Quality Assurance Manual (QAM)

Dokument: QAM
Revision: d00

	Name / Responsibility	Signature	Date
Generated	Duck Tape		
	QM		
Approved	Duck Duckling		
	AM		

Revision Log

Rev.	Description	Date
00	complies with AMC-ELA to 21.G as on the day of issue	2017-05-24

Table of Contents

1. General

21.A.139(a);

ASTM F2972-14, 4.2

This manual defines the binding operating principles of Ducklings, Ink. (“the company”). This QAM defines the Quality Assurance System (QAS) required to comply with ASTM F2972, and required to qualify for Production organisation Approval (POA) in line with EASA Part 21 Subpart G.

The extent of the documentation of this QAM is consistent with the complexity and type of the Company, with the complexity of the procedures, and with the competency of it’s staff and employees.

2. Organisational Aspects

2.1. Scope and Approval

2.1.1. Organisational Context

21.A.133(a), (b), (c); 135; 139(b)1.(ix); 21.A.145(b); 21.A.165(e), (f), (g);

The Scope of Work of the company exclusively covers aircraft within the scope of AMC-ELA to 21.G.

The design section of the company holds or has applied for approval of Type Design of (a) relevant product(s).

Design and production entity of this company work within one consolidated team. Considering the limited extent and complexity of the undertaking when producing aircraft within the scope defined by AMC-ELA No. 1 to 21.A.131, this ensures effective coordination between design and production with respect to information flow, availability of current design data, availability of all necessary airworthiness, noise and exhaust emission data, and coordination with respect to airworthiness matters.

Duties not specified within this QAM are consequently provided by staff working to the Design Organisation requirements.

2.1.2. Approval and Conditions

21.A.149; 21.A.159; 21.A.163

Approval of the Production Organisation on the basis of AMC-LA to EASA Part 21 Subpart G entitles the company to:

- Produce product and spare parts as identified in the Scope of Work of the POE;
- obtain an aircraft certificate of airworthiness and a noise certificate for complete aircraft produced by the organisation, without further showing and upon presentation of a statement of conformity (EASA Form 52);
- issue authorised release certificates (EASA Form 1) for spare parts produced by the organisation without further showing;
- maintain a new aircraft that it has produced as necessary to keep it in an airworthy condition and issue a certificate of release to service (EASA Form 53) in respect of that maintenance;
- Issue a Permit to Fly for an aircraft that it has produced for the purpose of production acceptance test flights, based upon Flight Conditions generated for this purpose as part of the approved Type Design, and when the Production Organisation is controlling the configuration of the aircraft and is attesting conformity with the design conditions approved for the flight.

The production organisation approval remains valid unless:

- the Competent Authority (CA) is prevented to perform its investigations; or
- A positive finding by the CA of:
  - an uncontrolled non-compliance with type design data affecting the airworthiness of product part or appliance
  - an incident/accident identified as caused by the manufacturer
  - a lack of effective and timely response to prevent a recurrence of the points above.
- the manufacturer stops producing products or related spare parts; or
- the manufacturer cannot ensure any more a satisfactory coordination between production and design

Upon surrender or revocation, the certificate will be returned to the CA.

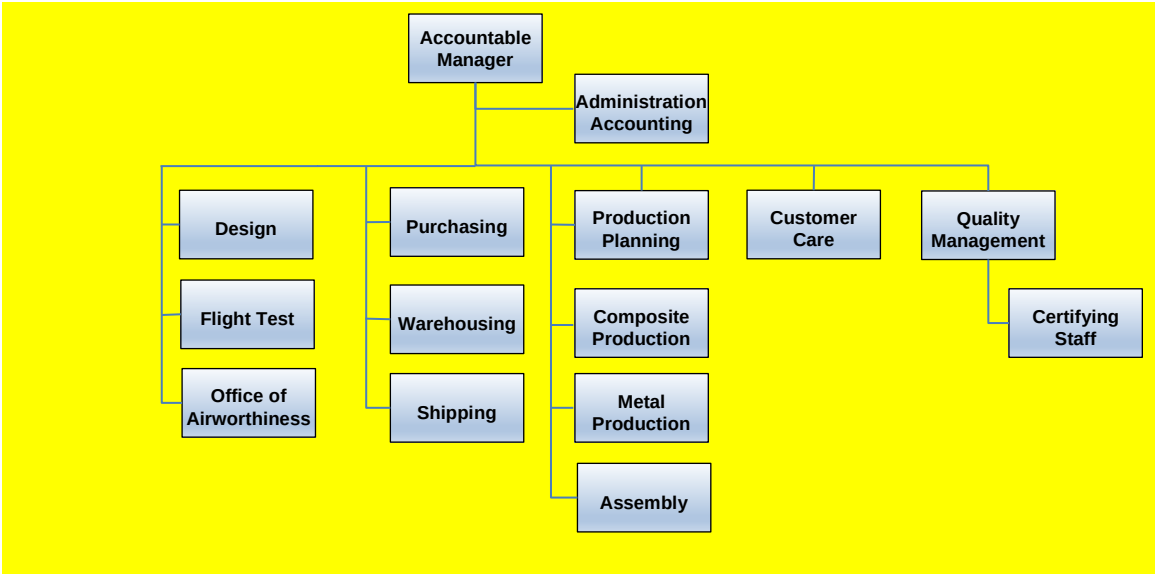
Transfer of approval is only possible in cases where the ownership changes but the organisation itself remains effectively unchanged. Such changes in ownership of manufacturers with products within the scope of AMC-ELA No. 1 to 21.A.131 are not considered to be significant changes to the quality system, and do not require separate oversight measures. Possible effects will be addressed at the subsequent regular oversight activity.

