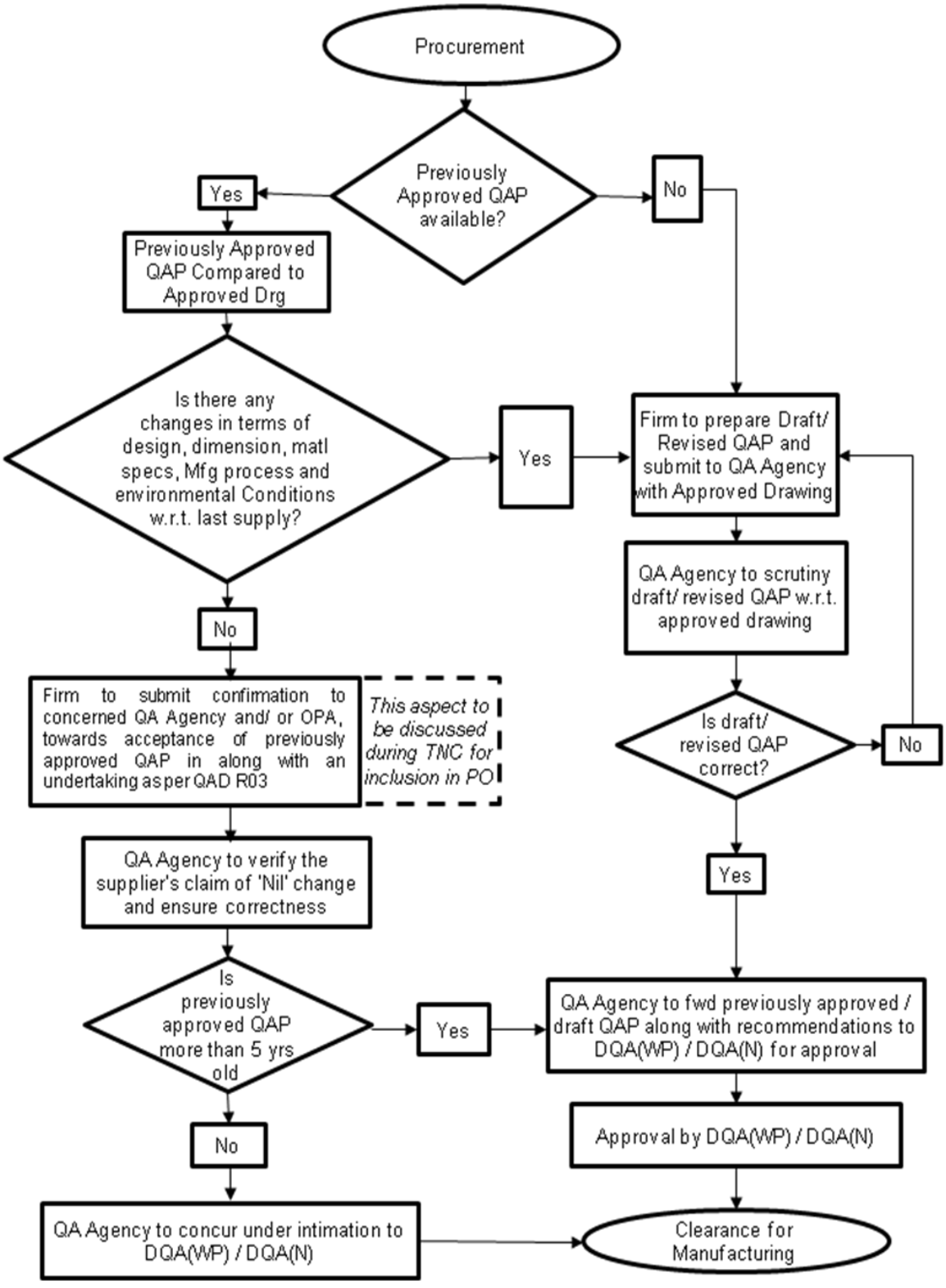


Fig. 4 : Flowchart to use previously Approved QAP or Approval of draft QAP

0414. **Concurrence to Use Previously Approved QAP for Repeat / Replenishment Orders**. In order to accelerate the inspection process, the Field Units (Inspection Agencies) under DQA(WP) & DQA(N) are authorised to give concurrence to use '*previously approved QAPs*' / '*previously approved SQAP/MQAP inclusion/ exclusion*' for inspection in case of repeat/ replenishment orders. In such case where the Supplier intends to use '*previously approved QAP'* or '*SQAP's / MQAP's inclusion/ exclusion* ', for inspection, a formal request for the same is to be submitted by the supplier by e-mail with an undertaking that "*There has been Nil changes in the system/ equipment/ assembly/ sub-assembly/ component in terms of design, architecture, dimension, material specification, duty point, internal configuration, manufacturing process, governing standards/ specifications and environmental conditions to which it was proved earlier*". On receipt of the request, the concerned Field Unit is to verify/ ensure that the Supplier's claim for 'Nil' change is correct and tender concurrence for use of previously approved QAP or inclusion/ exclusion by return e-mail **within 03 working days**, under intimation to DQA(WP). However, the previously approved QAP will **not** be applicable in following cases:-

(a) The previously approved QAP is more than five years old. This clause is only applicable for DQA(WP) approved QAPs. In such cases the previously approved QAP is to be forwarded to DQA(WP) for re-validation.

(b) SQAP/MQAP has been promulgated by DQA(WP)/DQA(N), for the particular system/ equipment/ assembly/ sub-assembly/ component. In such cases where SQAP/MQAP is available / promulgated, an Inclusion/ exclusion request is to be forwarded to DQA(WP) / DQA(N) for approval.

(c) The system/ equipment/ assembly/ sub-assembly/ component has undergone changes in terms of design, architecture, dimension, material specification, duty point, internal configuration, manufacturing process, governing standards/ specifications and environmental conditions to which it was proved earlier. Draft QAP is to be submitted by the firm for approval of DQA(WP)/ DQA(N) in all such cases.

(d) The previously approved QAP, was approved by other QA agencies (Eg TPIA), and not through DQA(WP)/DQA(N).

0415**. Use of Generic QAP/ Master QAP (MQAP)/ Order Specific QAP promulgated by DQA (N).** There are varieties of electrical/ electronic equipment where Generic / Master QAP have been promulgated by DQA(N). In such cases, Field Unit may include reference of applicable Generic QAP/ MQAP, if available. The same are to be used for QA purpose in conjunction with SOTR/ TNC minutes, approved drawing and ATP applicable for respective orders. These QAPs are valid till the next revision as and when issued. In case of order specific QAP was promulgated earlier for a specific equipment of a particular supplier, the same may be used subject to no change in earlier approved drawing & ATP. In case of any change, either fresh QAP is to be prepared or applicable Generic QAP may be used in conjunction with SOTR/TNC minutes, approved drawing/ Binding Data and ATP duly approved by professional directorates/ command headquarters.

0416. **QAP for Indigenisation/ Developmental Orders**. Most of cases of Indigenisation involve reverse engineering through iterative process. However, a number of tests are involved in the QAPs as CHPs post placement of order, which have not been catered by the vendor in terms of cost, time and infrastructure. Further, to ensure quality and structured involvement of the user rep during the indigenization process, it is essential that the design drawing and acceptance trials document be vetted by the appropriate agencies at Command level and QAPs by the QA Organisation. QAPs of such Indigenisation/ Developmental projects can be 'Provisionally Approved' by DQA(N)/ DQA(WP) based on approved SOTRs, initially approved design, drawings, purchase technical specifications etc. NHQ/ DoI Policy DI/ 1000/ Policy dated 29 Dec 23 may be referred for details on the subject.

0417. **Utilisation of DMDE Approved QAPs for Replenishment Orders by MOs.** The DMDE orders are inspection against the DMDE approved QAPs and that:-

(a) The DMDE QAPs, are developmental QAPs, and are thus more comprehensive as compared to the normal QAPs. Thus, the DMDE QAPs have additional tests/ checks which are required during the developmental stage. These additional tests/ checks may not be essential during the subsequent QA checks for the replenishment orders by MOs.

(b) DMDE is the main authority and that the same is required to be amended to DQA(WP) in the subsequent replenishment orders. The DMDE QAPs accepts QA inspections/ checks i.e. like Mechanical & Chemical properties, against 'Test Certificates' of supplier. However, DQA(WP)/DQA(N) approved QAPs accepts only against NABL TCs. Similarly, the DMDE QAPs accepts the Non Destructive tests (NDT) against Supplier's Inspection report (IR), and that in DQA(WP)/DQA(N) QAPs, the same is accepted against of NDT report i.a.w DQA(WP) Policy Letter No. 12575/Policy/DGQA/WP-TC dated 25 Mar 22.

(c) The approval procedure of QAPs has its own lead time. This 'lead-time' is to be avoided by considering the existing approved DMDE QAPs for that item. Thus, the re-approval of the DMDE QAPs is not essential. This paragraph is to be read in conjunction with para 0415 (e) (iii).

(d) The existing DMDE approved QAPs therefore can be utilised for the subsequent replenishment orders by MOs, however with necessary amendments. The amendments required in DMDE approved QAPs for subsequent replenishment orders primarily comprises of following:-

(i) Few 'Exclusions' of the additional checks (which were relevant for developmental stage only).

(ii) Few administrative amendments like, mentioning of DQA(WP)/DQA(WP) in place of DMDE, as the Authority.

(iii) NABL TCs in place of TCs and NDE report in place of TC/ IR.

(e) Accordingly, the QA checks for all replenishment orders by MOs, pertaining to the DMDE developed items, be undertaken as mentioned below:-

(i) The DMDE approved QAPs be followed for progressing the QA inspections for the replenishment orders of MOs.

(ii) In the DMDE approved QAPs, DQA(WP) / DQA(N) will be the authority by default, in place of DMDE for undertaking the QA inspections.

(iii) An 'Exclusion' for the additional checks, which are considered not essential for replenishment orders, may be taken up concurrently with DQA(WP) / DQA(N), either through email or a VC, for early approval of the same.

(iv) 'Inclusion' in the DMDE approved QAPs need to be avoided to the extent feasible. However, if there are any un-avoidable 'Inclusions', the same be forwarded / discussed on VC for early perusal and approval.

(v) The vetting and acceptance of material test reports, NDT reports, RT films, lab reports etc. are to be undertaken as in the case of other replenishment orders issued by various naval agencies.

Chapter 5

Chapter 5

OUTSOURCED COMPONENTS/ ITEMS

0501. Whilst it is the prerogative and mandate of the Supplier to manufacture or source manufactured components as deemed necessary, it is imperative that the information is provided in the approved drawings to facilitate smooth QA cover. The mode of sourcing is to be indicated in the approved drawing/DBOM explicitly. QA cover for the components which are manufactured in-house will commence with raw material inspection, followed by in-process inspections, testing & trials as necessary and culminates with inspection of preservation & packing and final dispatch clearance. QA cover for components which are sourced from other manufacturers/ suppliers (outsourced components/items) will be provided in accordance with the provisions provided in succeeding paragraphs.

0502. The following will constitute as outsourced components:-

(a) Imported items.

(b) Commercially off the Shelf (COTS) items.

(c) Bought-out items.

(d) Sub-contracted items.

0503. Input materials which go for further processing and manufacture like metal plates, billets, stocks, sections, tubes, wires, cables, metallic & non-metallic sheets etc will not be treated as outsourced components. POLs, chemicals, critical components of safety and life saving systems etc, though available commercially, will not be considered as outsourced/ COTS for the purpose of QA cover. Accordingly, these will be tested for all requirements as necessitated by the governing standards. For some input materials, where the quantities are meager and all tests as per governing standards not feasible/ viable, the same may be accepted against STC.

0504. **Imported Items**. Imported items are those which are manufactured in a foreign country and imported to India. The VI & DI of imported items is not mandatory. Imported items are to be accepted against submission of following documents only:-

(a) Bill of Lading/ Shipping Bill/ Airway Bill.

(b) Invoice by OEM/ Country of Origin certificate of equipment with packing list.

(c) Bill for entry to warehousing

(d) Supplier Declaration of Conformity (SDoC) /Certificate of Conformity (CoC) indicating governing specifications and values to which the items are tested along with OEM Test Certificates/ Test Reports/ Catalogue/ Data Sheet.

(e) Guarantee/ Warranty Certificate from the supplier/ OEM as per PO.

(f) Non-inclusion of Malicious Code Certificate in case of active electronic components. A certificate as per **Appendix 'F'** is to be submitted by the firm to the concerned Inspection Agency.

0505. **Inspection of Imported Consumables (Eg Gases & Chemicals)**. The firms are to do the packaging of stores in appropriate containers, as per the terms and conditions of the contract / PO, at the country of origin itself, prior transportation of delivery to consignee.

0506. To cater for different types of documents issued by different agencies and different formats and formalities across various countries, documents as indicated against each at **Appendix 'G'** will be acceptable as valid documents for providing QA cover for imported items.

0507. **COTS Items**. COTS items cover that items/ equipment which are available in the open market, are under the regular production of the firm and can be procured off the shelf without having to give a specific manufacturing order.

0508. COTS/Catalogue items will be accepted on the basis of Suppliers Test Certificate (STC) and/or Supplier Declaration of Conformity (SDoC) /Certificate of Conformity (CoC) with following conditions:-

(a) Suppliers Test Certificate (STC) is issued by the original manufacturer of the COTS item. Supplier Declaration of Conformity (SDoC) /Certificate of Conformity (CoC) is issued by the equipment manufacturer or integrator who has sourced the COTS item for use in the equipment. SDoC/CoC/STC must indicate governing specifications and values to which the item has been tested and must conform to 'Form, Fit and Function.

(b) In case of manufacturers certified under relevant quality standards (like ISO, OSHAS etc), the pre published data sheet or company quality policy bringing out the details of test carried out on specific items may be accepted.

(c) Indian Navy reserves the right to test a sample out of that supplied, for conformity to desired specification. Failure of the test sample will make the supplier liable for rejection/return of the entire lot. The test may be undertaken by *IN* anytime during the guarantee period at an NABL accredited lab.

0509. **Bought-Out Items**. Bought-out items are those which are in the general product range of the manufacturing firm, but manufactured on placement of specific order by main firm and production is covered by the main firms' quality control program. Bought out items manufactured indigenously will be subjected through QA inspection unless otherwise specified in the PO. Where bought out items are not subjected to inspections, relevant test certificates/reports and compliance certificate is to be submitted by manufacturer indicating governing specifications and values to which the item has been tested.

0510. **Sub-Contracted Items**. These are such items/components manufactured by a sub-contractor of the main firm against specific purchase order from the main firm and with reference and relevance to the PO/TSPs of the main order.

0511. In case parts/components are being outsourced, the main Supplying Agency is required to submit ink/ digitally signed copy of sub-order and ensures that the outsourced items meet the specifications/standard. Subcontract must include the main PO reference and governing specifications clearly as mentioned in main PO. Inspection where required, is to be carried out at sub-contractor's premises as per approved drawings, ATP and QAP.

0512. **Jurisdiction of QAO for Sub-Contracted/Bought-Out items**. Where the manufacturer of the sub-contracted/ bought-out item is not co-located within the jurisdiction of the primary QAO, the QA cover is to be provided by the local QAO under whose jurisdiction the manufacturing firm is located, against a sub-nomination. The sub-nomination is required to be undertaken as per Para 1005 of Chapter 10.

0513. In case of sub-nomination, the main Supplier will be responsible through the main QAO for providing approved drawings and QAP to the sub-nominated QAO. Once approved drawings and QAPs are received by the sub-nominated QAO, all subsequent actions/requirements, including clarifications from the nominated vendor, if any, is to be taken over by the sub-nominated QAO. The sub-nominated firm is to be treated at par with the main Supplier, till issue of I-Note.

0514. All Certificates like STC, SDoC /CoC, import documents, other test certificates etc should be submitted in original. In case STC or import documents are not available in original, the Supplier is to submit copies of the same with an undertaking that the submitted documents are authentic to the best of their knowledge. Traceability of digitally signed documents or e-documents, where applicable and submitted, is to be ensured and shown by the firm for verification.

Chapter 6

Chapter 6

QUALITY ASSURANCE INSPECTIONS, TESTS AND TRIALS

0601. Quality Inspections relate to those activities undertaken to assure compliance of the process and product to the specifications and standards as provided in the PO and approved drawings/DBOM. Inspections are undertaken as per the QAP, which would include the quantity to be inspected or the sampling plan.

0602. Quality Inspections could include following:-

(a) Raw material inspections, which may include Identification of material, QA stamping for lab testing, witnessing or review of pouring, forging etc.

(b) Destructive tests of samples/ test pieces for chemical composition and physical/mechanical properties.

(c) Component level (including weldments) NDT like RT, UT, DPT, MPT, etc to detect surface/sub-surface defects and grain boundary discontinuities.

(d) All castings are to be subjected to RT/ UT to qualify the same in accordance with the approved Class of castings, unless otherwise specified in PO or governing standards.

(e) Micro/Macro examinations.

(f) Dimensional checks, Pressure test i,e Pneumatic / Hydraulic as applicable.

(g) Sub-equipment/ component level pressure testing in addition to NDT for integrity/strength conformity.

(h) Witnessing procedures to ensure compliance to manufacturing plan and maintaining traceability of the component from raw material stage to final stage by stamp transfer or any other process which is mutually agreed by OEM / firm & QA team.

(j) Inspection/verification of calibration status of measuring instruments/ machinery/other instruments including furnaces/lathes/boring centers etc for heat treatment/melting/machining etc.

(k) Measurement of Structure Borne Noise and/or Air Borne Noise.

(l) Vibration Tests.

(m) **Clearance of Customer Hold Points** (CHPs) by the nominated Inspection Agency prior proceeding further with manufacturing, (both for “Witness” and “Review” as per applicability) to obviate rejection at later stage.

(n) All tubes/pipes are to undergo Eddy Current Test unless exempted in PO.

(p) All forgings are to undergo UT for soundness and integrity checks.

(q) All electronic components are to undergo endurance and ESS test. These tests to be undertaken for electrical systems as per latest policy, irrespective whether it is mentioned in PO or not. .

(r) Heat load checks of electronic components.

(s) Checks of NABL / OEM Calibration Certificates are to be conducted for all types of instrumentation/ gauges. In cases where firm submits internally calibrated certificate, Master gauge/ Instrument should be calibrated by NABL accredited bodies

0603. Tests relate to those activities undertaken on completed component, assembly, equipment or system for design validation of specific parameters and performance evaluation. Following tests and trials are undertaken:-

(a) **Production Tests**. These tests, as given at Para 0602 above, are undertaken during the manufacture of each piece/batch as per the approved QAP. This will also include Environmental Stress Screening (ESS) for all electronic components. Although ESS is a part of the manufacturing process, it plays a vital role in establishing the process and product capability. Guidelines for conducting ESS are placed at **Appendix 'H'**.

(b) **Qualification/Type Tests**. Qualification/ Type Tests refer to a set of tests carried out on equipment/ systems to validate the design, gauge the capability to deliver desired performance under severe marine environmental conditions and qualify them for installation/ exploitation onboard ships and submarines. The tests are conducted under simulated conditions in the laboratory/ test beds. Some of the tests may accelerate the severity of environmental conditions with commensurate reduction in exposure time of the equipment to such conditions. Type Test of a given system/ equipment may include Endurance Test, Tilt Test, Environmental Test, EMI/ EMC Test, Air/Structure Borne Noise Test, Vibration Test, Shock Test etc. Detailed guidelines regarding Type Test of Naval Equipment and system are enumerated at **Appendix 'J'**. Samples of ET specifications are placed at **Appendix 'K'**. Conduct of Qualification/ Type Tests is to be governed by the provisions of PO. If sufficient details are not available in SOTR, the same is to be obtained from Professional Directorate by the Supplier. In case of DPRO/CPRO orders, Type Tests are to be carried out if specifically mentioned in the PO. In case of shipyard/ new induction orders, where conduct of Qualification/ Type Tests is not explicitly mentioned in the PO, the following is to be adhered to:-

(i) Qualification/ Type Tests are to be undertaken if they have not been undertaken earlier or test reports are not held with the Supplying Agency.

(ii) Qualification/ Type Tests are to be repeated if there are changes incorporated in the equipment/ system that had undergone these tests earlier.

(iii) All requests for waiver of Type Test are to be forwarded by the Supplying Agency to the Production/ Professional Directorates with a copy enclosed to Inspecting Authority and Agency.

(c) **Functional Tests**. These tests are under taken on a component, an assembly or equipment to evaluate the functional capability and capacity, including SBN, ABN and vibration trials of the item under testing. These functional tests are to be carried out in accordance with the Acceptance Test Plan (ATP) approved by NHQ or the Command Headquarters, as applicable. NHQ and Command Headquarters is the approving authority for SBN, ABN and vibration trial reports generated on conclusion of the trials for shipyard and MO orders respectively. Since subjecting an item for functional test may require other components not in present order or supporting infrastructure not catered/envisaged for while placing the order, or not available with the Supplying Agency on whom the order is placed, there is a requirement to clearly define the applicability of such tests. The following guidelines will be applicable across all types of POs with respect to undertaking of functional tests:-

(i) All equipment/system which are part of first time or induction ordering are to undergo functional tests to establish its ability to confirm to specifications and requirements as provided in PO.

(ii) All equipment/assemblies like pumps, engines, compressors etc. which are part of even replenishment orders should undergo functional tests unless waived off in the PO. It is the responsibility of the Supplying Agency to provide such facility to undertake the functional tests.

(iii) All sub-assemblies and components are required to undergo functional tests if such tests are mandated in the original approved drawings/DBOM. Any wavier for such tests should be mentioned in the PO.

(iv) For all other spares where functional tests are not indicated in approved drawings/DBOM, no functional tests are to be undertaken, unless specified in the PO.

(v) Where functional tests are destructive in nature like filter elements, electrodes etc, relevant sampling criteria should be specified in PO/Approved drawing/ QAP.

(vi) Where functional tests are not feasible for lack of infrastructure or support facilities, the Supplying Agency is to appraise the OPA before placement of order and seek appropriate directions/orders, as applicable.

(vii) In general, the functional tests are meant to operate the equipment to rated load/performance under normal operating conditions. Any other specific regime or requirement like only no-load run, partial loading etc should be clearly defined in drawings, tendering/tender response and recorded in the PO.

0604. Trials relate to monitoring the operation and performance of the completed sub-assembly/assembly/equipment/system. Trials validate overall functional performance parameters as per design. These would include following:-

(a) **Production/ Routine Trials**. These are trials that each piece/system has to undergo to ensure designed performance.

(b) **Endurance Trials**. These are trials during which the equipment/system is operated continuously at pre-determined duty cycles for a pre-defined extended duration to ensure sustainability of the equipment/system for prolonged operation. The applicability of endurance run to each piece/system or only the pilot case will be governed by the provisions of PO and approved QAP. Duration of endurance trials shall be as per approved ATP.

(c) **Factory Acceptance Trials (FATs)**. The requirement for conduct of FATs would be specifically indicated as part of the PO. Conduct of FATs generally involves final operational run of the equipment at the manufacturers test bed, in a configuration as close to the actual layout on board as feasible, before the equipment is cleared for dispatch for onboard use/installation. Where the deliverables constitute a system, an Integrated FATs is required to be undertaken. Details and modalities of conduct of FATs is placed at **Appendix 'L'**.

0605. **Inspection Process for Replenishment / Repeat Orders**. Replenishment/ repeat orders can be for complete system, equipment or spares. The inspection process for replenishment orders is to be governed as follows:-

(a) Equipment and systems are to be inspected in accordance with relevant SQAP/ QAP and associated approved drawings. Type tests, qualification tests, endurance trials etc are to be governed by the provisions of PO.

(b) Spares sourced from non-PAC and PAC firms are to be subjected to QA inspection process as warranted by the PO. This could be 'against approved drawings & QAP' or 'as per OEM Tech Specs' or 'against Import Documents.

(c) In respect of spares (including those accorded PAC status) where inspection clause per PO is 'As per OEM Tech Specs', QA cover will be governed as follows:-

(i) The inspections are to be undertaken in accordance with specification/details provided in the approved PIL/ DBOM.

(ii) If specifications/sufficient details are not indicated in PIL, details provided in the drawings as indicated in approved DBOM submitted by firm are to be taken as reference.

(iii) Inspections are to cover conformance to material specifications, manufacturing process, dimensions and include following:-

(aa) Matching of Part No. and description with the approved PIL/ DBOM.

(ab) Visual inspection.

(ac) Physical verification of dimensions for all binding/ critical dimensions. Randomly selected samples as per IS 2500 may be subjected to physical verification of dimensions in case the ordered quantity is more than twenty.

(ad) Verification of material specifications, which would include the chemical composition and mechanical properties of the material, against STC (submitted by Manufacturer/supplier) along with FFF certificate (by firm on whom the order has been placed). In case of plastics, rubbers and other polymers etc only chemical composition/ identification of the polymer is to be covered in the STC. If the material specifications are covered under Intellectual Property Rights (IPR), CoC issued by firm stating compliance to material specification along with FFF certificate is to be accepted.

(ae) Verification of Certificate of Supplier Declaration of Conformity (SDoC) /Conformance (CoC) issued by firms (manufacturer / supplier) for other specifications like shelf-life of rubber components.

(af) Verification of NABL/OEM calibration certificates for instrumentation and gauges.

(ag) Verification of balancing certificate for rotating parts, where applicable.

(iv) Type testing/qualification tests where necessary, are to be undertaken if not undertaken earlier or if relevant test certificate is not available with the firm or if the item has any changes, provided conduct of the same is specified in the PO.

(v) All routine/functional tests that are part of ATP are to be conducted if specifically mentioned in the PO.

0606. **Laboratory Tests**. When inspections are conducted against approved drawings and QAP, all tests/trials, barring NDT, are to be undertaken at Govt/ NABL accredited laboratory, under intimation to the concerned QAO. Equipment/ test samples are to be forwarded to the NABL accredited laboratories by the Supplying Agency after identification and stamping by the Inspection Agency. In cases where testing is accepted to be undertaken at facilities which are not accredited by NABL, witness of testing by QA agency is mandatory. However, laboratory tests shall be resorted to only when there is no NABL accredited laboratory available in the country for undertaking the tests/ trials. Further, in case certain parameters are derived/ computed/ calculated using test data by the NABL accredited lab for which no NABL accreditation exists, in such cases, witness by QA agency may be undertaken, if required.

0607. **Conduct of NDT**. Considering the criticality of NDT procedures towards ensuring quality and reliability of ship/ submarine equipment, broad guidelines regarding qualification of NDT personnel for conducting RT, Eddy Current Testing (ET), UT, MPT and DPT are as follows:-

(a) **NDT Certification**. All NDT procedures are to be performed and/ or sentenced by NDT personnel who have acquired the desired minimum qualification (Level II/ III) through Central Certification Programs conducted by the Certification Bodies like ISNT, ASNT and BINDT. The certification of these personnel should be in-date and verifiable through the websites of the Certification Bodies. Certification of personnel through Employer Based Programs is not to be treated at par with Central Certification Programs.

(b) **Radiography (RT), Eddy Current Testing (ET), and Ultrasonic Testing (UT)**.

(i) RT, ET and UT procedures/ technique sheets are to be approved by ISNT Level-III or ASNT Level-III or PCN Level-III or other equivalent Level-III NDT personnel, certified through Central Certification Programs.

(ii) RT, ET and UT are to be performed by ISNT Level-II/ III or ASNT Level II/ III or PCN Level-II/ III or other equivalent Level-II/ III NDT personnel, certified through Central Certification Programs.

(iii) Interpretation/ sentencing of RT, ET and UT reports are to be done by ISNT Level-III or ASNT Level-III or PCN Level-III or other equivalent Level-III NDT personnel, certified through Central Certification Programs.

(c) **Magnetic Particle Testing (MPT) and Dye Penetrant Testing (DPT)**.

(i) MPT and DPT procedures/ technique sheets are to be approved by ISNT Level-III or ASNT Level-III or PCN Level-III or other equivalent Level-III NDT personnel, certified through Central Certification Programs.

(ii) MPT and DPT are to be performed by ISNT Level-II/ III or ASNT Level-II/ III or ASNT (SNT-TC-1A) Level-II/ III or PCN Level-II/ III or other equivalent Level-II/ III certified NDT personnel.

(iii) Interpretation/ sentencing of MPT and DPT reports are to be carried out by ISNT Level-III or ASNT Level-III or PCN Level-III or other equivalent Level-III NDT personnel, certified through Central Certification Programs, only if there is any ambiguity/ difference of opinion between QA Agency and the supplier.

0608. The QAE will attend to various stages of inspections on receipt of Inspection Call from the Supplying Agency through post/ fax/ electronic media like e-mail. Whilst a broad production schedule indicating likely period of Inspection Calls is to be prepared and handed over by the firm to local QAO during the FCM. The Inspection Call is to be made with advance notice of at least **three working days** for inspection in station, and **seven working days** for inspection out of station. Urgent cases may be mutually worked out between the firm and QAO. Details of internal QC inspections and reports of the Supplying Agency are to be provided along with the Inspection Call letter.

0609. In some cases, considerable time lapse is observed between the inspection of a particular sub-assembly and its integration with the main equipment. In such cases, the validity of QA inspection of the sub-assembly becomes suspect due to considerable lapse of time from its inspection. Therefore, the shelf life of every component or

assembly cleared is to be indicated after completion of inspection. Only components/ assemblies within the valid shelf life are to be taken up for assembly/integration in/with the main equipment/system. The vendor will provide details of any life-limited item, included as part of the equipment/ assembly/ sub-assembly, as part of the Inspection Process.

0610. Inspections are to be normally undertaken only within the currency of delivery period. In certain cases, where delivery period has expired, the Inspection Agency may continue to provide QA cover on specific request, subject to the Supplier having taken up the case for DP extension with the OPA. The Inspection Agency proceeding with the QA cover despite the expiry of the delivery period will not entitle the firm to any claims or guaranteed acceptance of the item/equipment by the OPA nor will it bind the OPA to provide delivery extension. Such inspections are to be at the sole risk and responsibility of the Supplying Agency.

0611. Within the validity of delivery period, Inspection Note is to be issued by the Inspection Agency within seven working days of completion of last inspection. In case the delivery period has expired, the Inspection Agency shall issue I-Notes with Standard Franking Clause i.a.w para 7.9.1 of DPM-2009. In specific cases where the delivery period has expired and delivery extension is not being considered/ accorded, the OPA shall intimate the same to the Inspection Agency who shall thereafter stop all inspections and withhold issuance of Inspection Notes. It is to be noted that franking clause is applicable only in case of item is offered for QA checks at fag end or on the last day of contracted delivery Period as per para 7.9.1 of DPM 2009. In such cases Fag End Notice to be issued to the firm with a copy to OPA that **"***The stores offered for the inspection will be inspected, and completion could be after the expiry of the delivery period. Such an inspection is neither intended nor is to be construed as keeping the contract alive***".** Grace period of 21 days is applicable for completion QA checks and issue of I-note under franking clause.

0612. After the I-Note is issued, the item has to be dispatched within 30 days in accordance with the INCO Terms specified in the PO. In case of non-dispatch within 30 days period, another 30 days of grace period is provided.

0613. QA inspection can be undertaken in remote mode, if the Supplying Agency has adequate infrastructure like video cameras, data loggers, SCADA system etc and is able to provide the necessary confidence that real time footage of the complete equipment/ item under inspection and the running parameters shall be available to the Inspection Agency during the progress of trials. Towards this, the Supplying Agency may have to conduct trial runs of the inspection being offered, prior to raising Inspection Call for undertaking inspections in remote mode. Some areas where RMI can be used, could be endurance test. In such cases, the running equipment can be video recorded with time-stamping and the running parameters can be auto logged. Remote inspection to be carried out iaw extant policies in vogue as promulgated by DGQA.

0614. **Virtual / Remote / Hybrid Inspections**. QA activities may be undertaken in Virtual / Hybrid mode, iaw guidelines issued vide DGQA Doc No DGQA/STD/005-23 (i,e SOP for Virtual/Hybrid Inspection of Defence Stores) . An extract of these guidelines is placed at **Appendix 'M'** for ready reference. The same has to be agreed by all concerned during FCM / prior to conduct of inspection and has to be requested by the Supplier.

0615. **Remote Mode Inspection of Pouring Activities**. With the advancement of technology, Remote Mode Inspection (RMI) is required to be used effectively for certain stages of inspection process. Accordingly, it is necessary that necessary efforts be made towards undertaking inspection of Pouring activities through Remote Mode. The orders where pouring of molten metal is involved, the Inspection Agencies to get involved in:-

(a) Identification of the raw material (Mill TC etc).

(b) Storage of the raw material in Bond Room.

(c) Inspection of suitability of mould.

(d) Inspection of the melting process.

(e) Inspection of pouring of molten metal into moulds.

(f) Breakage of mould after solidification.

(g) Breakage/cutting of integral test bar and sending to lab for testing.

0616. Towards inspecting the Pouring activities through Remote Mode, following be adhered to:-

(a) The firm to indicate 'commencement of pouring activity through an I-call as being done hitherto. The activity can be witnessed by the Inspection Agency online in live mode. Alternatively, Inspection Agency can also verify the video recording (being done by the firm) during the next visit to the firm premises.

(b) Physical visit by the inspector to firm premises to start with breakage of mould activity. All processes prior to breakage of mould are to be video recorded with time-stamp by firm. Video recordings to be offered for verification by firm during the QA personnel visit to firm. Also, as an additional check, an integral test bars can be cast with two moulds. Acceptance, / Rejection of the lot will depend on NABL test report of the integral test bars.

0617. **QA Inspections of Shipyard Orders with Scanned Copies of Drawings and ATPs**. Reduction in inspection timelines by eliminating factors that outstretch/ delay QA inspections is one of the key focus areas of DQA(WP) / DQA(N). This requirement has assumed greater significance as delivery period of the new construction projects and timelines of equipment to be installed onboard have become stringent to keep pace with the overall warship construction plans of the *IN*. The physical delivery of approved drawings through post has its own lead time. Therefore, instead of waiting for hard copies to be delivered by the shipyard/ firm, the inspections can be commenced with the scanned copies of approved drawings and ATPs, however with following caveats:-

(a) The drawing/ ATP should not be classified (SECRET and CONFIDENTIAL) in nature.

(b) Scanned copy of the drawings and ATPs should be submitted in **.pdf** format. They should be legible and bear the signatures/ endorsement/ stamp of competent authority. The resolution of the drawings should be atleast 600 dpi with A3 size paper setting.

(c) Hard copy of approved drawings and ATPs along with covering letter is submitted prior to issue of I-Notes.

(d) Further, following infosec measures are to be taken while handling the scanned copy of the drawings and ATPs:-

(i) On receipt of the e-mail with attached drawings and ATPs, all Field Units are to transfer the same from the Internet PC to Unit's LAN PC.

(ii) Scanned copy of the drawings and ATPs are not to be stored in the internet PC.

0618. **Standard Format for Raising I-Calls**. Inspection Calls (I-Calls) are raised by manufacturers/ suppliers to tender readiness of equipment/ stores and seek deputation of inspectors for undertaking QA inspections. A standard format for I-Calls has been promulgated **(Appendix 'N')** with following objectives:-

(a) The format should be compatible for forwarding by e-mails.

(b) It will serve as a check-off list for the firm to ensure that they are ready in all respect to offer inspections.

(c) Information sought from manufacturers/ suppliers would be basic minimum and necessary/ sufficient for deputing inspectors for on-site inspections.

0619. All Field Units (Inspection Agencies) are to intimate about the standard format to all manufacturers/ suppliers under the respective areas of jurisdiction for compliance. This requirement of submitting the I-calls in standard format be also deliberated during the FCM (First Contact Meeting). Use of digital signatures to endorse the I-Calls is permitted. All I-Calls are to be here-in-after forwarded by **e-mails only** and delivery of the same by hand/ postal service is to be done away with.

0620. **Gas Cylinder Management**. Gas Cylinder Management and inspection of gases is to be undertaken by inspection agencies i.a.w NHQ / DLS letter no. LS/ NS/3007/ Gases dated 29 Nov 2024 which pertains to the latest guidelines on "Gas Cylinder Management ".

Chapter 7

Chapter 7

DOCUMENTATION AS DELIVERABLES

0701. In some cases, particularly induction/shipyard orders, the deliverables also Include documents like technical description, operating manuals, PIL, maintenance manuals and ‘As Build ‘drawings, etc.

0702. For POs which include documentation as deliverables, I-Note/Form-IV will be issued only on completion of the contractual obligations as per PO. In case delay in delivery of documentation is anticipated, OPAs may unilaterally consider introduction of PSPP clause so that delivery of stores in not unduly delayed, pending final submission of documents.

0703. Notwithstanding any provisions for submission of final documentation de-linked from issue of I-Note/Form-IV and for cases where documentation is to be approved by NHQ or another third party, and the final document can be produced only after the FATs, hard and soft copy of the draft documents needs to be submitted as a pre-requisite for final dispatch clearance.

0704. For equipment/systems that are to be subjected to FATs, the draft operations manual is to be made available prior raising request for conduct of FATs.

0705. For electrical/electronic equipment and weapons/sensors, clearance certificates from NTG will form the basis for acceptance of documents as part of deliverable.

0706. Inspection Note / Form-IV may be issued based on the following:-

(a) Certificate issued by NTG

(b) SDoC (Supplier Documents of Conformance) issued by the supplier clearly certifying the quantity as per PO and conformance of all documents to the master copy vetted by NTG.

0707. The documentation for the item/ equipment is prepared by the firm as per NHQ/ design approving authority/ professional Directorate approved design of the equipment. Hence, the scope under 'Documentation ‘for QA Agency shall be limited to following:-

(a) Review / Verification of type of documentation Viz. Hard format / soft format as per SOTR/ PO

(b) Review / Verification of the listed documents and the quantity/ number as per PO / SOTR scope

Chapter 8

Chapter 8

MARKING, PRESERVATION & PACKING

0801. Preservation and packing is the last process before the equipment is cleared for dispatch from the factory to the consignee. Since the equipment or the spare is put to use much later, it is imperative that the items are adequately preserved, packed & Marked and delivered safely to the consignee/ End user. The measures to be complied with are as follows:-

(a) The medium and mode of preservation is to be unambiguously spelt out in the binding/ GA drawing with any additional specific requirement at the component level in the DBOM. The protection and preservation could include painting, electroplating, vacuum packaging, encapsulating with VCI/VPCI, shrouding etc.

