

Telefax: 011-23017362

Fax: 011-23014914

Directorate General of  
Aeronautical Quality Assurance  
Ministry of Defence, "H" Block  
New Delhi-110011

No: 1407(Policy)/AQAD/DGAQA/Tech Coord

10<sup>th</sup> Oct 2014

To,  
DDG(SZ)  
DDG(N&CZ)  
DDG(N)  
DDG(KPT)

**Release of "AQA Directive 01/14" on**  
**"Guidelines for Quality Assurance during outsourcing by Main Contractors"**

It has been decided by this HQrs to issue the Aeronautical Quality Assurance Directives (AQAD) on the subjects essential for QA in military aviation. The aim of issuing such AQA directives is to have continual improvement in Quality Management System in Indian military aviation as well as to set clear-cut guidelines / requirements which need to be adhered / ensured by Main Contractor / DGAQA office's while discharging their respective duties.

2. Accordingly first AQA directive on the subject is hereby issued as envisaged in AFQMS document (Sec-I, Para 4). This AQA directive is to be implemented with immediate effect and a copy of the same is enclosed for ready reference. Whenever the system audit of the firm is carried-out by resident office's as per AFQMS document ( Dec 2011), as a prelude to their recommendation for approval by DG,AQA, requirement of this directive should also be taken in to account and be recorded accordingly.

3. It is suggested to give wide publicity to the document within our organisation as well as existing / prospective main contractors for awareness and compliance. To facilitate this, a soft copy of the document is also uploaded on DGAQA website and can be accessed from our website i.e **dgaeroqa.gov.in** through Technical (main menu) and Role and functions (sub menu).



( A Dhanabalan)  
Addl Director General  
For Director General, AQA

Encl: As stated

Copy to :

All Field Establishment      For information and needful action as stated in text above.

Internal:

PPS to DG, AQA      For information please

All Technical Directorates      For information and needful action as stated in text above.

At HQrs

✓ IT Section      With a request to upload the document on DGAQA website

# GUIDELINES FOR QUALITY ASSURANCE DURING OUTSOURCING BY MAIN CONTRACTORS

## ISSUE I - SEPTEMBER 2014



**DIRECTORATE GENERAL OF  
AERONAUTICAL QUALITY ASSURANCE**  
GOVERNMENT OF INDIA, MINISTRY OF DEFENCE  
'H' BLOCK, NEW DELHI -110 011



सत्यमेव जयते

एम. राजाकन्नू  
महानिदेशक

**M. Rajakannu**  
Director General

भारत सरकार  
रक्षा मंत्रालय

वैमानिक गुणवत्ता आश्वासन महानिदेशालय  
एच-ब्लॉक, नई दिल्ली-110011

**GOVERNMENT OF INDIA  
MINISTRY OF DEFENCE  
DIRECTORATE GENERAL OF  
AERONAUTICAL QUALITY ASSURANCE**

H-BLOCK, NEW DELHI-110011  
TEL : 23011783 FAX : 011-23014395  
email : hq.dgaqa@nic.in

## PREFACE

The Defence industry in the country has grown by leaps and bounds in the last 10-15 years. The aircraft and aerospace sectors have grown manifold in terms of production/repair capacity of aircraft and missiles and the country is on the threshold of a quantum jump in technology and quality. Both these sectors require a high degree of commitment through quality of design, manufacture and maintenance.

In the early days of these two sectors, it was an unwritten rule that only the Govt./Public sector will deal with the manufacture of aircraft/aerospace items. However, the Government through its liberalization policy has opened the doors for the private sector and joint ventures to enter the fray. Also, the mandatory requirement of off-set during foreign procurements would lead to higher participation by the private players and will eventually involve outsourcing. The area of outsourcing has opened up new challenges for the Government QA agency on account of multiplicity of work centers. In order to have desired level of the quality standards, it is to be ensured that the outsourcing process is systematically planned and executed. There will have to be modalities in place for the transfer of technological documents along with the required checks and balances to provide the necessary confidence of quality of the final product. The need for guidelines on QA during outsourcing by the Main Contractors has also been reflected in the DGAQA document namely AFQMS-2011, duly approved by Secretary (DP).

The document has been carefully prepared keeping in view the requirements stipulated in latest standards in the Quality Management System and over six decades of experience of DGAQA in providing QA in the Military Aviation Sector in our country

It is hoped that the systematic approach as outlined in the document will ultimately result in desired level of quality standards, which will meet the expectations of the customer.