2.2. Resources

2.2.1. Organisation, Staff and Roles

21.A.145(a), (c);
AFTM F2972-14 4.3; 4.3.1

The overall company organisation is established as follows:



Associated staff is identified in Appendix I to this QAM. The Accountable Manager (AM) is in addition identified to the relevant CA using EASA Form 4.

On the basis of the limited size and complexity of the undertaking, all delegation of duties leaves the responsibility with the AM. All interaction with the authority is coordinated through the AM.

It is in the responsibility of the AM to ensure adequate resources with respect to number and qualification. Adequacy is continuously monitored by the AM as part of regular quality meetings and lessons learned sessions, supported by review of logged working hours.

2.2.2. Certifying Staff

21.A.139(b)1.(xi); 21.A.143(a)5.; 21.A.145(d);
ASTM F2971-14, 4.3.3, 12.1; 12.2

The manufacturer declares to issue nomination of Certifying Staff on the basis of a valid national maintenance inspection license class 3, obtained on the basis of the regulations defined by Commission Regulation (EU) No. 2042/2003, implemented by national regulations. Alternatively, L-License with “full subgroup rating”, as soon as Part-ML is active. Qualification to conduct type inspections is ensured by in-house introduction of the qualified inspector to all details of the type design and type specific production processes, when defined as part of the approved Type Design. Qualification basis of certifying staff is documented and archived by the manufacturer.

Nominated Certifying staff is identified in Appendix I to this QAM showing:

- Name
- Type and scope limitations, if applicable,
- authority to issue conformity or release certificates (EASA Form 1, Form 52 or Form 53; as adequate).

Appendix I explicitly identifies those persons that are authorized to attest compliance of LSA aircraft to the applicable standards. Those persons have received a standards training program as defined in ASTM F2971-14, Section 12.1 by either method identified in ASTM F2971-14, Section 12.2. Evidence of training is documented and held available.

Appendix I is made available to all relevant employees, so that the relevant Certifying Staff can be identified, whenever required.

2.2.3. Infrastructure

21.A.139(b)1.(xv); 21.A.145(a);

The major place of activity where the products are completed and checked out is:

Ducktale 1,
007 Ducks Ford
EASA-Land

It is in the responsibility of the AM to ensure adequate infrastructure with respect to applied technologies and production rate. Adequacy is continuously monitored by the AM as part of regular quality meetings and lessons learned sessions, supported by review of recurring quality issues and observed non-conformities.

When conducting work by PO staff but at a different location than normally used, measures are taken to ensure an equivalent quality of the work result. This includes consideration of the critical environmental parameters for the work to be provided, ensuring adequate tooling comparable to the one used in regular production, and ensuring equivalent inspection possibilities.

2.3. Changes to the QAM

21.A.147(a); 21.A.148; 21.A.153;

All changes to the Quality System are developed and implemented in a coordinated way under the responsibility of the AM. The AM ensures that changes in response to changes in the applicable regulations imposed by EASA or CA are implemented in a timely way.

Changes are only to be approved by the CA before implementation when related to:

- Relocation of the major place of activity where the product is completed and checked out to a different airfield;
- Changes in scope of approval.

Those changes are applied for by the AM at the relevant CA using the most recent forms provided for this purpose by the CA.

In all other cases the AM submits a copy of the updated QAM duly in advance of the subsequent surveillance activity of the CA, so that the effects may be addressed during the next surveillance.