(b) Specific procedures are to be provided in the drawing along with the specifications and standards, as applicable and mentioning generic conditions like 'standard commercial packing' etc are not acceptable. The MIL STD. on Preservation and Packing i,e MIL- STD-2073-1 to be referred.

(c) The preservation process is to commence immediately on completion of the last inspection procedure. Particular emphasis is to be paid to sealing/closing of open ends immediately on completion of relevant tests; including during in-process inspection to obviate ingress of any sort of contaminants. Suitable preservation of all electrical and electronic contacts, consoles and items are also to be undertaken immediately after the inspection process.

(d) Packing list providing details of items are to be enclosed with the package.

(e) Suitable tally providing the consignment and consignee details should be placed prominently on the package.

(f) The following additional details are also to displayed prominently on the packing:-

(i) The life of preservation (Re-preservation due on _____)

(ii) Any periodic inspection or maintenance required.

(iii) Any special or specific handling and transportation requirement.

(iv) Storage requirement in warehouse.

(v) Use before _____ in case of items with shelf life.

(vi) If provision for Nitrogen/ Inert Gas pressure gauge or moisture indicator is provided on the packing, instructions for monitoring the same should be provided on the packing prominently.

(vii) Procedure to recharge Nitrogen/ Inert Gas /Silica Gel/ Preservative Oil should be given on the packing.

(viii) Requirement of tools and procedure for unpacking should be given on the special packing.

(g) **Marking**. Item is to be marked properly so that it reaches its intended location / end consignee without any confusion and should be properly identified so that it is opened when it is needed. No matter how well an item is made / inspected / preserved or packed, it has no value if it cannot be identified at its destination. Therefore, marking of inspected store is very vital and significant activity.

Chapter 9

Chapter 9

INSPECTION NOTE

0901. The Quality Assurance inspections culminate with issue of Inspection Note (I-Note) that clears the item or equipment for acceptance and dispatch.

0902. Two formats have been promulgated for I-Note as mentioned below:-

(a) **DGS&D(S) - 84 Form**. These are I-Notes issued for orders placed by OPAs, except shipyards and sub-orders. This form is entirely filled by the Inspecting Agency. The payment cases under this form of I-Note are processed through CDA for orders placed by Indian Navy.

(b) **Form IV**. These are issued when an item is ordered by a shipyard or in case the item is a part of a sub-order. In this case, the Supplying Agency fills up the form and submits the same to Inspecting Agency for approval and issue. The payment cases under this form of I-Note are not processed through CDA.

0903. The issue of I-Note (Form 4/ DGS&D(S) - 84 Form) by Inspection Agency primarily certifies that:-

(a) The QA inspections of equipment or component are completed in all respects.

(b) The requirements stated in the PO have been met; with approved concessions or deviations, if any.

0904. The I-Note reflects acceptability of the ordered goods at the point of dispatch. In case equipment or part is damaged during transit, the applicable clauses of insurance, guarantee and warranty may be invoked.

0905. The I-Note is a document having financial implications. Hence all regulations and orders in force should be strictly adhered to. The salient features are:-

(a) I-Notes will be issued only when QA inspections are completed, including that of documentation, preservation and packing.

(b) The number of I-Notes in each order will not exceed the total number of Part Supply Part Payment (PSPP) clause mentioned in the PO.

(c) During issue of I-Note for part quantities, the rules for painting, preservation, packing and shipment will be applicable at par with the complete equipment and there shall be no deviations.

(d) I-Notes can be signed by authorised Officers only.

(e) I-Note will be issued within 07 working days of meeting all requirements.

0906. The distribution list for the I-Notes is as follows:-

Copy No.	Purpose	Remarks
1	Account Copy	(a) To be forwarded to Manufacturer/ Supplier / Contractor (b) Copy no 1 and 2 to be marked as Account Copy with additional authorized signature on top of I-Note.
2	Account Copy	
3	Manufacturer/Supplier/Contractor Copy	
4	Consignee Copy to be attached with consignment by supplier	
5	Additional Copy for account office	
6	Consignee Advance Copy	To be forwarded to Consignee as per PO
7	Office Copy	Kept in office for record.
8	Advance copy for OPA	To be forwarded to OPA
Note. (i) Photo copies of Copy No.7 may be used for additional distribution to DQA(WP) / DQA(N) as applicable. (ii) In case of total rejection, only copies no. 3, 6, 7 & 8 to be issued and no copies meant for payment/ Accounts office will be issued. Such copies will be cancelled across by the inspecting office with his signature and retained in the inspection file along with office copy of rejection I-Note.		

0907. No Certified True Copy or duplicates of the Inspection Note will be issued as a routine. If specifically sought by the firm or OPA, a certificate from Purchasing Agency stating “No payment has been made against the lost Inspection Note and no payment will be made against the original document if retrieved”, has to be submitted along with the request for issue of a Certified True Copy of Inspection Note. The extant rule is to be rigidly adhered to.

0908. A Vendor / Supply Rating of the firm will be an integral part of all I-Notes. Vendor/ Supply rating is an indexed grading of the performance of the firm with respect to instant order and will cover attributes such as quality of process, quality of product and adherence to timelines.

0909. **ICC**. The Inspection Completion Certificate (ICC) to be issued in lieu of Form IV, for the sub-nominated inspections. A format of ICC is placed at **Appendix ‘P’**. The Form IV to be issued only by the main unit.

0910. For equipment covered under Dual Inspection, the QAE shall issue Inspection Completion Certificate (ICC) on completion of all inspection stages as per DQA(WP)/ DQA(N) approved QAP. The I-Note shall be issued by the nominated Third-Party Inspection Agency based on the Inspection Completion Certificate. Similarly, in case of inspection of weapon items where few components will be inspected by Naval Armament Inspection (NAI), DQA(N) will remain the primary QA authority while NAI will issue Inspection Clearance Certificate to vendors for components falling under their purview. I-Note will be issued by DQA(N) on completion of all QA activities as per QAP and receipt of clearance certificate from NAI as well as NTG for documentation. Packing Preservation will be carried out by Main Inspection agency for final clearance / I-Note, based on NAI Inspection clearance certificate.

0911. **Dispatch Clearance**. Cases where part quantity is not covered in the PO or when the complete system is required at the consignee urgently, before the I-Note/Form-IV can be issued; the OPA may seek dispatch clearance for the inescapable quantities to meet the immediate requirement. In case of POs by NHQ and MOs, the dispatch clearance is to be issued by the Inspection Agency on a case to case basis, provided all QA activities are completed. In case of shipyard orders, the OPA is to seek Dispatch Clearance from the Inspection Agency. On receipt of request, the Inspection Agency is to take up the proposal with the Design/ Production Directorate at NHQ for approval under intimation to DQA, provided all QA activities are completed. Dispatch Clearance is to be issued by the Inspection Agency, if the same is approved by the Design/ Production Directorate through the Professional Directorate. I-Note/ Form-IV will be issued only after all requisites are met and available. Such dispatch clearance does not entitle the Supplier to seek issue of I-Note/ Form-IV till all pre-requisites are met and will be at the sole risk and responsibility of the Supplier to fulfill all the mandatory obligations for issue of I-Note/ Form-IV. There would be cases where Delivery Period has expired for NHQ/ MO orders and extension of DP may take time and items are urgently required by user. In such cases Dispatch Clearance may be issued by QA agency subject to completion of all QA activities, if OPA intimates that DP extension is in progress and Dispatch Clearance may be issued. I-note is to be issued on receipt of Valid Delivery Period. Proof of dispatch by supplier and Receipt of such stores by consignee is to be forwarded to QA agency.

Chapter 10

Chapter 10

NOMINATION AND SUB-NOMINATION

1001. The DQA organization provides quality cover for a wide range of equipment and systems through the various field units. In order to have clarity with respect to the Inspection Authority and Inspection Agency, clear demarcation of responsibilities with respect to functional jurisdiction and geographical jurisdiction has been made and is enumerated in succeeding paragraphs.

1002. **Nomination and Subnomination of Inspection Authority and Inspection Agency**. The responsibility of nominating the *Inspection Authority* and *Inspection Agency* for providing the requisite QA coverage for the ordered items rests on the Order Placing Authorities (OPAs). This is required to be performed accurately as incorrect nomination would entail amendment of PO and resultant delays in commencement of inspections. The general convention to be followed for nomination of the *Inspection Authority* and *Inspection Agency* is enumerated in the Paras below.

1003. **Nomination of Inspection Authority**. The functional jurisdiction of DQA(WP) and DQA(N) has been elaborated at **Appendix 'Q'** wherein the list of systems/ equipment/ stores to be handled by both Directorates has been clearly demarcated. OPAs are required to nominate DQA(WP)/ DQA(N) as *Inspection Authority* based on this demarcation as indicated in **Appendix 'Q**'. It may be noted that functional jurisdiction would take precedence over geographical jurisdiction of the inspection agency and location of factory / manufacturing facility of firm.

1004. **Nomination of Inspection Agency**. *Inspection Agency* is to be nominated by the OPAs based on functional jurisdiction followed by geographical areas of jurisdiction of Field Units of the respective Inspection Authorities [viz., DQA(WP) / DQA(N)] and location of the the factory / manufacturing facility of firm. Broad guidelines for nomination of Inspection Agency are as follows:-

(a) **Functional Jurisdiction**. As a first step, the functional jurisdiction of the store is to be ascertained / identified to arrive at the Inspection Authority [either DQA(WP) or DQA(N)].

(b) **Geographical Jurisdiction**. Based on the above (functional jurisdiction) OPA is required to identify Field Units of the nominated Inspection Authority [viz. DQA(WP) / DQA(N)] whose geographical areas of jurisdiction covers the manufacturing facility of the firm. The geographical areas of jurisdiction of DQA(WP) and DQA(N) field units have been specified at **Appendix 'R'**.

(c) In case the areas of jurisdiction of Field Units (Inspection Agencies) of DQA(WP) and DQA(N) are overlapping, then the Field Unit under the nominated Inspection Authority, whose geographical area of jurisdiction covers the manufacturing facility of firm, is to be nominated by the OPA as the *Inspection Agency* for the PO.

For example:- Firm M/s ABC has factory at Ahmedabad which manufactures stores which fall under the functional jurisdiction of DQA(N). Thus, DQA(N) is

to be nominated as the *Inspection Authority* for the PO. CQAE(NS), Mumbai is the Field Unit of DQA(N) whose geographical area of jurisdiction covers the firm's manufacturing facility at Ahmedabad. Hence, CQA(NS), Mumbai is to be nominated as the *Inspection Agency* for the PO. Though QAE(WE), Vadodara [Field unit DQA(WP)] is located nearest to Ahmedabad, since it is not a Field Unit of the nominated Inspection Authority, QAE(WE), Vadodara is not to be nominated as the Inspection Agency for this PO.

(d) In some cases the OPA may observe that, the firm's manufacturing facility, DQA(WP) Field Unit and DQA(N) Field Unit are located at the same place. In such cases, the *Inspection Agency* is to be nominated by the OPA in a manner which will facilitate inspection of DQA(WP)/ DQA(N) items by their respective Field Units.

For Example:- Firm M/s ABC has factory at Bangalore and produces Pumps which are to be inspected by DQA(WP) as per functional jurisdiction specified at **Appendix 'Q'**. QAE(WE/FPC) and CQAE(WE) are the two Field Units of DQA(WP) and DQA(N) respectively, which are both located at Bangalore. Since Pumps fall under functional jurisdiction of DQA(WP), QAE(WE/FPC), Bangalore being Field Unit of DQA(WP) is to be nominated as the *Inspection Agency* for the PO.

(e) Many-a-times, Registered Office and factory of the OEM are not co-located and POs are addressed to the Registered Office. There are also instances wherein, orders are placed on suppliers who do not have own manufacturing set-up and entire scope of work is sub-contracted to a third party having manufacturing unit at a different location. In both cases, the OPA is required to nominate the *Inspection Agency* as per guidelines at para 1004(a) to (c) above.

1005. **Sub-Nomination of Inspection Agency**. Majority of systems/ equipment installed onboard Naval ships and submarines are amalgamation of individual assemblies, sub-assemblies and components which are integrated by the Original Equipment Manufacturers (OEMs) into single entities to meet the intended performance/ end-use. Often it is observed that the OEMs do not have the capability to manufacture all assemblies/ sub-assemblies/ components and thus outsource the same from multiple ancillary manufacturers located at various part of the country. In such cases, conduct of inspections by the *nominated Inspection Agency*, by deputing personnel to each sub-manufacturer's premise may be difficult. Hence, in order to provide timely QA coverage, the *nominated Inspection Agency* is authorised to formally seek the services of other Field Units of DQA(WP)/ DQA(N), whose areas of jurisdiction covers the sub-manufacturer. This process is termed as *Sub-nomination of Inspection Agency* and the Field Units which are required to provide the support are known as *sub-nominated Inspection Agency*. Further, the Field units of DQA(WP) and DQA(N) may also sub-nominate other Field units under DQA(WP) and DQA(N) on mutually accepted terms to meet following situations:-

(a) Urgent Inspection requirements.

(b) Administrative ease owing to geographical location of factory / manufacturing facility.

1006. In case of any overlap of jurisdiction of Field Units, the procedure outlined at Para 1004 above for nomination of *Inspection Agency* is to be followed for *Sub-nomination*. Further, based on lessons learnt over a period of time, the broad guidelines regarding sub-nomination are consolidated below:-

(a) **Responsibilities of Nominated Inspection Agency**. The *nominated Inspection Agency* is to operate as the *Main/ Nodal Inspection Agency* and steer QA inspections of complete system/ equipment along with associated assemblies/ sub-assemblies/ components and serve as single point contact for DQA(WP)/ DQA(N), OPA and the main OEM/ supplier. The responsibilities of the *nominated Inspection Agency* are as follows:-

(i) Scrutiny of the main PO and action on observations, if any.

(ii) Issue First Contact Letter (FCL) and conduct First Contact Meeting (FCM) with the main OEM/ supplier iaw **Para 0107** of **QAD-R03**.

(iii) Obtain approved drawings from main OEM/ supplier, as applicable.

(iv) Scrutiny of approved drawings along with draft QAPs/ SQAP/MQAP (inclusion/ exclusion) for complete system/ equipment.

(v) Forwarding of draft QAP/ SQAP/MQAP (inclusion/ exclusion) for the main equipment and all assemblies/ sub-assemblies/ components to DQA(WP)/ DQA(N) for approval.

(vi) Obtain technical clarifications and resolve technical issues iro the complete system/ equipment in consultation with DQA(WP)/ DQA(N), NHQ, Command Headquarters, OPAs, main OEM/ supplier and other agencies, as necessary.

(vii) Process sub-nomination requirement received from main OEM/ supplier.

(viii) Provide complete documentation necessary for QA inspections of the assemblies/ sub-assemblies/ components to the *sub-nominated Inspection Agency.*

(ix) Undertake inspections of the complete system/ equipment.

(x) Render Monthly Progress Report and other periodic feedbacks to DQA(WP)/ DQA(N).

(xi) Update PO data on the SOM Portal.

(xii) Process all Deviations/ Concession requests for the complete system/ equipment in consultation with the *sub-nominated Inspection Agency*, main OEM, NHQ and DQA(WP) / DQA(N) / DMDE

(xiii) Obtain approval of FATs report/ Vibration Trial Report/ ABN & SBN Report etc from NHQ or Command Headquarters or DMDE or NSTL, as applicable for the complete system/ equipment.

(xiv) Process case for issue of Type Approval Certificate for the complete system/ equipment and the assemblies/ sub-assemblies/ components, as relevant.

(xv) Issue I-Note on satisfactory completion of all inspections of the complete system/ equipment.

(b) **Requirement of Sub-Nomination**. During the FCM, details of the sub-manufacturers are to be ascertained and requirement of sub-nomination, if any, is to be sought from the main OEM/ supplier. The main OEM/ supplier is to intimate requirement of sub-nomination by letter/ e-mail to the *nominated Inspection Agency* for the sub-contracted / bought out items as and when the complete documentation required for undertaking QA inspections are ready. The sub-nomination requirement should be submitted with an undertaking that the sub-order meets the SOTR and PO requirements. The following information and/ or documents are to be submitted by the main OEM/ supplier for sub-nomination:-

(i) Item details.

(ii) Copy of Sub-order.

(iii) Approved drawings and DBOM.

(iv) Approved QAP/ SQAP / MQAP, duly highlighting part of approved QAP/ SQAP / MQAP applicable, in case the complete QAP/ SQAP/ MQAP is not required for inspection.

(v) Name, address and contact number of sub-manufacturer.

(vi) Name and telephone/ mobile number of contact personnel.

(vii) Approved RT Shooting Sketch, Approved NDT procedure, Approved UT Scanning Sketch, Approved ATP for Type Test and Functional Trials etc, if ready.

(viii) Approved SOTR/ TSP, TNC MoM iro the sub-ordered item (relevant pages).

(c) **Sub-Nomination Request for Naval and Shipyard POs**. On receipt of the communication along with complete documentation from the main OEM as per Para 1006(b) above, the *nominated Inspection Agency* is to examine the documents for their sufficiency/ completeness for undertaking QA inspections. In case there are shortcomings, the same are to be intimated to the main OEM/ supplier by the *nominated Inspection Agency* **within three working days** by a return e-mail. However, if the documentation received are sufficient/ complete, the *nominated Inspection Agency* is to make *Sub-nomination Request* as per format placed at

Appendix 'S' and forward the same by e-mail to the Field Unit required to undertake the QA inspections **within five working days** of receipt of sub-nomination requirement from the firm. *Sub-nomination Request* is to be complete with all documents received from the main OEM/ supplier and copy of the same without enclosures is to marked to DQA(WP)/ DQA(N), OPA, main OEM/ supplier and sub-manufacturer.

(d) **Sub-Nomination Request for DMDE POs**. Procedure mentioned at Para 6(d) above is also applicable for DMDE POs. Since documents pertaining to DMDE are classified in nature, guidelines regarding handling of classified documents are to be followed. Transmission of classified document over e-mails is not permitted.

(e) **Responsibilities of Sub-Nominated Inspection Agency**. On receipt of the *Sub-nomination Request*, the *sub-nominated Inspection Agency* is responsible to undertake all actions required to complete the QA inspections and issue of ICC. The responsibilities of the *sub-nominated Inspection Agency* are broadly enumerated below:-

(i) Scrutiny of all documents received with the *Sub-nomination Request* and communicate the observations/ shortcomings, if any, to the *nominated Inspection Agency* **within three working days** under intimation to DQA(WP)/ DQA(N).

(ii) Undertake inspections in consultation with sub-manufacturer/ supplier as per the approved QAP/ SQAP (inclusion/exclusion).

(iii) Obtain technical clarifications and resolve technical issues iro sub-order in consultation with DQA(WP)/ DQA(N), Command Headquarters, OPAs, main OEM/ supplier, sub-manufacturer/ supplier and other agencies, as necessary.

(iv) Render Monthly Progress Report and other periodic feedbacks to DQA(WP)/ DQA(N) and *nominated Inspection Agency* for the sub-order.

(v) Forward deviation/ concession requests to the *nominated Inspection Agency* for further processing.

(vi) Obtain approval of FATs report/ Vibration Trial Report/ ABN & SBN Report etc from NHQ or Command Headquarters, as applicable for the sub-nominated items.

(vii) Issue ICC on satisfactory completion of all QA inspections of the sub-nominated stores. A format of ICC is placed at **Appendix 'P'**.

1007. The Process Flow Diagram for Naval / Shipyard POs and DMDE POs is placed at **Appendix 'T' & 'U'** respectively.

1008. While scrutinizing the POs, if it is observed that nomination of *Inspection Agency* is not in compliance to para 1004 above, the PO is not to be sub-nominated. The *nominated Inspection Agency* is to intimate OPA to change the *Inspection Agency* by issuing necessary Amendment to PO.

1009. In many cases, documents like RT Shooting Sketch, UT Scanning Sketch, approved NDT procedure, approved ATP for Type Test etc may not be ready but QA inspections of the assemblies/ sub-assemblies/ components can commence. Since time is at premium in case of any PO/ shipbuilding project, the *Sub-nomination Requests* for such cases are to be processed without these documents, provided it has no direct implications on the immediate QA activities. The *nominated Inspection Agency* is to ensure that these documents are made available to the *sub-nominated Inspection Agency* in due course. In case any impediment or dispute arises in the sub-nomination process, DQA(WP)/ DQA(N) is to be intimated **within three working days** by the *nominated / sub-nominated Inspection Agency* for decision on the same.

1010. The Inspection Authority reserves the right to nominate a different Inspection Agency, considering core competence and work load. Such cases will be taken up with the OPA as required.

Chapter 11

Chapter 11

CONFLICT RESOLUTION

1101. The Quality Assurance process is an intense and iterative process involving many stakeholders, viz. the OPA, Production and Professional Directorates/Command Headquarters, the Inspection Authority/Agency and the Supplying Agency. In case of any conflicts arising in execution of PO, these are to be resolved as provided in succeeding paragraphs.

1102. Authority to approve and/or amend QAP is the Inspection Authority. For systems/equipment for which SQAPs have been issued, deviation from SQAP will be accepted only in exceptional cases like change in process, sourcing etc. Any request/case with respect to the QAP in so far as the specifics of QAP are concerned is therefore to be referred to the Inspection Authority through the nominated Inspection Agency.

1103. Authority to specify/amend the governing parameters including specific standards, grades, qualification/type test requirements, limiting parameters, indication of list of COTS equipment/ module/ sub-assembly etc will be the OPA. The Inspection Agency will accept the product/process only when they are within the prescribed limits as per the specifications provided in the PO. Any request/case with respect to changes/amendments to the governing standards/specifications or parameters is therefore to be referred to the OPA under intimation to the Inspection Authority and the nominated Inspection Agency.

1104. Concessions and Deviations will be governed as per the provisions in Guidelines for Quality Assurance for Engineering and Hull equipment for Indian Naval Warships.

1105. **Q-Seva**. Q-Seva portal has been developed under DGQA. This portal is an interactive helpline for query and complaint resolution with HELPLINE No. 08042300897, to enhance support to the Defence Industry. This system consists of two components: a Call Management System (CMS) and a Query Response System (QRS), designed to improve transparency, reduce response time, and ensure faster resolution of queries and complaints from defence industry partners. The system allows industry partners to directly interact with the apex body for quick solutions, automatically managing standardized queries through a database or forwarding non-standard queries and complaints to designated higher authorities for resolution. Queries and complaint are assigned unique tokens for tracking and resolution details are sent via email to the caller. The system also facilitates record generation, data storage and data analysis on call data. This Initiative aligns with government's push for industry 4.0, QA 4.0 and the "Ease of doing business" initiative, aiming to create a more efficient, transparent, and automated process. Initially being implemented as a pilot project at DQA(N), it is planned to be extended to other DGQA directorates after successful deployment.

Chapter 12

Chapter 12

REGISTRATION OF MANUFACTURERS FOR DEFENCE

1201. DGQA is entrusted with registration of manufacturers for the Indian Army and the Indian Navy and promulgates Compendium of Indian Registered Manufacturers. This is in keeping with Para 3.2 of Defence Procurement Manual - 2009 (Revenue Procurement). DQA(WP) and DQA(N) are responsible for capacity assessment and registration of manufacturers for the Indian Navy iaw the Ministry of Defence guidelines on Assessment and Registration of Manufacturers for Defence, promulgated vide JSG 015:2021 or its latest edition.

1202. **Purpose of Registration of Manufacturer**. Registration of manufacturer is necessary for the following purposes:-

(a) To register manufacturers who have been supplying/have the capability to manufacture the specified store for Defence organisations and have the Quality Management System (QMS) & finances in place to ensure specified stores can be supplied within the delivery period of the contract.

(b) To renew already registered manufacturers who have been participating in the Defence Procurement process.

(c) To intimate OPA, the registration status of the potential manufacturers to enable procurement action.

1203. **Registration of Manufacturer**.

(a) **General Registration**. A manufacturer, with minimum two years (preceding years from the date of applying) of experience in the industry, who desires to participate in defence supplies, may approach concerned Registration Authority to get registered with Defence. This may be undertaken for any number of items/ stores for which Registration is sought by the manufacturer.

(b) **Registration Against RFP**. Registration against RFP may be taken up with concerned Registration Authority by manufacturer who is not registered for specific item(s) mentioned in the RFP issued by OPA. Registration certificate will be issued only for the specific product mentioned in the RFP for which manufacturer has applied. Following aspects are to be noted:-

(i) **Firms Already Having General Registration**. The item for which the assessment against RFP/ TE has been carried out and the same has been recommended, will be added as additional item in the existing Registration Certificate. Validity of this registration will be as per the original certificate.

(ii) In case of un-registered firm, a Registration Certificate valid for five years will be issued.

(iii) **Firms already having Registration Against RFP/TE**. The item(s) for which the assessment against another RFP/TE/addition of item has been carried out and the same has been approved, will be added as additional item in the existing Registration Certificate. Validity of this registration will be as per the original certificate.

1204. **Eligibility Criteria**. A manufacturer, integrator and firm in joint venture with minimum two years of experience in the field of manufacturing of the specified store/ equipment with production line still functional to produce the said item, is eligible for registration. DPIIT registered Start-ups having adequate plant & machinery for manufacture specified store or equipment, meeting eligibility criteria for registration, with less than two years manufacturing experience and with minimum one year audited financial statement can be considered eligible for registration as potential supplier.

1205. **Entities Not Eligible for Registration**. The following entities are not eligible for registration:-

(a) Traders/ Dealers/ Stockiest/ Sole Selling Agents.

(b) Sick units as defined in the 'Sick Industrial Companies (Special Provision) Act 2013' and which have been declared sick by the Central/ State Government authority.

(c) Black listed firm by the competent authority/ Govt. of India.

1206. **Special Eligibility**. For indigenous manufactures who supply items only through their sole selling agents/ marketing firms, the registration of the manufacturing firm (OEM) would be mandatory. The authorised Selling Agents should have valid Certification/ MoU with the OEM. In case of imported items of supply, Indian firms acting as Authorised Dealers/ Stockists of foreign OEMs in India can also be registered.

1207. **Value Addition**. A product/ item not manufactured by an OEM but taken for processing into a finished product by means of process or design is said to be a value addition. The principle of 'value addition' will be applied to decide whether the OEM can be assessed for Registration as Defence Manufacturer in following cases:-

(a) Fabricators of Ferrous/Non ferrous sheet metals and processors of grey cloth into finished fabrics may be considered as manufacturer meriting registration since these involve value addition.

(b) Integration/ final finish /assembly of hardware/ software to produce sub-system and interfacing with the main system.

(c) With own designed hardware, integration of software to main system etc.

1208. **Procedure for Registration**. Manufacturers fulfilling the eligibility criteria are to be considered for Registration. Procedure for registration is enumerated at **Appendix 'V'**.

1209. **Registration of Additional Items**. Application for registration of additional items from existing registered manufacturers can be entertained. The inclusion of additional items is to be based on the assessment by the Assessment Team, especially in case the item involves a different manufacturing technology, process, category or group of items registered. In such cases a visit by Assessment Team may be needed. Registration Fee is to be charged every time the manufacturer requests for registration of additional items where a visit is involved. Registration of additional item once approved is to be added as additional item in the existing Registration Certificate. Validity of this registration is to be as per original Registration Certificate. Applications for general registration of additional items from existing manufacturers are NOT to be entertained earlier than expiry of six months from date of last registration/ visit.

1210. **Timeline for Assessment**.

(a) **General Registration**. As far as possible, General Registration is to be completed within 90 days after the receipt of complete set of documents from the intending vendors. As per directions of DG, DGQA this timeframe has been reduced to 45 days and in no case will take more than 90 days, and that too in exceptional cases, on receipt of complete set of documents from the interested vendors. Further, a due justification for time taken beyond 45 days need to be submitted by the concerned registering authority.

(b) **Registration Against RFP**. Registration against RFP is to be completed within 45 days post receipt of complete set of documents from firm.

1211. **Validity of Registration**. Validity period in case of General Registration as well as Registration against RFP is for five years. Renewal of registration is valid for a period of five years from the date of expiry of originally issued certificate.

1212. **Special Circumstances**. The formal procedure for submitting all documents indicating details of technical infrastructure/ facilities and the Quality System may be modified by DQA(WP) / DQA(N) in specific cases of renowned and reputed manufacturers where it is desirable to keep such manufacturers in compendium of registered manufacturers. For example, in the case of M/s L&T Defence, BHEL etc., it may be irrelevant to compile and collect all details of installed machinery, personnel etc. Registration of such manufacturers may be carried out after deliberations between the recommending authority and suitable officials of the top-level management of the company and assessment of the quality control practices & quality of the product. Before registration, a written commitment will be obtained from the top management of the company to develop, indigenise and manufacture the stores in question as per defence requirement.

1213. **Assessment of Financial Health**. While carrying out the manufacturer assessment, apart from verification of technical capability, it is also necessary to assess the financial soundness of the manufacturers to invest and incur expenditure for initial development, raw materials and various other inputs required for execution of defence supplies as per the stipulated delivery schedule. For this purpose, the audited balance sheets and profit and loss statements of the manufacturer for the previous two financial years is to be obtained. From these documents, the Registration team will give factual position as under:-

(a) Sales/ Turnover in last two years and average/ year. For this purpose trading account will not be considered and only sales account given in the audited Balance Sheets is to be included.

(b) Profit/ losses during the past two years.

(c) Accumulated losses, if any.

(d) Net Worth of the firm (Assets minus Liabilities). Average turnover of the firm for the last two years is to be taken as the monetary limit up to which order can be placed and this is to be included in the assessment report.

(e) In case a manufacturer is making losses it should not be assumed that it cannot be considered for registration. Each case will be assessed and examined on its overall merits by the CQAO/ QAOs and DQA(WP) / DQA(N).

(f) For DPIIT registered Start-Ups, minimum one year audited financial statement is to be considered.

1214. **Rejection of Registration**. In case it is not possible to register a manufacturer due to deficiencies noticed during assessment, the details of the deficiencies noted is to be intimated to the manufacturer as an advice by DQA(WP) / DQA(N) indicating that the firm may apply for registration afresh within a prescribed time frame. Normally re-Registration of such firms is to be taken up only after six months and on payment of fresh Registration Charges for initial registration. However, re-Registration may be taken up earlier at the discretion of the DQA(WP) / DQA(N) for reasons to be recorded in writing depending on the nature of deficiencies noted earlier and merits of the case. To avoid the possibility of manufacturer for a particular item which may have been rejected for registration by one authority seeking to get registered through some other Authority dealing with similar items, it will be incumbent on the part of manufacturer to furnish all information regarding previous Registration results. For such serious acts of omission and commission by manufacturer, the manufacturer will not be considered for registration with Defence for a period of three years.

1215. **Delegation of Responsibilities**.

(a) **Initial Assessment**.

(i)	Initiation		
	(aa) General Registration	:	OEM to approach CQAE/ QAE
	(ab) Registration against RFP	:	OEM to act as per instructions of OPA/RFP
(ii)	Initiation of Renewal	:	Manufacturer
(iii)	Assessment	:	CQAE/ QAE
(iv)	Accepting Authority	:	ADGQA(WP)/ ADGQA(N)
(v)	Registering Authority	:	DGQA

(b) **Review and Appeal Against Initial Registration**. ADGQA(WP)/ ADGQA(N)

(c) **Manufacturer Rating**.

(i)	Assessment	:	CQAE/ QAE
(ii)	Recommendation and Confirmation	:	ADGQA(WP)/ ADGQA(N)

(d) **Removal from Compendium of Registered Vendors**.

(i)	Initiation	:	CQAE / QAE
(ii)	Recommendation	:	ADGQA(WP)/ ADGQA(N)
(iii)	Approving Authority	:	Head of the Organisation

(e) **Reinstatement in Compendium of Registered Vendors**. Head of the Organisation

1216. **Categories for Registration**. In addition to grading, the manufacturers are to be assessed for categorization depending on their infrastructure and capabilities for one or more type of activities like design, development and production. Accordingly, the vendors are also to be categorised as follows:-

(a) **Design, Development & Production (DDP)**. Manufacturers who have capability and infrastructure for R&D, apart from manufacturing capability, covering all requirements of a quality system are to be registered for all three capabilities and categorized 'DDP'.

(b) **Development & Production (DP)**. Manufacturers which have capability for development and bulk manufacture only, but do not have infrastructure for design (i.e. conversion of a concept into an engineering design) are to be categorized as 'DP'.

(c) **Production (P)**. All other manufacturers having only production facilities for converting defence design into hardware or end stores or those capable of specified process such as fabrication, casting machining etc. are to be categorized as 'P'.

1217. **Registration Fee**. A Registration Fee is chargeable, as mentioned below or as amended from time to time, from all prospective manufacturers, including Govt/ Semi-Govt Undertakings and PSUs, seeking registration. The manufacturers are to deposit GST under reverse charge mechanism directly with GST authorities and produce evidence. Registration Fee is non-refundable. At present the fees are as under:-

(a) **Initial Registration**.

(i)	Large Scale Industries	-	Rs 25000.00 + GST as applicable
(ii)	MSME/ Start-ups	-	Rs 10000.00 + GST as applicable

(b) The Registration Fee is also to be charged in the following contingencies:-

(i) For additional items involving new technology/ design at any stage after initial registration/ renewal. In case of doubt, the decision of DQA (WP) regarding technology being new or otherwise will be final.

(ii) Change of location/ premises of factory/ works of the manufacturer involving fresh visit.

1218. **Grading of Manufacturers**. All manufacturers are to be graded and registered according to their quality system, technical facilities available with them and their financial status. The grading will be awarded based on a system of allotment of marks by the assessing team deputed to verify the manufacturer in their report viz. "Manufacturer Quality Survey Report (MQSR)". Based on the marks obtained in the MQSR, the following grading is to be awarded to manufacturers:-

Sl	Points	Grading	Remarks
(a)	80% and more marks	I	Fit for registration
(b)	70% to 80% marks	II	Fit for registration and advice to improve
(c)	Less than 70% marks	III	Not fit

1219. **Marking System for Grading**. For the purpose of grading, 'Manufacturer Quality Survey Report (MQSR)' is to be used as a guideline. This MQSR has been framed in two parts as under:-

(a) **Part I**. In case of firms which are ISO 9001: 2015 QMS/ AS9100 Aerospace and Defence/ ISO 13485 Medical Devices/ IATF 16949 Automotive/ IMS certified, assessment of Part I is not be carried out and is to be considered as qualified for Part I. If the firm is not having any of above QMS Certification, then the assessment is to be carried out as per Part I, as qualifying criteria for assessment of Part II. Achieving min 70% marks in Part I is essential for qualification. This part has been formulated to assess the requirement of the QMS as per attributes (clauses) of ISO 9001. Under each main clause, a number of sub-clauses have been suggested as a guide to meet the minimum requirements of the quality system for defence stores. However, the manufacturer has to provide details on the capability of 'Design', 'Development' and 'Production/ Development' and 'Production/Production'.

(b) **Part II**. This part has been framed to assess the product specific technical aspects of the manufacturers, which are not directly related to the quality system. In addition to the requirements of manpower, bond room space, inspection facilities and environmental standards etc. of the manufacturer has been suitably incorporated.

1220. **Evaluation Norms for Allotting Marks**. Certain clauses/ sub clauses may not be applicable to same/ some types of manufacturers or for some stores/ disciplines. In such cases, these clauses are not to be considered for computation. Qualification (min 70%) in Part I of MSQR is to be treated as criteria for assessment of Part II. Accordingly, percentage of marks of Part II of the MQSR is to be worked out, based on the total marks of the applicable elements of the product specific aspects. Firm is to be graded based on its score in Part II.

1221. **Issue of Registration Certificate**. After manufacturer assessment and approval of recommendations by DQA(WP) / DQA(N) to register a manufacturer and include it in the compendium of registered manufacturers, a Registration Certificate is to be issued by the Registration Authority. Copies of the Registration Certificates are to be endorsed to the following:-

(a) The Manufacturer.

(b) Quality Assurance Authorities.

(c) Order Placing Authorities.

(d) DGQA/ SDCC

1222. **Contents of Registration Certificate.** The contents of the Registration Certificate should be prepared as per the following guidelines:-

(a) A combination of similar technology / design and specific description of the stores/ processes should be included.

(b) The range of dimensions/ weight/ tolerance limits should be specified.

(c) Specific technology available with manufacturer may be mentioned but may not be limited.

(d) In case of processes such as machining, casting, forging etc., mention may be made of component/ sub-assemblies/ assemblies (as examples), which the vendor is capable of manufacturing.

(e) Where possible/ necessary, specification and / or drawings may be indicated.

(f) Certificate should include suitable grade of the manufacturer for example 'Large Scale - Design, Development and Production Grade 80% (LS-DDP-GRADE-1)' etc.

1223. **Compendium of Registered Manufacturers**. The Compendium of Registered Manufacturers is to be prepared in single volume by DQA(WP) / DQA(N) as per details given below:-

(a) It is to comprise of all sources (including Start-Up) and is to be prepared to indicate details of registered manufacturers for supply of all stores/ equipment. This volume is to be in three parts as under:-

(i) **Section A**. Alphabetical list of registered manufacturers covering their entire range of stores, equipment, spares, tools, other accessories/sub-assemblies and processes for which the manufacturer is registered.

(ii) **Section B**. Product/ item-wise directory of registered manufacturers with cross reference to manufacturers covered under Section A.

(iii) **Section C**. Engineering process-wise directory of registered manufacturers with cross reference to manufacturers covered under Section A.

(b) Compendium of registered manufacturers is to be available on DGQA portal.

1224. **Compendium Updating**. The compendium will be updated through notifications by DQA(WP) / DQA(N) once in every quarter i.e. April, Jul, October and January for amendments processed during the preceding quarter. The compendium will be uploaded on DGQA website by SDCC. The details that may be included in the notification are as under:-

(a) Addition of new sources of supply.