New Delhi

12 Sep 2014

(M. Rajakannu)

## LIST OF AMENDMENTS

[illegible]

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## **GUIDELINES FOR QUALITY ASSURANCE DURING OUTSOURCING**

1. **INTRODUCTION:** In the 1950s, the Indian Defence Aircraft Industry and manufacturing of associated systems, such as ground radar and related communication systems, was confined to the Defence Public Sector and Government Controlled Ordnance factories (for Air Armaments) who were the main contractors for the Indian Military Services. Primarily all the design, development, production/overhaul/repair and related testing activities were carried out within the premises of these Government Controlled establishments.

1.1 The closed economy in India underwent major changes in the Nineties and further changes are still in progress keeping in view the global developments in the aircraft and aerospace field. With the thrust on time frames, economics and self reliance, these main contractors have introduced the concept of outsourcing of components / sub-assemblies / assemblies. Outsourcing of structural assemblies and complete instruments etc., have also been initiated. As is becoming the practice world- wide, design and development activities such as aeronautical design, development of component / subassemblies / assemblies would as well be undertaken by tier 1 / tier 2 companies in the near future and hence the main contractor would need to control the outsourcing in a systematic and planned manner.

1.2 It is essential that transfer of technology by the main contractor flows down to the sub-contractor and that necessary checks and balances are introduced in the system by the main contractor in consultation with DGAQA in case of critical items to give the desired degree of assurance to DGAQA as is obtained from the main contractor.

Also, if the vendor/sub-contractor of the main contractor holds DGAQA approval (based on AFQMS document of DGAQA), the checks and balances outlined for action at the vendor shall be modified on case to case basis depending on the scope of activities held in the DGAQA approval vis a vis the outsourced activities. Notwithstanding this, the procedures would be in line with the guidelines given in DDPMAS (latest edition) as well as AFQMS-2011.

1.3 The main contractors should hold AS9100 or ISO9001 certification and be subsequently approved by DGAQA. The procedure outlined below is therefore based on the fact that such contractors would continue to operate under a sound quality management system to international standards.

## **2. ACTIVITIES INVOLVED**

2.1 Each main contractor is to prepare an outsourcing procedure/document for the scope of activities planned to be outsourced and forward to DGAQA for comments and coordination. This shall include the activities involving special processes (if any) and procedures for approval of personnel engaged in such processes. These procedures should take into account either the national (such as existing practices in-house with the main contractor) or internationally recognized requirements such as NADCAP standards.

2.2 The Divisional Head / Head of Quality Department of the main contractor shall formally approve the vendor / subcontractor based on the recommendations of the evaluation committee (formally authorized for such activity by the top management of the Main Contractor) in the prescribed format. It is desirable that vendors dealing with critical items involving assembly work are AS 9100 or ISO 9001 certified company. Such a certification is not necessary for vendors performing machining / fabrication / calibration / non assembly work for the main contractors. However existing quality system must meet

Aeronautical System Requirements specific to the activity being performed to the satisfaction of DGAQA. Vendor evaluation document is to be prepared by main contractor and forwarded to DGAQA.

2.3 The list of approved vendors as well as sub-vendors if any, having relevant details such as scope of activity etc. should be forwarded by the main contractor to the resident office of DGAQA. Such a list will be reviewed periodically for addition / deletion (if any) by the main contractor.

2.4 The Vendor evaluation should be done by a defined team of executives from the main contractor. The evaluation should cover availability of resources for capability / capacity to design / manufacture / assemble the specified product(s) including human resources. The human resources will be covered in two parts i.e. inspection personnel and those whose work will have an effect on the quality of the product. The special process operators such as welders, NDT personnel, etc would need to be approved based on qualification, experience, skill and training for the scope of work assigned to them as per laid down procedures concurred by DGAQA. However, approval / certificate holders from national / international bodies may be considered as alternate to above requirements, if found otherwise suitable. The scope of approval is to be clearly stipulated in the approval certificate by the approving agency. The assessment reports of vendors to be made available to DGAQA on as required basis. The vendor / sub-contractor will propose by name a head of quality and certificate of compliance signatory to the main contractor who will then get his QC personnel approved for specific areas by the main contractor.

2.5 Members from DGAQA are to be co-opted in the quality audit team in case of critical aeronautical stores being outsourced / indigenized. The classification of stores into critical (Mission / flight safety) / non-critical shall be decided by the main contractor in consultation with the DGAQA, in case the same is not given by the OEM. Periodicity of



such audit shall be mutually decided between the main contractor and DGAQA depending upon feedback.

