



CAV Ice Protection Ltd

Quality Requirements for Suppliers (QRS)

Medomsley Road,
Consett,
Co. Durham,
DH8 6SR

RECORD OF REVISIONS

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Quality Requirements for Suppliers

1.0 Introduction

This document defines the requirements CAV Ice Protection Ltd expect of their approved suppliers when carrying out work on any purchase orders placed by CAV Ice Protection Ltd for components, assemblies, materials or processes.

2.0 Definitions

| | |
|--------|---|
| C of C | Certificate of Conformity |
| EASA | European Aviation Safety Agency |
| EDM | Electro – Discharge Machining |
| FAIR | First Article Inspection Report |
| NDT | Non-Destructive Testing |
| UK CAA | United Kingdom Civil Aviation Authority |

3.0 Changes to Supplier / Sub-contractor Organisation

In the case of a change of ownership, name or location of the supplier, the CAV Ice Protection Quality Department and/or Purchasing Departments shall be notified in writing as soon as possible – preferably, in advance of the said change.

Where there is a change to any senior personnel in the organisation e.g. Managing Director /Chief Executive Officer, Quality Manager, Operations Manager then the CAV Ice Protection Quality Department shall be informed immediately.

4.0 First Article Requirements

The first production run carried out by each supplier shall be subject to a First Article Inspection in accordance with AS 9102. The forms which form part of AS 9102 shall be completed.

5.0 Release Requirements

5.1 C of C

See appendix 1.

5.2 EASA Form 1

Where the purchase order requests that the supplier release the goods on an EASA Form 1 in accordance with their EASA approval then the release shall be carried out in accordance with the requirements of EASA.

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5.3 Raw Material / Mill Certificates and Analysis

In cases where the CAV Ice Protection purchase order requests copies of raw material / mill certificates then, with each delivery the supplier shall furnish a copy of the incoming material certificate along with a copy of the certificate from the mill where the material was produced and the actual analysis results obtained by the mill or an associated test house confirming that all requirements of the relevant specification have been met.

Non aerospace material shall only be used when specified by the CAV drawing or when approved as a substitute for the specified material . It is not permissible for the sub-contractor/ stockist to upgrade material from commercial to aerospace grade, even when the chemistry and mechanical properties are shown by testing to conform. This can only be done by the original mill.

5.4 Release Signatories

Each supplier shall maintain a list of approved signatories for release documentation which shall be furnished to CAV Ice Protection on request.

6.0 Information for External Providers

The organization shall ensure the adequacy of requirements prior to their communication to the external provider.

The organization shall communicate to external providers its requirements for:

- a. the processes, products, and services to be provided ***including the identification of relevant technical data (e.g., specifications, drawings, process requirements, work instructions)***
- b. the approval of:
 1. products and services;
 2. methods, processes, and equipment;
 3. the release of products and services;

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- c. competence, including any required qualification of persons;
- d. the external providers' interactions with the organization;
- e. control and monitoring of the external providers' performance to be applied by the organization;
- f. verification or validation activities that the organization, or its customer, intends to perform at the external providers' premises;
- g. design and development control;
- h. special requirements, critical items, or key characteristics;
- i. test, inspection, and verification (including production process verification);
- j. the use of statistical techniques for product acceptance and related instructions for acceptance by the organization;
- k. the need to:
 - implement a quality management system;
 - use customer designated or approved external providers, including process sources (e.g., special processes);
 - notify the organization of nonconforming processes, products, or services and obtain approval for their disposition;
 - prevent the use of counterfeit parts;
 - notify the organization of changes to processes, products, or services, including changes of their external providers or location of manufacture, and obtain the organization's approval;
 - flow down to external providers applicable requirements including customer requirements;
 - provide test specimens for design approval, inspection/verification, investigation, or auditing;
 - retain documented information, including retention periods and disposition requirements;

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- l. the right of access by the organization, their customer, and regulatory authorities to the applicable areas of facilities and to applicable documented information, at any level of the supply chain;
- m. ensuring that persons are aware of:
 - their contribution to product or service conformity;
 - their contribution to product safety;
 - the importance of ethical behaviour.