(b) Deletion of manufacturers already registered with reasons.

(c) Revision of grading or other important details given in existing edition of the compendium.

1225. **Compendium Monitoring**. DQA is to monitor the compendium. The monitoring is to include:-

(a) Allotment of Registration Number for newly registered manufacturers.

(b) Issue of updated compendium once in three years.

(c) Issue of notification updating every quarter.

(d) Highlighting the manufacturers where validity has expired and removal from compendium was necessitated but not removed.

(e) Maintaining a centralized list of compendium in the organisation.

1226. **Removal from Compendium of Registered Manufacturers**. Removal of manufacturers from the Compendium may be ordered by DGQA on following grounds:-

(a) Manufacturer fails to execute a PO or fails to execute it satisfactorily against the specification.

(b) Manufacturer no longer has technical staff or equipment considered necessary.

(c) Manufacturer is declared bankrupt/ insolvent/ its financial position has become unsound, and in case of limited company, it is wound-up/ taken into liquidation.

(d) Consignee end rejection cases where the firm is at fault in supplying substandard stores.

(e) Firms which are blacklisted/banned and put on hold for all procurement and acquisition cases in the pipeline by the competent authority.

1227. **Procedure for Removal from Compendium of Registered Manufacturers**. A Show-cause Notice will be issued to the manufacturer with the approval of the DGQA, about the action proposed and grounds therefore. On consideration of the reply thereto or after the expiry of the notice period, the DGQA will pass appropriate orders for cancellation of the registration of the manufacturer and removal from the list of registered manufacturers. However, in case of reasons as specified at 1226 (a) and (b) above, orders regarding removal may be made applicable in respect of one or more items as may be relevant. Once removed from the compendium, the name of the manufacturer may not be restored in the compendium unless it satisfies the registration requirements. After taking due corrective measure/ after expiry of the period of removal from compendium, as the case may be, the manufacturer may make a request to the CQAO/ QAO to review its case accordingly.

1228. **Suspension and Banning**. For serious acts of omission and commission, action may be taken for Suspension/ Banning of business dealings with defaulting manufacturers as per Government orders issued from time to time.

1229. **Procedure for Renewal of Registration**. In case there is no change in Monthly Production Capacity, plant & machinery and other administrative and technical parameters against which the manufacturer was previously registered, then renewal of registration is to be carried out on the basis of self-declaration by the manufacturer in the specified format. The firm's application as per format should reach DQA, 90 days in advance but not less than 60 days before expiry along with copy of Registration Certificate. In such cases visit of Assessment Team to firm is not required and no assessment fee is to be charged. However, in case there are any changes, then the manufacturer is to apply as per the Manufacturer's Application for Registration format. The Assessment Team visit is to be carried out with applicable Assessment Fee. Renewal of registration will be valid for five years. The following points are relevant as regards to renewal of registration:-

(a) The Manufacturer should have participated in at least one of the tender enquiries in case tender enquiries have been floated to them/published in the media and there is no adverse feedback from the OPA. The concerned CQAE/ QAE is to give feedback on the performance of the firm during valid registration period.

(b) Registration status of manufacturers who do not apply for renewal prior to expiration of their original registration validity will be deemed lapsed.

(c) Renewal of registration with or without visit of Assessment Team is to be done only once. Therefore, after a total period of ten years, renewal of registration is to be done afresh, as per initial registration with applicable assessment fee and visit of assessment team to the firm.

(d) If request for renewal by the firm is not submitted as stated above, the name of manufacturers will be removed from the compendium of registered manufacturers and no requests/representation from the manufacturer will be entertained thereafter. Further, no show cause is required to be issued to the manufacturers in such cases.

(e) As and when the manufacturer apply at later date, fresh Registration will be carried out as per procedure for registration and Registration fee will be charged as applicable.

(f) Where application for renewal has been made by due date, such supplier, will be deemed to be registered till the renewal action is completed.

1230. **NCAGE Registration**. NCAGE (NATO Commercial and Governmental Entities) Code, is a unique identifier assigned to OEMs, Manufacturers, Suppliers or various government/ defense agencies under NATO Codification System. All Indian suppliers/ manufacturers are required to obtain NCAGE code through Directorate of Standardisation website https://ddpdos.gov.in via NCAGE application link. The detailed procedure for registration and submission of request form for allotment of NCAGE code is also available on Directorate of Standardisation website. Obtaining NCAGE is a mandatory pre-requisite for registration of a manufacturer.

1231. **IDM Portal**. Indian Defence Mart Portal (IDM Portal) is a web based portal developed by MoD/DDP to enable ease of doing business and promote export potential of Indian Defence Suppliers. This is a common portal for registration of all Indian Defence Suppliers. All firms registered with DQA(WP) / DQA(N) are required to upload the firms' data on IDM Portal for NCAGE+ certification. The uploaded data is checked at DGQA and NCAGE+ certification/ Raksha Udyami Number (RUN) is issued to the firms. Only after completion of this process, the firm can upload products on the portal and details of the firms including product photographs are available for viewing on the IDM Portal by Service HQs, DPSUs, Govt/ Pvt Entities, thereby enhancing their export potential.

Chapter 13

Chapter 13

SELF-CERTIFICATION AND GREEN CHANNEL STATUS

Green Channel Status

1301. In order to encourage Indian industry for investments in the Defence Sector and to promote Make-in-India, the Green Channel Policy has been promulgated vide MoD letter 43(5)/2015/DQ(A) dated 24 Mar 17 as amended from time to time. It is applicable for broad categories of items required by the Armed Forces. The firms awarded with Green Channel Status (GCS) will have following privileges:-

(a) Deemed registration status.

(b) Waiver of Pre-Dispatch Inspection (PDI).

(c) Supply under firm's warranty/ guarantee.

1302. **Eligibility for Award of GCS**. The eligibility criteria for award of GCS are enumerated below:-

(a) Annual average turnover of at least Rs 500.00 Cr during last 03 years.

(b) Making profit in at least 03 years out of last 05 years.

(c) Should be one of the following categories of firm:-

(i) Indian firm/ PSU.

(ii) Foreign firm with manufacturing facility in India.

(iii) OEM outsourcing product in their own brand name.

(iv) OEM having fully owned Indian subsidiary having manufacturing facility in India (the subsidiary may not fulfill the laid down turnover and profitability criteria)

1303. GCS is to be granted for specific products only. The OEM will be fully responsible for the quality of the products even if they are manufactured by their Indian subsidiary/ channel partners. The Green Channel firm has to abide by all the terms and conditions and the governing technical specifications of the Purchase Order/ Contract Agreement. The OPA may seek PDI after recording the reasons thereof. JRI can be carried out as per the existing procedures.

1304. **Green Channel Committee**. The firms seeking GCS will have to submit application in the prescribed format. The application will be considered by the Green Channel Committee (GCC). The Committee or its authorized representative may undertake a physical verification of the applicant's production facility and inspect the product. The Green Channel Committee will constitute of following: -

(a) **Chairman**. ADGQA of the concerned Directorate

(b) **Members**.

(i) DDGQA/ Controller/ Principal Dir/ Dir
(ii) DDG/ Dir (concerned Purchase Directorate)/ PD (Procurement)
(iii) DDG/ Dir (Professional Dte)/ PD (Professional Dte)
(iv) Any other co-opted member.

1305. The competent authority for GCS will be DG, DGQA. The compendium of Green Channel Firms, listed items along with Certificate No. and validity will be hosted on the DGQA website.

1306. **Categories of GCS**. Manufacturers will be granted GCS for categorisation depending on their infrastructure and capabilities as under and categories will be indicated in Certificate for GCS:-

(a) **Design, Development & Production (DDP)**. Manufacturers having design capability and infrastructure for Research & Development in addition to manufacturing capability will be registered for all three capabilities and categorised 'DDP'.

(b) **Development & Production (DP)**. Manufacturers having capability for development and bulk manufacture and not having infrastructure for conversion of a concept into an engineering design will be categorised as 'DP'.

(c) **Production (P)**. All other manufacturers having only production facilities for converting design into hardware or end stores or those capable of specified process such as fabrication, casting machining etc. will be categorised as 'P'.

1307. **Registration Fee**. The firm has to pay an Account Payee Demand Draft of amount Rs 1.0 Lakhs towards one-time registration fee for Green Channel certification. The applicable GST on the Registration Fee of Rs 1.0 Lakhs is to be directly paid by the firm to GST authorities and copy of challan/ proof of payment are to be appended to the application.

1308. **Green Channel Bank Guarantee**. Firms granted with Green Channel Status will have to deposit an irrevocable Bank Guarantee (as per DPM format) of Rs 50.0 Lakhs as Security Deposit with DQA. The Bank Guarantee should be made in favor of 'Principal Controller of Defence Accounts', New Delhi from any Indian Scheduled Bank or its affiliated Banks with validity of 63 months.

1309. **Validity/ Renewal of Green Channel Status**.

(a) Green Channel Certificate will be valid for a period of 05 years w.e.f the date of issue/ renewal. The first renewal will be made based on self-declaration by the manufacturer that nothing has been altered in Tech and administrative areas from the earlier GCS. Subsequent renewals will be based on fresh registration by GCC.

(b) Application for renewal should be submitted 90 days before the date of expiry of the validity period with details of orders executed by them during the last five years.

(c) Original GCS will remain valid if the application for renewal is submitted 90 days before the date of expiry of the validity period and the Bank Guarantee of Rs 50.0 Lakhs is extended.

(d) Green Channel status for an item will be renewed for another five years in case supply orders for the item have been successfully completed during the term without any adverse feedback from the Customer.

(e) In case the concerned manufacturer has not received any Purchase Order or has completed the orders received but there has been an adverse feedback on the store supplied or has not successfully completed any purchase order, renewal of Green Channel status is to be done after re-assessment.

1310. **Defect Investigation**. Green Channel firms may be summoned by DGQA for defect investigation in respect of products as and when required.

1311. **Applicability**. Firms granted GCS by any Department of MoD will be honored by all OPAs under MoD.

1312. **Additional Conditions for GCS**. The grant and continuation of GCS is governed by the following additional conditions:-

(a) **Process Capability.** The process should be stable and Process Capability Index (Cpk) for all processes critical to quality of the product should be greater than 1.33. This information provided by the firm is to be subjected to scrutiny by the GCC.

(b) GCS is applicable only for the products listed in the certificate and NOT for any similar or allied product.

(c) The products are to be manufactured as per design, material, production process, quality control procedures and acceptance levels, as declared by the manufacturer initially. Any changes in the same without approval of GCC will result in withdrawal of GCS.

(d) Necessary documents as required under the Quality Management System, as approved at the time of registration for award of GCS, shall be maintained by the manufacturer and shall be subject to GCC audit for any product at any stage of production, procurement and acceptance during the validity period.

(e) DQA or its local Field Unit shall have the inalienable right to verify the Quality Management System of any item, production process, product assembly/subassembly at any point of manufacture, assembly and testing. Notice of such audit would be given by the designated DQA functionary, who would have the right to associate himself or his representative with the audit team during the course of audit. Material AHSP rep will also be invited by main AHSP as observer.

(f) GCS may be withdrawn through a unilateral notification by DQA based on Quality Audit or customer feedback on the quality of the product indicating that the conditions prevailing at the time of award of the facility no longer exist.

(g) Stores supplied against GCS, if found defective or deficient in quality/performance any time within the warranty period shall be replaced by the manufacturer unconditionally at the consignee premises, after the 'root cause' is identified by DQA. Contractual/ administrative actions, including withdrawal of GCS, are to be taken as warranted at the discretion of DQA and OPA, if the Supplier is found to be at fault.

(h) Whenever the GCS manufacturer shifts the production facility to another unit, the capacity assessment of the new unit is to be undertaken by the GCC and the validity shall remain as per initial certification.

(j) Indenter reserves the right of Pre-Dispatch Inspection (PDI) after recording the reasons thereof.

(k) OPA has the right to carry out Joint Receipt Inspection (JRI) as per the existing procedure.

(l) The Supplying Agency shall nominate officials from their organisation as authorised functionaries who will be responsible for assuring the quality of the final consignment for its conformance to the drawing/ specification requirements. Any change in the person holding the post of the designated functionary is to be intimated to GCC. All QA documents in respect of the store supplied by the manufacturer under the Green Channel Policy will have the signature of the designated functionary and the function cannot be delegated by the manufacturer/functionary to any other person.

(m) The Supplying Agency will forward details of the seal and acceptance mark of the authorized functionary that will be affixed on the accepted stores dispatched to the consignee to the OPA and DQA for future reference.

1313. **Acceptance of Stores Under Green Channel Status**. DQA will not issue I-Note for consignments supplied against POs placed on Supplying Agency post issue of GCS certificate. However, DQA will continue to provide QA coverage and issue of I-Note for the stores/ items supplied against POs preceding the date of award of GCS Certificate. If the OPAs feel that the previously ordered stores/items can be accepted through Green Channel, they may amend the PO accordingly. Following are relevant towards acceptance of stores against GCS:-

(a) The stores consigned through Green Channel shall be uniquely marked with a label certified by the authorised functionaries of the Supplying Agency for identification as GCS certified store.

(b) The Supplying Agency will submit details of consignment supplied through Green Channel including the Indent/ PO reference, Green Channel certification reference and other details such as, nomenclature, Part No, quantity, governing

specification, consignee etc. along with complete Test Reports, Warranty Certificate and a Certificate as per **Appendix 'W'**, signed by the authorised functionary.

(c) The I-Note (Form-4/ DGS & D(S) - 84 Form, as applicable) will be prepared by the authorized functionary and will be signed by the Board of Officers at Consignee end after verifying the final consignment received. The distribution list for I-Note shall be as given below:-

(i) Copy Nos.1, 2 & 5 : Accounts Office Copy

(ii) Copy No. 3 : Professional Directorate

(iii) Copy No. 4 : Consignee (along with consignment)

(iv) Copy No. 6 : Consignee

(v) Copy No. 7 : Manufacturer's office copy

Photo copies of Copy No.7 may be used for additional distribution to DQA.

1314. **Adverse Feedback Report**. OPA/ User/ AHSP may initiate an '**Adverse Feedback Report**' in case of recurring defects or any other quality issue, upon which GCC would then recommend appropriate penal action.

1315. **Penal Action**. All the customer complaints are to be brought to the notice of the Green Channel Committee. In case of recurring defects during exploitation/ defect investigation, the Committee may propose one or both of the following penal action:-

(a) Monetary penalty up to Rs 50.0 Lakhs.

(b) Withdrawal of GCS for a minimum period of 03 years.

1316. **Self Certification**. Self-certification is the process adopted by Govt. of India to delegate the responsibility of certifying the Quality of products to the manufacturer on behalf of purchaser, after ensuring the demonstration of the manufacturer's capability of consistently producing defect free products over a period of time. This scheme is open to all Defence Public Sector Undertakings (DPSUs) as well as Private Manufacturers/ Supplying Agencies with state-of-the-art manufacturing infrastructure and demonstrated capability to consistently fulfill the stipulated quality requirements.

1317. **Eligibility Criteria for Award of Self-Certification**. The eligibility criteria for award of Self-Certification are enumerated below:-

(a) Final Supplier Rating above 90% in the preceding three years.

(b) The process should be stable and Process Capability Index (Cpk value) for those processes critical to Quality of the product should be greater than 1.33.

(c) Have an established Quality Management System (QMS) certified as per the requirements of ISO 9001: 2015 and its revisions.

(d) The test labs having Quality Systems in conformance with ISO/IEC 17025 and preferably be NABL accredited.

1318. **Acceptance of Stores**. DGQA will not issue I-Notes for consignments supplied under Self-certification. The responsibility for dispatch of stores of approved quality to the consignee rests with the Supplying Agency. The Supplying Agency shall nominate officials from their organization as authorised functionaries responsible for assuring the quality of the end product vis-a-vis the drawing/ specification requirements. The stores consigned under Self-certification will be uniquely identified as such with a label, certified by the authorized functionaries and supported by complete Test Reports and Warranty Certificates. The authorized functionary will inform readiness of the stores for dispatch to the Consignee and designated CQAO/ QAO on a Conformance Certificate (proforma at **Appendix 'X'** refers) which shall indicate the Indent/ purchase order reference, Self-certification reference and other details such as, Nomenclature, Part No, Quantity, Governing specification, Consignee etc. along with complete Test Reports, Warranty Certificate and a Certificate signed by the authorized functionary under the scheme certifying the stores are meeting the specifications and other conditions of the purchase order in all respects. The Inspection Note(Form-4/ DGS&D(S) - 84 Form, as applicable) will be prepared by the authorized functionary of the Supplying Agency, duly filling out the details and certifying that the stores identified by the approved acceptance mark fully meet the requirements of the drawing and specification contracted. On receipt of stores at the Depot, the consignee will carry out Receipt Inspection by a Board of Officers. The I-Note for conforming consignments will be franked by the Board of Officers as 'Accepted' to enable payment to the Supplying Agency. The distribution list for the Inspection Note shall be as given below:-

(a)	Copy Nos. 1 & 2	:	Accounts Office Copy
(b)	Copy No. 3	:	Manufacturer's office copy
(c)	Copy No. 4	:	Consignee (along with consignment)
(d)	Copy No. 5	:	Professional Directorate
(e)	Copy No. 9	:	OPA
(f)	Copy No. 7	:	CQAE/ QAE

1319. **Quality Audit**. During the currency of Self-certification, audit of the processes and QMS is to be carried out by DGQA with the approval of ADG of concerned Technical Directorate to confirm that QA activities are carried out as per the agreed terms and conditions, including use of the stamp of approval on the accepted stores. In the case of minor observations during such checks, the Supplying Agency is to be apprised of necessary improvements to be affected. Also, Control samples can be drawn at random with the approval of ADG of concerned Technical Directorate from any of the accepted lots for assessing conformity with the specification. Test results of the Audit samples so drawn will be analysed by the QAE and action taken as deemed. However, the drawing and testing of the audit samples is not to affect/ delay the release of the lot.

1320. **Traceability**. The Supplying Agency is to ensure the batch-wise traceability of the final product to raw material test reports and manufacturing processes including Casting, Forging, Heat treatment, Surface treatment etc. The batch codes maintained are to uniquely identify the raw material lot, the date of manufacturing, the machine used and the name of the operator, if operator qualification is required.

1321. **Assessment Team**. Self-certification status awarded is product specific. The desirous Manufacturer/ Supplying Agency is required to apply to the concerned CQAE/ QAE with data of the items supplied in the last three years, including a comprehensive report on assessment of Quality Management Systems (QMS) and Performance Matrices. The Assessment Team thereafter undertakes assessment of the QMS and performance matrices of the Manufacturer/ Supplying Agency. The Self Certification status is granted by DGQA based on the recommendation of the Assessment Team. The composition of the Assessment Team is as follows:-

(a) **Chairman**. ADGQA of the concerned Directorate [DQA(WP) / DQA(N)]

(b) **Members**.

(i) DDGQA/ Controller/ Principal Dir/ Dir of DQA(WP) / DQA(N
(ii) DDG/ Dir (concerned Purchase Directorate)/ PD (Procurement)
(iii) DDG / Dir / PD / Officer from Professional Dte)
(v) CQAO/ QAO
(vi) Any other co-opted member.

1322. **Validity/ Renewal of Self Certification Status**.

(a) The Self-certification status is valid for three years from the date of issue of the certificate.

(b) The Manufacturer/ Supplying Agency is required apply to the CQAO/ QAO for renewal of Self-certification status at least 90 days prior to the expiry of validity, giving details of orders executed during the last three years.

(c) Renewal shall be subject to successful completion of supply orders during the term of Self-certification with a consistent Final Rating of at least 90% without any adverse feedback from the Customer including the performance of the stores during Warranty Period.

(d) In case the concerned manufacturer has not received any purchase order or has completed the orders received but there has been an adverse feedback on the store supplied or has not successfully completed any purchase order, renewal of Self-certification status is to be done after re-assessment.

1323. **Revocation of Self Certification Status**. During the period of execution of orders under Self-certification, any non-conformance in quality and reliability of product performance observed by the User on account of manufacturers fault will warrant immediate revocation of the Self-certification status. If major defects are observed during Quality Audit

by DGQA, action will be initiated to review and cancel the Self-certification status, if necessary.

1324. **Defect Investigation**. Whenever defects are reported on the self-certified stores during exploitation by the User, the Manufacturer/ Supplying Agency is to initiate action on the Defect Report within 72 hrs. The defective item is to be rectified or replaced at the earliest and the root cause is to be analysed in depth in association with the concerned CQAO/ QAO for instituting corrective and preventive measures. The Manufacturer/ Supplying Agency is to report details of the defect, the causes and the rectification, corrective and preventive action carried out to the CQAO/ QAO.

Chapter 14

Chapter 14

SUPPLY ORDER MONITORING PORTAL (SOMP)

1401. SOMP is an online supply order monitoring portal, developed by CDAC, Chennai on the instructions of MOD/DDP, in 2021. The purpose of the portal is to oversee the status of all POs which are inspected by DGQA. The POs are initially uploaded on the portal, either by Inspection Authority (DQA(WP)/DQA(N)) or by the Inspection Agencies (i,e the Field Units). The status of POs are monitored by higher authority using this portal and therefore ensuring latest updated data on SOMP is critical.

1402. **Uploading of POs on SOMP**. OPAs, on placing orders on various firms, are required to submit PO copy to the concerned Inspection Agency by the fastest available means (email or by-hand). On receipt of PO copy, the same to be uploaded by Inspection Agency / Inspection Authority.

1403. **Updating of POs**. The stake holders involved towards updating / monitoring the uploaded POs are the Industry partners (firms), Inspection Agency and Inspection Authority. There are various stages against which the concerned stakeholders need to update the PO, as the QA activities are undertaken / progressed.

1404. **Timely Updating of POs**. Firms are to ensure updating the status on SOMP on completion of relevant QA activity. This updating is critical towards ensuring availability of updated status / information on SOMP. OPAs are required to sensitise the firms about the importance of updating the status within 24 hrs, post completion of the relevant QA activity.

Appendix ‘A’

Appendix 'A'
(Refers to Para 0107)

FORMAT FOR PO DETAILS

(To be submitted by firm for discussion during FCM)

File Letter Ref.:

dated

PART 1 – ADMINISTRATIVE

1	PO No. & Date	
2	Delivery Date	
	(i) Original Equipment	
	(ii) OBS, if deferred delivery date	
3	Firm	
4	Firm Representative from Quality Department for Coordination	
	Name	
	Email Id	
	Phone / Mobile no.	
5	Firm Representative for Escalation	
	Name	
	Email Id	
	Phone / Mobile no.	
6	OPA Representative for Escalation	
	Name	
	Email Id	
	Phone / Mobile no.	
7	Sub Vendor Details, if applicable (include all sub vendors)	
	(i) Name of Sub Vendor	
	(ii) Sub Assembly details	
	(iii) Sub Order No. & Date	
	(iv) Sub Order Delivery Date	
	(v) Sub Vendor Rep. for QA along with email id & Mobile No.	
8	(i) Availability of facility for Remote Location Inspection along with details	
	(ii) Activities to be offered for remote inspection	

PART 2 – TECHNICAL

1	Availability of approved drawings	
	(i) If yes,	
	(a) Date of Approval	
	(b) EDC for Submission to CQAE	
	(ii) If no,	
	(a) EDC for Submission to OPA / NHQ	
	(b) Likely EDC for Approval of Drawings	
	(c) EDC for Submission to CQAE	
2	Applicability of SQAP	
	(i) If yes,	
	(a) EDC for Submission Inclusion & Exclusion to CQAE	
	(b) Likely EDC for Approval	
	(ii) If no,	
	(a) EDC for Submission Draft QAP to CQAE	
	(b) Likely EDC for Approval	
3	Availability of approved ATP (Type Testing Protocol / IFAT Protocol)	
	(i) If yes,	
	(a) Date of Approval	
	(b) EDC for Submission to CQAE	
	(ii) If no,	
	(a) EDC for Submission to OPA / NHQ	
	(b) Likely EDC for Approval of ATP	
	(c) EDC for Submission to CQAE	
4	EDC for Submission of PERT Chart / Production Schedule	
5	Expected Date for offering Raw Material Inspection	
6	Expected Date for completing Raw Material Inspection	
7	Expected Date for offering In-Process Inspection	
8	Expected Date for completing In-Process Inspection	
9	Expected Date for offering Final / Pre FATs Inspection	
10	Expected Date for completing Final / Pre FATs Inspection	

11	Expected Date for IFATs / FATs Inspection	
12	Expected Date for OBS Inspection, if applicable	
13	Applicability of as-built drawings	
	(a) EDC for Submission to OPA / NHQ	
	(b) Likely EDC for Approval of Drawings	
	(c) EDC for Submission to CQAE	
14	Applicability of Documentation including IETM Data	
	(a) EDC for Submission to OPA / NHQ	
	(b) Likely EDC for Approval of Documentation	
	(c) EDC for Submission to CQAE	
15	Expected Date for Submission of I-Note (Form IV) to CQAE	
16	Expected Date for Dispatch of CQAE cleared stores	
17	Suggestions, if any 'OR' assistance required from CQAE to expedite inspection / PO completion	

For Firm

For CQAE(WE)
Mumbai

*EDC – Estimated Completion Date

Appendix ‘B’

Appendix 'B'
(Refers to Para 0302)

PROCEDURE FOR DRAWING APPROVAL FOR QA COVER OF FIRST TIME INDUCTION SYSTEMS AND EQUIPMENT

1. **Submission of Drawing**. The Supplier to submit the GA drawings with respect to the system and/or the equipment under procurement containing the layout, boundary/ installation parameters/dimensions and a Detailed Bill of Material(DBOM).

2. If the main or subsequent GA drawings have assemblies and sub-assemblies in their BOM, GA drawings of these assemblies and sub-assemblies along with their DBOM are also to be submitted. Thus, all assemblies, sub-assemblies and parts constituting the equipment and system should get reflected in the GA drawings and DBOM submitted, duly linked in a parent child relation that will ensure forward and backward traceability.

3. **Manufacturing Drawing**. The manufacturing or detailed drawings are to remain with the firm and are to be produced to the QA team during the visit for inspection.

4. **Detailed Bill of Material**. Each GA drawing is to have its associated DBOM. Specifications and parameters which ensures that the product will meet the requirements of PO and which are required to draw up QAP are to be provided in the DBOM. While providing the details in the DBOM, following are to be included:-

(a) Drawing number of each assembly, sub-assembly and component indicated in the drawing.

(b) Material specifications including grade and condition, as applicable.

(c) Manufacturing process (including heat treatment and stress relieving diagram where applicable) in case of major, critical, loaded and stressed components.

(d) Components where specific testing and examination like RT, UT, MPI, DP etc are required with the corresponding drawings depicting shooting sketch and inspection norms and acceptance criteria for the specific BOM (can be schematic without dimensional, or manufacturing details).

(e) Requirement of type testing, functional testing etc in respect of assemblies and sub-assemblies.

(f) Areas of critical dimensions, weights and tolerances (values and limits need to be indicated in the manufacturing drawing only).

(g) Interfacing requirements of mating components.

(h) In case of COTS, imported and bought-out items, the details like make and model, country of origin etc.

5. This DBOM is to form the basis of PIL and both DBOM and PIL should be mapped one to one. Sample of GA drawing with DBOM and guidelines for preparation of GA drawings are placed at **Annexure I** & **II** respectively.

6. **Formulation of Requirement in GA Drawings**. Lack of adequate information provided at the approval stage can lead to incomplete or inadequate QA cover. Therefore, various stakeholders are to arrive at acceptable level of depth in drawings and information to be submitted by the manufacturer prior issue of purchase order. With experience gained over time, this to be frozen and issued as equipment and system specific drawing requirements, as in the case of Standard QAPs being issued presently. The Check-off list for preparation of GA drawings is placed at **Annexure III**.

7. **Manufacturing Drawing Verifications**. The first step of Quality Assurance is verification of the availability and completeness of manufacturing drawings. The drawings are to be verified with respect to the drawing number and details provided in the approved GA drawing and DBOM as well as with respect to complete representation of data and information in the drawing to undertake the production and process inspections. Inspection are to be undertaken only when these are confirmed and any incomplete or missing information or data is to be intimated to the firm to be made good before commencing the inspection.

8. **Amendment to Drawings during Production**. Amendments required in the drawings due to changes necessitated during production can be incorporated by the manufacturer in the drawing, duly authenticating the changes, if such changes are not affecting the details provided in the approved GA drawing and DBOM. If binding data and parameters of GA drawing and DBOM requires change, the revised drawings are to be reapproved by all concerned.

9. **Stamping of Manufacturing Drawings**. After the inspection is undertaken, along with stamping of the product, the copy of the drawing held by the firm is to be stamped by the inspector as being the reference of inspection undertaken providing details of the PO No, the QAP No and the date of inspection. The same drawing will be stamped every time an inspection is undertaken; for the next stage of same piece, a subsequent piece or order.

10. **As-Built Drawing for Future Reference**. Post completion of the manufacturing of first piece, an ‘As-built’ drawing, incorporating all changes is to be prepared and stamped by the Inspection Agency. The stamped ‘As-built’ drawing is to be forwarded to the drawing approving authority/ies for approval under intimation to DQA(WP). A flow chart in this regard is shown in Figure no 3 below for better understanding. Further, the firm to also forward soft copies of the ‘As-built’ drawings in .pdf/.dwg format to facilitate early vetting and approval of the drawings. The ‘As-built’ drawing of first piece will become the reference for manufacture of subsequent pieces. In respect of subsequent production, no changes in dimensions or parameters from the ‘As-built’ drawing are to be accepted by the QA team without the approval of the competent authority.

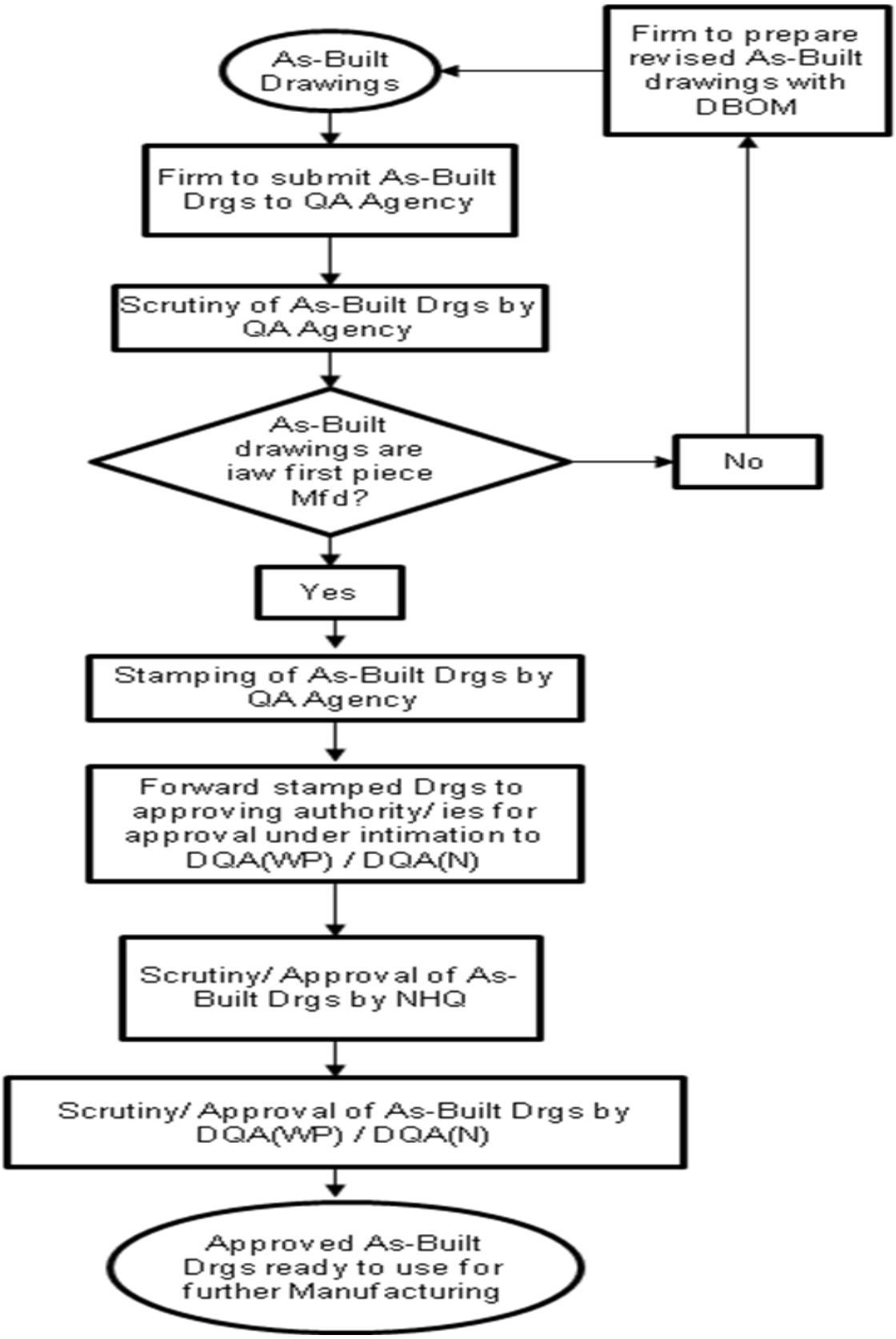


Fig 5 : Process Flowchart for Approval of As-Built Drawings

11. **Post Production Verification**. In case of a requirement of verification at a later date, the firm will be required to provide the inspection details and the relevant stamped drawings as required by the Navy. A certificate from the firm that these details will be provided as and when needed is to be obtained from the firm with every PO.

12. **Overhaul and Maintenance Requirements**. All overhaul processes, acceptable tolerances, limits etc is to be included in the maintenance manuals submitted by the firm.

13. Notwithstanding the above, the responsibility of design and performance will be that of the firm. Therefore the following will apply to all orders:-

(a) Full responsibility of design and performance will be of firm.

(b) Approval of drawings is to ensure and bind firm with limiting boundaries and specific requirements.

(c) QA cover is to ensure that the production has been undertaken in accordance with the defined process and specifications.

(d) Stamping of manufacturing drawing is to ensure continued reference to same drawing and repeatability of the product and is not an authentication of the design or any change.

Appendix ‘C’

Appendix 'C'
(Refers to Para 0305 & 0411)

APPLICABILITY OF APPROVED DRAWINGS

1. **FOR INDUCTION ORDERS**

Condition			Drawing
Has supplied earlier	Approved drawings are GA drawings with DBOM	Has no changes in present supply	Latest version of approved, As-fitted drawing
		Has changes in present supply	Revised drawing and/ or DBOM approved afresh
	Approved drawings are in the old format and are up to component level as per practice prior to Apr 2016. Present supply with or without changes.		New GA drawings and DBOM need to be approved.
Has not supplied earlier		New GA drawings and DBOM need to be approved afresh as per current directives in vogue.	

2. **FOR EQUIPMENT/ SYSTEM/ ASSEMBLY/ SUB-ASSEMBLY: DPRO/MO ORDERS**

Condition			Induction OEM	Others
Has supplied earlier	Approved drawings are GA drawings with DBOM)	Has no change in present supply	Latest version of approved, as fitted drawing	
		Has changes in present supply	Revised drawings and/or DBOM approved afresh	
	Approved drawings are in old format & up to component level as per practice prior to Apr 2016.	Present supply without changes	Latest version of approved, as fitted drawing	
		Present supply with changes	Revised drawings and/ or DBOM approved afresh	
Has not supplied earlier			NA	New GA drawings with DBOM approved afresh

3. **FOR SPARES: DPRO / MO ORDERS**

Condition			Inspection against OEM Tech Specs	Others
Has supplied earlier	Approved drawings are GA drawings with DBOM	Has no change in present supply	Latest version of approved, as fitted drawing	
		Has changes in present supply	Revised drawings and/or DBOM approved afresh	
	Approved drawings are in the old format and up to component level as per prior to Apr 2016.	Has no change in present supply	Details as per approved PIL	Latest version of approved, as fitted drawing
		Has changes in present supply		Revised drawings and/ or DBOM approved afresh
Has not supplied earlier			NA	New GA drawings with DBOM approved afresh

Appendix ‘D’

Appendix 'D'
(Refers to Para 0305, 0411 & 0413)

SUBMISSION OF DRAWINGS FOR REPLENISHMENT ORDERS OF EQUIPMENT / SPARES

1. In cases of replenishment orders placed by any OPA (both *IN* and Shipyards), which also includes orders for 'On-Board' spares and 'Base & Depot' spares for first time inductions, the necessity to have any drawings approved should not arise under normal circumstances, since these have already been inducted into the *IN* against approved drawings and QAP.

2. Fresh approval of drawings will be required only under following conditions:-

(a) Any change, irrespective of the quantum, in terms of design, architecture, dimension, material specification, duty point, internal configuration, manufacturing process, governing standards/ specifications and environmental conditions to which the system has been proved earlier since these could have effect on stress distributions, compatibility, installation requirements, functional parameters (including endurance and environmental qualification parameters) etc.

(b) Any change in manufacturing process or sourcing since these may call for changes in QAP.

(c) Any change in governing specifications including reference standards since these may change testing and acceptance norms.

(d) In specific cases, where complete equipment/ system installed in one platform/ship is being retrofitted on another platform/ship which may necessitate changes in the binding data.

3. In cases where there are changes as brought out above, the corresponding drawings needs to be re-approved/re-validated as follows:-

(a) The firm submits the revised drawings along with the original (latest version of drawings approved earlier) to the OPA indicating the changes incorporated/necessitated under intimation to the respective Inspection Agency.

(b) Where there are no changes in the equipment, but the platform/ship where it would be installed is different from initial fit, the firm to submit the binding data to the respective OPA for ratification, under intimation to the Inspection Agency.

(c) The OPA obtains approval or otherwise of the competent authority for the changes incorporated/necessitated or the concurrence to use the existing equipment as it is with respect to existing approved drawings on new platform and forwards to Inspection Agency for ratification or otherwise of existing QAP.