2.4. Monitoring of the Quality System

21.A.139(b)1.(xiv); 21.A.139(b)2.; 21.A.165(b);

ASTM F2972-14, 11;

Monitoring of compliance with, and adequacy of the implemented quality system is done by structured means following a schedule created by the QM. The means may include experience exchange, lessons-learned-sessions, project reviews or internal audits, either one at reasonable phases of company or project development. At least one full assessment of the overall Quality System is scheduled prior to delivery of a new model, and from thereon on a yearly basis.

Monitoring activities are organised by QM. The AM shall be part of those sessions, or obtain direct information about the results so as to enable him to require improvements to the implemented system, when necessary. It is the responsibility of the AM to initiate adequate corrective action in cases of non-conformities with the obligations defined by this manual, that are likely to result in nonconforming products or that endanger the safe operation of the aircraft. The QM is responsible to keep records of monitoring conducted, and resolution of non-conformities.

2.5. Authority Oversight

2.5.1. Investigations

21.A.157;

The manufacturer agrees to cooperate with CA during its investigations at the location of the manufacturer, and gives the necessary access to facilities, staff and information relevant to demonstrate conformity of the product to the approved Type Design.

Authority investigation will be based upon the assessment of products produced under the approved scope, and will verify conformity with the type design and condition for safe operation. Monitoring, witnessing, checks, flight and ground tests may become part of the investigation when non-conformities to the Type Design are identified that have the potential to endanger safe operation of the product.

Investigations are only extended to subcontractors or suppliers in those cases, where the approved Type Design requires to exercise direct supplier supervision, performance assessment and extension of quality assurance methods due to the nature of the involved processes and lacking detectability of critical aspects after receipt of a part.

2.5.2. Findings

21.A.158(a), (b), (c);

The CA may raise findings in case of non-conformities to the Type Design are identified that have the potential to endanger safe operation of the product. Depending on the severity of the identified situation, the CA will classify these findings as Level 1, 2 or 3.

An uncontrolled non-compliance with applicable design data is a non-compliance that:

- cannot be discovered through systematic analysis; or
- prevents identification of affected products, parts, appliances, or material.

Only when such a non-compliance has effect on the condition of the aircraft and objective evidence has been found that this finding does affect the safety of the aircraft, this finding may be classified as Level 1.

An item where objective evidence is present for potential future problems that could lead to a non-compliance of Level 1 or Level 2 may be classified as Level 3.

All other findings are Level 2.

The manufacturer understands that corrective action to findings is to be implemented as follows:

- Level 1: no more than 21 working days after written confirmation of the finding;
- Level 2: no more than 3 months after written confirmation of the finding;
- Level 3: no timeline associated.

3. Quality System

21.A.139(a);

ASTM F2972-14, 4.1; 4.3; 4.3.1; 4.3.2;

The Quality (Assurance) System defines the key workflows that are required to ensure conformity of delivered products to the applicable design data and a condition of the product that allows safe operation.

The Quality System defines key responsibilities for the determination of conformity with the applicable design data.

Notwithstanding his responsibility, the AM delegates the duties of definition, implementation and maintenance of the QS to QM. AM charges Quality Management and Certfying Staff with the implementation of the Quality Assurance System, thus together forming the Quality Assurance Administration.

Definition of the elements of the QS is done within this manual, by declaration of the principles applied. As suitable, details may be enhanced by flow charts for individual activities, outside of the formal manual. The affected section of the company is responsible to ensure that this detailing meets the commitment provided here.

3.1. Control of Documented Information

21.A.139(b)1.(i), (x); 21.A.139(b)1.(x); 21.A.165(h);

Document control is ensured by workflow management being part of the IT based Document Management System (DMS). The workflow ensures revision management, adequate document approval and adequate document access to employees on the basis of defined user authorizations. Adequate backup procedures are in place that ensure safe copies of the database at a separate location.

This commitment applies to all documented information related to this QMS, especially to those of relevance for the production of conforming and safe products, including records, and to the applicable Type Design.

3.2. Supplier Control

21.A.139(b)1.(ii); 21.A.139(b)1.(iii);

ASTM F2972-14, 7.2; 7.3; 7.5; 10;

Purchasing is conducted in a structured way and on the basis of the complete specification and requirements for all items as specified within the approved Type Design.

Direct supplier supervision, performance assessment and extension of quality assurance methods is only applied when explicitly required by Type Design due to the nature of the involved processes and lacking detectability of critical aspects after receipt of a part. For

the products currently to be produced within the Scope of Work, no components are obtained from external sources where direct supplier supervision or assessment is required.