7.0 Inspection Requirements

7.1 Source Inspection

Where the purchase order from CAV Ice Protection states that source inspection is required then the supplier shall contact the CAV Ice Protection Quality department at least one week before the goods are due to be finally inspected (two weeks for suppliers located outside the UK). CAV will then arrange for a representative to be present at and to verify the final inspection process at the suppliers premises. CAV Ice Protection Quality Department reserve the right to waive this requirement, notification of which will always be made in writing to the supplier.

7.2 Non-conforming product

Where non-conformance is identified within manufactured product which will mean a departure from the design definition when the product is delivered then this shall be notified to the CAV Ice Protection Quality department immediately upon discovery and prior to delivery of the affected items. When a non-conformance identified means that material "free issued" by CAV has to be scrapped then this shall be notified to the relevant purchasing point of contact within CAV Ice Protection as soon as practicable. Non-conforming material shall not be delivered to CAV without receipt of prior written agreement from the CAV Ice Protection Quality department.

8.0 Packaging Requirements

All items despatched to CAV Ice Protection shall be packaged sufficiently to prevent any damage to components or surface treatments during the handling and transportation process.

Where there is a requirement for specific packaging for a particular product then this shall either be quoted on the drawing, quoted on the purchase order or the relevant packaging specification shall be quoted on the purchase order.

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9.0 Tooling

Each supplier / sub-contractor shall maintain a definitive register of all tooling, production, inspection or other tooling which they hold that is used in the fulfilment of CAV Ice Protection purchase orders. This shall include tool numbers, locations and calibration status.

All tooling used for inspection purposes shall be reviewed on a regular basis. Any discrepancies with tooling provided by CAV Ice Protection identified during these reviews shall result in the suspension of the tool from use. This shall be communicated immediately to the CAV Ice Protection Quality and Purchasing departments. All product produced from discrepant tools shall be quarantined and 100% inspected to identify conformity to design requirements prior to use.

For tooling owned by CAV Ice Protection customers then the tooling register shall be maintained in a format conforming to the requirements of that customer's specifications.

10.0 Sub-contracting

Where the supplier proposes to further sub-contract any processes involved in the fulfilment of the purchase order then the CAV Ice Protection Quality Department shall be notified in advance.

Sub-contracting shall only take place with companies listed on the CAV Ice protection Approved Vendor List unless written permission has been received in advance from the CAV Ice Protection Quality Department.

Where sub-contracting occurs then the contents of this document in its entirety shall be flowed down to that supplier.

11.0 Non-conventional Machining Processes

11.1 General

No non-conventional machining processes are permitted on work for CAV Ice Protection without prior written approval from the Quality Department of the CAV. Under no circumstances shall these processes be used for machining to final size.

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11.2 Laser Profiling

Unless otherwise defined by drawing or specification, any items which have been machined using a laser cutting process shall be subject to further processing to remove at least 1.5 times the Heat Affected Zone or a minimum of 0.040 inch of metal from all faces subject to the cutting process. This material may be removed by either mechanical or chemical methods.

11.3 EDM / Spark Erosion

Any items which have been machined using an EDM / Spark Erosion process shall be subject to further processing to remove a minimum of 0.003 inch of metal from all faces subject to the cutting process. This material may be removed by either mechanical or chemical methods.

12.0 Welding

12.1 Qualification of Welders

All welders are required to demonstrate their ability to produce acceptable welded joints to the engineering requirements of BCAR A8-10 (this is available from the UK CAA website as part of CAP 553) or an alternative agreed in advance by the CAV Ice Protection Quality Manager.

Records relating to each welder shall be retained by the sub-contractor to demonstrate the continued proficiency of the welder.