(d) The approval accorded for changes should clearly indicate if its validity is only for the instant order or valid for all future orders as well. Where the changes are valid for all future orders irrespective of command or platform applicability, the necessary amendments to approved drawings is to be endorsed in all records for future procurements. In such cases, this revision of the drawings will become the latest version of approved drawings.

4. In cases where there are no changes and the existing approved drawings are valid, their submission will be governed as follows:-

(a) Where the latest versions of approved drawings are GA drawings along with DBOM, only mention of the relevant item no drawing with traceability to details in PO is sufficient and no physical submission of any drawing is required. The firms will be required to present the original stamped drawing held in its custody to the QA team during the first visit for inspection.

(b) Where the latest version of the approved drawings are detailed drawings up to component level, original drawings of the latest version of approved drawings will need to be presented to the QAO for verification. Whilst submission of authenticated copies is sufficient for processing the QAP and other initial formalities, inspection will commence only after verification of the originals. Non-availability of original drawing will require the vendor to obtain fresh approval of the competent authority.

(c) In case of spares ordered against OEM Tech Specs, there is no requirement to submit any drawings and inspection will be carried out in accordance with details provided in approved PIL/DBOM. If specifications/ sufficient details are not indicated in PIL, the drawings indicated in approved DBOM are to be submitted by firm and details there in are to be taken as reference.

5. Whenever a change is envisaged or necessitated, the process for revision and/or clarifications can be taken up any time by OEM with the concerned Professional Directorate for amendment to their approved drawings and DBOM, even when there is no tender or order pending on the firm.

6. It will be incumbent on all firms responding to a tender, to indicate and intimate any changes that have been incorporated or necessitated in any of the items or components with respect to last approved drawings and supply, during their offer, so that necessary clarifications and approvals can be accorded prior issue of PO, if not done earlier.

7. Any delay or difficulty in execution of order due to changes noticed with respect to last supply that has not been intimated during the offer and before issue of PO will be fully attributable to the firm.

8. All previously approved GA drawings of equipment/ systems which are not made as per the provisions of Chapter-3 are to be progressively revised by the Supplying Agency and submit the GA drawings along with the DBOM for approval of concerned Professional Directorate at NHQ MoD(N) or Command Headquarters.

Appendix ‘E’

Appendix 'E'
(Refers to Para 0403 & 0413)

APPLICABILITY OF APPROVED QAPs

(A) **FOR INDUCTION ORDERS**

Condition			QAP
SQAP / MQAP issued	Has supplied earlier	Has no change in present supply	Relevant SQAP/ MQAP with amendments, if any.
		Have changes wrt last supply	Relevant SQAP/ MQAP with necessary amendments, if required.
	Has not supplied earlier		Relevant SQAP/ MQAP, with amendments as required
SQAP/ MQAP not issued	Has supplied earlier	Has no change in present supply	Latest version of approved QAP. In case a later QAP for similar equipment of a different supplier is available, necessary changes to the existing QAP will be incorporated and issued as 'Approved QAP'
		Have changes wrt last supply	Revised QAP, if necessary. For faster approval, changes wrt previous supply be submitted along with proposed QAP. Type / Qualification tests will be required unless waived off by OPA
	Has not supplied earlier		New QAP to be drafted by firm and approved by Inspecting Authority

(B) **FOR EQUIPMENT / SYSTEM / ASSEMBLY / SUB-ASSEMBLY: DPRO / MO ORDERS**

Condition			Induction OEM	Others
SQAP/ MQAP issued	Has supplied earlier	Has no change in present supply	Latest version of previously approved QAP, if mentioned in PO by OPA. Else, relevant SQAP/ MQAP, with amendments if required	
		Have changes wrt last supply.	Relevant SQAP/ MQAP, with amendments if required	
	Has not supplied earlier		Relevant SQAP/ MQAP, with amendments as required	
SQAP/ MQAP not issued	Has supplied earlier.	Has no change in present supply	Latest version of approved QAP	
		Have changes with respect to last supply.	Revised QAP, if necessary. For faster approval, changes with respect to previous supply be submitted along with proposed QAP. Type/ Qualification tests will be required unless waived off by OPA	
	Has not supplied earlier		New QAP to be drafted by firm and approved by Inspecting Authority	

(C) **FOR SPARES – DPRO / MO ORDERS**

Condition			QA as per OEM Tech Specs	QAP
SQAP/ MQAP Issued	Has supplied earlier	Has no changes with respect to last supply	Details provided in approved DBOM or PIL	Latest version of previously approved QAP, if mentioned in PO by OPA. Else, relevant articles of SQAP
		Have changes in present supply	Details provided in approved DBOM or PIL	Relevant articles of SQAP/ MQAP
	Has not supplied earlier		Details provided in approved DBOM or PIL	Relevant articles of SQAP/ MQAP
SQAP/ MQAP not issued	Has supplied earlier	Has no changes with respect to last supply	Details provided in approved DBOM or PIL	Latest version of previously approved QAP
		Have changes in present supply	Details in revised and approved DBOM or PIL	May require amended QAP
	Has not supplied earlier		Details in revised and approved DBOM or PIL	QAP drafted and approved afresh.

Note:- For Table (A), (B) and (C), if SQAP/ MQAP is promulgated post issue of RFP/ TE for a particular PO, conditions for SQAP/ MQAP not issued shall be applicable

Appendix ‘F’

Appendix 'F'
[Refers Para 504(f)]

CERTIFICATE - MALICIOUS CODE

(To be rendered on the Company Letter Head)

1. PO No:_____dated_____.

2. PO Serial No._____and Item Description _____.

3. This is to certify that the Hardware and the Software being supplied as part of the PO mentioned above does not contain embedded malicious code that would activate procedures to:-

(a) Inhibit the desired and designed function of the equipment.

(b) Cause physical damage to the user or equipment during the exploitation.

(c) Tap information resident or transient in the equipment/networks.

4. The firm will be considered to be in breach of the procurement contract, in case physical damage, loss of information or infringements related to Copyright and Intellectual Property Rights (IPRs) are caused due to activation of any such malicious code in embedded software.

Signature:
Name of the Person:
Designation:

Firm Name & Seal:

Date:

Place:

Appendix ‘G’

Appendix 'G'
(Refers to Para 0506)

DETAILS OF ACCEPTABLE IMPORT DOCUMENTS

Sl No	Document	Interpretation	Acceptable Documents	Remarks
1.	Bill of Lading	Bill of lading is a document issued by the carrier which details a shipment of merchandise and gives title of that shipment to a specified party. OR Bill of Lading is a document issued by the actual transporter (Ship, Airway or agent) of the equipment which clearly indicates the description, quantity, port of collection and port of discharge.	(a) Bill or receipt issued by the Shipping Company/ Shipping agent/ Ship's Captain (b) Shipping Bill (c) Airway Bill (d) Couriers' Bill	In case main firm intends procuring the imported component/ item though other Indian sources through suborder, the same should be ratified by OPA, preferably before placement of PO. In such cases, the original importers' document can be accepted if traceability can be established with respect to the items being supplied as having been currently and correctly imported. If Indian vendor receive items through Courier Services and are unable to submit the original Bill of Lading, items can be cleared based on packing slip on the consignment & verifying Courier service's Bar Code on packing.
2.	Shipping Bill	Shipping Bill is a form used by Customs & Excise before goods can be exported from the country or removed from a bonded warehouse and indicates details of PO, goods, consignee etc.	(a)Invoice issued by foreign firm giving details of PO, goods, consignee etc and submitted to freight agent/ customs towards transportation by sea/ air. (b) Complete packing list of all items along with complete details of ship/flight through which the item have been supplied, issued by logistic firm tasked by foreign supplier/ manufacturer to supply the item.	It is an important document required by Customs authorities for allowing shipment. It is prepared by exporter & contains following:- 1. Name of Shipment Vessel. 2. Name of the port of discharge. 3. Country of final destination 4. Exporter's name and address. 5. Details about packages. 6. Quantity and details of each case. 7. FOB price. 8. Total no. of packages with weight &value. 9. Name and address of the importer.

Sl No	Document	Interpretation	Acceptable Documents	Remarks
3.	Country of Origin	A document which certifies that the products exported are wholly obtained or produced or manufactured in that particular Country. This certificate is issued by Chambers of Commerce/ Such Authorised Signatory of the country in which imported item/ eqpt is manufactured.	(a) Country of Origin certificate issued by Chamber of Commerce or Government of respective country. (b) If country of origin is indicated in Shipping Bill or Bill for entry to warehousing and is matching with BOM, the same may be accepted. (c) In case firm cannot produce country of origin certificate issued by Chamber of Commerce or Govt of respective country, the same should be told upfront to OPA and if OPA ratifies in PO or subsequent document, one of the following documents can be accepted:- (i) Certificate issued by Foreign Supplier/ OEM (ii) Declaration Certificate for country of origin issued by the OEM in case of PAC firms	Country of Origin (COO) is the country of manufacture, production or growth where an article or product comes from. The origin of the product does not refer to the country where the goods were shipped from but to the country where they were made. In the event of the product being manufactured in two or more countries, origin is obtained in the country where the last substantial economically justified working or processing is carried out. As a thumb rule if more than 50% of the cost of producing the goods originates from one country, then that country is acceptable as the country of origin. In case of trading bloc, certificate of origin may be allowed to state the trading bloc (for e.g. European Union as origin) rather than specific country
4.	Bill of Entry to Ware Housing	A form issued by Indian Customs and Excise to list goods prior to entry to warehouse for home consumption on import	Certificate by Indian Customs giving confirmation of the entry of items into the Indian port containing the details of supplier, port of loading, country of origin, no of packages and weight etc.	
5.	OEM'S CoC	SDoC /CoC issued by OEM stating that spares are tested for FORM, FIT and FUNCTION indicating governing	SDoC /CoC issued by the OEM from whom the equipment is sourced. Also, if the firm is Indian Subsidiary of	SDoC /CoC is to be verified against specific serial no or batch no, to be available on the SDoC /CoC and same details of the instant piece/pieces being

Sl No	Document	Interpretation	Acceptable Documents	Remarks
		specifications and values to which the items are tested along with OEM Test Certificates/ Test Reports/ Catalogue/ Data Sheet	principal OEM, the SDoC/CoC issued by Indian subsidiary with authority letter may be accepted	supplied.
6.	Guarantee/ Warranty Certificate	Guarantee/ Warranty Certificate is to be issued by supplier/ OEM on whom order is placed	Guarantee/ Warranty Certificate issued by Supplying Agency on whom order is placed	
7.	Non-inclusion of Malicious Code Certificate	Non-inclusion of Malicious Code Certificate in case of active electronic components.		

Note:- Any mismatch in item code / description/part number between import document and PO should be ratified by the OPA; either by amending the PO or by approving the FFF certificate submitted by the firm.

Appendix ‘H’

Appendix 'H'
{Refer to Para 0603(a)}

GUIDELINES FOR CONDUCT OF ESS

Aim

1. The The aim of this letter is to lay down guidelines for formulation of effective ESS programme and methodology for conduct of ESS on Electronic Components/Units/ PCBs/Modules. The guidelines also provide directions to manufacturing agencies to incorporate ESS programme at the design and manufacturing stage to weed out such deficiencies, which can manifest at a later stage causing avoidable down time of the equipment and expensive corrective action thereupon.

Applicability of ESS

2. **Indigenously Manufactured Items**. The ESS is to be applied to 100% electronic components/units/assemblies as part of manufacturing process for indigenously manufactured electronic items.

3. **Imported/COTS Items**. In case of imported and COTS items, following guidelines will apply: -

(a) During the course of production, a variety of imported/COTS items (components/PCBs/modules) may be used by the manufacturer of main system. ESS on such items is to be carried out at the next higher indenture level. ESS requirements with the given severity are the part of RFP, therefore, design of eqpt and choice/ procurement of the components/modules should cater for the requirements accordingly. For imported items the ESS report conducted as per Mil HDBK 344A/ Mil HDBK2164A are considered to be meeting the requirements.

(b) However, in case the Imported items are being supplied by the manufacturer in 'As It Is' condition with no addition/alternations, such items are to be accepted based on OEM's SDoC / CoCs clearly endorsing the standards to which the items comply and there is no further requirement of conducting ESS.

4. The present guidelines will be applicable for the new POs placed after promulgation of this policy. For new orders pertaining to spares of Systems/Equipment supplied earlier, ESS scheme as per guidelines in vogue/as conducted at the time of delivery of the system would be applicable. However, for all previous POs which are yet to be executed, Supplier may either follow ESS plan as per approved QAP or guidelines given in this document.

ESS Programme

5. It is necessary to conduct ESS at the earliest possible stages where it is possible to reveal latent defects and initiate necessary corrective actions. Following needs consideration while devising effective ESS programme:-

(a) The severity of the applied stress screen must be strong enough to effectively reveal the latent defects. Non-precipitation of latent defects is indication of weak stress level. The stress must conform to stringent level within designed parameters of the weakest component. Design parameters are

generally much higher than the operating parameters. Two screens for Thermal Cycling Stress Screening (TCSS) and Random Vibration Stress Screening (RVSS) have been defined at **Annexure IV** and **Annexure V** respectively.

(b) ESS is applied to 100% of the units manufactured including spares and repaired units.

(c) Since ESS is part of production process the manufacturer will have the installed facilities for vibration and thermal cycling facilities with valid calibration status. However, the same can be outsourced if the supplier does not own the facilities. In such case the ESS will be witnessed by QA rep if the facilities are not accredited to NABL but will not be witnessed by QA agency in case ESS facilities are NABL accredited as per the given standard. The ESS report along with performance monitoring results of the system will be submitted to QA agency for scrutiny.

(d) Analysis report along with corrective and preventive action reports will be submitted to QA agency in case of failures/observations during conduct of ESS.

ESS Process Sequence

6. The electronic hardware is recommended to be screened as per the following sequence:-

Stage I	Perform thermal cycling screening at PCB level
Stage 2	Perform random vibration at module level.
Stage 3	Repeat thermal cycling screening at module/ eqpt level.

7. However, in case of production of PCBs to be supplied as spares the complete ESS cycle (TCSS-RVSS-TCSS) must be completed on PCBs itself. In such case "I-RU mock-up" approach is acceptable for RVSS purpose where PCBs are fitted in mock-up LRU casing. In case of production of modules as spare supplies the TCSS should be conducted on PCB followed by RVSS and repeat TCSS at module level.

8. **Tailoring of ESS severities**. Equipment designed and developed to meet JSS 55555/ Mil Std 810 or even automotive grade COTS components will generally comply to ESS severities given at Annexure IV and Annexure V. The manufacturer will make all out efforts to select suitable components/ modules, however in case because of non-availability of the components/ modules or any other design related issues the manufacturer uses components/modules which cannot tolerate given ESS severities, a detailed justification will be submitted to OPA/ Professional Dte, for using lower grade components with OEM data sheets along with list of PCBs/ Modules affected by such components, for approval. Lowering of severity will be limited to PCB/module using such low grade component and the extent of severity will be decided in consultation with DQAN as per the weakest component parameters based on OEM specifications. For other PCBs/ Modules the screen severity will remain unaltered. It is worth mentioning here that component design parameters are much higher than equipment operating parameters. Pure mechanical/ non electronic/ electrical assemblies, wire wrapped backplanes and very sensitive items like hard disk, Displays etc will be exempted from ESS.

9. **Thermal Cycling Stress Screening (TCSS)**. The following aspects are to be considered whilst conducting TCSS:-

(a) The temperature range for thermal cycling should be established by considering the component characteristics and the equipment specifications for maximum and minimum designed values under operating and storage conditions. The temperature range should be as large as component characteristics will permit regardless of the products intended operational limits.

(b) The rate of change of temperature between the extremes must be as rapid as possible to create the optimum level of thermal stress. The minimum acceptable rate of change is 5 0 C per minute.

(c) The number of cycles is more closely related to the temperature range and rate of change than to the equipment complexity or number of parts. Tailoring of this parameter is generally done based on the analysis of failures observed with the incremental number of cycles.

(d) Dwell time at maximum and minimum operating and storage temperatures should be only enough to achieve thermal stability.

(e) Switching "ON" of equipment during TCSS will be limited to Equipment's operating temperature zone and the equipment will be switched "OFF" when temperature reaches below lower/ above high temperature.

10. **Random Vibration Stress Screening (RVSS)**. The following aspects are to be considered whilst conducting RVSS:-

(a) Random Vibration Stress Screening may be performed preferably at lower indenture level.

(b) The attitude or orientation of item for RVSS shall be decided based on the plane which provides maximum shear force to the soldered joints and components during random vibration. The RVSS is to be conducted preferably in all three axes.

(c) For a module level testing, the fixture shall be structurally rigid without causing resonance and further amplification to the Unit Under Test (UUT).

(d) EUT shall be subjected to sinusoidal sweep between 20-2000 Hz to identify the existence resonance prior to conduct of RVSS. If the equipment resonance frequencies fall within the input frequency range, excessive energy could be seen by the equipment and damage could occur. One of the following two measures may be taken in such cases: -

(i) Modify the equipment design to achieve a more rugged item to obtain a resonance falling outside the input frequency range.

(ii) Make a notch on the input profile eliminating frequency band of 5 Hz before and after the resonating frequency.

(iii) During RVSS the device under stress will be in "ON condition".

11. **Approval of ESS Programme**. The manufacturer is solely responsible for drawing up the ESS programme as the design parameters of the components are known to them. Once the ESS screen is finalized the same is to be submitted to DQA(N) through respective field units for approval. Such ESS plan will be annexed to the QAP.

12. **Performance monitoring**. The overall effectiveness of ESS is dependent upon the completeness of the performance monitoring, before during and after environmental exposure. Prior to the environmental exposure all functional parameters should be verified and to the extent possible, quantified (in terms of potential, impedance, power etc). Parameters of defect free system will serve as benchmark data which will be utilized throughout the subsequent screening phases to identify failures or degraded performance. Just switching ON the equipment/ module as performance monitoring will not be accepted. Only BIT as performance monitoring will be accepted but only when monitoring or measurement of other parameters is absolutely not possible in the system/ module. Performance monitoring time during TCSS will be decided by manufacturer depending upon the type of equipment.

Appendix ‘J’

Appendix 'J'
{Refers Para 0603(b)}

TYPE TESTING OF NAVAL EQUIPMENT / SYSTEM

1. **Background**. Ship/ submarine borne equipment/ systems are likely to encounter stringent environmental conditions during their operational/ storage life cycle. These are categorized as climatic environmental conditions (high/ low temperature, humidity, tropical exposure etc.) and induced environmental conditions viz. shock & vibration, EMI/EMC etc. It is essential that the equipment, if exposed to such environments, continue to work satisfactorily and therefore, there is a need to design/ ruggedize these equipment and validate their capability to operate in most stringent environment conditions prior installation/exploitation. This policy letter aims to standardize the acceptance of any Naval equipment/system wrt Quality assurance and functional acceptance in the Navy.

2. **Type Tests**. In order to gain confidence that the equipment would perform its designed role in the intended environment, during its expected operational and storage life, the equipment is subjected to standard tests under simulated marine/ environmental conditions in laboratory. These tests are designed to accelerate severity of environmental/marine conditions with commensurate reduction in exposure time of the equipment to such conditions. In addition, the electrical/electronic equipment are also required to be subjected to electrical qualification tests under specified conditions to assess their capability for reliable performance. Type tests or Qualification Tests therefore, are essentially tests carried out on equipment/ systems to validate the design and gauge the capacity to deliver the desired performance under severe marine/ environmental conditions.

3. **Conduct of Type Tests**. Type Tests are conducted on prototype equipment or early production model to qualify the equipment for their operation/exploitation onboard ships/submarines as per the standards specified in the Purchase order. It is essential that the type tests are tailor made on the basis of equipment specifications, operational characteristics and installation region onboard ship. The sequence of Type Tests is followed as indicated in JSS 55555 for effective validation of design. In a system configuration comprising of multiple independent functional units, each independent functional unit will be Type Tested.

4. **Sampling Plan for Type Test**. Following would be the norm for selection of sample for conduct of Type Test :-

(a) One sample each for every type of equipment/ system should go through Type Testing to prove its capability to withstand environmental conditions.

(b) In a situation like multiple units of same specifications, one specific unit (preferably prototype or first production model in the absence of prototype) is subjected to all tests as per defined sequence in JSS 55555.

(c) Distributed tests over various units (with same specifications) are neither permitted nor does it serve any purpose.

(d) If there is a range of items of same category, but of different ratings, the type testing needs to be undertaken on one sample of each rating. However, in case the range of items are using same components and material, Type Test of samples of highest rating would be undertaken.

5. **Occasion of Type Test**. All equipment/ system for Naval application (excluding COTS and imported Equipment), unless and otherwise specifically stated, are required to undergo Type Tests before induction into service. Type tests will be applicable as follows:-

(a) Type Test will be undertaken on prototype or first piece/ set of equipment/ system manufactured by an OEM.

(b) Type Test will be undertaken on previously inducted equipment/ systems if they have not been Type Tested during induction and/ or there are major changes in environmental conditions to which the equipment/ system was earlier Type Tested.

(c) A type tested equipment which is operating satisfactorily in the *IN* may have a requirement of changing internal components for future production. The same may be necessitated either due to Obsolescence Management, Change of location and Changes in Form/ Fit amongst other reasons. In such a scenario, abridged Type Testing would be undertaken. Guidelines towards concluding the scope of abridged type testing is placed at **Annexure VI**. Some of the salient aspects that merit attention are as follows:-

(i) In the event of change of make of component(s) of the equipment/ replacement with equivalent substitute component, (whether major or minor) repetition of Type Tests for whole equipment need not be undertaken provided the smallest independent functional unit with modified/new make component has been successfully type tested and it's use does not affect the functionality of the whole equipment.

(ii) For instances wherein only minor internal components (viz. fuses/ indication lamps etc) are modified/ upgraded, without tampering the external casing/ control panel, re-Type Testing should be avoided.

(d) Specific clarifications, if any, may be sought from the Professional Directorates at NHQ.

6. **Categories of Type Tests**. The type tests can be broadly categorized into following: -

(a) **Environmental Tests**. These tests cater for the natural (climatic) as well as induced environmental conditions. The categorisation of Environmental Test is as follows:-

(i) **Indigenous Equipment**. JSS 55555:2020 (Rev 04), issued by the Directorate of Standardisation has been promulgated as the guideline for conduct of Environmental Tests on equipment/ system inducted in service. The list of environmental tests applicable for naval equipment is contained at Table 3-5, 3-6 and 3-7 of JSS 55555:2020 (Rev 04) corresponding to

ship-borne equipment protected (Class N1), exposed (Class N2) and submersible (Class N3) respectively.

(ii) **Imported Equipment**. MIL-STD-810 G is normally specified as the applicable standards for ET in respect of all equipment being imported from western countries. However, a number of countries, especially Russia, France and Germany, follow their own ET standards viz. GOST, STANAG, VG etc. which is also acceptable (Provided the severities are conforming to requirements mentioned in the RFP/PO).

(b) **Dynamic Tests**. These tests deal with the shock and vibration likely to be encountered by the equipment during transportation, storage and operation. For all Electrical and Hull equipment, conduct of these tests would be undertaken subject to provisions of Para 15. For all engineering equipment, light (upto 600Kg) and medium (600-2500 Kg) category equipment are to be physically shock tested and heavy (more than 2500 Kg) category equipment is to be qualified through shock analysis/ mathematical calculations. This is as per Para 11 of DME policy letter EG/Policy/TSV/12/23 dated 31 Jan 23 on IN Shock Standards and Shock Testing procedures for Surface Ships. Vibration Test of engineering equipment encompasses following types of tests:-

(i) **Environmental Vibration Test**. During Environmental Vibration Tests, the equipment is subjected to simulated environment vibration, as may be encountered when installed onboard ships/ submarines, to prove the physical and functional integrity when subjected to the vibration environment.

(ii) **Internally Excited Vibration Test**. In case of Internally Excited Vibration Test, record of overall vibrations and narrow-band analysis are also undertaken on test beds so as to ensure that the amplitudes recorded are within the stipulated limits. Abnormal / high vibration levels at the fundamental and harmonic/ sub-harmonic frequencies indicate inherent/ incipient defects in the equipment/ systems. The values recorded on the test bed are also used for benchmarking/ comparison during the service life of the equipment/ systems. ISO 10816 and MIL-STD-167-1A/2 are to be referred for undertaking vibration tests.

(c) **EMI / EMC Tests**. These tests ensure functionality of the equipment without any performance degradation during operation in intended Electromagnetic environment.

(d) **Ingress Protection Tests**. Ingress Protection test is carried out to classify and rate the enclosure of devices/ panels as per its degree of protection against physical object, accidental contact, dust and water. IP rating does not substitute the drip proof test or driving rain test as the former is the rating of the protective enclosure whereas the latter two tests are to check the effect of such environmental condition on electronics. IP rating table is placed at **Annexure VII**.

(e) **Generic Electrical Type Tests**. Electrical equipment is required to undergo few generic Electrical Type Tests to qualify them for their general electrical performance and suitability to operate onboard ships. The SOTRs of respective electrical equipment indicate such equipment specific Type Tests also

with test severities and test methodologies. An indicative list of equipment generic electrical type tests is placed at **Annexure VIII.** Applicability of such type tests are equipment specific and therefore, are to be selected as per equipment specifications and design.

(f) **Endurance Test**. Endurance Test involves continuous running of equipment/system for a prolonged duration on the test bed. During the test the operating parameters and performance characteristics of the equipment are monitored by the Inspection Agency. Duration of endurance test is to be as specified in the approved ATP. For engineering systems, the Endurance test is a part of Type testing. However, for Electrical/Electronic systems the endurance test is carried out as part of Functional/ Environmental stress screening (ESS) tests.

(g) **Tilt Test/Ship Motion test**. The equipment/ systems onboard ships are required to sustain the roll/ pitch of the ship and give the desired performance. To simulate the shipboard conditions, the equipment/ systems are tilted on the test bed and run for a predefined period of time. The operating parameters and performance characteristics of the equipment shall be monitored by the Inspection agency during Tilt Test for the duration as specified in the approved ATP. For engineering systems, the Tilt test is a part of Type testing. However, for Electrical/Electronic Equipment, the ship motion test is carried out based on the requirements of SOTR/ RFP.

(h) **Airborne Noise (ABN) Test**. The ABN test is generally conducted as per MIL STD- 1474E and IS: 13161 to ensure that the equipment/ systems comply with the acceptable airborne sound level criteria. The weighted sound pressure levels and octave band sound pressure levels are measured at designated locations and the values obtained are compared with the limits specified in the SOTR to ascertain the acceptability of the equipment/ systems. For engineering systems, the ABN test is a part of Type testing. However, for Electrical/ Electronic Equipment the same is carried out based on the requirements of SOTR/ RFP.

(j) **Structure Borne Noise (SBN) Test**. The SBN test is critical, to ensure that the noise transmitted by the equipment to the ship's hull is within the limits prescribed in the approved SOTR. MIL-STD-740-2 is to be used as the guiding documents for undertaking SBN measurements of shipboard equipment. For engineering systems, the SBN test is a part of Type testing. However, for Electrical/Electronic Equipment, the same is carried out based on the requirements of SOTR/RFP.

7. **Guiding Standards**. Following standards specified in the RFP/PO are to be followed for Type test.

(a) **Environmental Tests**

(i) **Environmental Tests**.

(aa) JSS 55555 2020 (Rev 4) for indigenous equipment.

(ab) GOST, STANAG, VG for equipment imported from Russia / Europe.

(ac) MIL-STD-810 G for equipment imported from Western countries.

(ii) **IP Rating** - EN 60529.

(b) **EMI / EMC** - MIL STD 461 F/G.

(c) **Shock Standards** - BR 3021 (1) / BR 3021 (2).

(d) **Vibration Tests** - ISO 10816 and MIL-STD-167-1A/2.

(e) **Airborne Noise (ABN) Test** - MIL STD- 1474E and IS: 13161.

(f) **Structure Borne Noise (SBN) Test** - MIL-STD-740-2.

8. **Severity Levels**. The maximum severity levels, as indicated in above standards would, become applicable unless specified otherwise. Similarly, the EMI/EMC qualification of the equipment must follow the "Naval EMI/EMC Acceptance Plan' approved by NEC(Mbi) under intimation to NHQ/ DEE. In case of imported items, the severity as well as range and scope of ETs, shock/ vibration and EMI/ EMC requirements must compare to those indicated at Para 6 above. While such requirements depend upon the type of platform and location of the equipment onboard, a generic table indicating various types of Environmental Tests (but not limited to) with respective severity level for Naval equipment is placed at **Appendix 'K'**. The type test plan including EMI/ EMC acceptance plan must form part of QAP.

9. **Type Test for Replenishment Orders/Developmental Orders**. In so far as equipment which are already inducted to the *IN* without Type Testing are concerned, Type Tests will be conducted only if the same is mandated vide the PO issued by any of the Naval Order Placing Agencies. Additionally, Type Testing of developmental system will be carried out on the directives of NHQ. Type Testing can also be carried out by QA agencies on directives of NHQ/OPA to cater for service exigencies where PO has not been placed.

10. **Type Test for Shipyard Orders**. In case of equipment ordered by the shipyards for the shipbuilding projects, Type Testing will be conducted, if the equipment is not Type Tested in the past. As indicated in Para 5 above, in case of any ambiguity, the issue is to be taken up with NHQ for decision. The scope of Type Testing is to be fully covered in the SOTR, RFP and Purchase Orders. All endeavour should be made to the extent feasible, that any equipment nominated for new construction ship should be type tested or be in the process of Type Testing for obviating shipbuilding delays linked to type testing.

11. **Type Testing by Third Party Inspection Agency**. The Type Tests can be conducted by Third Party Inspection Agencies (TPIA) except mission critical equipment. In such cases, the Type Test Report is to be approved by NHQ. For conduct of Type Test by TPIA, the schedule for Type Test or the Acceptance Test Plan (ATP) is to be approved by NHQ. For TPIA, the laboratory tests are to be conducted only at NABL accredited laboratories.

12. **Grant of Green Channel Status or Self Certification Status**. Completion of Type Testing shall not be pre-requisite for award of Green Channel/ Self Certification as the GoI letter on Self Certification/ Green Channel does not mandate Type Test.

13. **Type Testing for Vendor Registration**. Type testing is not a requirement for Vendor Registration. Capacity Assessment and Vendor Registration (CAVR) will be carried out holistically by MoD/ DGQA [(DQA(N) and DQA(WP)] for respective equipment iaw Joint Services Guidelines common to all three services. Further, vendor nomination is carried out by NHQ based on service requirements as per *IN* policies. However, in order to ensure nomination of Type Tested/ undergoing Type Testing equipment for new construction ships, vendors with Type Tested equipment will be nominated by *IN* for shipbuilding projects (to the extent feasible), so as to obviate any delays in ship construction. At the same time, in order to accrue maximum benefits of CAVR vis-à-vis the vendor nomination process, following is to be ensured:-

(a) CAVR iaw JSG 15:2021 through DGQA [(DQA (N) and DQA (WP) for respective equipment is mandatory prior nomination of equipment/ OEM by *IN*.

(b) All CAVR certified companies and their respective equipment will be considered for inclusion in the vendor list by respective Professional Dte after undertaking additional technical assessment, if required. For any long lead time test requirements, Prof Dte may seek additional test reports from the OEM accordingly.

14. **Yellow Banding**. Equipment subjected to complete range of ETs render it unfit for onboard use as the test conditions limit the performance of the equipment over intended period of service life. Such equipment is “Yellow Banded” and is used as reference system for training and display purposes. However, the equipment if not subjected to Mould Growth and Corrosion (Salt) tests, is not required to be Yellow Banded. In cases, where no prototype is catered, mould growth and salt corrosion tests may be carried out on representative samples to obviate Yellow Banding of equipment. The representative sample, in such cases, will contain PCBs, electronic components, connectors, card cage elements, guiderail etc., forming part of equipment. Further, in case of shock test, yellow banding is generally not required for electronics equipment unless specifically recommended by design authorities. However, in case of mechanical/electromechanical equipment, yellow banding would necessarily be done if permanent misalignment or displacement takes place during shock test. The requirement of Yellow banding of Equipment is to be adequately covered in the SOTR/RFP/PO. The decision regarding the use of Yellow banded prototype for any emergent requirements shall be that of NHQ.

15. **Rationalization of Type Test**. While it is essential to subject new induction equipment to complete range and scope of Type Test/ ETs, there may be a need to rationalize the same due to non-availability of test facility or the test chamber of required size. Some equipment e.g. large cabinet of Radar/ Sonar, antenna, APMS, IPMS, Hull equipment etc. due to their size/ weight constraint, may undergo design verification such as Finite Element Module (FEM) analysis by NABL accredited/ Govt. body in place of physical tests for shock and vibration. Such verification of design calculation is to be considered as conformance to specified shock/ vibration provided specific directives by OPA is obtained by the vendor.

16. **Conduct of Type Tests**. As far as possible, Type tests are to be conducted at NABL accredited Lab and may not be witnessed by QA agencies. In such case, Lab reports are to be reviewed by QA agency for qualifying the product. In case, the tests are undertaken at any Lab, not accredited by NABL, tests will be witnessed by QA agencies for qualification. Following Sequence Will be followed during Qualification Testing:-

(a) **Visual Inspection**. For physical damage and workmanship.

(b) **Functional Test**. To check operational features of system against requirements as per approved ATP. Refer para 0603(c), Chapter 6 for details regarding conduct of Functional test.

(c) **Electrical Tests**. To check all technical measurable parameters (specifications) of the system including safety tests as per given Test Procedures (TPs).

(d) **Identification of Parameters and conduct of Environmental Tests.** Environmental tests are carried out as per JSS/ Mil Std as per specifications of the equipment. Before and after every Environmental/ Dynamic test, the equipment is examined physically and performance is checked for operation and critical measurable parameters. These parameters will be identified and performance of the equipment will be checked against these parameters as per approved ATP.

(e) **Final Functional test**. Post environmental tests, the equipment will be tested again for normal operation of the equipment as per approved ATP.

17. **Type Tests for Imported Items**. In case of items of import nature, Type Tests qualification of the item would be accepted by reviewing the Certificate of Conformity (CoC) submitted by the vendor. The CoC must indicate the governing standards for Qualification Tests and values to which the items have been tested. The Original Equipment Manufacturer test certificates/test reports/data sheet and compliance matrix vis-à-vis the standards specified in the Purchase Order (PO) will form a part of the CoC required for Type Approval. A typical CoC format is placed at **Annexure IX**.

18. **Repeat Type Test/Abridged Type Test**. Equipment, already qualified type approval tests, need not mandatorily be subjected to repeat Type test and abridged type test can be undertaken. The repeat type test, if deemed necessary, is applicable for only those independent functional units, which have undergone changes. However, in case such changes do not affect equipment specifications, an "Abridged Type Test" protocol can be proposed, giving due justification, by the OEM.. Guidelines on scope of Abridged Type testing are placed at **Annexure VI**.

19. **Type Test Requirements as part of Specifications.** Type Testing of any equipment has time and cost implication. It is, therefore, essential that the requirement of Type Tests is spelt out upfront as part of equipment specification (SOTRs/ TSPs) and RFP/TE as part of essential requirements/ equipment specifications. The Type Testing plan must form part of Quality Assurance Plan generated for the equipment. For electrical / electronic equipment, the Type Test Protocol is prepared iaw SOTR/ RFP/ PO by DQA(N) and only deviation/ waivers, if any, are referred to Professional Directorates. For engineering equipment, Type Test Protocol would be approved by

Professional Directorates post vetting by DQA(WP) and the approved Type Test Protocol is to be made available prior to the commencement of Type Test.

20. **Type Approval Certificate**. Upon qualification of Type tests, a Type approval certificate in respect of the type approved item will be issued by HQ DQA(N)/ DQA(WP) on recommendations of concerned field unit. The Type approval certificate issued by any other Defence Authority will be acceptable provided the range and scope of the Type tests meet the Purchase Order requirements. The Type approval certificate will indicate the equipment details and the unique Type approval number. Type Testing Compendium will be maintained at HQ DQA(N)/ DQA(WP) in soft/ hard copy. Following details will be required by HQ DQA(N)/ DQA(WP) for issue of Type approval certificate:-

(a) Test reports of all Type tests.

(b) Drawing of the equipment.

(c) Relevant Bill of Material.

(d) Details of major manufacturing processes.

(e) Approved Type Test Protocol.

21. **Validity of Type Test**. The Type Approval Certificate (TAC) will remain valid subject to conditions outlined at Para 5 above for all Equipment/Systems. However, for EBXL Cables tested iaw EED 50-12 and EED 50-13 the validity of TAC is presently three years. The Type Test Validity for other cables (LFH, VG, PT etc.) will be governed by specifications issued by NHQ.

22. **Type Testing at NABL accredited Lab**. Testing at external NABL accredited laboratory is permitted if test facilities are either not available in DGQA laboratory, delay is anticipated due to non-availability of time slot or if so desired by Vendor. Following procedure will be followed: -

(a) Supplier will ensure that proposed external lab has the given test in its scope of NABL accreditation and provide the copy of the same to QA agency.

(b) Eqpt/ Samples will be sealed by the QA agency after preliminary QA checks on Eqpt as per the approved Qualification Test Procedure (QTP).

(c) Supplier will arrange for submitting Eqpt / samples to NABL lab and bear all logistical/ financial expenses incurred in testing.

(d) Applicable standard will be indicated in the requisition for the test and approved QTP (Acceptance criteria) will be provided to the testing Laboratory for measuring performance of equipment during Type testing.

(e) Confidential test reports will be submitted by the NABL laboratory to the QA agency.

23. **Acceptance Test Procedure (ATP)**. Functional/ performance checks of the equipment are carried out as per approved ATP for any equipment/ store. It is mandatory that the same be reflected in the approved QAP of the system.

24. **Factory Acceptance Trials (FATs)**. FATs are the final acceptance checks of equipment undertaken in factory premises post completion of all QA activities. The purpose of FATs is to verify the system parameters, operational and functional checks as per contractual specification. FATs will be undertaken iaw approved FATs documents by a team constituted by NHQ. All QA requirements needs to be completed prior to FATs. Dispatch clearance can be authorized by QA unit, subject to nil observations (including no pending observations of previous FATs undertaken/ design issues) and based on firm recommendation of FATs team. In case of observations in the FATs report, the same is required to be forwarded to Professional Directorates for examination.