2.6 When required, the vendor shall be issued with a transfer of technology document along with the drawings. The technological requirements for the manufacture, assembly and testing are also to be provided to the sub-contractor. In case the sub contractor's process differs from that of the technological requirements given by the OEM, the same would need to be validated / approved by the main contractor in coordination with RCMA (covering design aspects) and DGAQA (covering quality / reliability), for all the critical stores and complex processes. For non-critical items, any changes in process should be documented by the main contractor accordingly and forwarded to DGAQA periodically as per laid down procedures.

2.7 Main Contractor is to prepare a quality plan for the Class I products (where such classification exists), sub-assemblies and assemblies outsourced. For critical stores, the quality plan is to be put up to DGAQA to define the extent and point of DGAQA's involvement by defining their QA stage. DGAQA would approve the Q.A. plan in mutually agreed time frame. The same will be brought to the notice of the vendors / sub-contractors in the appropriate documents clearly defining the role of DGAQA. The main contractor is to stipulate the requirements of First Article Inspection Report (FAIR) based on which go ahead is given by main contractor as per the quality plan pertaining to the First Article.

2.8 The main contractor shall establish a vendor education and training programme on selective / need basis. The main contractor shall define the education levels, skill levels, experience, identity of the inspection and all other personnel whose work will have bearing on the quality of the product. The vendor may also need to institute special quality

requirements for aeronautical applications if his QMS does not cater for it. Such requirements shall be provided to the vendor / subcontractor by the main contractor.

2.9 The main contractor shall clearly define the Incoming Goods Inspection (IGI) requirements at their premises and shall ensure compliance in all respects including identification and traceability before according acceptance to any outsourced store. Records of IRS (Inspection Record Sheet) pertaining to these stores are to be maintained and retained as per existing procedures applicable to similar type of stores produced in-house by the main contractor.

2.10 In case of further subcontract by the vendor the same needs to be brought to the attention of the main contractor who will then exercise control over the activities of the subcontractor of the vendor after assessing that the sub vendor also meets the quality system requirements for aeronautical applications.

### **3. WORK PACKAGE FOR OUTSOURCING:**

3.1 Each major / critical assembly outsourced shall have a work package to be issued with the knowledge of DGAQA. The work package as a minimum shall address the following aspects for critical items (criticality to be decided between Main Contractor & DGAQA where it is not given by the OEM):

- a) Work description and scope, including PQT / LQT requirements, if any.
- b) Drawing details with traceability to the latest issued SOP of both hardware and software.
- c) While the main contractor supplied stores should have traceability, vendor procured materials should additionally have information about source of supply (including approval details), Inward Goods Inspection at the vendor site, shelf life etc. Only products duly accepted are to be stored in identified -Bonded Storesø These should be physically separate from Quarantine Stores

or Rejection Stores depending upon the status of each product at the vendor's premises.

- d) Details of tools / jigs / fixtures i.e. contractor supplied / vendor supplied and tool calibration and certification is to be maintained as per documented procedure.
- e) Quality plan and control stages by vendor QC / Contractor QC and DGAQA are to be maintained by the main contractor.
- f) Details of special processes like Heat Treatment, Plating, and Painting etc are to be provided by the main contractor.
- g) Definition of standards to be followed for manufacturing, NDT, material testing etc as applicable with relevant literature are to be made available.
- h) Authorized / approved (as applicable) / Quality control / Inspection / test documents including ATP etc are to be provided by the main contractor.
- i) First off inspection requirements as well as records are to be made available by the main contractor.
- j) Non-conformance control is to be strictly as per defined documented procedures and all deviations are to be reported to main contractor for disposal as per DDPMAS / DDPIIL procedures. Cause of deviations, corrective and preventive measures are to be intimated by the subcontractor.
- k) Quality records would need to be maintained by the vendor as per contract.
- l) Preservation and packaging requirements are to be met as per the contract.
- m) The procedure for configuration control of hardware and software is to be supplied to the vendor by main contractor with adequate controls. Procedures given in DDPMAS (Volume-II) on software development and certification are to be complied with.
- n) Performance related deficiencies reported by way of premature failures during exploitation need to be addressed as per existing procedures in DDPMAS (latest edition) wherein vendor representatives shall also be a member in the Defect Investigation Team.