The manufacturer accepts the risk of delays in deliveries due to faulty supplies and declares that production of a specific product serial number will be suspended until conforming components are available.

3.3. Incoming Goods Inspection

21.A.139(b)1.(iii); 21.A.139(b)1.(viii);
ASTM F2972-14, 8.3; 8.4;

Incoming goods verification is limited to those aspects defined as part of the approved Type Design, and directly follows the acceptance criteria for supplied components defined as part of the approved Type Design. Where later production steps provide implicit verification of defined aspects, such as for example with respect to form and function of components, verification of these aspects can be deferred to this later stage, either by definition of the Type Design, or by decision of the manufacturer.

The manufacturer accepts the risk of delays in deliveries due to faulty supplies detected only at a later stage and declares that production of a specific product serial number will be suspended until conforming components are available.

Conforming items are either distributed for immediate use, or placed in the relevant controlled stock area. Nonconforming items remain separated until clarification on further handling is achieved.

3.4. Identification and Traceability

21.A.139(b)1.(iv);
ASTM F2792-14, 7.4;

All material, articles and components on stock or in production, and intended to be used upon products within the scope of this QAM, are properly identified, by reference to the part number or material specification, as applicable.

The manufacturer follows the definitions for identification provided as part of the approved Type Design. The manufacturer does not apply marking beyond this level. Traceability is ensured by identification of each material on stock, completed part or part in process through the IT based ERP system. Definition of method of traceability is provided by the approved Type Design. Identification is done by labels with barcodes, with the labels applied directly to the part, or stored together with the part in case of bulk or small goods.

3.5. Manufacturing Processes and Production Planning

21.A.139(b)1.(v), (x);
ASTM F2972-14, 6.2.2, 6.3

For the types covered by the Scope of Work, all manufacturing process information for those aspects where strict process adherence is imperative in order to ensure safety critical product characteristics is defined as part of the approved Type Design in its relevant revision at the date of production of an aircraft, or by standard established process information.

The manufacturer conducts production planning where all working steps are allocated to staff and working locations that meet required minimum characteristics, if applicable.

Work orders are issued within the IT based ERP system. The work orders include reference to the required configuration in its applicable revision and to all required records for that working step. Production staff records begin, completion and result of each working step within that system.

3.5.1. Critical Parts and Special Processes

21.A.139(b)1.;

ASTM F2972-14, 5.2; 6.4

By definition of the applicable Certification Specifications for those products within the Scope of Work of this company, there are no Critical Parts.

However, regardless of this general definition, the company considers the following components as important to the structural integrity of the aircraft:

- Wing strut and its attachment means

For these components tighter inspection and documentation requirements are defined as part of the Type Design.

The following processes are considered to be critical to the structural integrity of the products produced and are therefore treated as Special Process:

- Production of primary composite structural components, including:
  - mixing of resins;
  - impregnation;
  - layup;
  - vacuum bagging;
  - curing;
  - bonding;
  - post curing.
- Welding of the Strut Assembly

The special processes are performed in accordance with process specifications that are approved as part of he Type design.

3.6. Inspection and Testing

21.A.139(b)1.(vi); 21.A.139(b)1.(x);

ASTM F2972-14 7.1; 8.1;8.2; 8.6;

Control procedures are in place so that parts and products are in accordance with the applicable specifications, including materials and processes. The scope and sampling rate of inspection, testing and final acceptance flight testing is defined as part of the approved Type Design data. This includes definition of checklists and records, case dependent in generic or specific form. The manufacturer defines conduct of these steps during production planning. The manufacturer does not go beyond these verification methods.

The IT based ERP system ensures that subsequent working steps may only be started, when previously required inspections have been positively conducted and are approved by the adequately qualified Certifying Staff, with records completed. The current level of verification of a product can be identified through the ERP system.

3.6.1. Quality Assurance Records (QAR)

ASTM F2971-14, 5.1; 5.2

The manufacturer maintains Quality Assurance Records for each completed aircraft. Records that are defined by the Type Design include, but are not limited to:

- Records of workstep completion;
- Records of completed inspections and tests;
- Records of traceability of materials for components critical to the aircraft structural integrity;

The QAR is completed with:

- Copies of statements of conformity or compliance;

- Records of aircraft configuration at its point of obtaining declaration of conformity or compliance, and at delivery, if different.

3.7. Calibration of Jigs and Tools

21.A.139(b)1.(vii)

The approved Type Design identifies those production steps where ensuring of high accuracy is required. The manufacturer has identified the related jigs, tools and test equipment that is required to ensure this accuracy. Calibration is ensured for this equipment, following practices in compliance with typical national or international calibration standards.