25. **Change of Inspection Agency**. For all mission critical equipment as promulgated by Professional Directorates, Inspections are to carried out by the DQA(WP)/ DQA(N). Broad guidelines regarding such equipment have been brought out in DQA(N) letter 66301/Policy-03/DQA(N)/ QA-03 dated 14 Jun 13. Further, change in Inspection Agency is not to be undertaken during QA/ Type Test process without seeking comments of DQA(WP)/ DQA(N).

SOP - Environmental Testing at CQAE(WE), Bengaluru Laboratory.

26. Environmental Testing(ET) Lab at CQAE(WE), Bengaluru is a premier testing agency for conducting tests with in its scope as per JSS-55555, IEC60529, MIL 810, BR 3021 or any other test standard as a part of Type testing of defence equipment. The customers of the lab are broadly identified under two categories namely - Defence Customers and Private Customers. In general, free service is provided to the Defence Customers and prescribed rates are charged from Private Customers. Equipment are tested on a 'First Come First Served' basis. However, the priority of the testing is accorded as given below in the event of concurrent requests from various agencies, unless otherwise directed by DQA (N):-

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

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

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

(d) Items ordered by Indian Army.

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

27. **Testing Cycle**. Testing of Unit Under Test (UUT) commences after initial verification of UUT, test setup instruments, test fixtures, documents and rectification of deficiencies. In no case defined procedures are compromised. To optimize testing process, following timelines are adhered to:-

(a) Quotation request/enquiry is replied as per the latest approved Standard Quotation Performa within three working days. Approval of JCQAO(Lab) is obtained on file before sending the Quotation.

(b) The Job Card is created within two working days of receipt of test requisition and UUT or after settlement of observations, if any.

(c) Firm rep attending the UUT is informed about the tentative test schedule of his UUT on creation of Job Card.

(d) On completion of tests, Test Report duly approved on file by CQAO is released in three working days.

28. **Defence/ Free Testing Applicability**. The Laboratory undertakes ET (type testing) free of cost for the Indian Navy/ Army equipment/ components for which Supply Orders of MOD/ NHQ / DRDO/ Shipyard exist and where DGQA organization has been assigned the responsibility of Inspection Agency (IA)/ Inspecting Officer (IO), unless otherwise specified of in the PO. In case, tests have to be repeated due to failure of equipment/ components, such test will be repeated on payment. Though the tests are being repeated on payment, they will continue to fall under defence testing category and will not be treated as private payment testing.

29. **Defence / Free Testing Procedure**. The procedure to be followed for defence/ free testing is enumerated below:-

(a) To initiate testing process, DCQAO (Planning) verifies and ensures that the Lab Test Requisition Performa is duly forwarded by the concerned QAE and the firm rep is authorized by QAE to witness the tests.

(b) DCQAO (Testing) verifies physical receipt of the UUT, basic functional checks test set up instruments, approved Acceptance Test Procedure (ATP), test jigs and fixtures and other relevant documents necessary for completion of requested tests. In case of any deficiency of documents or test instrument or technical difficulty, firm's rep is informed. The QAE is informed on e-mail in two working days and test requisition is put on hold till deficiencies are made good.

(c) On clearance of test requisition by DCQAO (Testing), DCQAO (Planning) prepares Job Card by taking approval of ACQAO/JCQAO to commence testing on UUT.

(d) The required test jigs and fixtures as applicable for the test are provided by the firm. Pre and post preparatory activities on the UUT are the responsibility of firm's rep.

(e) The UUT is subjected to tests as per the applicable test sequence mentioned in JSS:55555. An UUT passed in a test, should be offered by firm's rep for the next test in sequence within three working days. Under normal circumstances, if the UUT is not offered for test within three working days, DCQAO (Planning) puts up the file to ACQAO/JCQAO for closing the Job Card. On approval, test completed reports are generated and Job Card is closed.

(f) In case of any failure of UUT in between the requested set of test, intimation of status is communicated by e-mail to concerned QAE within two working days. In case the QAE wishes to subject the UUT to further tests after repair/ rectification, they are to provide a fresh QA clearance to the UUT along with a repeat test request and repeat test charges payment details. If no QA

clearance and payment is received within 30 days, DCQAO (Planning) puts up the file to ACQAO/JCQAO for closing the Job Card. On approval, test completed report are generated and Job Card is closed.

(g) In case of failures, no free retest is authorised.

30. **Private/ Payment Testing**. The Laboratory undertakes testing on payment basis in the following events:-

(a) Type testing of equipment/ components for which POs of MOD/ NHQ/ DRDO/ shipyards exist and where DGQA has been assigned the responsibility of Inspection Agency (IA)/ Inspection Officer (IO) and the tests need to be repeated a second time due to failure of the equipment/ components during free testing for the first time.

(b) The equipment/ components not ordered by NHQ/ MoD (Army) authorities/ DRDO or by DGQA organization (unless otherwise specified in the PO) are undertaken on payment basis.

(c) Environmental Stress Screening (ESS) Test as a part of Production Process are chargeable for all equipment/ components irrespective of whether the PO has been placed or not by NHQ/ MoD (Army). Repeat test due to failure of Equipment Under Test (EUT) are also undertaken on payment basis.

31. **Private/Payment Testing Procedure**. The procedure followed for payment testing is as mentioned below:-

(a) Customers are required to submit quotation request as per standard performa. Quotation Request Performa is provided by the Lab on initial contact/query.

(b) DCQAO (Planning) scrutinizes the Quotation Request Performa and forwards the quotation within three working days.

(c) On receipt of quotation the firm is to make payment to CQAE(WE) Public Fund Account and submit the Test Requisition as per standard performa provided by Lab.

(d) To initiate testing process, DACQAO (Planning) scrutinizes the Test Requisition Performa submitted by customers and verifies it with respect to the quotation and amount payment details.

(e) DACQAO (Testing) verifies physical receipt of the UUT, basic functional checks test set up instruments, approved Acceptance Test Procedure(ATP), test jigs and fixtures and other relevant documents necessary for completion of requested tests. In case of any deficiency of documents or test instrument or technical difficulty, the firm’s rep is informed and in case of defense repeat testing, the QAO is informed on e-mail within two working days. The Test requisition is put on hold till deficiencies are made good.

(f) The required test jigs and fixtures as applicable for the test are provided by the firm. Pre and post preparatory activities on the UUT are the responsibility of firm's rep.

(g) On clearance of test requisition by DACQAO (Testing), DACQAO (Planning) prepares Job Card by taking approval of ACQAO/JCQAO to commence testing on UUT.

(h) The UUT is subjected to tests as per the applicable test sequence mentioned in JSS:55555. An UUT passed in a test, should be offered by firm's rep for the next test in sequence within three working days. Under normal circumstances, if the UUT is not offered for test within three working days, DACQAO (Planning) puts up the file to ACQAO/ JCQAO for closing the Job Card. On approval, test completed reports are generated and Job Card is closed.

(j) In case of any failure of UUT in between the requested set of tests, intimation of status is communicated by e-mail to concerned firm within two working days. In case the firm wishes to subject the UUT to further tests after repair/ ratification, they are to provide a repeat test request and repeat test charges payment details. If no test request and payment is received within 30 days, DACQAO (Planning) puts up the file to ACQAO/ JCQAO for closing the Job Card. On approval, test completed reports are generated and the Job Card is closed. In case of defence payment/ repeat testing, procedure mentioned at Para 34(f) is followed.

(k) In case of failures, no free retest is authorised.

(l) In a situation where UUT has been physically received in the lab and Job Card created, and the firm wishes to withdraw UUT from testing due to the reasons not assignable to lab, no refund request will be processed. However amount may be adjusted against another test of same firm within 90 days**.** After lapse of 90 days, the amount stands lapsed.

(m) Invoices for received/accepted payments during a month and GST return are generated by 5th day of next month and forwarded to the respective firms.

32. **Queries**. Queries related to testing/ status/ facilities through phone are entertained daily between 1400 hrs to 1630 hrs. Personal visits for queries are discouraged. In case of unavoidable situations, visits of firm reps for queries may be permitted during the promulgated timings only i.e. 1400 hrs to 1630 hrs. Officer attending to queries/ visitors maintains discipline and is polite to the customers.

33. Test samples are often landed in the lab with additional components like metal clamps, rubber gaskets, shock absorbers, glues etc which do not form a part of the approved drawing and DBOM. These components do not form a part of the standard fit of the equipment and are meant to help the test sample in withstanding the ET tests, especially the Dynamic Ingress Protection Tests. The firms are to refrain from such practices, as use of unauthorised components is not permitted.

34. **Test Facilities at CQAE(WE), Bengaluru**. The test facilities available at CQAE(WE), Bangalore laboratory along with limiting test sample size and weight is furnished in the table below.

SNo.	Test Facility	Range	Remarks
(a)	**Dry Heat (High Temperature)** Chamber Size: 1.0x1.0x1.0 m Max weight of test sample= 200 kg Max. permissible size of test sample (width x height x depth)= 0.5x0.5x0.5m(*)	Amb to 300°C +/-3°C<100°C +/-5°C>100°C	JSS 55555, IS 9000, DEF 133, MIL 810 & JSS 50101
(b)	**Damp Heat (Steady State)** Chamber Size: 1.5x1.5.5m Max weight of test sample= 300 kg Max. permissible size of test sample (width x height x depth) = 0.75x0.75x0.75m(*)	40°C+/-2°C 95%RH(Min)	JSS 55555, IS 9000, DEF 133 & JSS 50101
(c)	**Damp Heat (Cyclic) / Tropical Exposure** Chamber Size: 1.5x1.5x1.5m Max weight of test sample= 300 kg Max. permissible size of test sample (width x height x depth) = 0.75x0.75x0.75m(*)	Amb to 55°C+/-2°C, 95% RH(Min)	JSS 55555, IS 9000, DEF 133, MIL 810 & JSS 50101
(d)	**Damp Heat (Moisture Resistance)** Chamber Size: 1.5x1.5x1.5m Max weight of test sample= 300 kg Max. permissible size of test sample (width x height x depth) = 0.75x0.75x0.75m(*)	Amb to 65°C+/-2°C, 95% RH(Min)	JSS 50101
(e)	**Dry Cold (Low Temperature)** Chamber Size: 1.0x1.0x1.0 m Max weight of test sample= 300 kg Max. permissible size of test sample (width xheight x depth) = 0.5x0.5x0.5m(*)	Up to 60°C+/-3°C	JSS 55555, IS 9000, DEF 133, MIL 810 & JSS 50101
(f)	**Mould Growth / Fungus Resistance** Chamber Size: 1.2x1.2x1.2m Max weight of test sample= 200 kg Max. permissible size of test sample (width x height x depth) = 0.6x0.6x0.6m(*)	29°C+/-1°C 90%RH(Min)	JSS 55555, IS 9000, DEF 133, MIL 810 & JSS 50101
(g)	**Corrosion (Salt)** Chamber Size: 1.5x1.5x1.5m Max weight of test sample= 500 kg Max. permissible size of test sample (width x height x depth) = 0.75x0.75x0.75m(*)	35°C+/-2°C 90 to 95% RH	JSS 55555, IS 9000, DEF 133, MIL 810 & JSS 50101
(h)	**Rain** Chamber Size: 2x2x2m Max weight of test sample= 1000 kg Max. permissible size of test sample (width x height x depth) = 1.0x1.0x1.0 m (*)	200kPa+/-15% 450 ltrs +/- 10% per hr	JSS 55555, IS 9000, DEF 133, MIL 810 & JSS 50101
(j)	**Drip Proof** Chamber Size: 1.0x10.m Max. permissible size of test sample = 0.75x0.75m (*)	1m from top of equipment	JSS 55555, DEF 133, JSS 50101
(k)	**Contamination** Chamber Size: 1.0x1.0x1.0 m Max weight of test sample= 200 kg Max. permissible size of test sample (width x height x depth) = 0.5x0.5x0.5m(*)	50°C+/-2°C	JSS 55555, DEF 133.

SNo.	Test Facility	Range	Remarks
(l)	**Rapid Temperature Cycling / Thermal Shock** Chamber Size: 1.0x1.0x1.0 m Max weight of test sample= 100 kg Max. permissible size of test sample (width x height x depth) = 0.75x0.75x1m(*)	-40 to + 100^{o}C +/-2^{o}C 95% RH(Min)	JSS 55555, IS 9000, DEF 133, MIL 810 & JSS 50101
(m)	**Shock** Chamber Size: 0.75x0.75m base size Max weight of test sample= 500 kg for NSS-I & 800 kg for NSS-II including jig Max. permissible size of test sample (width x height x depth) = 0.75x0.75x1.0m (*)	NSS I & II, Half sine pulse only	JSS 55555
(n)	**Vibration (Manual Sweep & Endurance at Fixed Frequencies)** Chamber Size: 1.0x1.0m base size Max weight of test sample= 500 kg including jig Max. permissible size of test sample (width x height x depth) = 1.0x1.0x1.0 m (*)	5 to 33 Hz 0.125 mm constant disp.	JSS 55555, DEF 133
(p)	**Vibration (Endurance by Sweep)** Chamber Size: 0.15x0.15 m base size Max weight of test sample = 02 kg including jig Max. permissible size of test sample (width x height x depth) = 0.1x0.1x0.1 m(*)	7 to 350 Hz, 2G tolerance in accelerations <150Hz +/- 15% >150Hz +/- 25%	JSS 50101
(q)	**Random/Sine Vibration** Chamber Size: 1.0x1.0 m base Max weight of test sample = 400 kg including jig Max. permissible size of test sample (width x height x depth) = 1.0x1.0x1.0 m(*)	5 to 2000 Hz, 100G	JSS 55555, MIL & DQAN Guideline
(r)	**Bump Machine** Chamber Size: 1.0x1.0 m base size Max weight of test sample = 250 kg including jig Max. permissible size of test sample (width x height x depth) = 0.75x0.75x0.75 m(*)	10, 40g, 6, 11 ms 1 or 2 bump per sec.	JSS 55555, IS 9000, DEF 133, JSS 50101
(s)	**Bump Machine** Chamber Size: 1.3x1.3 m Max weight of test sample = 1000 kg	0 to 100g, 5 to 20 ms ,1 bump per sec.	
(t)	**Ship Motion** Chamber Size: 1.2x1.2 m base size Max weight of test sample = 200 kg Max. permissible size of test sample (width x height x depth) = 0.9x0.9x0.9 m(*)	+/- 15^{o} fixed	
(u)	High Voltage Break Down	10 KV	NES
(v)	Insulation	UP to 1000 V DC	NES
(w)	Load Tank	40KW, 3 phase	

SNo.	Test Facility	Range	Remarks
(x)	Shock & Vibration Measurement System	0.7 to 3000 Hz , ±600g	
(y)	3-phase Variable Power Supply	0V - 460V AC , 2000Amp	
(z)	400 Hz Variable Frequency Supply	0V - 250V AC, 40- 450 Hz	
(aa)	Multimeter	750V AC, 1000V DC	
(ab)	Lux Meter	0.1mV - 200mV	
(ac)	IR Laser Temperature Sensor	-20 ^{o} to +65^{o}	
(ad)	Clamp Meter AC/DC	0 - 400 Amp, 1000V DC, 750V AC	
(ae)	Clamp Meter AC	1000Amp, 750V	

(*) Following tolerances are permissible on the sample size mentioned in Col (3) above-

(i) +30% of any one side, if only one side of the sample exceeds the max permissible size of the sample.

(ii) +15% of any two sides, if only two sides of the sample exceed the max permissible size of the sample.

(iii) +10% of any three side, if all three sides of the sample exceed the max permissible size of the sample.

Appendix ‘K’

Appendix 'K'
{Refers Para 0603(b)}

ENVIRONMENTAL TEST SPECIFICATIONS

1. **Indigenously Manufactured Equipment**. Electrical/ electronic equipment should comply with following environmental test specifications to be conducted in accordance with the current version of JSS 55555 in force unless specifically indicated in the PO. Confirmation of compliance to environmental specifications would involve conduct of physical tests on the first production system. All naval equipment are required to comply to MIL STD 810 G/H if sourced from overseas and JSS 55555: 2020 (Rev-4) for indigenously manufactured/ sourced equipment. However, the above are to be used as guidelines and ETs may be modified/ tailored depending upon various aspect viz. environmental operating conditions during use, operational philosophy of the equipment, criticality of operation under hostile conditions, manufacturer's capability to meet the specified severities etc and include the same in PSQRs. Guidelines for formulation of QA aspects of an equipment have been outlined in DQAN Policy No. 66301/Policy-24/DQA(N)/QA-17 dated 19 Aug 13.

Sl. No.	Test	Test No.	Specifications	Remarks
(a)	Bump	5	Peak acceleration 100 m/s^2, pulse duration 16ms, No. of Bumps 4000±10, general ruggedness test.	Equipment should be unpacked
(b)	Corrosion Salt	9	Temp: 35^0C RH: 90 to 95% Exposed & submersible items – Procedure 1 Protected items-Procedure 2	To be conducted on representative samples for N1 class and on complete equipment or scale down model for N2 and N3 class equipment. COTS items (or part of it) approved by NHQ not to be selected for Corrosion Salt Test. Equipment should be in switched OFF condition during the test.
(c)	Damp Heat	10	Operating Temperature: 40°C Relative Humidity: 95% Duration - Unpacked & Switched OFF: 15h 30 mins Unpacked & Switched ON: 30 mins. Total duration: 16 hrs	

(d)	Drip Proof	11	Duration: 15 min	For protected items. Equipment should be operated during the test.
(e)	Driving Rain	12	Test Condition C Static Pressure: 200 KPa	For exposed items
(f)	High Temperature	17	Procedure 6. Test Condition K (for protected & submersible): (a) Operation at +55°C (b) Storage at +70°C Procedure 6. Test Condition M (for exposed): (a) Operation at +55°C (c) (b) Storage at +85°C Duration: 16 hrs	Performance check during last hour
(g)	Immersion	19		Equipment should be unpacked and Switched OFF
(h)	Low Temperature	20	Procedure 4. Test Condition H: Temperature: - 10°C Duration: 16 hrs	Performance check during last 30 mins
(j)	Mould Growth	21	Temperature: 30°C RH: greater than 90% Duration: 24 hrs	
(k)	Shock or Impact	24	(a) **NSS Grade I** (for equipment fitted below waterline) – 120g, 8ms (vertical) and 70g, 8ms (lateral). (b) **NSS Grade II** (for equipment fitted above waterline) – 50g, 11ms (vertical) and 22g, 8ms (lateral).	The equipment should be in switched OFF condition during the test.
		Mechanical equipment/ systems	(a) NSS Grade 'A' in accordance with IN Shock Standards and Shock Testing Procedures for surface ships (for equipment – fitted below waterline – 120g, 8ms (vertical) and 70g, 8ms (lateral)	Refer **Annexure 'X'**
			(b) NSS Grade II (for equipment fitted above waterline -50g, 11ms (vertical) and 22g 8ms (lateral).	In accordance with BR 3021

(l)	Solar Radiation	25	Irradiance of 1.2 ± 0.10 kW/m^2 Procedure 1		For exposed items
(m)	Tropical Exposure	27	Test condition A: 7 cycles (for protected& submersible) Test condition C: 28 cycles (for exposed) Temperature: 20°C to 35°C RH: 95% Duration: 24 hrs (one cycle)		
(n)	Vibration	28	**Equipment installed in major warships**		The equipment should be in switched ON condition during the test. The equipment would be mounted on the vibration table by its normal means of attachment on ship.
			(i) Mast head region		
			Frequency range	Amplitude	
			5 to 14 Hz	±1.25 mm constant displacement	
			14 to 23 Hz	±0.45 mm constant displacement	
			23 to 33 Hz	±0.125 mm constant displacement	
			(ii) After region		
			5 to 23 Hz	±0.45 mm constant displacement	
			23 to 33 Hz	±0.125 mm constant displacement	
			(iii) Main region		
			5 to 33 Hz	±0.125 mm constant displacement	
			Equipment installed in minor warships		
			(i) After region		
			7 to 300Hz	±0.4 mm constant displacement Or ±60 mm/s constant velocity (whichever is lesser)	

			(ii) Main region		
			7 to 300Hz	±0.2 mm constant displacement Or ±30 mm/s constant velocity (whichever is lesser)	
			Equipment installed in submarines		
			5 to 33 Hz	±0.125 mm constant displacement	
(p)	Any other tests applicable as per equipment specification				

2. **Mould Growth and Salt Corrosion Test**. Fungus and corrosion, in case of electronic/ electrical components does not only cause physical damage but also alters the impedance of electronics/ electrical circuitry thus affecting the component characteristics. It can undesirably create electrical conducting path across insulating material and thus can change the intended behavior of electronic/ electrical component while also becoming a health hazard. The JSS - 55555 is an exclusive standard for electronic/ electrical equipment and all tests contained therein including Mould Growth and Salt Corrosion Tests pertain to electronic/ electrical equipment. The representative samples have been accordingly specified as PCBs, electronic components, connectors, card cage elements, guiderail etc. While MIL STD 810-G includes the effect of Mould Growth and Salt Corrosion on non-electronic/electrical material as well however, it is erroneous to interpretation applicability of Mould Growth and Salt corrosion Tests only to metal items only. Onboard maintenance routine envisages regular surface cleaning/painting to help obviate fungus growth to a large extent, however such periodic maintenance is often not feasible for electronic/electrical material Therefore, and the issue of mould attack and corrosion needs to be addressed at the design stage of electronic/electrical components. It is therefore, more important to select suitable electronic/electrical components as representative sample to qualify the equipment.

3. **Selection of Samples for Mould Growth & Salt Corrosion Test**. On account of size and type and type of the equipment and Test Chamber, it is not always possible/ suggested to subject complete equipment for mould growth and corrosion tests. Following procedure will be followed:-

(a) For N2 and N3 class equipment (JSS 55555:2012 Rev 3, Table N2, N3) which have higher IP rating to operate in fully exposed and submersible conditions respectively, the complete equipment/scale down model to be subjected to Mould Growth Test. A dummy sample can be used if the equipment is hermetically sealed and mould spores can be sprayed only on the components outside the seal.

(b) Since N1 category equipment are generally not sealed and have sufficient openings to allow ingress of airborne contaminants, including mould spores and salt vapors, the mould growth test is to be carried out on samples drawn from within the N1 class equipment as per JSS 55555: 2012 Rev 3.

(c) To meet operational requirements of the Naval systems, NHQ, after due verification of specification, approves usage of imported/COTS items with specific Make and Model in consultation with the supplier during pre-contract activity. To eliminate dual qualification (COTS specs + JSS 55555 specs) scenario, and probable conflicting outcome of the test, such items (or part of it) will not be selected as sample for Mould Growth and Salt Corrosion tests. Such items would be listed in the remarks column of the Inspection-Note/ Qualification Test report.

(d) When Pre-qualified cables as per EED or other specifications approved by NHQ are used in equipment, then samples of such cables will not be selected for Mould Growth and Salt Corrosion test. All non-prequalified cables being used to be qualified separately as per procedure in vogue.

(e) NHQ approved list for items mentioned vide Para 3 (c) & (d) above will be submitted by the supplier to Inspection agency before the selection of samples for mould growth and salt corrosion test.

(f) Mould growth and salt corrosion test are long duration tests and have maximum number of observation in Environmental Testing. Since Bill of Material is finalized before assembly of equipment, it is recommended that samples be sent in advance for Mould Growth and Salt Corrosion test to provide sufficient time to the supplier to undertake corrective action in case of any observations.

Appendix ‘L’

Appendix 'L'
{Refers Para 0604(c)}

FACTORY ACCEPTANCE TRIALS

1. FATs, if indicated as part of the PO, are the ultimate test to validate the design and performance of the equipment before it leaves the supplier's premises for installation on board. It is therefore mandatory that all pre-requisites towards conduct of FATs are completed and available to the satisfaction of the FAT steam.

2. The pre-requisites and procedures for conduct of FATs are enumerated in succeeding paragraphs.

3. **Pre-requisites**. Availability of the following are essential pre-requisites for conduct of FATs:-

(a) FATs protocol approved by Professional Directorate or Command Headquarters. The approval should also include interface protocols signed between WESEE and firm.

(b) Approved system layout, including technological components, if any. The requirement or otherwise to provide simulators to cater for interfacing system/equipment require to prove FATs protocol but not available with the firm should be clearly mentioned in the approved layout.

(c) Operating and limiting parameters to be monitored, including essential and/or permissible physical phenomenon like leakages, hunting, deflections etc.

(d) Report of FATs undertaken in-house.

(e) Draft operating manual of the system/equipment.

(f) Any other equipment/system specific requirement as provided in the PO.

(g) FATs team as constituted by NHQ/ Professional Directorates/OPA.

(h) Completion of all QA activities preceding FATs, including Type/ Qualification Tests, if applicable.

(j) Submission of all lab test certificates, NDT Reports, Supplier Test Certificates, OEM Test Certificates, Calibration Certificates, Certificate of Conformances, Type/ Qualification Test Reports etc. as per QAP by firm for review of QAO and satisfactory clearance of the same by the QAO.

4. **Conduct**. On the availability or assured availability of the pre-requisites at sub paras 3(a) to 3(j) above, the firm is to make a formal request to NHQ/OPA, under intimation to the Inspection Authority and Inspection Agency for scheduling FATs. On receipt of the request, the competent authority for FATs will co-ordinate and schedule the conduct of FATs per extant procedures in force.

Appendix ‘M’

Appendix 'M'
(Refer para 0614)

EXTRACT OF SOP FOR VIRTUAL/HYBRID INSPECTION OF DEFENCE STORE

Doc No. DGQA/STD/005-23

SOP FOR VIRTUAL/HYBRID INSPECTION OF DEFENCE STORE

Director General of Quality Assurance

20 October 2023

SOP FOR VIRTUAL/HYBRID INSPECTION OF DEFENCE STORE

1. INTRODUCTION:

1.1. As per Quality Management Practices, Quality is the responsibility of the manufacturer. All QC activities ought to be carried out by the manufacturer. Based on successful completion of all such activities, manufacturer is ought to produce quality conformance certificate along with supporting documents as Pre Inspection Reports to DGQA for final Inspection.

1.2. Physical Inspection by Inspecting Officer in the supply chain management leads to increase the expected delivery period of the equipment. Time taken in the QA activity needs to be reduced wherever feasible. In this direction Virtual Inspection is one such methodology which can reduce the QA lead time and the Inspection cost.

1.3. Recent advances in the area of information and communications technology and the difficulties faced for attendance on board due to any force majeure situation have led to the increased application of Virtual Inspection.

1.4. Virtual Inspection is a process of verification that the equipment/store are in compliance with the requirements, where the verification is partially or fully undertaken by applying digital or technological means, in an efficient and secure manner, without physical attendance of the Inspecting Officer in the firm.

1.5. The purpose of this Standard Operating Procedure (SOP) is to provide guidelines to firms and Inspecting Officers for planning and undertaking Virtual Inspection in an efficient and secure manner, as an alternative to physical Inspection.

1.6. These guidelines will be reviewed as necessary based on advancement in technology being used, experience gained during such Inspections and inputs/feedback from stakeholders.

2. REFERENCES

DGQA SOP on SDoC(CoC)
IACS Rec/Rev 2016 - Guidelines for Virtual Inspection Techniques
IAF MD4 - Mandatory document for the use of ICT for audit and assessment.
ISO 19011:2018- Auditing practices group guidance on Virtual audits.
ISO 27001 - Information Security Management System
IRS-SUR-01 2021 - Guidelines on Virtual Inspections/ audits/ Inspections.
NABL Doc No. 120
Session Initiation Protocol (SIP) - TLS encryption

3. QUALIFICATION REQUIREMENTS FOR VIRTUAL INSPECTION OF FIRM'S PRODUCT:

3.1 Should have valid registration certificate from Defence Eco system.

3.2. Should have SO/Contract with sufficient delivery period.

3.3. Should have at least one inspection coordinator as per Para No.7.2.

3.4. Should have ICT as per Para 4 below.

4. INFORMATION AND COMMUNICATION TECHNOLOGY(ICT):

4.1. Information and Communication Technology (ICT) are the technologies used in the scope of Virtual Inspection for gathering, storing, retrieving, processing, analysing and transmitting information with includes both software and hardware.

4.2. The firm should have following minimum capability (Infrastructure)to connect the Inspecting Officer by use of Information and Communication Technology (ICT): -

4.2.1. A firm shall have procedures available for Virtual Inspection.

4.2.2. A firm shall possess suitable hardware/software/equipments which are acceptable to rep of DGQA.

4.2.3. Both ends are to see the same image/videos (live streaming) simultaneously in real time. Actual date/time shown on the device is to be verified for correctness with real time.

4.2.4. Establish two-way communication.

4.2.5. Take screenshots and record videos.

4.3. **Devices**:- Devices compatible with the software/application can be used for receiving images/data/video in Virtual Inspection. This may include standalone devices i.e. digital cameras and other smart devices such as smart phone, tablets, wearable device, smart glass, communication accessories like headphones and microphones and any other devices which can be connected to the network and capable of transmitting the necessary data/images over a cellular, Wi-Fi or Satellite Connection to the Inspecting Officer.

4.4. **Hardware**: - All hardware used for Virtual Inspection are to comply with the applicable requirements relevant for use in the firm's manufacturing site, testing area and hazardous areas etc. The computer screen should be able to present an image quality that is sufficient to take a decision. Portable equipment should have capacity to handle the intended scope of Inspection.

4.5. **Internet**:- The internet connection should have sufficient and stable bandwidth capacity to ensure quality (such as resolution and frame rate) of direct colour image/video and voice communication to the Virtual Inspection location to the satisfaction of the Inspecting Officer.

4.6. **Software**:- A 3rd party software/application for the Virtual Inspection to be utilised as per the Standard Operating Procedure(SOP) issued vide ID No: DPIT/DDP/VC/2022-21 dtd 30 Jun 22 (SOP is at the end of this doc at Appx- F of DGQA Doc No. DGQA/STD/005-23).

4.7. **Cyber Security**:- In compliance with cyber security, data protection and confidentiality policies, it is to be ensured that data captured, transmitted and collected during the Inspection are stored in a secure way that has minimum vulnerability to unauthorized manipulation and distribution. Integrity of raw data is to be maintained during the data storage process and it is to be ensured that data is made available and when

required via secure sharing mechanism to authorized personnel and systems. In such cases the proposal will be evaluated by the firm for compliance with the cyber security, data protection and confidentiality requirements of GoI. The certificate of compliance or undertaking shall submit along with request for virtual inspection to Inspecting Officer.

4.8. **Industry 4.0**. Industry 4.0 is an Industrial revolution that provides various opportunities to firms to optimise and enhance production as also enable real time decision making wrt Quality & Reliability of Components/ Assemblies & Systems. The adoption of Industry 4.0 by the Industry may have widespread ramification towards the methodology of QA by the firm and the Govt QA agency &shall pave the way for Real time online QA, concurrently by the Govt QA agencies.

4.8.1. **Industry 4.0 Approach**. With the Industry at various stages of automation (Industry 2.0 to 4.0), it shall be difficult to adopt to Industry 4.0 and QA 4.0 for an Integrated product/ System. Therefore, it would be prudent to assess the traceability of remote surveys or remote QA on a case-to-case basis stage-wise. The Industry 4.0 standard is initially recommended to be adopted by the Industry only for Critical and Complex Assemblies/ Equipment. Remote QA by use of IoT, Big Data, AI & any other enabling ITC, as QA check can then be taken on by DGQA on these assemblies. For data integrity the Block Chain technology can be adopted for date & time stamp and conversion of the data to a Hash key. The reformed QA in totality could be a Hybrid Model (mix of online & offline QA).

4.8.2. **Transformational Approach: Industry 4.0 Adoption by the Industry**. The transforming approach to QA 4.0, in case of Industrial reforms by the Industry shall have to factor aspects as under:-

Industrial Revolution and QA	Operation Strategy	Quality Concept	Quality nagement Goal	Approach to Management	Quality Management Strategy
4.0	Mass customization and personalised production system	The ability to anticipate and meet the needs of user, considering the interests of other stakeholders	The anticipation of expectations of users and other stakeholders	Responsible Quality Management	Partnership shared values, accountability
3.0	Lean Production	Quality as requirement conformity	User satisfaction with the cost efficiency	Quality Management	Innovation, Efficiency
2.0	Mass Production	Quality as a set of product properties	Minimisation of defects	Quality Assurance	Audit, Standardisation
1.0	Factory Production	Quality as synonymous of excellence	Sorting of product	Quality Control	Inspection

4.8.3. **Characteristic of Industry 4.0 to be Factored by the Industry**. Further, the Industry 4.0 may be characterised by the following aspects/ elements: -

	Cyber-Physical Systems	Internet of Things	Internet of Services	Smart Factory
Interoperability	✓	✓	✓	✓
Virtualisation	✓	-	-	✓
Decentralisation	✓	-	-	✓
Real-time Capability	-	-	-	✓
Service Orientation	-	-	✓	-
Modularity	-	-	✓	-

4.9. During Virtual Inspection, ICT tools/equipments used may include the following:-

Sr No	Equipment	Specification	Purpose/Use
1	Video - Camera	High definition camera, 10-12 MP(Min), HDR video recording with 24 fps/30 fps/ 60 fps, Rotation to 360° with zooming & panning or Better than the above specification.	For visual Inspection(as per QAI/ ATP) to record video footage.
2	Smart Phone (To be used only for QA Check)	Android based-with 10-12 MP cameras, having wi-fi and in-build data usable facility. Min data storage 4 GB RAM/ 64 GB ROM Able to operate upon Microsoft meet& NIC meet for Video conferencing. or Better than the above specification.	For visual Inspection (as per QAI/ ATP) to record video footage.
3	Tablet	Android base, 10-12 MP Camera, Having Min data storage 6 GB RAM/164 GB ROM, Display 1920x1200 (WUXGA) TFT with size 6.4cm (10.4 inch),Dolby Atom Quad speakers. or Better than the above specification.	For visual Inspection (as per QAI/ ATP) to record video footage.
4	Drone	With floating CCTV & 15+ MP HD camera on a radio-controlled motorized gimbal (+90° -90° tilt).Having Min data storage 6 GB RAM/164 GB ROM. or Better than the above specification.	For inspection of Ammunition proof testing, Missiles testing, drone, Loitering munitions.

5	Robot arm (3D scanner)	Dual robotic arm with a 3D scanner was used to capture the geometry and orientation of the object to be inspected. or Better than the above specification.	For scanning the items.
6	VR (Virtual reality) Goggles	VR Goggles Compatible with iPhone/Android with min Resolution per eye 1080 x 1200, Max screen refresh rate 80 Hz. or Better than the above specification.	To inspect as a part of industry 4.0 testing, as applicable.
7	AR (Augmented reality) Goggles	AR Goggles with transparent lenses with min 8 MP HD camera and microphone for voice commands. or Better than the above specification.	To inspect as a part of industry 4.0 testing, as applicable.
8	MR (Mixed reality) Goggles	MR Goggles with iPhone/ Android with min resolution of 1440 x 1440 pixels per eye (2880 x 1440 pixels combined) ; Refresh rate 90 Hz (HDMI 2.0). 60 Hz (HDMI 1.4). or Better than the above specification.	To inspect as a part of industry 4.0 testing, as applicable.
9	Data Acquisition System	Data loggers and Supervisory Control and Data Acquisition System (SCADA System), wherever applicable.	To inspect as a part of industry 4.0 testing, as applicable
10	Ultrasonic inspection tools	Ultrasonic inspection tools like Rapid Ultrasonic Gridding (RUG) and Advanced Ultrasonic Inspection tools especially for mechanical equipment, wherever applicable. Machine should comply to ISO 8373:2021.	To inspect as a part of industry 4.0 testing, as applicable
11	ERP Software	Use of the Data base / NQDBMS/ SAP/ERP suite Compliance to ISO 21378:2019 or better (Audit Data collection std) & ISO 8000-1-2022 or better (Data Quality std).	To inspect as a part of industry 4.0 testing, as applicable

Note:- No Chinese device / ICT tools are allowed for Virtual Inspection.

5. **APPLICATION AND METHODOLOGY**:

The following activities are considered for Virtual Inspection.:-

5.1. Review of Inspection requests and connected documents.

5.2. Planning of Virtual Inspection.

5.3. Critical Raw Material sampling/Inspection.

5.4. In process Inspection/ Stage inspection.

5.5. Final Acceptance Inspection(FAI).

6. **REVIEW OF INSPECTION REQUESTS AND CONNECTED DOCUMENTS**:-

ICT tools are to be adopted for transmitting information between firm and Inspecting Officer. Inspection will be carried out in accordance with the guidelines issued by AHSP/IA. Acceptance Criteria and Test Schedule will invariably be finalized by the AHSP/IA based on the governing specification and provisions of RFP peculiar to the stores. The remote QA request needs to factor the under mentioned aspects to perform QA remotely without compromising the Quality and Reliability of the System under QA:-

6.1. Security & Integrity of the data captured - To be ensured by the firm.

6.2. Data loggings & storage – To be provisioned by the firm.

6.3. Verification and Validation – By the firm.

6.4. Maintaining Confidence Level of Machine outputs vs Consequence of Actions by the firm.

6.5. It is pertinent that in order to have a robust Remote/ Online QA framework while preserving trust over Quality and Reliability of equipment, the firms need to have well-equipped test machines and systems, which will be audited by the Govt. QA Agency for their regular calibration and functioning.

6.6. A highly secure yet flexible mechanism needs to be maintained by QA agency to maintain the security, especially the data collected for reports of QA during complete production cycle for high accuracy. The Govt QA agency need to maintain its audit records and efficiency for the test machines and system on regular basis, especially prior and post QA.

6.7. **Verification and Validation** in accordance to JSG 1040:2023 becomes a necessity to assure the inputs by test machines and system.