Each welder shall prepare test pieces on an annual basis (or at the frequency specified by the relevant prime contractor) for each type of weld and material group to be welded. These test pieces shall then be tested to the requirements of BCAR A8-10 by a laboratory agreed by the CAV Ice Protection Quality Department.

13.0 Special Processes

Special processes in the context of this document are defined as any processes which cannot be verified by inspection subsequent to processing and thus require more stringent controls of the process parameters to ensure acceptable processing.

13.1 Heat Treatment

Any heat treatment required in the fulfilment of the purchase order shall only be carried out by suppliers approved to carry out heat treatment processes and listed on the CAV Ice Protection Approved Vendors List. Heat treatment controls shall be in accordance with the relevant AMS specifications (AMS 2770, 2771, 2772 and 2750).

13.2 Chemical Processing

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Any chemical processing required in the fulfilment of the purchase order shall only be carried out by suppliers approved to carry out the relevant chemical processes and listed on the CAV Ice Protection Approved Vendors List. The required processing and controlling specifications will be called up on the drawing (either directly or indirectly).

13.3 NDT

Any Non-Destructive Testing required in the fulfilment of the purchase order shall only be carried out by suppliers approved to carry out the relevant processes and listed on the CAV Ice Protection Approved Vendors list. The required processing and controlling specifications will be called up on the drawing (either directly or indirectly).

13.3.1 Processing

The proposed testing specifications shall be agreed with the CAV Ice Protection Quality Department prior to carrying out any work on the order.

12.3.2 Personnel

All personnel carrying out NDT processes shall be qualified to the relevant National Standards acceptable to CAV Aerospace Ice Protection and to the appropriate Airworthiness Authority (EN4179 for example).

14.0 Design / Production and Production / Production Interface Agreements

Any orders placed by CAV Ice Protection which request release of goods on an EASA Form 1 require that an interface agreement is in place between the supplier and CAV Ice Protection. The format for this shall be agreed with the CAV Ice Protection Quality department prior to shipment of the first items on the order.

15.0 Quality Records

15.1 Retention Periods

Those records defined in BS EN ISO 9001 or SAE AS9100 shall be available for scrutiny by CAV Ice Protection representatives, their Customers or relevant Airworthiness / Aviation Authorities. They shall be retained for a minimum period of seven years, or longer if required by contract and **in no case are they to be disposed of without the prior written approval of the CAV Ice Protection Quality Manager**, On expiry of the **Seven year** period, the Supplier is required, if so instructed by CAV Ice Protection to deliver designated records to the CAV custody.

15.2 Archiving of Records

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Records should be archived in a safe and secure environment appropriate for the storage of paper documents. If agreed in advance then electronic archiving may be permissible subject to the agreement of the CAV Ice Protection Quality Manager. Archiving of records, which are consigned from hard (paper) copies to microfilm/microfiche or electronic media (scanned images etc.), must be carried out in accordance with appropriate National Standards, e.g. BS 6498, acceptable to CAV Ice Protection and the Airworthiness Authorities. The continued integrity of archived records will be subject to review by the Supplier's internal quality audit function

16.0 Production Paperwork

The supplier shall ensure that production paperwork is created. This shall be detailed enough to communicate the engineering requirements to the manufacturing operatives. The production paperwork shall clearly indicate the status of a job at any particular time and shall also provide evidence of the inspection status of the items. This paperwork shall accompany the items at all times.

Any changes to production paperwork shall be reviewed in relation to the requirements of clause 4.0 of this document.

The production paperwork shall be sufficient to allow retrospective review of the sequence of manufacturing operations with times and dates as required.

17.0 Calibration

All tools and gauges used to verify conformance of items to be shipped to CAV Ice Protection shall be logged and subject to regular calibration. This calibration shall be in accordance with and traceable to the relevant National Standards.

18.0 Product ID and Traceability

All product for shipment to CAV Ice Protection shall be identified and traceable at all times. This shall include traceability to the individual batch / lot of raw material from which the goods were manufactured.