#### **4. ROLE OF DGAQA DURING OUTSOURCING:**

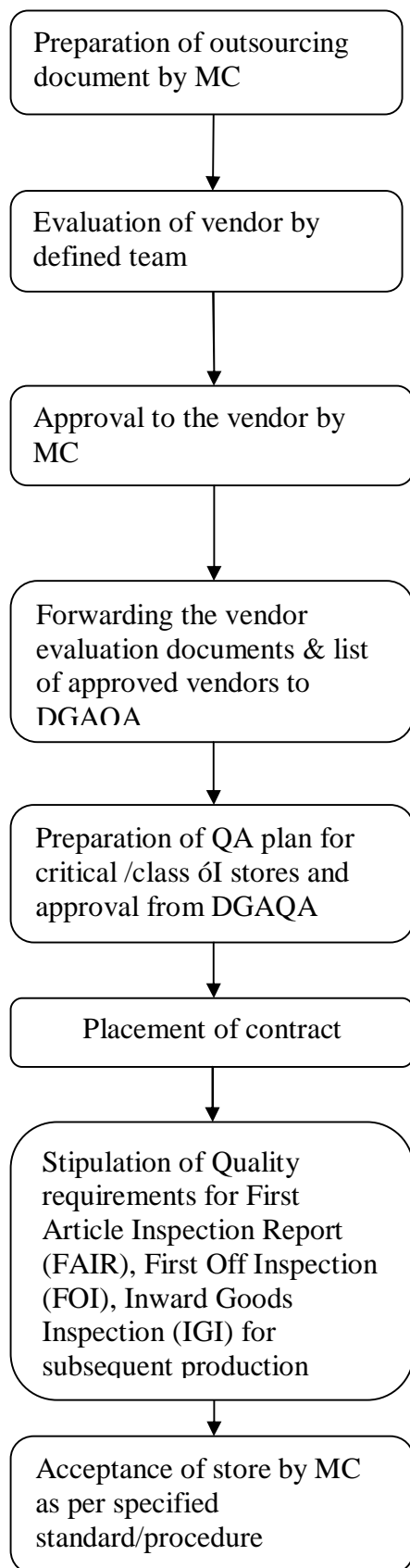
Following activities are to be executed by the resident office of DGAQA:

- a) To ensure existence of contractor's document on outsourcing.
- b) To ensure availability of document on vendor assessment with the main contractor and evaluation report before vendor approval.

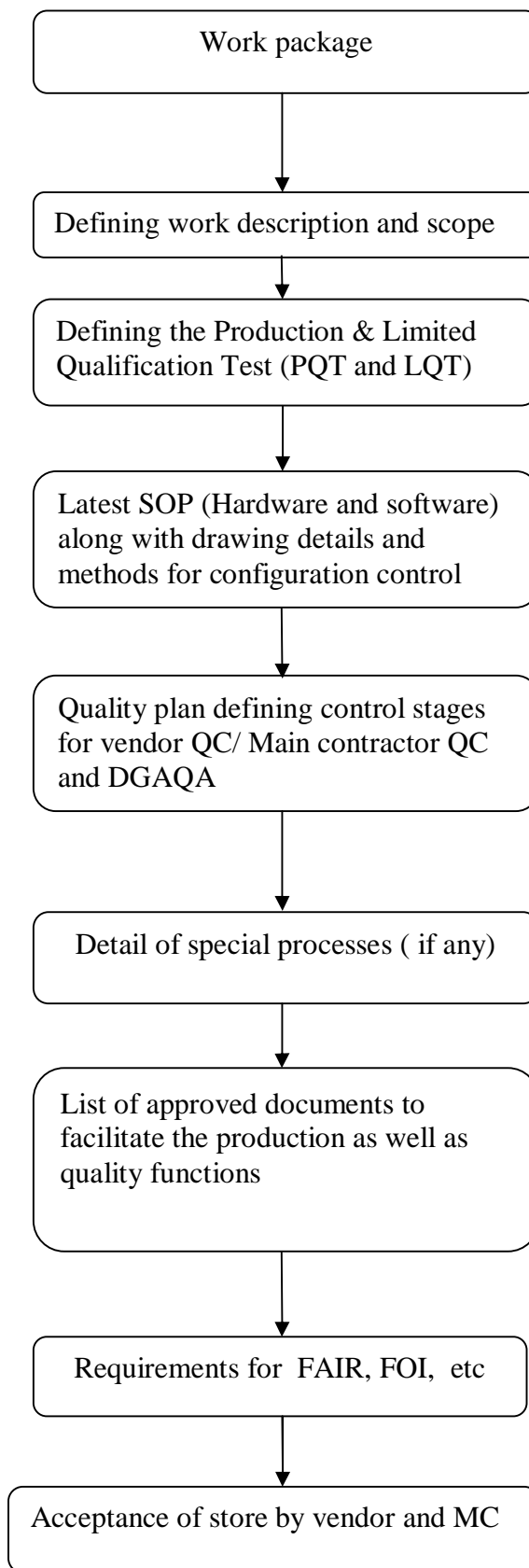
- c) To participate in vendor assessment depending on criticality of stores decided between Main Contractor and DGAQA.
- d) To examine the vendor assessment / evaluation conducted by the main contractor at the time of initial vendor approval and to ensure compliance as per the documents.
- e) Work package document for critical stores shall be studied to ensure completeness from quality aspects.
- f) To study and co-ordinate Quality Plans for critical stores defining check points for vendor / contractor / DGAQA.
- g) Finalization of the details of DGAQA involvement in QA activities for critical items at the vendor premises or on receipt of the items at the main contractor as per the approved quality plan. This will depend on the complexity and criticality of the outsourced item. It may include joint audits, initial batch acceptance tests, development evaluation and test activities.
- h) For supplies received from the vendors / subcontractors, it shall be ensured that non-conformance control procedure is in place at the main contractor premises. For deviation if any, disposition procedure as enumerated in DDPMAS (latest edition) be followed prior to offering parts to DGAQA for clearance. In case of deviations of critical nature, if required, the same may be referred to RCMA by DGAQA for a comments on design aspects / disposition as per DDPMAS (latest edition) guidelines. Concessions when required will be processed in the normal manner as defined in DDPMAS.
- i) Root cause analysis by the vendor / subcontractor will be insisted upon by the main contractor to ensure that CAPA (Corrective Action Preventive Action) document is generated for bringing the desired improvements. Periodic reporting on the same is to be done by the Main Contractor to the resident office of DGAQA on quarterly basis.
- j) Outsourcing activity will be monitored and periodically reviewed by the main contractor for its effectiveness. Addition / Deletion or introduction of revised acceptance criteria will depend on the results of the analysis of the deviations.
- k) DGAQA interactions with the vendors shall be conducted through the main contractor.