6.8. **Inspection Request** - Firm is to submit Virtual Inspection request as per the **Appx 'A'** of this document (I,e of DGQA Doc No. DGQA/STD/005-23). The request for Virtual Inspection is to be in accordance with DGQA requirements and subject to acceptance as per **Appx 'B'** of DGQA Doc No. DGQA/STD/005-23. Alternately, when First contact meeting or Planning meetings take place with the vendor the details mentioned in **Appx A and B** of DGQA Doc No. DGQA/STD/005-23 can be used as guidance. The Inspecting officer is to be provided with all necessary facilities for safe execution of the Inspection and access to plans and documents to carry out Virtual Inspection effectively.

6.9. **Inspecting officer** - An officer nominated to enable inspection who will review documents, photos, records provided by firm to demonstrate the conformity of the product to the specification. He may perform, witness, observe, audit, undertake sampling and administer the inspection virtually. Firms can utilize third party inspection Agencies/Firms registered with DGQA, having Virtual Inspection (VI) services can be utilized for Virtual Inspection /Hybrid Inspection (VI/HI).

6.10. **Document review** - Review of the documents including manufacture application along with the Acceptance Test Procedure (ATP), Pre-inspection reports, video, photos demonstrating the conformity to specifications and standards will be done by inspecting officer in online mode. Any clarifications regarding documents are taken in the virtual mode by arranging collegiate meetings through Video Conferencing (VC). The Quality Assurance (QA) documents are to be approved online preferably by endorsing digital signatures of approving authorities. Every activity involved in complete QA process is to be performed in virtual mode to safeguard time.

6.11. It is to be ensured that there is no breach of legal, regulatory or statutory requirements. This responsibility lies with the all stake holder in virtual inspection.

7. PLANNING FOR VIRTUAL INSPECTION:

Applicable method for Virtual Inspection will depend on the type of Inspection being undertaken. While information required such as video/photographs and supporting documents would be exchanged through official emails of respective stake holders of Virtual Inspection. Before initiating the Virtual Inspection, the following are to be confirmed by Inspecting officer under taking Virtual Inspection.

7.1. **Scope of Inspection**.

7.1.1 Demo of hardware and software to be used, including internet connectivity test to ensure the efficacy of audio video output, Zooming, panning, data logging device, Supervising Control And Data Acquisition (SCADA) system etc should be undertaken by inspecting officer before conducting of Virtual Inspection. Schedule and time frame for conducting Virtual Inspection is to be finalized post satisfactory demo of entire setup.

7.2. **Inspection Coordinator(s)**: -Person identified and nominated by authorised signatory of the firm for the Virtual Inspection. Such individual will be authorised by DGQA based on skill “Certification” for virtual inspection. Skill matrix of the inspection coordinator(s)will be to be submitted in the application (Appx ‘A’ of DGQA Doc No. DGQA/STD/005-23).The persons assisting in the Virtual Inspection are to be familiarised in carrying out those activities.

7.3. Firms should keep all the documents and records required by the Inspecting Officer during Virtual Inspection.

8. CONDUCT OF VIRTUAL INSPECTION:

8.1. **Planning meeting** is to be scheduled to brief the Inspection instructions. The meeting shall contain all the concerned management representatives. This may be done using VC or by any other means to save time. Flow chart for the Virtual Inspection is attached at **Appx ‘C’** of DGQA Doc No. DGQA/STD/005-23.

8.2. If the Inspecting officer is not satisfied with the arrangements or if the remote session cannot be properly maintained, he/she may call off the Virtual Inspection. For example, in case of a live video, the image quality is to be at least such that the person or the thing can be clearly seen.

8.3. **Virtual Inspection** is carried out in part or as a combination of Virtual Inspection and physical Inspection depending on the circumstances. **Hybrid Inspection** is combination of Virtual Inspection and Physical Inspection. The extent of combining virtual inspection with physical inspection shall be arrived during the first contact meeting or planning meeting or by resorting to any other communication method. In the event of any constraint faced for conduct of inspection or recording of inspection proceedings, virtual inspection can be restarted from the beginning. The remote QA by use of cameras could be taken up for non-critical stages/ equipment and/ or noncritical tests. Further, QA in the current scenario be taken up on a Hybrid QA methodology as under: -

8.3.1. **Quality Audit**: Online mode, with the Govt QA agency being given access to the firms' SAP/ NQDBMS, else the QA report could be shared in digital form by the firm for evidence based Audit by DGQA.

8.3.2. **Non-Critical Long-Term Tests**: Online/ Remote mode by use of cameras. However, the test equipment in such a case is required to be calibrated & accredited by the NABL lab. Post testing the reports will have to be shared by the Firms in digital form through mail or otherwise.

8.3.3. **Integrated Functional Testing**: To be undertaken by Govt QA agency physically before final clearance and by use of remote cameras wherever possible by use of cameras to optimize time & effort.

8.3.4. **Independent Verification & Validation (IV&V) of System, Software & Hardware**: Online if documents shared online.

8.4. It is essential that sufficient lighting is arranged by the firm to show the condition of the store, its machinery and equipment clearly. Where the Inspection location does not have sufficient/no natural lighting, temporary lighting is required to be provided, keeping safety issues on priority at all items.

8.5. Where simple/ limited verifications are required (e.g. documentary or data base information) evidence can be received using ICT platform, which can be verified by IO/IAs.

8.6. When live streaming is used for Virtual Inspection., the Inspecting officer is to verify the identity of the store at the commencement of the Inspection. Inspection coordinator attending the Inspection must have access to the areas intended to be inspected.

8.7. In case live streaming is not possible or is not continuous at the place of Inspection, partly online sequences may be accepted by the Inspecting Officer.

8.8. All findings are to be recorded and proposal for repairs, corrective actions are to be reviewed along with provisions for alternate arrangements.

8.9. The objective evidence available are subject to technical evaluation by the Inspecting officer/Inspecting Agencies and accepted if found satisfactory.

8.10. In case the Inspecting Officer, according to his professional judgment, deems that the Virtual Inspection does not provide the same level of assurance as physical Inspection, the Inspecting Officer may decide not to clear the relevant items.

8.11. **Hybrid Inspection**: -The Inspecting Officer may require re-confirming the result of the Virtual Inspection, by a Physical Inspection to clear the relevant item(s).This hybrid inspection is done at his discretion. Virtual Inspection is not carried out to his satisfaction he may resort to Hybrid inspection. In addition, Hybrid inspection may be resorted in the following events: -

(i) Classified equipment
(ii) Any constraints faced in ICT Tools.
(iii) Physical inspection and cross check of sample can be done in case doubt exist in virtual inspection.
(iv) Virtual inspection is not possible or subjective measurement is required with respect to a standard.
(v) Any other unforeseen condition.

8.12. The Inspecting Officer is to collect the evidence as required based on the type and scope of the Inspection: -

8.12.1. **Critical Raw Material Inspection**: - Selection of components, raw material/ samples for laboratory testing is to be carried out in Virtual mode. Raw materials selected through Virtual mode be stamped by the firm's authorised internal quality representative(Inspection Coordinator) with his designated stamp of the firm and to pack in tempered proof sample sealing bag. Serial Nos may be used for easy identification, traceability. Other methods like stickers, holograms may also be adopted on mutual agreement on procedures; such samples should be sent to laboratory by the manufacturer for testing as per the procedure in vogue. For further information please see SOP on SDoC.

8.12.2. **In Process/Stage Inspection.** All reports prior to Control points Inspection are to be forwarded to Inspecting officer through e-mail along with inspection request for review indicated in the relevant ATP. Any clarifications/ discussions on the report could be resolved through e-mail/ Video Conferencing (VC). The activity is to be witnessed virtually by the Inspecting officer. The inspection is to be commenced after witnessing requisite parameters through ICT tools. All reports of above activities are to be submitted online to Inspecting officer for necessary clearances.

8.12.3. **Final Acceptance Inspection (FAI) of Product:** The inspection coordinator uses a video-enabled device to provide a live feed of the Inspection site to the Inspecting officer. Inspecting officers may direct the site contact to specific areas or equipment for closer examination. Site contact may use additional cameras or devices for detailed views if required. Although touch and feel of the Equipment under Test (EUT) and test equipment is not experienced in Virtual mode, all efforts should be made to complete the activity online. Requisite clarity of camera, positioning, panning, zooming etc. are to be ensured to avoid possible errors in reading the measurements. Firms to be sensitized to undertake this activity sincerely as 100% coverage of camera view for visual Inspection of large equipment may not be possible at all times. Appropriate sensors to be installed to carry out the dimensional checks. Final Acceptance Inspection is of two categories:-

8.12.3.1. **Equipment**: Equipment offered for inspection is witnessed for conformance to QAI, the same be stamped and I/note is issued on acceptance. In case, defects are observed in equipment, the same will be returned for rectification (RFR) to firm. I-Note will be issued on resubmission and its successful evaluation.

8.12.3.2. **Items/Spares**: Items offered for inspection are witnessed for conforming to QAI same be stamped and I/note issued on acceptance. In case, defects are observed, the same will be rejected and Rejection note will be issued.

8.13. **Data Acquisition/Evidence Collection**- Inspecting officers capture screenshots, photographs, or video recordings of critical Inspection points as a proof of findings. Digital information/ evidences submitted by the firm's Inspection coordinator to the Inspecting officer are to reflect the real situation of the item. Geographic coordinates (Geo Tagging) and Time stamping to mark time and location of Inspection. Where geo tagging is not feasible, firm name & location can be mentioned on the video footage/photos.

8.14. **Closing and follow up**- Inspecting officer at the end of inspection will summarize the findings with the Inspection Coordinator. He will also address questions and concerns. He will provide a timeline for submitting additional documentation or implementing corrective actions, if applicable. In the event of any nonconformity, wherever possible Inspecting officer will carry out a virtual review of corrective and preventive action.

8.15. **Stamping, Preservation and Packing**- As per the existing procedure, inspecting officer is to physically stamp the equipment/ stores which have undergone inspection and witness preservation and packing as per the approved ATP. The same procedure to continue with the help of inspection coordinator. However, DGQA inspecting officer exercise the right to do the same physically. Hologram, QR Code for stamping will be utilised where feasible.

8.16. **Review and Approval**- DGQA inspecting officer will review the Inspection report for accuracy and completeness and obtain necessary approvals and signatures as required by DGQA inspection procedure.

8.17. **Issue of I- Note**-On successful completion of Inspection, digitally signed-note will be issued with a remark that "**stores have been accepted through virtual inspection**" subject to confirmation by Controller of Defence Account (CDA). Otherwise Paper I-Note issued with the same remark. A sample I-Note for is enclosed at **Appx 'E'**, this is format same as the I Note in vogue

9. **RESPONSIBILITY OF FIRMS**-Following to be adhere by the firms for conduct of Virtual Inspection activities: -

9.1. Utmost importance to be given to quality aspects and firm should own responsibility for quality of their products. As brought out above, the Virtual Inspection process to be discussed and agreed upon by both the Inspection agency and the firm. The associated risks of Virtual Inspection and appropriate mitigation plans have to be worked out by the firms.

9.2. Requisite Virtual Inspection plan and corresponding undertakings have to be completed prior commencement of the Inspection activities.

9.3. All personnel of the firms associated with defence products are to be sensitized regarding changes in the Inspection process and therefore, need for stricter internal quality checks.

9.4. Infrastructure required for Virtual Inspection such as camera with high resolution, camera controls, network connectivity with good bandwidth, recording, encryption, decryption etc. are to be set up by the industry/supplier.

9.5. One internal Quality Assurance (Inspection coordinator) will be nominated by firm and authorised by IO/IA for undertaking stamping on behalf of QA agency.

10. POST VIRTUAL INSPECTION ACTIVITY

10.1 **Archiving**- All records in soft form will be forwarded for archiving purpose. Archiving of all inspection records and documentation in a secure and organised manner must be done. Data collected in soft form shall be retained for 10 Years.

10.2. **Continuous Improvement**- Regularly review and evaluate the virtual inspection process for improvement, considering feedback from all stakeholders.

11. GUIDANCE PERTAINING TO VIRTUAL INSPECTION

11.1. A detailed plan for conduct of Virtual Inspection on specific equipment as per approved ATP is to be worked out and mutually agreed by the firm and AHSP.

11.2. Firms to intimate the inspection agency about conduct of specific test through virtual mode.

11.3. Firm to forward all relevant reports for review and confirm the readiness of Virtual Inspection infrastructure.

11.4. Inspecting officers would attend the inspection activity from their respective unit/ designated place and adhere to their internal procedures/ orders.

11.5. All norms for the inspection required to be followed as per concerned policy guidelines in vogue.

11.6. On Successful completion of inspection activity in virtual mode, the firm will generate reports and forward it to inspection agency through e-mail for issue of I Note. All Video recording of virtual inspection are to be forwarded to inspection agency in soft copy in portable media for safe storage. In the event of long duration test, trials, inspection, the video footage need to cover only relevant event at the beginning, intermediate and final finishing for evidence purposes. Such footage is required when the data logging is not available. If data logging is available for testing and inspection, video footage is not compulsory, however real time video footage is required during inspection by inspecting Officer whether same is recorded or otherwise.

11.7. All security aspects pertaining to information security have to be ensured throughout the virtual inspection process. Any breach of information security to be reported immediately by the supplier to the QA Agency.

11.8. As mentioned in the Standard Operating Procedure (SOP), all efforts should be made to route the virtual activities through DGQA portal and data storage in DGQA/ SDCC servers in future and link to DGQA digital QA process, as much feasible.

12. **SOP Review**: Since contemporary technologies are emerging faster and faster, in an endeavour to keep the standard current, DGQA will review periodically as necessitated.

13. **CONCLUSION**: The Virtual Inspection process has to be conducted in a systematic way covering all aspects of the process brought out in the previous paragraphs without compromising on quality and information security.

Appendix 'N'

Appendix 'N'
(Refer para 0618)

INSPECTION CALL FORMAT

Tel No: Firm Name
e-Mail: Address

Ref No: Date: DD/MM/YYYY

Name of Inspection Agency

INSPECTION CALL - SL NO___

It is requested to depute your rep/(s) to carry out QA inspection of material as mentioned below:-

1.	Purchase Order/ Sub-order No and date	
2.	Order placing authority/ agency	
3.	Broad description of item/(s) (Table depicting ***POSI No, Part No, Item Description, Manufacturing Year, Qty Ordered & Qty Offered*** is to be enclosed)	
4.	Proposed date/(s) for inspection	
5.	Place of inspection	
6.	Inspection instruction as per PO	

7(a) **Inspection against approved drawings & QAP**	7(b) **Inspection against OEM Tech Specs**	7(c) **Inspection against Import Documents**
GA/ component drawing reference	Approved PIL/ DBOM reference	Documents as per **Appendix-'G'** of QAD-R03 available & enclosed
		Yes / No
Approved QAP/ SQAP / MQAP No & date	Documents iaw Para 0605 (c) of QAD-R03 available & enclosed	
	Yes/ No	
Applicable Clause No/(s) of approved QAP/ SQAP / MQAP		
Particulars of inspection/(s) being offered		
Approved ATP, FATs/ IFATs Protocol etc enclosed		
Yes/ No/ NA		
Previous stage inspections (self tests, lab tests, NDT, Type Tests etc) iaw approved QAP/ SQAP / MQAP completed & all reports submitted		
Yes/ No/ NA		

Previous stage inspection reports, CoCs, test certificates, Type Test reports NDT reports etc, not submitted earlier, enclosed Yes/ No/ NA			
8.	Self-inspection by in-house QC satisfactory & reports/ test certificates attached	Yes/ No	
9.	Measuring instruments/ equipment to be used are available and calibrated	Yes/ No/ NA	
10.	PSPP as per PO/ Offered Lot No/(s)	PSPP____/ Offered Lot No/(s)_____	
11.	Delivery date/ Extended delivery date		
12.	Contact person & telephone number		
13.	Any other relevant information		

(Authorised Signatory)

Digital signature permitted

Attachment:- As above

Appendix ‘P’

Appendix 'P'
{Refers to Para 0909 & 1006(e)(vii)}

उप-नामित निरीक्षण एजेंसीके लिए
निरीक्षण समापन प्रमाण पत्र
INSPECTION COMPLETION CERTIFICATE (ICC)
FOR SUB-NOMINATED INSPECTION AGENCY

1.	मुख्य आदेश प्राधिकार एवं मुख्य आदेश सं. तारीख Main Ordering Authority andOrder No. & date			
2.	निरीक्षण प्राधिकार / Inspection authority			
3.	मुख्य निरीक्षण एजेंसी/Main Inspection Agency			
4.	मुख्य फर्म का नाम/Main Firm's name			
5.	उप-नामित निरीक्षण एजेंसी Sub-Nominated Inspection Agency			
6.	उप-नामित फर्म का नाम Sub-Nominated Firm's name			
7.	उप-आदेश संख्या तथा तारीख/Sub-Order No. & date			
8.	Purchase Order Value &Delivery Period (D.P.)			
	Order Value of Main PO	D.P. of Main PO	Order Value of Sub-PO	D.P. of Sub-PO
9.	अनुमोदित आरेजखनगुणता आश्वासन योजनातथाविनिर्देश का विव्रण Details of approved Drawings, QAP & Specification			
10.	अनुमोदित गुणता आश्वासन योजना के अनुसार गुणता आश्वासन गतिविधियाँ का विव्रण जिसके लिए यूनिट को उप-नामित किया गया है। Details of QA activities as per approved QAP for which unit is sub-nominated			
11.	निरीक्षण की तारीख/Date of Inspection			
12.	अंतिम संयुक्त निरीक्षण रिपोर्टकासंदर्भ क्रमांक एवं दिनांक प्रतिलिपि संलग्न करें) Reference No. & Date of Final Joint Inspection Report (Copy to be enclosed)			
13.	जिस मद से यह प्रमाण-पत्र सबंधित है उसका पूर्ण विवरण मात्रा तथा पंजीकरण संख्या (यदि यह प्रेषित माल केवल आंशिक आपूर्ती है तो इस कालम में 'आंशिक आपूर्ती' लिखा जाना चाहिए|) Full description, quantity & registered Nos of any items to which the certificate refers (if this consignment represents only part supply this column should be endorsed "PART supply")			
14.	संरक्षण, पैकिंग और मार्किंग, यदि कोई हो, का विवरण Details of Preservation, Packing & Marking, if any			
15.	गारंटी/वारंटी का विशेष खंड, यदि कोई हो Special Clause of Guarantee / Warranty, if any			
16.	जिसको भेजा गया / भेजा जाएगा उसका प्रेषण विवरण यदि उपलब्ध हो| Dispatched to / will be dispatched & dispatch details if available			
17.	यदि पहले कोई आंशिक आपूर्ती दी गई हो तो उससे संबधित जारी किए गए निरीक्षण समापन प्रमाण-पत्र की संदर्भ संख्या Reference number of ICC if any, issued in respect of part supplies made earlier.			

गुणता आश्वासन अधिकारी के हस्ताक्षर
QAO Signature

Appendix ‘Q’

Appendix 'Q'
{Refers to Para 1003 & 1004(d)}

FUNCTIONAL JURISDICTION OF DQA(WP) & DQA(N)

Demarcation of Responsibilities

1. The demarcation of QA responsibilities between DQA(N) and DQA(WP) for QA inspection will hereinafter be as follows:-

(a) Demarcation of responsibility will be based on division of main equipment as followed for new construction ships. Quality Assurance responsibility with regard to "Electronics/ Electrical/ Weapons Equipment" will fall under the purview of DQA(N) whereas integrated electrical machinery such as Diesel Alternators/ Turbo Alternators/ Pumps/ Integrated Control Systems with motors and associated control panel will fall under the purview of DQA(WP) (in addition to existing Engineering and Hull equipment).

(b) Responsibility of QA will be all inclusive wherein the QA authority providing coverage for main equipment will also be responsible for QA coverage for associated equipment parts, spares, test, equipment/ tools, irrespective of the fact whether such items are supplied along with main equipment or are an isolated procurement by Material Organisations (MOs) or other Order Placing Authorities (OPAs). **The responsibility of QA coverage based on Pattern Number isceased.**

(c) In case of common spares for multiple main equipment falling under the purview of both DQA(N) and DQA(WP), the QA will be undertaken by the QA agency as per PO, if main equipment is not indicated. In case of indication of any of the main equipment, the QA will be undertaken as per the indicated main equipment, under the provision of para 1(a)above.

2. **Systems of Integrated Nature**. The new integrated system complex is combination of many legacy systems which were earlier dealt individually either by DQA(N) or DQA(WP). The same is no more feasible as one supplier is likely to supply the entire integrated system. The IPMS, for example, will be under the QA authority of DQA(WP) including all sub-systems therein, except for Automatic Power Management System (APMS). The QA coverage for APMS will remain with DQA(N), however, those of Battle Damage Control System (BDCS) and other systems will be with DQA(WP). Changes in such QA responsibility will thus be applied to legacy systems, too. For example, Flood Alarm/ Fire Detection and Fighting Systems will fall under purview of DQA(WP) as part of IPMS as well as individual equipment.

3. **QAP Approving Authority**. The approving authority for QAP will be DQA(N)/DQA(WP) as per the provision of Para 1(a). Approved QAPs for a specific equipment/ sub-assemblies/ system (regardless of approving authority viz DQA(N) or DQA(WP)) will be applicable if no changes have been incorporated and validity of the same concurred by Inspecting Authority.

4. **General Stores**. As per list of General Naval Stores.

5. An indicated list of equipment depicting responsibility of DQA(N) and DQA(WP) is as follows:-

(a) **Indicative List of Equipment Under DQA(N)**

(i) **Electrical Stores**

Sl. No.	Item Description
(aa)	Submarine Batteries
(ab)	Battery Charger
(ac)	Cables
(ad)	Light Fittings
(ae)	Navigational Light Control Panel
(af)	Switchboards and Energy Distribution Centers (EDCs)
(ag)	Hand / Auto Change Over Switches
(ah)	Fuse & Distribution Panels
(aj)	Automated Power Management System (APMS)
(ak)	Automatic Emergency Lanterns (AELs)
(al)	Transformers
(am)	Rectifiers
(an)	Converters (Static & Rotary)
(ap)	Impressed Current Cathodic Protection (ICCP) System
(aq)	Helicopter Starting System
(ar)	Galley Ranges and Deep Fat Fryer
(as)	Glide Path Indicators, GSHB, SGSI
(at)	Sound Power Telephone
(au)	General Purpose Electrical / Electronic Test Equipment
(av)	Signaling Projectors
(aw)	Emergency Supply System
(ax)	Electric Hooter
(ay)	MF Beacon, CCTV

(ii) **Electronic Stores**

Sl.No.	Item Description
(aa)	Radars
(ab)	Internal and External Communication system
(ac)	Combat Management System
(ad)	Ship's Data Network
(ae)	NAVAIDS (Gyro, Log, Echo sounder, AIS etc.)
(af)	Integrated Bridge System (IBS)
(ag)	EW & COMINT Equipment
(ah)	Meteorological Equipment / Survey Equipment
(aj)	NBC System fitted on IN Ships (SIRS / SICADS)
(ak)	Data Link
(al)	IFF, UASS, GMDSS, ECDIS

(iii) **Weapons & Sensors**

Sl.No.	Item Description
(ab)	Missiles / Rocket / Torpedo Launchers
(ab)	Gun Mounting (Except Barrels)
(ac)	Fire Control Radar
(ad)	Fire Control System of all Weapons
(ae)	Night Vision Binoculars
(af)	Sonar, XBT, UWT, ASW FCS, TOTED and Winch Handling System
(ag)	Periscope
(ah)	Wind Speed and Direction System
(aj)	Degaussing System
(ak)	SWISS, MISU, Chaff System

(iv) **General Naval Stores**

Sl. No.	Item Description
(aa)	Oils & Lubricants
(ab)	Refractory and Insulating Material, Fire Retardant Compounds and Materials
(ac)	Life Saving Equipment – Life Rafts, Life Jackets, Bullet Proof Jackets etc.
(ad)	Rubber Products – Sheets, Tubes, Hose, Gaskets, Oil Seals, ‘’O’’ rings etc.
(ae)	Diving Equipment, Breathing Apparatus
(af)	Floor Covering, Linoleum including FR Linoleum
(ag)	Textiles and Furnishing Fabrics
(ah)	Asbestos Sheets, Ropes, Packing Material etc.
(aj)	Paints &Chemicals
(ak)	Portable Fire Extinguishers
(al)	Rigging Material, Chain Cables, Anchors etc.
(am)	Pulley Blocks
(an)	Wood
(ap)	Electrodes/Weld Consumables
(aq)	Ferrous and Non-Ferrous Plates/Sections
(ar)	General Hardware Tools and Fasteners
(as)	Rubber Fenders
(at)	Inflatable Boats
(au)	Gas Cylinders

(b) **Indicative List of Equipment Under DQA(WP)**

(i) **Main Propulsion & PGD Group & Associated System Equipment**

Sl. No.	Item Description
(ab)	Main Propulsion System and associated equipment including Control Systems, Shafting, OBMs
(ab)	All types of Alternators, Emergency Generators, Compressors
(ac)	Pressure Gauges / Differential Pressure Gauges & Temperature Gauges, Tank Content Gauges & Magnetic Level Switches, Gas Analysers
(ad)	Distilling Plants/ Fresh Water Generators / Reverse Osmosis Plants
(ae)	LP, HP, Servo, Salvage & Diving Air Compressors & FD Blowers
(af)	Valves for Steam Systems Fuel/ Lub Oil System, Compressed Air System, AVCAT System, Fire Main, Sea Water, Fresh Water and Chilled Water System including underwater valves, Rod Gearing for Valves
(ag)	IPMS

(ii) **Auxiliary Equipment**

Sl. No.	Item Description
(ab)	All types of pumps (Motor Driven as well as Diesel Driven) with associated motors and Control / Starter Panels
(ab)	A/C, Refrigeration and Ventilation system (other than trunking) including associated equipment and control panels
(ac)	**System Pipes**. All types of Steam Systems, Fuel/ Lub Oil and Lubrication System, Compressed Air System, Tele motor System, Hydraulic System, AVCAT System, Fresh Water/ Chilled Water System, Sea Water/ Brine System, Ref Gas system, Exhaust System of all types of equipment including compensators, Boiler Tubes
(ad)	Steering Gear and associated equipment including Control Panel
(ae)	Ship's Stabilizer and associated equipment including control panel and auto pilot
(af)	Bilge Separators & Bilge Eductors / Ejectors, Steam Sirens, Air Whistle
(ag)	Shock Mounts

(iii) **Hull, Miscellaneous & Fire Fighting Equipment**

Sl. No.	Item Description
(ab)	Fire and Flood Alarm System including associated valves, Sensors and Control Panels, Fixed Fire Fighting systems
(ab)	All types of Doors & Hatches, Man Holes, Bow Door & Ramps, Scuttles / Windows, Deck Head Tubes / Glands, Ladders.
(ac)	Helo Traversing & Handling system, Helo Landing Grid, Helo Hangar & general-purpose Rolling shutters, Helo Fuelling / De-fuelling System.
(ad)	LP / HP Air Bottles.
(ae)	Davits, Derricks, Booms, Fairleads, Bollards, Capstan, Winches for Helicopter Handling / Towing / Minesweeping Boat Davit / Ammunition Loading & General Purpose.
(af)	Bellows, Load Hangers
(ag)	**Miscellaneous Equipment**. Laundry Equipment, Sewage Treatment Plant, Pollution Control Eqpt, Incinerator, Blowers, Vacuum Cleaners, Oily Water separator, Miscellaneous Domestic Eqpt. Etc.
(ah)	**Workshop Equipment**. Lathes, Drilling Machines, Grinding Machines, Milling Machines, Welding Equipment and accessories, Wood Cutting Eqpt, Lifts, Chemical Cleaning Equipment., Shot Blasting Equipment, Electroplating Equipment, Coating, Surface & Heat Treatment Equipment, Hydraulic Presses

(iv) **Electrical & Controls**

Sl. No.	Item Description
(aa)	Motors for all general applications, Ventilation Motors, NC Fan motor, Motor for Motor – Generators
(ab)	Starters & Control Panels for electrical motors & all equipment.
(ac)	Automatic Voltage Regulator (AVRs), Window Wipers
(ad)	Heating Elements pertaining to equipment

Appendix ‘R’

Appendix 'R'
[Refers to Para 1004 (b)]

GEOGRAPHICAL JURISDICTION OF FIELD ESTABLISHMENTS

FIELD ESTABLISHMENTS OF DQA(WP)

Sl.No.	Establishment	Areas Covered
1.	CQAE (WE& WP), Mumbai	Maharashtra (except Pune) & Goa
2.	QAE(EFS), Mumbai	Maharashtra (except Pune) & Goa
3.	CQAE(MS), Mumbai	Maharashtra (except areas covered by QAE(WE), Pune at Sl 4 below & Nagpur), Nasik, Goa & Talegoan, in respect of machinery spares orders ex-DPRO / MOs
4.	QAE (WE), Pune	Pune region (except Talegoan & Nagpur), District of Pune, Satara, Solapur, Karad, Sangli, Walchand Nagar & Aurangabad. Aurangabad for DPRO/MO Orders only)
5.	QAE (WE), Vadodara	Gujarat, Daman & Diu, Dadra & Nagar Haveli
6.	CQAE (EFS), Visakhapatnam	Andra Pradesh and Telengana
7.	QAE (WE, FPC), Bangalore	Karnataka, Kerala, Lakshadweep
8.	QAE (WE, EFS), Chennai	Tamil Nadu, Pudduchery
9.	QAE (WE/ WP) & QAE EFS), Kolkata	West Bengal, Bihar, Orissa, North Eastern States, Jharkhand & A&N Islands
10.	QAE EFS), Kolkata	West Bengal, Bihar, Orissa, North Eastern States, Jharkhand & A&N Islands in respect of orders of Eastern Fleet Stores only
11.	QAE(WE), New Delhi	Delhi, U.P, Haryana, Rajasthan, Uttarakhand
12.	QAE (WE), Bhopal	Madhya Pradesh, Chhattisgarh & Nagpur district of Maharashtra
13.	QAE (WE), Jalandhar	Punjab, Chandigarh, H.P, J&K

FIELD ESTABLISHMENTS OF DQA(N)

Sl.No.	Establishment	Geographical Jurisdiction
1.	CQAE (WE), Bangalore	Karnataka and areas in and around industrial township of Hosur
2.	CQAE (NS), Mumbai (along with QAE(N) Mumbai	State of Goa, Union Territories of Daman, Diu, Chhattisgarh, Maharashtra and Gujarat State
3.	CQAE (WS), Mumbai	State of Goa, Union Territories of Daman, Diu, Chhattisgarh, Maharashtra and Gujarat State
4.	CQAE (N),Secunderabad	Andhra Pradesh and Telangana
5.	QAE (N), Chennai	Tamil Nadu (except areas in and around Industrial Township of Hosur and Coimbatore Defence Corridor)
6.	QAE (N), Kochi	Kerala and Coimbatore Defence Corridor
7.	QAE (N), Kolkata	Orissa, West Bengal, Bihar, Jharkhand, Assam and North Eastern States
8.	QAE(N) Inspection Cell, Cossipore	Cossipore
9.	QAE (N), Badarpur	Delhi, Haryana, Rajasthan, U.P., Uttarakhand, Punjab, J & K, Himachal Pradesh and Madhya Pradesh.
10.	QAE (UB), Mumbai	State of Goa, Union Territories of Daman, Diu, Chhattisgarh, Maharashtra and Gujarat State
11.	DQA (N) Inspection Cell, Hardwar	Hardwar (Uttarakhand)

Appendix ‘S’

Appendix 'S'
[Refer to Para 1006 (c)]

SUB NOMINATION REQUEST

1.	Main PO number & date	
2.	Description of main system/ equipment	
3.	Part No of main system/ equipment, if applicable	
4.	Name of main OEM/ supplier	
5.	Address/ Tel / e-mail of Main OEM/ supplier	
6.	Sub-order number & date	
7.	Delivery date	
8.	Description of sub-ordered item	
9.	Part No of sub-ordered item, if applicable	
10.	Name of sub-manufacturer/ supplier	
11.	Address/ Tel No/ e-mail of sub-manufacturer/ supplier	
12.	Approved drg reference for sub-ordered item (Manufacturing drg reference, in case approved GA drawings not available/ applicable)	
13.	Approved QAP/ SQAP reference for sub-ordered item	
14.	Applicable clauses of approved QAP/ SQAP	
15.	Details of inclusion/ exclusion approval accorded by DQA(WP)	
16.	Approved ATP reference for Type Test and/or Functional Trials, as applicable	
17.	Approved Shooting Sketch reference for NDT, if applicable	
18.	Approved NDT Procedure reference, if applicable	
19.	Approved SOTR/ TSP, TNC MoM iro the sub-ordered item (relevant pages)	
20.	Any other document, if applicable	
21.	Special Instructions, if any	

ENCLOSURE CHECK-OFF LIST

Sl No	Document	Yes/No
1.	Copy of sub-order	
2.	Copy of approved drgs (Details of manufacturing drgs, if approved GA drgs are not available/ applicable)	
3.	Approved QAP/ SQAP (relevant pages, if complete QAP/ SQAP is not applicable)	

4.	Inclusion/ exclusion approval accorded by DQA(WP)/ DQA(N), if applicable	
5.	Approved ATP for Type Test and/or Functional Trials, as applicable	
6.	Approved Shooting Sketch for NDT, if applicable	
7.	Approved NDT Procedure, if applicable	
8.	Approved SOTR/ TSP, TNC MoM iro the sub-ordered item (relevant pages)	

CONFIRMATION

It is confirmed that:-	
1.	All documents submitted are approved by competent authority.
2.	All documents enclosed to the subnomination request are legible.

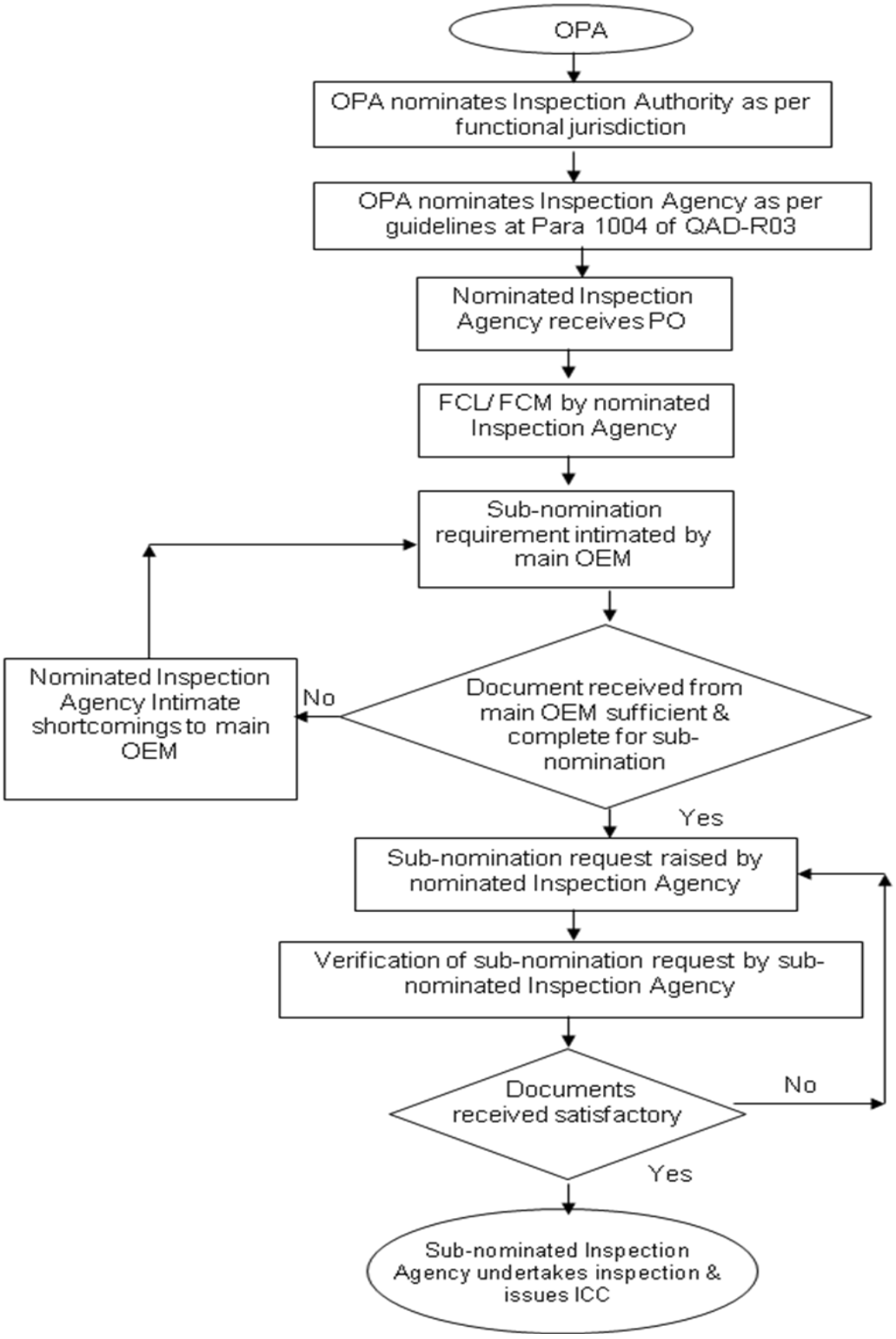
(Signature Block of QAO)

Enclosures:- As above

Appendix ‘T’

Appendix 'T'
(Refers to Para 1007)

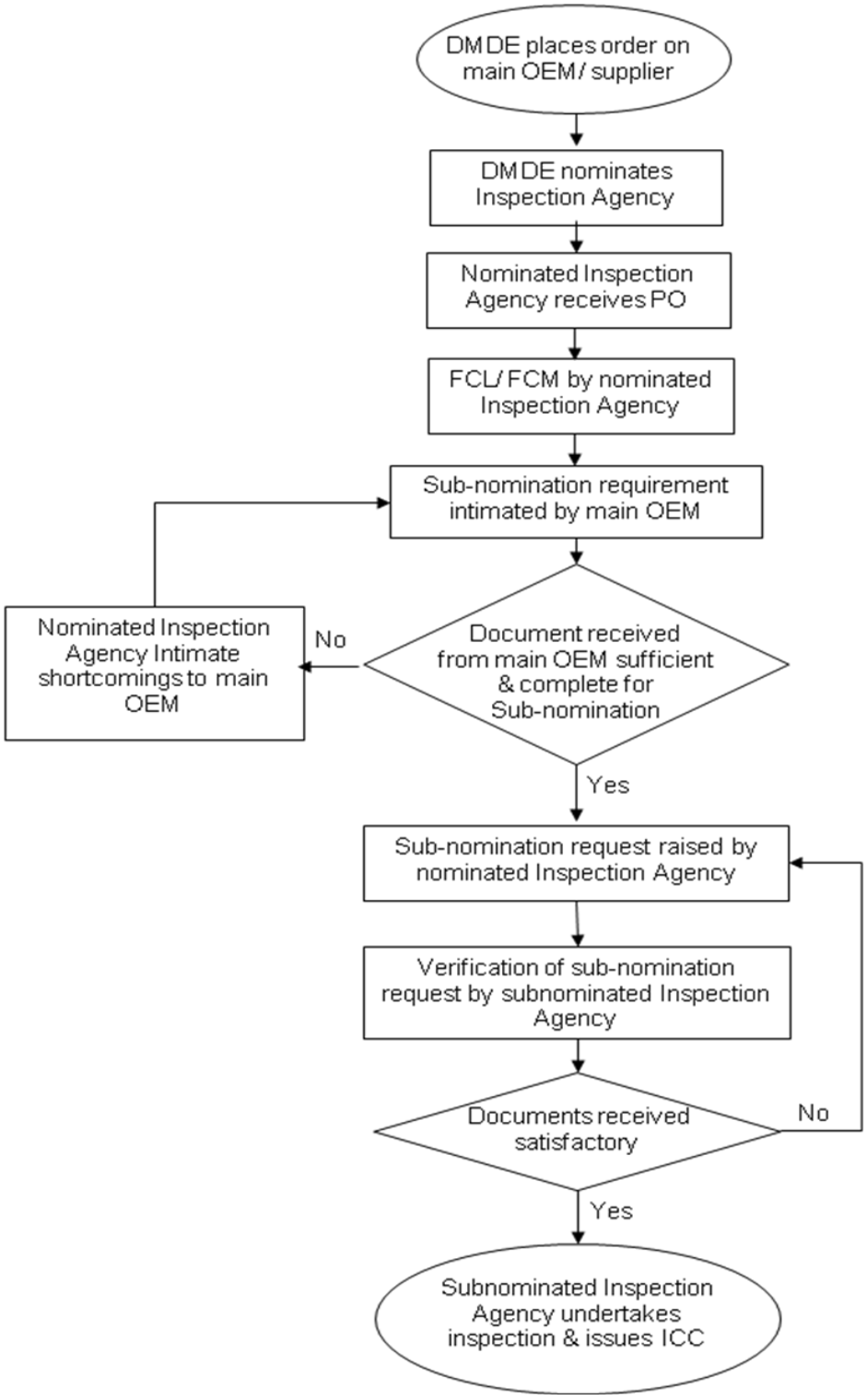
FLOW CHART FOR PROCESSING SUB-NOMINATION IN CASE OF NAVAL AND SHIPYARD ORDERS



Appendix ‘U’

Appendix 'U'
(Refers to Para 1007)

FLOWCHART FOR PROCESSING SUB-NOMINATION IN CASE OF DMDE ORDERS



Appendix ‘V’

Appendix 'V'
(Refers to Para 1208)

PROCEDURE FOR REGISTRATION OF MANUFACTURERS

1. Application form for registration namely Manufacturer's Application for Registration (MAR) is to be obtained by manufacturer from nearest competent authority/ Field Unit. Alternatively, the same can be downloaded from the DGQA website (www.dgqadefence.gov.in). MAR along with all requisite documents are to be submitted online to the local CQAE/ QAE followed by hard copy. In case of registration against TE/ RFP, the MAR is to be submitted strictly by the date as intimated by the OPA.