Traceability shall be sufficient to identify the following:

- Identification throughout the product life
- All product manufactured from a single batch of raw material.
- All product from the same manufacturing batch.
- The destination (delivery, scrap etc.) of all items of a batch.
- For assemblies the identities of all components used.

Where CAV Ice Protection send multiple batches of components to a sub-contractor for any further processing the individual batch identities of these

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components shall be retained throughout processing and the subsequent shipment of the components back to CAV Ice Protection.

19.0 Document Control

The supplier shall maintain a register of all drawings, specifications and other Engineering documents which are required for the supply of goods to CAV Ice Protection. This shall include, as a minimum a record of the issue status and controlled locations.

20.0 Right of Access

CAV Ice Protection representatives, customer representatives and representatives of the relevant Airworthiness Authorities shall be permitted access to the supplier's site as and when required.

21.0 Drawing, Model and Specification Issues

Drawing, Model and Specification issues will only be called up on CAV purchase orders where they differ from the current issue. If no issue is called up manufacture and processing shall be to the latest issue of the relevant CAV, customer or industry specification.

22.0 Anti-counterfeit

CAV Ice Protection adopts anti-counterfeit measures in order to eliminate the impact of counterfeit products on our customers.

To support these measures, CAV requests that its suppliers maintain appropriate processes to ensure purchases are only made from reputable sources approved by the supplier.

Should any suspected counterfeit parts affecting CAV supplies be identified by the supplier, the supplier should quarantine such parts immediately, and report any suspected counterfeit items to the CAV Quality department, along with any appropriate authorities, as soon as possible.

Appendix 1: C of C requirements

1.0 Introduction

All aerospace materials and supplies shall be released and conveyed under cover of the correct form of release document, ie a Certificate of Conformity, Approved Certificate, Release Certificate, etc as appropriate and as requested by the CAV Ice Protection purchase order.

2.0 Documentation

All Certificates of Conformity shall have

- a A unique serial number
- b The name and address of the supplier
- c A full and comprehensive description of the relevant consignment which shall

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- include the following minimum information
 - i Order Number
 - ii Part Number
 - iii Specification
 - iv Description of Goods (including material condition, manufacture/cure date/s, etc as applicable)
 - v Serial Numbers (if any)
 - vi Batch Numbers (where applicable)
 - vii Quantity
- e A certifying statement
- f Signature of an approved signatory

- 2.1 Attention shall be drawn to any item which does not fully meet the requirements of the order, drawing or specification, etc by means of suitable endorsements on the release documentation. Further, relevant information/data shall be transmitted in the same way.

Examples of circumstances/data requiring endorsement include, but are not limited to, the following

- 2.1.1 Additional requirements as requested by the purchase order
- 2.1.2 Condition of supply requirements.
- 2.1.3 Concession number granted.
- 2.1.4 Non-conforming items subject to further work after delivery.
- 2.1.5 Items with shortages or work outstanding
- 2.1.6 Reference to documents sent with the goods (eg First Article Inspection Reports).
- 2.1.7 Where CAV Ice Protection have supplied free issue material, the supplier's release certificate for the end product shall quote the relevant CAV Ice Protection material batch number on the release certificate.
- 2.1.8 When items are re-released following rejection the by CAV Ice Protection the CAV Ice Protection Reject Note number shall be stated on the release certificate.

3.0 Direct Delivery Authorisation

Suppliers receiving purchase orders from CAV Ice Protection requesting delivery to another supplier or direct to the CAV Ice Protection customer shall send a copy of the release paperwork to the CAV Ice Protection as notification of shipment to an address other than CAV Ice Protection

4.0 Approved Signatories

- 4.1 All release certificates shall be signed by the supplier's Quality Manager or his authorised nominee.
- 4.2 Personnel authorised to sign release certificates shall be listed in an appropriate authoritative document.