## 5.0 QA DURING OUTSOURCING AT A GLANCE

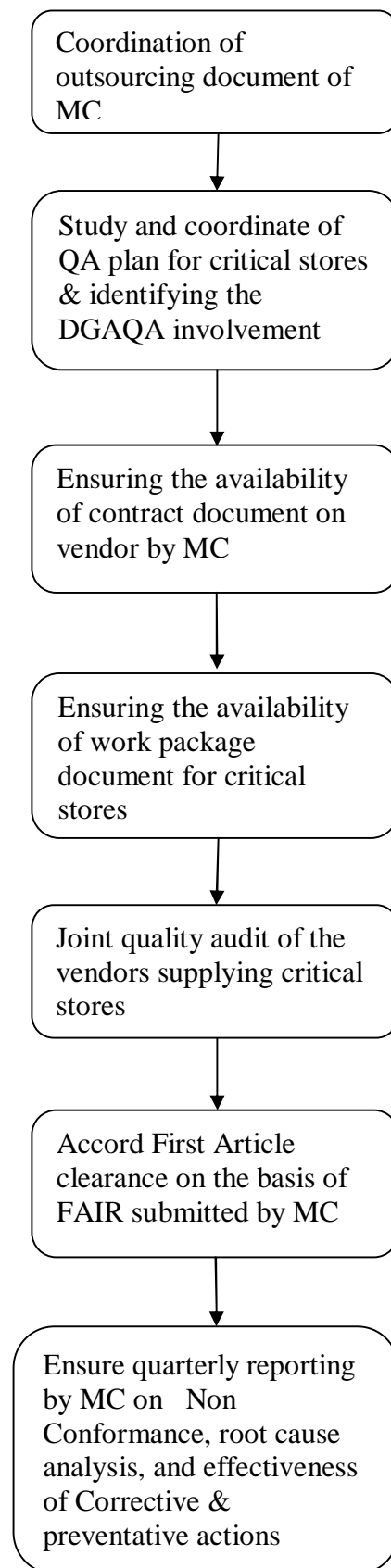
### General activities by by Main Contractor(MC)



### Salient points for Major/Critical assy /Sub assemblies



### Control points by DGAQA



## 6. **CONCLUSION:**

The document has brought out systemic procedures / practices that will help all the stakeholders in the outsourcing activity to ensure with documentary evidence that specified quality requirements have been met. Though the primary responsibility of ensuring the quality of the outgoing product will continue to rest with the main contractor, these procedures will enhance the assurance that final product is of the requisite quality. Strict adherence to these procedures is expected to further the confidence of our esteemed customers in Armed Forces for keeping our flying machines in the highest order of operational readiness.

NOTE: Suggestions for further improvement/amendment in this document are welcome and may be addressed to the following;

Directorate General of Aeronautical Quality Assurance  
(Attention: Director / Tech coord)  
õHö Block, New Delhi-110 011  
e-mail [hq.dgaqa@nic.in](mailto:hq.dgaqa@nic.in)

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