2. On receipt of MAR the CQAE/ QAE scrutinise the same for completeness as per check off list and forward the case to DQA(WP) / DQA(N).

3. DQA(WP) / DQA(N) will seek concurrence of NHQ/ Professional Directorates for registration of the firm keeping in mind utility of the product in *IN*. On concurrence by NHQ/ Professional Directorates and scrutiny of the documents, DQA(WP) / DQA(N) is to constitute Assessment Team of Officers for Manufacturer's Registration who will visit the manufacturer's premises/ facility to verify the details submitted in the application form and assess the manufacturer. The Presiding Officer of assessment team will be Group 'A' Officer. In case of Registration against RFP, the assessment team leader will be from DQA(WP) / DQA(N). Composition of the Board is to be as mentioned below:-

(a)	Team Leader	-	CQAE/ QAE {of DQA(WP) / DQA(N) in case of Registration against RFP}
(b)	Member	-	DQA(WP) / DQA(N)
(c)	Member	-	CQAE/ QAE
(d)	Co-opted Member	-	Nominated by CQAO/ QAO, if necessary

4. The Registration Report as per format prescribed in the latest version of Joint Services Guidelines (JSG:015) is to be prepared by the Assessment Team and submitted for perusal of the HoE.

5. Post verification of Registration Report and recommendations of HoE, the case is to be submitted to DQA(WP) / DQA(N) for approval of ADGQA(WP)/ ADGQA(N)

6. If approved, the control number is to be obtained from DGQA/ SDCC and draft Registration Certificate is to be forwarded to the firm for vetting. After receipt of concurrence of the firm regarding the draft, the Registration Certificate is to be issued to the firm. If not approved, the reasons are to be intimated to the firm concerned.

7. Post issuance of the Registration Certificate, the firm's name is to be included in the Compendium of Registered Vendors by DQA(WP)/DQA(N) and uploaded to the DGQA website.

Appendix ‘W’

Appendix 'W'
{Refers to Para 1313(b)}

Name of the Green Channel Status Firm

CONFORMANCE CERTIFICATE – GREEN CHANNEL

1. The stores as per details given below have been inspected and it is confirmed that the same are released under the Green Channel Policy:-

(a) Green Channel Status approval No and date

(b) Nomenclature

(c) Part No

(d) Supply Order No & Date

(e) Governing specification/Drawing

(f) Lot/Batch No

(g) Date of Manufacture

(h) Quantity

(j) Consignee

2. Complete Test Reports and Warranty certificate in respect of the above mentioned lots are enclosed herewith.

3. It is hereby certified that the stores offered above have been identified with the'Green Channel Status' mark……and that the above mentioned stores have been manufactured as per the Quality System approved at the time of grant of Green Channel Certification and that they conform to the specification/ requirements in all respects.

Seal

Name, Designation & Signature of the
Date: Authorised Functionary of the GCS firm

Appendix ‘X’

Appendix 'X'
(Refers to Para 1318)

Name of the Self-Certification Status Firm

CONFORMANCE CERTIFICATE- SELF CERTIFICATION

1. The stores as per details given below have been inspected and it is confirmed that the same are released under the Self-Certification Scheme:-

(a) Self-Certification Status approval No and date

(b) Nomenclature

(c) Part No

(d) Supply Order No & Date

(e) Governing specification/Drawing

(f) Lot/Batch No

(g) Date of Manufacture

(h) Quantity

(j) Consignee

2. Complete Test Reports and Warranty certificate in respect of the above mentioned lots are enclosed herewith.

3. It is hereby certified that the stores offered above have been identified with the'Self-Certification Status' mark…….and that the above mentioned stores have been manufactured as per the Quality System approved at the time of grant of Self-Certification Status and that they conform to the specification/ requirements in all respects.

Seal

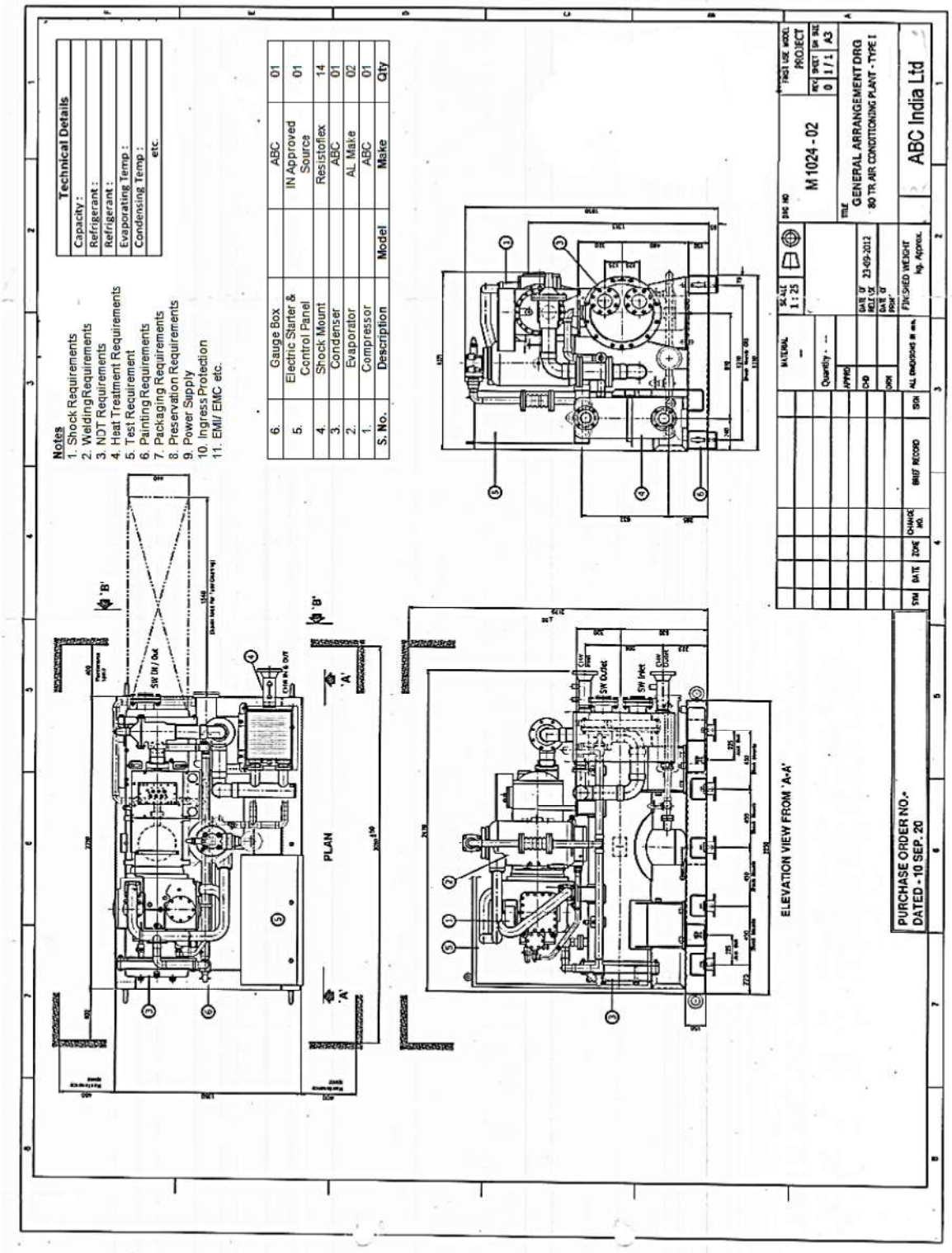
Name, Designation & Signature of the
Date: Authorised Functionary of the Self-Certification firm

Annexure I

Annexure I

(Refers to Para 5 of Appendix 'B')

SAMPLE OF GA DRAWING WITH DBOM



BILL OF MATERIAL

MAIN GA DRAWING NO: AB-01-00-00

(A) Assemblies

Sl No	Item	Drawing Number	Part No.	Qty.	Source with Details	Critical activity/ process requiring Inspection (CHP)	Functional/ Type Tests Required	Linked/ Mating Component	Weight
1	Compressor	AB-01-01-00		01	In-house	(i) Integration with Motor (ii) Assembly	(i) Functional Test – CHP (ii) Type test / certificate	Motor	
2	Evaporator	AB-01-02-00		02	Alfa Laval	(i)Tube Bundle assembly (ii) Pressure Testing of Tubes (iii) Assembly	(i) Type test/ Certificate	Expansion device	
3	Condenser	AB-01-03-00		01	In-house	i)Tube Bundle assembly (ii) Pressure Testing of Tubes (iii) Assembly	(i) Type test / Certificate	Compressor	
4	Shock Mount	AB-01-04-00		14	Resistoflex (Model ADP-500)	(i) Rubber –Metal Bonding (ii) Dimension (iii) Static deflection	(i) Type test/certificate	Skid/Base Frame	
5.	Electric Starter & Control Panel	AB-01-05-00		01	E+L/IN approved source	(i)Wiring Checks (ii)Functional Checks (iii)Load Testing	(i) Type Test/Certificate (ii)Functional Checks	Compressor/Motor	
6	Gauge Box	AB-01-06-00		01	In-house	(i)Calibration certificate (ii) OEM test certificate	Functional Checks	Compressor/ Condenser/ Evaporator	

					ABC Limited, New Delhi		P.O. No.		
					Project:		Title : GA Drawing of AC Plant (Model: _____)		
					End User:				
					Drawing No. AB-01-00-00				
					Dim. Tol. IS-2102-C		Rev.02	Dated 01-03-16	Sheet No. 2 of 3
	26.10.13	2	IHQ Comments		Finish Weight(: _____Kg.	Scale 1:15	Project:		All Dimension in MM
	22.07.13	1	MDL Comments						
Sym.	Date	Rev. No	Brief Record	Sign					

MAIN GA DRAWING NO: AB-01-00-00

(B) Components

Sl No	Item	Drawing Number	Part No	Material/ Specs	Qty	Source with Details	Manufacturing Processes	Critical activity/ process requiring Inspection (CHP)	Functional Test/Type test requirements	Linked/ Mating Component	Weight
1.	Coupling	AB-01-00-01		EN 8	02	Bought Out Love Joy Rathi Make RB 125	NA	OEM Test certificate	Function	Pump Shaft & Motor shaft	3.5
2	Mounting Bracket	AB-01-00-02		IS 2062	01	In house	Fabrication	STC of Physical Chemical test report	NA	Motor	110
3	Lifting Eye bolt	AB-01-00-03		IS 2062	04	Bought Out Market M20	Fabrication	STC of Physical Chemical test report	NA	Mounting Bracket	8
4	Pressure Gauge	AB-01-00-04		SS316	06	Waree 0-10 Kg/cm^2	NA	(i) OEM Test certificate & (ii) Calibration certificate	Functional Test	Control Panel	10
5	Discharge Flexible Bellow	AB-01-00-05		Nitrile Rubber	04	Resistoflex 3" ANSIb16.5, 150#, 500mm long	Rubber Moulding	(i)STC (ii) Dimension	NA	Flanges	14

Sym.	Date	Rev. No	Brief Record	Sign
	26.10.13	2	IHQ Comments	
	22.07.13	1	MDL Comments	

P.O. No.

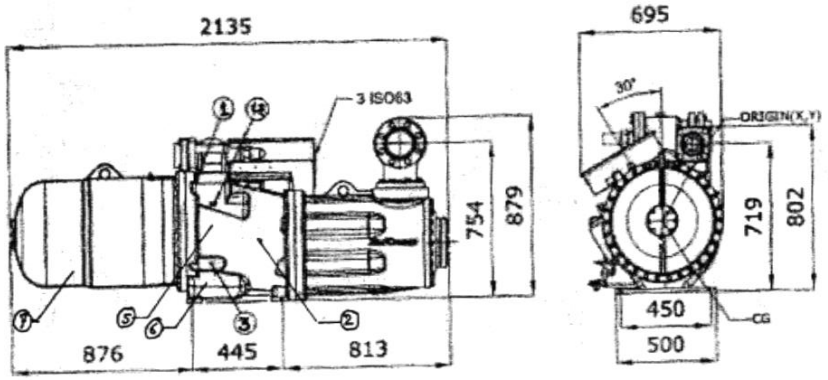
End User:

Drawing No. AB-01-00-00

Title : GA Drawing of AC Plant (Model: _____)

Dim. Tol. IS-2102-C | Rev.02 | Dated 01-03-16 | **Sheet No. 3 of 3**

Finish Weight(:_____Kg. | Scale 1:15 | Project: | All Dimension in MM



Technical details
Capacity: 650 Kw +10% overload
Refrigerant: R-134a
Evaporating Temp.: 2.3 C
Condensing Temp. :43 C
etc.

Notes:

1. Shock requirements
2. Welding requirements
3. NDT requirements
4. Heat treatment requirements
5. Test requirements
6. Painting requirements
7. Preservation requirements
8. Power supply
9. Electrical protection
10. EMI/EMC etc.

Sym.	Date	Rev. No	Brief Record	Sign					
					Drawing No. AB-01-01-00		Title : GA Drawing of Compressor (Model: _____)		
					Dim. Tol. IS-2102-C		Rev.02	Dated 01-03-16	Sheet No. 1 of 2
	26.10.13	2	IHQ Comments		Finish Weight(:_____Kg.	Scale 1:15	Project:		All Dimension in MM
	22.07.13	1	MDL Comments						

BILL OF MATERIAL

CONDENSER GA DRAWING NO: **AB-01-03-00**

Sl No	Item	Drawing Number	Part No.	Material I/ Spec.	Qty.	Source with Details	Manufacturing Process	Critical activity/ process requiring Inspection (CHP)	Functional/ Type Tests Required	Linked/ Mating Component	Weight
1	Shell	AB-01-03-01		ASTM A516 GR 60 and above/ASTM A 106 GR. B	01	In-house	Mfg. from Seamless pipe/ Mfg. from Plate with Butt welding	(i) RT ,if applicable (ii) Pressure Test	NA	End Covers	
2	Tube	AB-01-03-02		70/30 Cu-Ni to ASTM 359 C 71500 / NES 780 Pt. III	380	In-house	(i) Drawn process (ii) Heat treatment	(i) Eddy current/Pressure Testing of Tubes (ii) Tube Bundle Assembly	NA	Tube Plate	
3	L.H.S End Cover	AB-01-03-03		GM to NES 830 Pt. 2/BS 1400 4C	01	In-house	Mfg. from Plate/Casting	(i) NDT, if applicable	NA	Shell	
4	R.H.S. End Cover	AB-01-03-03		GM to NES 830 Pt. 2/BS 1400 4C	14	In- house	Mfg. from Plate/Casting	(i) NDT, if applicable	NA	Shell	
5.	L.H.S. Tube Sheet	AB-01-03 – 04		70/30 Cu-Ni to ASTM B 171 C 71500/ NES 780 Pt. III	01	In-house	Mfg. from rolled Plates	NDT, if applicable	NA	Tubes, Shell	
6	R.H.S Tube Sheet	AB-01-03 – 04		70/30 Cu-Ni to ASTM B 171 C 71500/ NES 780 Pt. III	01	In-house	Mfg. from rolled Plates	NDT, if applicable	NA	Tubes, Shell	
7	Tie Rod	AB-01-03 –05		IS 2062	04	In-house	Mfg from Pipe/fabrication	Assembly	NA	Tube Plate	

Sym.	Date	Rev. No	Brief Record	Sign
	26.10.13	2	IHQ Comments	
	22.07.13	1	MDL Comments	

Drawing No. AB-01-03-00

Dim. Tol. IS-2102-C

Finish

Weight(:_____Kg.

Scale 1:15

Title : GA Drawing of Condenser (Model: _____)

Rev.02 | Dated 01-03-16 | Sheet No. 2 of 2

Project:

All Dimension in MM

BILL OF MATERIAL

COMPRESSOR GA DRAWING NO: AB-01-01-00

Sl No	Item	Drawing Number	Part No.	Material / Spec.	Qty.	Source with Details	Manufacturing Process	Critical activity/ process requiring Inspection (CHP)	Functional/ Type Tests Required	Linked/ Mating Component	Weight
1	Crank case	AB-01-01-01		IS 1865-GR-400/15 S.G. Iron	01	In-house	(i) Casting (ii) Dimension	(i) DPT (ii) RT (iii)Leak test	NA	Crank Shaft	
2	Crank Shaft	AB-01-01-02		IS 1865-GR 700/2	380	In-house	(i) Casting (ii) Dimension (iii) Heat Treatment	(i) Eddy current/Pressure Testing of Tubes (ii) Tube Bundle Assembly	NA	Crank case	
3	Connecting Rod	AB-01-01-03		Aluminium Alloy to IS 733 Gr 24345	01	In-house	(i) Physical & Chemical Test (ii)Dimension	(i) Dimension (ii)NDT, if appiicable	NA	Crank Shaft	
4	Piston	AB-01-01-04		IS 7793-1975	14	In- house	i) Physical & Chemical Test (ii)Dimension	(i) NDT, if applicable	NA	Liner, Con Rod	
5.	Oil Filter	AB-01-01- 05		—	01	Bought Out	(i) Dim. (ii) Hole Drilling	As per Separate QAP	NA	-	
6	Crank Case Heater	AB-01-01- 06		—	01	Bought Out	(ii) Dim. (ii) Hole Drilling	As per Separate QAP	Functional Test	Crank case	
7	Motor	AB-01-01-07		EED-Q-071(R4)	01	Bought Out M/s Narhari	(i) Air Gap (ii) Dimension	As per Separate QAPand EED-Q-071(R4)	(i) Functional Test (Load Test) (ii) Type Test	Crank Shaft	

Sym.	Date	Rev. No	Brief Record	Sign
	26.10.13	2	IHQ Comments	
	22.07.13	1	MDL Comments	

Drawing No. AB-01-01-00		Title : GA Drawing of Compressor(Model: _____)	
Dim. Tol. IS-2102-C		Rev.02	Dated 01-03-16	Sheet No. 2 of 2
Finish Weight(:_____Kg.	Scale 1:15	Project:		All Dimension in MM

Annexure II

Annexure II
(Refers to Para 5 of Appendix 'B')

GUIDELINES FOR PREPARATION OF GA DRAWINGS

1. The drawings are to conform to basic design of engineering drawing as per **BIS-SP46-2003.**

2. Besides meeting the basic requirements as per BIS-SP 46-2003, the following specific details are to be provided with the drawings:-

(a) The title block of drawing should have additional details as follows:-

(i) Description of equipment/component with model.
(ii) Part No. of the component.
(iii) Drawing revision no.

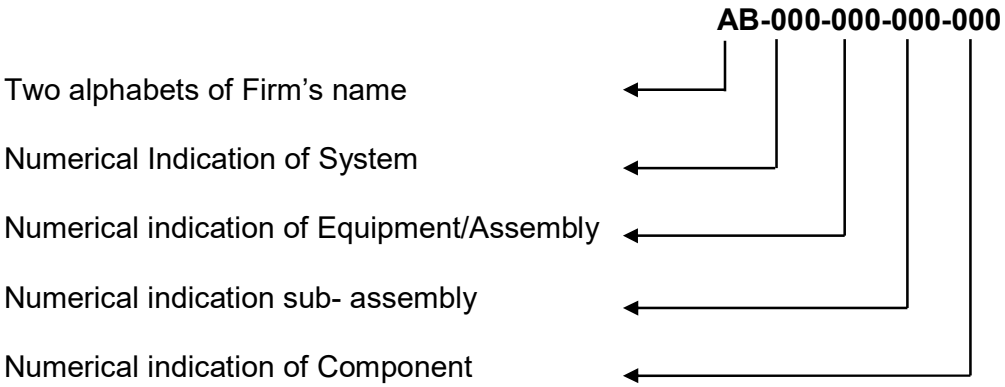
(b) Technical Details Block to be provided with design data/ operating parameters.

(c) Requirements to meet PO and specifications, especially requiring approval from designer; is to be included under heading "Notes". The following details, where applicable, to be included under 'Notes' heading:-

(i) Shock requirements
(ii) Welding requirements
(iii) NDT requirements
(iv) Heat treatment requirements
(v) Specific test viz functional check, pressure/leak test etc.
(vi) Painting requirements
(vii) Preservation requirements
(viii) Surface treatment
(ix) Electrical protection
(x) EMI/EMC requirements
(xi) Type testing requirements
(xii) Weight & CG details
(xiii) Tolerances & surface finish details

(d) The drawings should have the "**Detailed Bill of Material (DBOM)"**specifying details of the assemblies, sub-assemblies and components. Sample DBOM is shown at **Annexure-I**.

(e) Drawings of all assemblies, sub-assemblies and components of the system should have forward and backward traceability. The methodology of traceability adopted should therefore be appended to the set of GA drawings submitted, to ensure that all users can exploit the details provided in the drawings. A suggested numbering system is given below:-



For example: Order is placed on M/s ABC Ltd. To supply AC Plant

The first two alphabets may be AB

First three numeric will be 001-006 for 20 - 140 (07 models available) TR AC plant assembly

Second three numeric will be 001-006 for sub-assemblies viz., Compressor, Condenser, Evaporator, Receiver, Oil Tank Separator and Base frame etc.

Third three numeric will be 01-999 for components of sub-sub-assemblies like tube bundle with tube sheet, oil pump in compressor, pressure relief valve etc.

Fourth three numeric will be 001-999 for components like crank shaft, tubes, tube plate, valve body, valve spring, pump body, pump screw etc.

The Main GA drawing no. will be AB-**007**-000-000-000 (plant is say 140 TR).

The Assembly drawing no. for compressor will be AB-**001**-000-000.

The sub assembly drawing no. for oil pump will be AB-001-001-000.

The component level drawing no. for crankshaft will be AB-001-001-001-**001.**

In case component do not pertains to any assembly like base frame, its drawing no. will be AB-001-**000-000-001.**

Annexure III

Annexure III
(Refers to Para 6 of Appendix 'B')

CHECK-OFF LIST FOR DRAWINGS

1.	Submitted drawing is a GA drawing as per BIS-SP46-2003	:	Yes / No / NA
2.	Following information provided in the Title Block		
	(a) Title / Equipment description as per P.O.	:	Yes / No / NA
	(b) Drawing No	:	Yes / No / NA
	(c) Revision No with Revision Details	:	Yes / No / NA
	(d) Sheet No	:	Yes / No / NA
	(e) Date	:	Yes / No / NA
	(f) Name of Vendor	:	Yes / No / NA
	(g) Unit for all dimensions	:	Yes / No / NA
3.	Title of the drawing is correct	:	Yes / No / NA
4.	All sheets of the drawing are numbered correctly	:	Yes / No / NA
5.	Drawing is complete and covers main assembly and all sub-assemblies	:	Yes / No / NA
6.	All critical parts of main assembly and sub-assemblies are depicted and marked in drawings and also covered in DBOM	:	Yes / No / NA
7.	Sub-assembly drawings can be correlated with the main drawings	:	Yes / No / NA
8.	Dimensions of main assembly & sub-assembly are complete	:	Yes / No / NA
9.	Tolerances for dimensions are provided in main assembly and sub-assembly drawings	:	Yes / No / NA
10.	Important technical parameters of equipment / system are provided as per SOTR / TSP/ TNC (if applicable) in the main GA drawing	:	Yes / No / NA
11.	Weight of main assembly with tolerances provided	:	Yes / No / NA
12.	Working / Test pressures; Working / Testing Medium; and Test duration specified	:	Yes / No / NA
13.	Technical parameters mentioned in the drawings are matching with the same specified in SOTR	:	Yes / No / NA
14.	Direction of rotation marked, if applicable	:	Yes / No / NA
15.	Rotational speed indicated, if applicable	:	Yes / No / NA
16.	Direction of flow indicated, if applicable		Yes / No / NA
17.	CG indicated (X, Y and Z coordinates)	:	Yes / No / NA

18.	Lifting points of equipment are indicated		Yes / No / NA
19.	Break-to-open and Closing Torque for Valves		Yes / No / NA
20.	Torque value for fasteners, where applicable		Yes / No / NA
21.	Details of SV mounts and drawing of the same provided	:	Yes / No / NA
22.	Shock specifications provided	:	Yes / No / NA
23.	Internally excited vibration, external vibration, ABN and SBN specifications specified as per SOTR	:	Yes / No / NA
24.	DBOM is as per the format provided in the QAD-01 R01	:	Yes / No / NA
25.	Following information is complete in the DBOM		
	(a) Main GA drawing No	:	Yes / No / NA
	(b) Following details of assemblies and sub-assemblies:-		
	(i) Item	:	Yes / No / NA
	(ii) Drawing No.	:	Yes / No / NA
	(iii) Part No.	:	Yes / No / NA
	(iv) Size (Length / Breath / Height / ID / OD / Thickness / Threading details etc.)	:	Yes / No / NA
	(v) Material with Grade and latest applicable Specification No. and year	:	Yes / No / NA
	(vi) Quantity	:	Yes / No / NA
	(vii) Source (In-House / Bought-out / COTS / Imported)	:	Yes / No / NA
	(viii) Manufacturing process	:	Yes / No / NA
	(ix) Critical activities requiring inspection OR product specific testing requirements, as applicable	:	Yes / No / NA
	(x) Requirement of NDT (UT/RT/MPT/DPT)	:	Yes / No / NA
	(xi) Marking of Test Zones and Critical Test Zones for NDT	:	Yes / No / NA
	(xi) Requirement of Surface finish	:	Yes / No / NA
	(xii) Requirement of Eddy current / Hydro / Pneumatic Test etc.	:	Yes / No / NA
	(xiii) Requirement of static / dynamic balancing	:	Yes / No / NA
	(xiv) Requirement of functional ET / ESS / Type Tests	:	Yes / No / NA
	(xv) All components (like metal clamps, rubber gaskets, SV Mounts, adhesives etc) which shall be used during ET are included in the drawings and DBOM		Yes / No / NA
	(xvi) Linked mating component	:	Yes / No / NA
	(xvii) Weight	:	Yes / No / NA
26.	Material Specification in SOTR / TSP/ TNC (if applicable)and that in the DBOM are matching	:	Yes / No / NA
27.	The GA drawings and the DBOM should map one to one	:	Yes / No / NA
28.	Interface of assemblies and sub-assemblies indicated	:	Yes / No / NA
29.	Welding requirements indicated for assemblies &sub-assemblies	:	Yes / No / NA

30.	Coating and Painting specifications provided	:	Yes / No / NA
31.	Preservation, Packing and Marking details provided	:	Yes / No / NA
32.	Following are submitted for electrical equipment / systems		
	(a) **Motor / Alternator**		
	(i) Connection details	:	Yes / No / NA
	(ii) View a connection diagram	:	Yes / No / NA
	(iii) Wire gauge, Make & IS	:	Yes / No / NA
	(iv) Wiring diagram	:	Yes / No / NA
	(v) Class of insulation	:	Yes / No / NA
	(vi) Cable gland details	:	Yes / No / NA
	(vii) Coil form details	:	Yes / No / NA
	(viii) Starting current and Starting torque	:	Yes / No / NA
	(ix) Full load current	:	Yes / No / NA
	(x) Efficiency at EL, ¾ FL and ½ FL	:	Yes / No / NA
	(xi) Temperature rise	:	Yes / No / NA
	(xii) Bearing details DE & NDE	:	Yes / No / NA
	(xiii) Shock & vibration mount details	:	Yes / No / NA
	(xiv) Ingress Protection (IP rating)	:	Yes / No / NA
	(xv) Frame size	:	Yes / No / NA
	(xvi) Duty cycle (S1 / S2 / Continuous)	:	Yes / No / NA
	(xvii) Weight	:	Yes / No / NA
	(xviii) Physical deposition with tolerance	:	Yes / No / NA
	(xix) Name plate	:	Yes / No / NA
	(b) **Control Panel / Starter**		
	(i) Circuit diagrams	:	Yes / No / NA
	(ii) Physical deposition of panels with tolerance	:	Yes / No / NA
	(iii) Wiring chart and Cable schedule	:	Yes / No / NA
	(iv) Component layout drawings	:	Yes / No / NA
	(v) Maintenance envelop	:	Yes / No / NA
	(vi) Protection / Safety details	:	Yes / No / NA
	(vii) Material including IS, Grade condition	:	Yes / No / NA
	(viii) Bottom Gland Plate, Mounting Plate &Mounting Bracket material IS, Grade Condition	:	Yes / No / NA
	(ix) Thickness of Sheet for Panel housing, BGP, MP&MB	:	Yes / No / NA
	(x) Gland details	:	Yes / No / NA
	(xi) Ingress Protection (IP rating)	:	Yes / No / NA
	(xii) Weight	:	Yes / No / NA
	(xiii) C.G	:	Yes / No / NA
	(xiv) Name Plate	:	Yes / No / NA
33.	If the drawing is submitted for the second time, are the earlier observations incorporated in the revised drawing.	:	Yes / No / NA

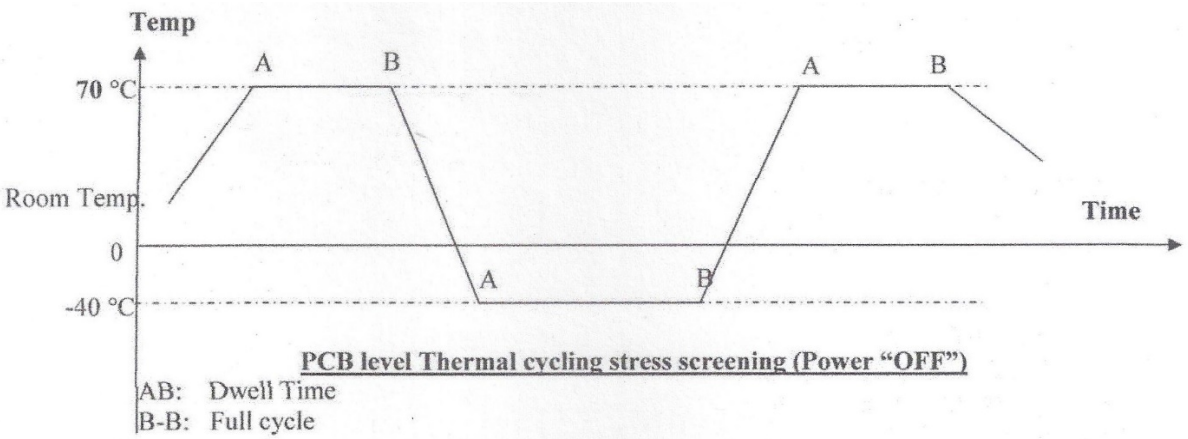
Annexure IV

Annexure IV

{Refers to Para 5 (a) of Appendix 'H'}

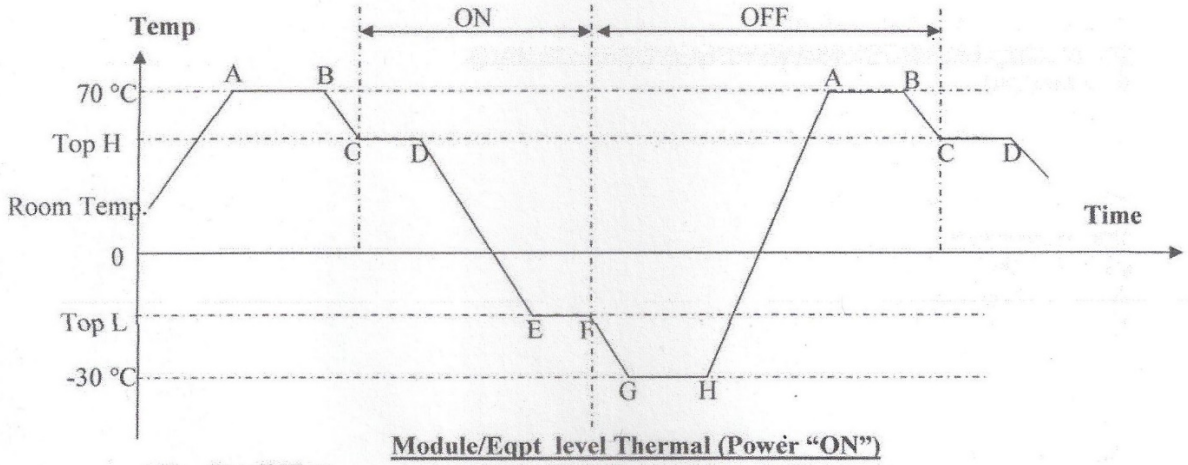
THERMAL CYCLING STRESS SCREENING (TCSS) PLAN

Ser	Level	Test Details	Remarks
1	PCB Level	-40 °C to +70 °C, 10 Cycles (Ramp 10° C/min) OR 20 Cycles (Ramp 5° C/min) Dwell: 10 min	Power OFF condition
2	Sub Unit/ Equipment	-30 °C to +70 °C, 6 Cycles (Ramp 10° C/min) OR 12 Cycles (Ramp 5° C/min) Dwell: 10 min	Power will be switched "ON" only during the eqpt operating temperature range of TCSS.



PCB level Thermal cycling stress screening (Power "OFF")

AB: Dwell Time
B-B: Full cycle



Module/Eqpt level Thermal (Power "ON")

AB: Dwell Time
BB: Full cycle
CD/ EF: Performance Monitoring Time
Top H: High operating Temperature
Top L: Low Operating Temperature

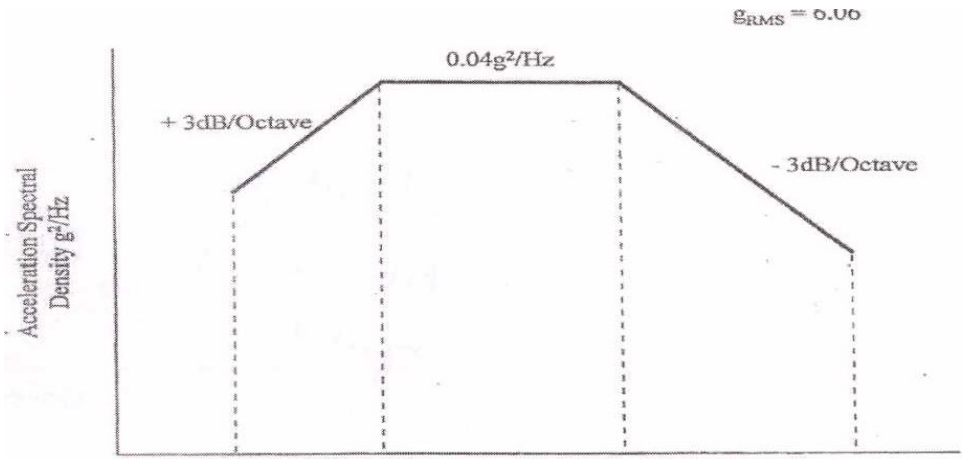
Annexure V

Annexure V

{Refers to Para 5 (a) of Appendix 'H'}

RANDOM VIBRATION STRESS SCREENING (RVSS) PLAN

Ser	Level	Test Details	Remarks
1	PCB Level/ Sub Unit/ Equipment	20-80 Hz, +3db Octave 80-350 Hz, PSD 0.04 g^2/Hz 350-2000 Hz, -3db Octave 10 min per axis, G RMS = 6.06 (Profile given below)	1. On all three axes. 2. Power ON condition



Random Vibration Profile

Annexure VI

Annexure VI
(Refers to Para 5(c) of Appendix 'J')

RECOMMENDATIONS FOR ABRIDGED TYPE TESTING

Ser	Changes	Recommended Tests	Remarks
Obsolescence Management			
1.	When PCBs/ Modules are replaced to cater for obsolescence management without any change in enclosure/ cabinet (including gaskets on door panels/ top) in the following circuits:-	(a) Damp Heat (b) EMI/ EMC (c) Endurance Test	Form, Fit and Function not changed
	(a) Power Circuit		
	(b) Control Circuit		
	(c) Processor Circuit		
	(d) Interface Circuit		
	(e) Memory Module	NIL	
2.	When a Mil Std sub-assembly/ module/ component is replaced with COTs/ MOTs sub-assemblies/ modules/ components, with similar specifications/ standards.	Complete type testing is to be undertaken on the smallest independent functional unit which encompasses all the changes.	
Addition/ Removal of Components			
3.	**Passive Components**. When a passive component is added or removed without any change in the enclosure/ cabinet.	NIL	Form, Fit and Function not changed
4.	**Active Components**. When an active component is added or removed without any change in the enclosure/ cabinet.	(a) Damp Heat (b) EMI/ EMC (c) Endurance Test	
5.	**Interface Unit**. When there are changes in interfacing modules/ components without any other change.		
Other Changes			
6.	**Changes in FIT (Mounting Arrangement)**. When there are changes in mounting arrangement without any change in the cabinet and the overall functionality.	(a) Shock Test (b) Vibration Test	
7.	**Changes in FORM (Enclosure/ Cabinet)**. When enclosure/ cabinet is changes without any	(a) Drip Proof (protected) **OR**	

Ser	Changes	Recommended Tests	Remarks
	change in electronics or overall functionality.	Driving Rain (exposed) **OR** Immersion (submerged) (b) IP Testing	
8.	**Changes in Function**. When the basic functionality of the unit/ module is altered.	Complete type testing is to be undertaken on the smallest independent functional unit which encompasses all the changes.	
9.	**Multiple Changes**. When there are multiple changes i.e. change in dimension, structural changes, changes in ratings, functional changes, change in manufacturer of the equipment/ item, change in manufacturing process.		
10.	**Change in Location**. When the location of an equipment/ cabinet is changed leading to change in category (protected/ exposed/ submerged)	(a) Driving Rain Test (for exposed environment) **OR** Immersion (for submerged environment) (b) EMI/ EMC (c) IP Testing (d) Endurance Test	Shock Test would additionally be applicable in case the equipment is re-located from above to below waterline.

Annexure VII

Annexure VII
(Refers to Para 6(d) of Appendix 'J')

IP RATING TABLE

FIRST DIGIT	PROTECTION	SECOND DIGIT	PROTECTION
X	Protection unspecified (Untested)	X	Protection unspecified (Untested)
0	Non Protected	0	Non Protected
1	Protection of the back of the hand against accidental access to hazardous parts, and protection of equipment against objects larger than 50 mm.	1	Protection against drops of water falling vertically.
2	Protection of fingers against access to hazardous parts and protection of equipment against objects larger than 102.5 mm.	2	Protection against drops of water falling vertically when the object is tilted up to 15 ft from its normal position. (In any direction)
3	Protection of persons holding tools or wires (larger than 2.5 mm diameter) and protection of equipment against object larger than 2.5mm.	3	Protection against spraying water at up to 60 ft from the vertical.
4	Protection of persons holding small tools or wires (larger than 1mm diameter) and protection of equipment against objects larger than 1 mm.	4	Protection against splashing and spraying water from all practicable direction.
5	Protection against entry of dust in sufficient quantity to interface with satisfactory operation of equipment.	5	Protection against low pressure jets of water from all practicable direction.
6	Complete protection against entry of dust.	6	Protection against heavy seas or strong jet of water from all practicable direction
-		7	Protection against temporary immersion.
-		8	Protection against continuous submersion.

***In IP RATING ip AB: The first numerical indicates protection of person against access to hazardous parts, and protection of equipment against ingress of solid foreign object. The second numerical indicates protection of equipment against harmful ingress of water.**

Annexure VIII

Annexure VIII
(Refers to Para 6(e) of Appendix 'J')

GENERIC ELECTRICAL TYPE TESTS

Sl. No.	Test Description	Reference	Remarks
01	Mili Volt Drop	NES 511	Superseded by DEFSTAN 02-511/1:2000
02	Short Circuit	NES 511	
03	Temperature Rise	NES 511	
04	Through Fault	NES 511	
05	Withstand Voltage (HV)	NES 511	
06	Insulation Resistance	NES 511	
07	Operation of Protection Devices	NES 511	
08	Tilt Test	NES 1004	
09	Load Test	NES 511	
10	Intrinsic Safety Test	NES 511 (For equipment in magazine area)	
11	Flame Proof Test	NES 511 (For equipment in magazine area)	
12	Any other tests applicable as per specification of eqpt/ PO/SOTR.		As per details specified in the applicable equipment standards /PO/SOTR

Annexure XI

Annexure IX
(Refers to Para 17 of Appendix 'J')

CERTIFICATE OF CONFORMANCE (CoC)

1. **Item Details**

Ser	Description & Part No. of Item	Serial No. of Item, in case, specified in the PO	PO Reference

2. **Qualification Tests**

(a) Environmental Tests – Compliance Matrix

Ser	Details of ET as per PO			Standard to which tested	Test Severity to which tested	Test Report Reference	Remarks	
	Test No	Test Condition	Procedure				Complied	Not Complied

(b) EMI/ EMC Compliances

(c) Any Test(s) other than ET and EMI/ EMC tests

3. This is to certify that the above mentioned item(s) being supplied conform to the above mentioned standards.

Date :
Seal/ Stamp

Signature :
Name :
Designation :

Annexure X

Annexure X
(Refers to Para 1(k) of Appendix 'K')

THE *IN* SHOCK POLICY

1. This policy specifies the general guidelines related to the shock resistance and shock tests required for various equipment fitted onboard IN ships. However, with advent of new technology and substantial up gradation of shock testing facilities within the Navy, it has been felt that this policy is not comprehensive and merits reformulation.

2. In order to unambiguously define various issues concerning shock classification of Marine Engineering equipment designated for usage on board ships, it is imperative that the guidelines contained in succeeding paragraphs are meticulously followed in conjunction with BR 3021 (I). The issues that require to be addressed while assessing the shock grading requirements for new equipment being inducted for onboard usage are highlighted below:-

(a) Criteria to undertake actual shock testing of the equipment with the availability of modern theoretical analysis techniques and modeling and simulation tools.

(b) Criteria for accepting shock calculation in view of availability of modern theoretical analysis and modeling and simulation tools.

(c) Requirement of shock testing one in a series of equipment or each model in a series of equipment.

(d) Utilisation of improved infrastructure and capability of indigenous labs for shock testing of shipboard equipment.

(e) Criteria for the equipment to be shock tested with Shock mounts or for the equipment to be inherently shock resistant to the specified levels.

(f) Methods to be adopted for acceptance of shock calculations, i.e. Static 'g' method or dynamic analysis.

(g) Requirement of individual equipment or complete system (in the case of mechanically coupled systems) being designed for shock resistance.

3. In order to clarify the above issues and in the light of advancements in modeling and computing techniques, it is considered essential to introspect and revise the *IN*-Shock Policy. Therefore, to make the existing policy more explicit, necessary guidelines for a comprehensive shock policy are promulgated below.

Ship Classification

4. Based on the role of a ship, the classification to be followed for the purpose of shock grading is listed below. The list is indicative, however, the 'Staff Requirements' should clearly specify the Class based on the specific role of the vessel.

Class I	Class II
Aircraft Carries/ADS	Survey Ships/Crafts
Cruisers	SDBs
Destroyers	FACs
Frigates	Submarine Rescue Vessel
Corvettes	CG Ships
MCMVs	OPVs
Tankers	Training Ships
LSTs/LCUs	OGTs
Missile Boats	Auxiliary Crafts

Equipment Classification

5. Each equipment on a vessel should be assigned to one of the under mentioned three categories, based on its critically and function with respect to the role assigned to the vessel. Each of these categories has different shock resistance requirements, which are enumerated below in decreasing order of severity.

(a) **Category A**. Equipment necessary for the vessel to return to base under its own power. Such equipment must be capable of surviving the "Mission Critical" shock loadings, i.e. the vessel must survive a single underwater shock load as specified for this category, which does not incapacitate the hull, essential equipment and systems necessary for the ship to return to base under its own power.

(b) **Category B**. Equipment necessary for the vessel to fulfill its assigned operational role. Such equipment must be capable of surviving the "Mission Critical" shock loadings, i.e. the vessel must survive a single underwater shock load as specified for this category, which does not incapacitate the hull, essential equipment and systems necessary for the ship to undertake its operational role (combat efficiency).

(c) **Category C**. Equipment not falling in the above two categories and covers all equipment which do not necessarily mandate shock grading. Such equipment is to be supported and fastened in a manner so that they do not cause any danger to life and equipment in close vicinity, owing to shock loads.

6. A representative list of equipment in the above mentioned three categories is appended below:-

Category A	Category B	Category C
Propulsion machinery and associated auxiliaries and controls.	Stabiliser System	Laundry Equipment
Essential/ Emergency Power Generation machinery and associated auxiliaries	Alternate Power Generation machinery and associated auxiliaries and controls	Galley equipment
Steering Gear	Air Conditioning Machinery and System	Domestic Refrigeration Units
Fuel Transfer System	Refrigeration Machinery and System	Workshop Machinery

Category A	Category B	Category C
All major Damage Control and fire Fighting equipment, system and controls thereof	Distilling Plants	Domestic equipment other than fresh water pumps and system.
HP Air Compressor	Lubricating oil pumps and Systems	
	Fresh water pumps and system.	

7. While defining Category A and B equipment, the normal operating configuration shall be taken as being the most probable configuration of the equipment when the vessel is under hostile environment. When there is a range of likely operating conditions, the most severe will govern the requirement for shock qualification.

Shock Grade Classification

8. Based on the role of a vessel and criticality of equipment designated for fitment thereof, as outlined above, the under mentioned shock classification norms are to be followed:

(a) **IN Shock Grade 'A'**. IN Shock Grade 'A' is applicable to Category 'A' equipment onboard Class-I ships.

(b) **Naval Shock Standards-2 (NSS-2)**. NSS-2 is applicable to Category 'B' equipment onboard Class I ships, besides Category 'A' and 'B' equipment on Class-II ships.

9. The IN-Shock Grade 'A' curves, NSS II curves and Grade A – Velocity & Displacement curves are placed at **Enclosure 1, 2 & 3** respectively for ready reference.

Weight Classification for Shock Test/Calculation

10. Shock tests/calculations are to be undertaken based on the weight of the equipment and facilities available for undertaking shock tests. The equipment are classified into three weight categories as listed below:-

(a) Up to 600 kg - Light

(b) Between 600-2500 kg - Medium

(c) Greater than 2500 - Heavy

Policy for Testing

11. Light and medium category prototype equipment are to be shock tested as a part development programme. Heavy category prototype equipment are normally not to be shock tested. However, if there are any features which reflect doubt on the shock resistance, then shock test is be undertaken.

12. All “First of its kind” equipment is to be shock tested under the following conditions:-

(a) If there has been no prototype for the same, or

(b) If the equipment differs considerably from the prototype, or

(c) If any major modifications have been undertaken on the equipment, which would have significant effect on the shock resistance of the equipment.

13. Equipment of a particular model, with any variance to a previously tested model is to be necessarily shock tested, as the dynamics of such equipment are different from the originally tested equipment. Further, the OEM will provide test certificate/proof of shocktestcalculationsforallfollow-onequipment(forthesametypeandmountingarrangement). Equipment which have been subjected to shock test are to be “Yellow Banded” and is to be used for training or in shore-based applications.

Shock Testing Procedure

14. The details of procedure to be followed for shock testing of shipboard equipment are placed at **Enclosure 4** for ready reference. MIL-S-901 (D) (Navy) may also be referred as a guideline document.

Standardisation of Format for Shock Calculation

15. In case of equipment where shock qualification is to be done on the basis of shock calculation, the essential criterion to be followed while formulating the shock calculation report are highlighted at **Enclosure 5** for ready reference. As a first step the Static ‘g’ method is to be used for evaluation of the equipment. However, if the equipment fails to qualify the Static ‘g’ calculations, the Dynamic Design Analysis Method (DDAM) or Transient Shock Analysis Method (TSAM) is to be used for evaluating the equipment.

Shock Testing With or Without Mounts

16. The equipment/assembly to be shock tested is to be mounted on shock and vibration mounts which will eventually be used for mounting the equipment during actual shipboard usage. Thus, equipment designed for being rigidly mounted in the ship shall be subjected to shock test in the same state, whilst equipment designed for installation on flexible mounts shall be subjected to the shock test with the intended mounts in place. Further the shock attenuation across the mounts is also to be recorded to corroborate the efficacy of the mount selection.

Shock Testing of Mechanically Coupled Systems

17. The equipment/assembly to be shock tested is to be essentially fitted with all associated pipe work, cabling and controls and sensors, besides any other attachments necessary for normal operation of the entire assembly. Thus, the piping, cabling, controls and auxiliaries associated with any equipment are to be tested to the first supporting bracket fixed to some structure other than the equipment, if not integrally mounted on the equipment itself.

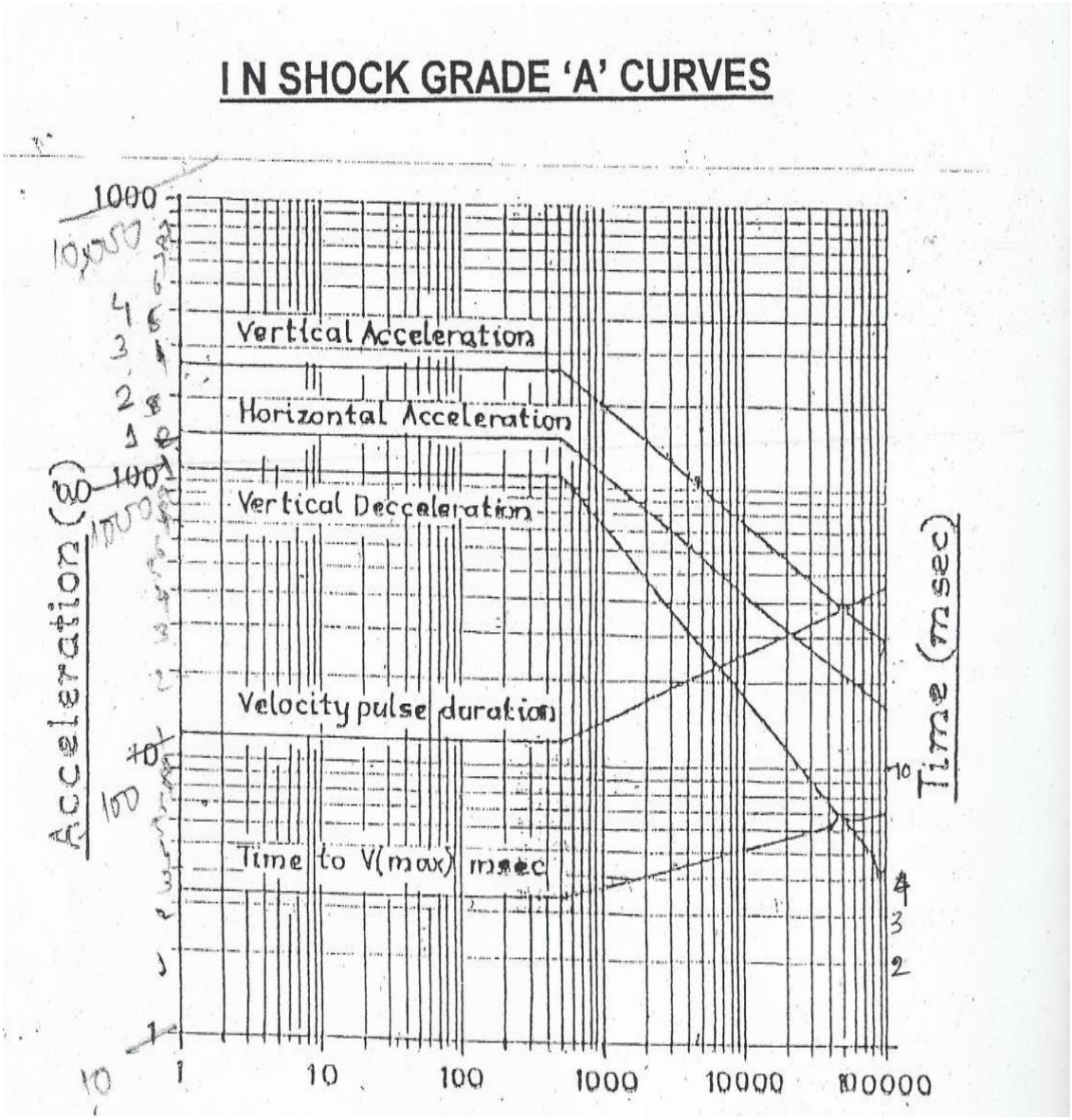
Test Facilities

18. Shock testing of equipment is to be undertaken at NSTL (Visakhapatnam), unless prior approval for conduct of the same at an alternate location has been obtained from the Integrated Headquarters of Ministry of Defence (Navy)/Directorate of Marine Engineering. The details of test facilities available at M/s NSTL and DMDE are placed at **Enclosure 6** for ready reference.

19. Flowchart for Design/Verification checks for shock is placed at **Enclosure 7.**

Enclosure ‘1’

Enclosure 1

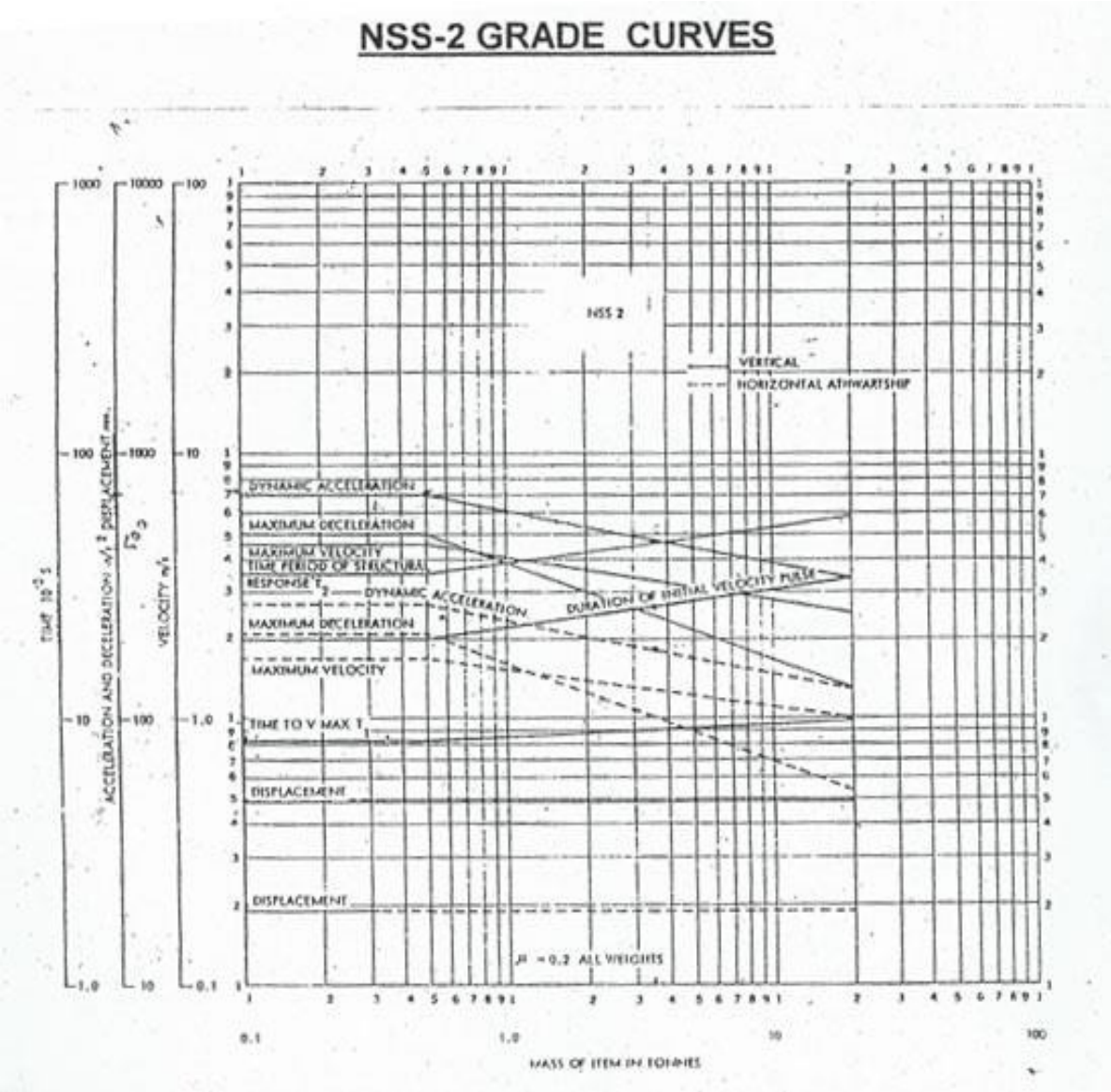

I N SHOCK GRADE 'A' CURVES
Vertical Acceleration
Horizontal Acceleration
Vertical Deceleration
Velocity pulse duration
Time to V(max) msec
Acceleration (g)
Time (msec)
1000
100
10
1
10
100
1000
10000
100000

\

Enclosure ‘2’

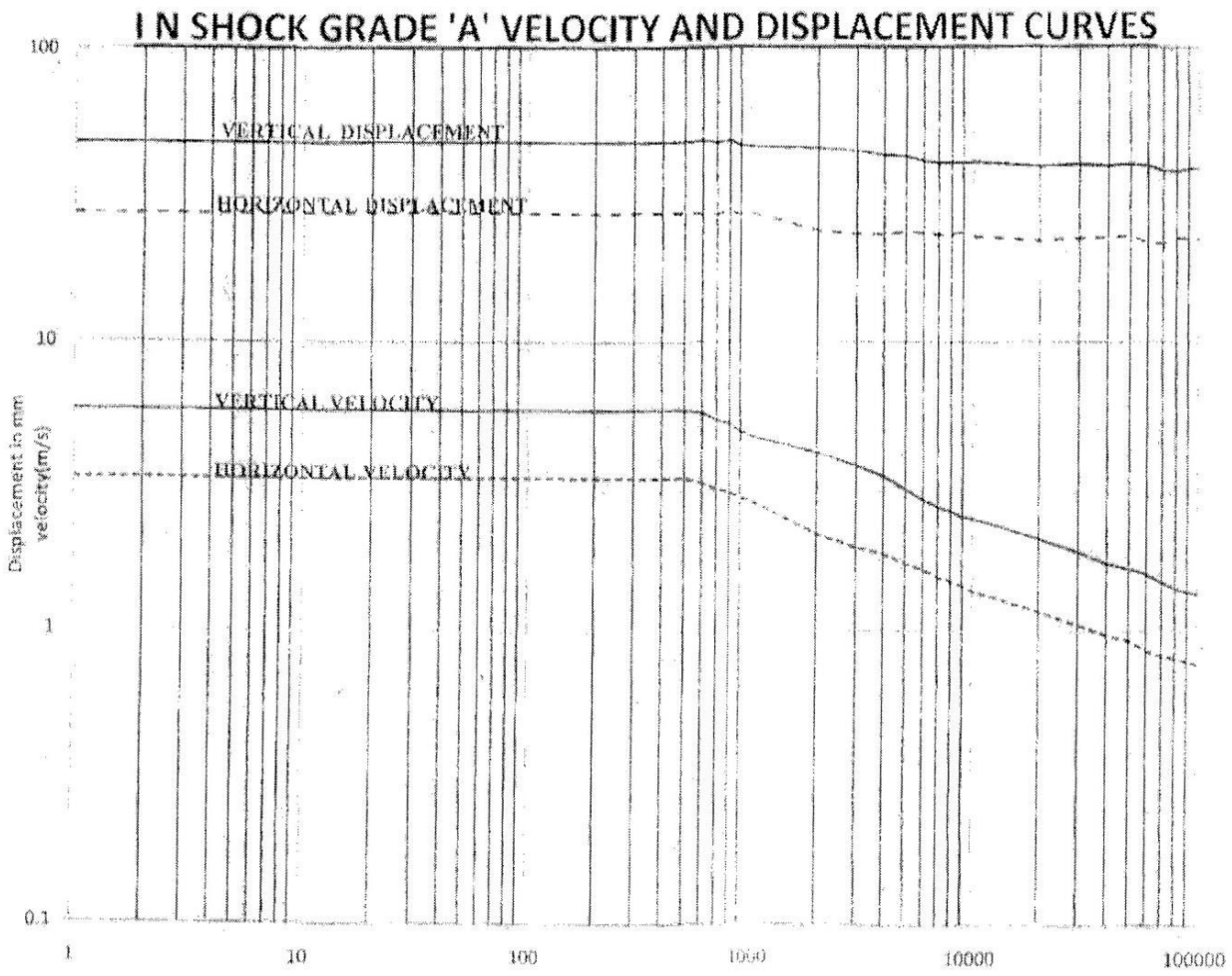
Enclosure 2

NSS-2 GRADE CURVES



Enclosure ‘3’

Enclosure 3


I N SHOCK GRADE 'A' VELOCITY AND DISPLACEMENT CURVES
VERTICAL DISPLACEMENT
HORIZONTAL DISPLACEMENT
VERTICAL VELOCITY
HORIZONTAL VELOCITY
Displacement in mm
velocity(m/s)
100
10
1
0.1
1
10
100
1000
10000
100000

Enclosure ‘4’

Enclosure 4

SCOPE OF TESTING

1. The equipment which is shock tested would be complete with all accessories viz. interconnecting pipes. Sensors, transmitters, indicators, gauges etc. In the case of electrical/electronic equipment, which are mounted separately, the same would be subjected to shock loads as stipulated in JSS55555.

Sequence of Testing

2. The equipment which is earmarked for shock test shall undergo the following tests (in that sequence):-

(a) Visual inspection to identify apparent defects.

(b) Proving run or endurance run as per the duration and modes specified in procurement specification.

(c) Shock test of the equipment to levels specified in procurement specification.

(d) Visual inspection for apparent defects/looseness, which would have occurred due to shock loads.

(e) Disassembly of the equipment into components and visual inspection.

(f) NDT (DPT) of critical components.

(g) Assembly and proving run of the equipment.

3. The equipment is considered to have passed the shock test if the following conditions are satisfied:-

(a) There are no mechanical damages/failures.

(b) There is no deterioration of performance of the equipment when compared to pre-shock test status.

(c) There are no cracks, leakages of working medium/control medium or any other defects that may lead to degradation of characteristics of the article.

(d) There is no change in status of switches (ON/ OFF) or malfunctioning of equipment/skid-mounted sensors, transducers gauges etc.

Enclosure ‘5’

Enclosure 5

GUIDELINES FOR SHOCK QUALIFICATION BY SHOCK CALCULATION

1. The following shall be considered explicitly in the calculations, which shall be made for each of the principle axes separately:-

   (a) The mass of the equipment.

   (b) The strength and stiffness of the foundation.

   (c) The response of the sub components of the equipment.

   (d) The duration of the shock loading.

2. The calculation/method employed for evaluation of the centre of gravity of the complete equipment and individual components are to be clearly indicated.

3. Material and physical properties of components of the equipment are to be indicated.

4. The natural frequency of the equipment as mounted on the ship is to be either calculated or determined by tests. On evaluation of the natural frequency, the equipment/components are classified as either rigid/flexible as per guidelines in BR 3021(I).

5. A Non-Linear Lumped Mass Modeling is to be adopted for evaluation of the characteristic of the equipment. The boundary conditions and constraints applicable to the equipment are to be clearly specified in the model. Advanced techniques such as Finite Element Analysis and tools such as ANSYS/PAFEC code may be used for the analysis clearly specifying the number of nodes and elements used for discretising the equipment.

6. The “frequency ratio” of the natural frequency of the equipment to the shock input frequency is to be evaluated as per guidelines in BR3021(I).

7. The “Shock Amplification Factor” and load multiplier required to applied for the calculations is to be evaluated as per guidelines in BR3021(I).

8. The Acceleration, Velocity, Time period values as applicable for the calculations are to be obtained as per guidelines in BR 3021(I).

9. Permissible shock design stresses are to be obtained as per guidelines in BR 3021(I).

10. The Bending Moment, Shear force, Bending Stresses and displacement as obtained in the calculations are to be clearly specified for the equipment and each individual component of the equipment. The effect on various clearances of the equipment/components is to be clearly stated in the calculations.

11. A flow chart indicating the steps to be undertaken for design/verification checks for shock is highlighted in the next page.

Enclosure ‘6’

Enclosure 6

DETAILS OF TEST FACILITIES

1. **Test facilities Available at NSTL Visakhapatnam**. The following infrastructure/ facilities are available for undertaking actual shock testing of equipment:-

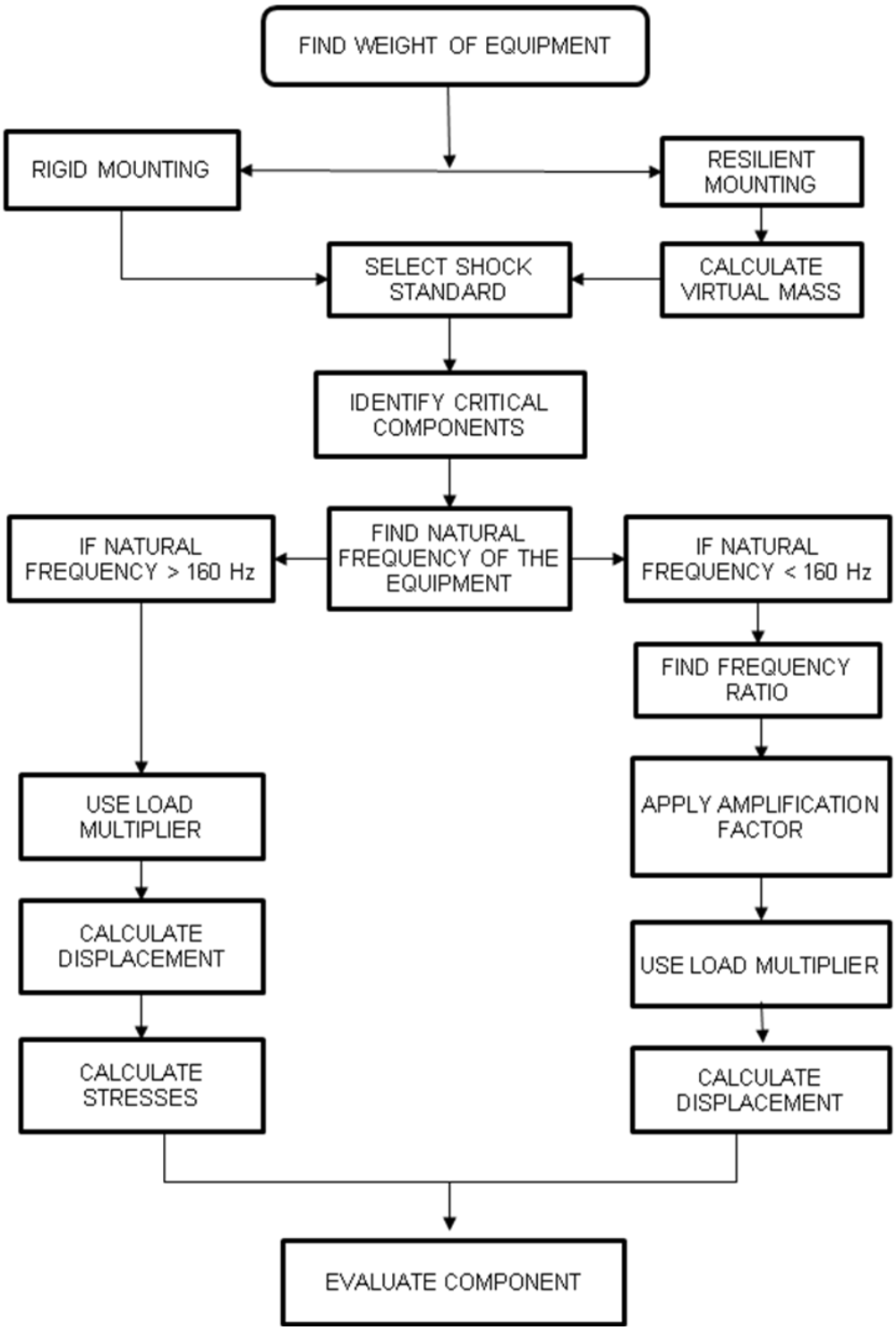
SL.NO	TEST FACILITY	PAYLOAD	PAYLOAD SIZE	REMARKS
(a)	Test machine (Drop test/ free fall machine)	up to 600 kg	1m x1m	600kg-90 g
(b)	Test machine (Drop test/ free fall machine)	up to 1000 kg	1.5x1.5m	Max acceleration - 600g Min. weight - 200kg
(c)	Floating Shock Platform (FSP-I small)	Up to 2000kg	2.5 X 1.5 X 1.5m	The platform is floated in NSTL shock tank of size 15mx12mx10m and explosives are used in the rank to create the required shock levels.
(d)	Floating Shock Platform (FSP-II Large)	Up to 15000 kg	8x3x2m	The platform is floated in NSTL Shock tank of size 15mx12mx10m or in open water and explosives are used in the tank to create the required shock levels
(e)	Shock tubes	Shock tubes are fabricated to accommodate any size of equipment. Very high levels of shock pulses are channelized in the shock tubes and applied on the test equipment.		

2. **Test Facilities at DMDE, Secunderabad**. DMDE has an impact-testing machine (K-200M) for subjecting equipment weighing up to 200 kgs to impact loads.

Enclosure ‘7’

Enclosure 7

FLOW CHART FOR DESIGN / VERIFICATION CHECKS FOR SHOCK



NOTES

DQA(WP)			DQA(N)		
ADGQA(WP)	011-24196717		ADGQA(N)	011-20863222	
DDGQA(WP)	011-24196920		DDGQA(N)	011-20863228	
Dir(Tech)	011-24196934		Dir(SG)	011-20863230	
Dir(P&T)	011-24196946		Dir(Pers)	011-20863229	
Dir(Admin)	011-24196922			011-26192870	
Email	dqawp@navy.gov.in		Email	naval-dgqa@nic.in	
Contact Details of Field Units			**Contact Details of Field Units**		
Unit	**Telephone**	**Fax No./ e-mail**	**Unit**	**Telephone**	**Fax No./ e-mail**
CQAE(MS) Mumbai	022-22664099	022-22662077 cqaems@navy.gov.in	CQAE(WE) Bengaluru	080-23571171	080-23571172 cqae-bng-dgqa@ nic. in
CQAE(WE) Vikhroli	022-25779117 022-25781827	022-25779118 cqaewe@navy.gov.in	CQAE(NS) Mumbai	022-22663192	cqaens-dgqa@nic.in
QAE(WP) Mumbai	022-22653270	022-25779118 qaewpmb-navy@gov.in	CQAE(WS) Mumbai	022-22752060	cqaews-dgqa@nic.in
QAE(EFS) Mumbai	022-22626202	022-22616119 qaefsmb@navy.gov.in	QAE(N), Secunderabad	040-29561963	040-27741079 qaensecbad-dgqa@nic. in
CQAE(EFS) Vizag	0891-2558493 0891-2575400	0891-2958493 qaeefs@navy.gov.in	QAE(N) Chennai	044-22340430	044-22340430 qaenchn.tn@nic.in
QAE(WE/WP) Kolkata	033-22230872	033-22230718 qaewekal@navy.gov.in	QAE(N) Kochi	0484-2668179	qaenkochi-dgqa@nic.in
QAE(EFS) Kolkata	033-22230893	033-22230893 qaefskal-navy@nic.in	QAE(N) Kolkata	033-22230540	033-22230233 qaenkol@navy.gov.in
QAE(WE/EFS), Chennai	044-22340249	044-22340365 qaewechn-dgqa@nic.in	QAE(N) Badarpur	011-29892171	0129-2279528 qaend@navy.gov.in
QAE(WE), Jalandhar	0181-2261207 0181-2262054	0181-2262054 qaewejal@navy.gov.in	QAE(UB) Mumbai	022-25781566	022-25781566 qaeub-dgqa@nic.in
QAE(WE), Bhopal	0755-2500016 0755-2502108	0755-2505436 qaewebpl-dgqa@nic.in	DQAN Cell Haridwar	01334-28548384	01334-28548384 dqancellhwr@navy.gov.in
QAE(WE), Vadodara	0265-2961697 0265-2961698	0265-2961118 qaewevad@navy.gov.in			
QAE(WE/FPC) Bengaluru	080-29611070 080-23377222	080-23375605 qaewebang-dgqa@nic.in			
QAE(WE) Pune	020-27287474	020-27285458 qaewewal@navy.gov.in			
QAE(WE) Delhi	011-29895814	011-29895814 qaewend@navy.gov.in			

ADDRESS

DQA(WP)	DQA(N)
'B' Block, 6th Floor Defence Offices Complex Africa Avenue Marg New Delhi - 110 023	**West Block - 5 Sector-1, RK Puram New Delhi - 110 066**