3.8. Nonconforming Item Control

21.A.139(b)1.(viii)

ASTM F2972-14, 8.5; 9;

Every employee is instructed to identify potentially nonconforming items, or conditions of parts or components that may affect the safe operation of the product, to the relevant certifying staff. The certifying staff is responsible to identify the affected part of component as non-compliant until further clarification.

Clarification is obtained by the Material Review Board (MRB) under control of the relevant certifying staff by involving design, production specialists and AM, as suitable. The result of the clarification can be:

- Rework of the component to an existing standard process. This may be decided by the relevant certifying staff together with the affected production section.
- Rework of the component to a specific process. This may be decided by the relevant certifying staff together with design and requires design approval following the applicable Design Organisation workflow.
- Scrapping of the component. The relevant certifying staff is required to locate the component in a dedicated stock area. Warehousing is required to destroy and scrap the component in a timely way.

Permanent records are held showing the disposition of nonconforming items hat have been evaluated by the MRB,

3.9. Airworthiness Release Documents

21.A.139(b)1.(xii); 21.A.165(c), (i);

Airworthiness Release Documents are issued following the format and filling instructions provided by EASA, implemented by the relevant CA. The Certifying Staff that intends to fill a certificate is instructed to obtain the latest form, as applicable.

The certificate may be issued when the following is verified and appropriately documented:

- A completed aircraft conforms to the applicable design data being part of the approved Type Design, has been subjected to necessary maintenance and is in condition for safe operation (Form 52); or
- parts or appliances are complete and conform to the applicable approved design data (Form 1) or non-approved design data (Form 1 “conformity only”), and are in a condition for safe operation (Form 1).

Airworthiness Release Documents are signed by the AM.

Originals of Airworthiness Release Documents are supplied with the product or component to the customer. Copies are maintained by the manufacturer for documentation purposes.

3.10. Handling, Storage and Packing

21.A.139(b)1.(xiii);

Materials, parts, components and products are stored in a way:

- to minimise the possibility for deterioration;
- to maintain the possibility for identification;
- to maintain the possibility for traceability, when defined as required by the approved Type Design.

Components requiring special care are electronic components, instruments susceptible to humidity, chemicals that may have temperature limitations, fabrics that may have humidity and UV radiation limitations and limited permissible storage times.

It is the duty of warehousing to run recurring stock inspections for adherence to the above listed items.

When shipping parts, components or products it is in the responsibility of shipping to ensure adequate packing in order to reasonably safeguard the delivered items. This includes at least consideration of:

- Use of adequate shipping boxes;
- adequate padding;
- adequate protection against electrostatic charge;
- adequate protection against humidity.

3.11. Maintenance of Completed Products

21.A.139(b)1.(xvi);

The manufacturer is conducting maintenance to aircraft that have been completed and when conformity to the Type Design has been declared, up to the point of delivery of the aircraft to the initial customer and subsequent initial regular registration of the aircraft, in order to maintain the aircraft in a condition for safe operation.

Examples of such maintenance activities are:

- Preservation, periodic inspection visits, etc.;
- embodiment of a Service Bulletin;
- application of airworthiness directives;
- repairs;
- maintenance tasks resulting from special flights;
- maintenance tasks to maintain airworthiness during flight training, demo flights and other non-revenue flights.

Maintenance is conducted by the production staff that is dealing with the affected components during production, following production or maintenance instructions issued for the affected component or product as part of the Type Design or relevant ICA.

Maintenance activities are recorded in the relevant aircraft specific documents and signed off by certifying staff for attesting the conformity of the work to the applicable airworthiness data.

3.12. Factory Acceptance Test Flights

21.A.139(b)1.(vi); 21.A.139(b)1.(xvii); 21.A.165(j), (k);

Production Acceptance Flight Test is conducted using the Flight Test Plan and Flight Conditions that both have been approved as part of the type design. The flight conditions form the FTOM in relation to this purpose and therefore include all relevant information related to:

- The required flight test work flow;
- method to issue the permit to fly;
- composition, competency, currency and flight time limitations of the crew;

- definitions for the carriage of persons other than crew members and for flight test training, when applicable;
- specifications for risk and safety management and associated methodologies;
- procedures to identify the instruments and equipment to be carried;
- definition of documents that need to be produced for flight test.

Obtaining Permit to Fly is under the responsibility of the Certifying Staff with permission to issue conformity certificates. Before preparing the PtF, it is the duty of the Certifying Staff to verify that:

- The intended Factory Acceptance Test Flight meets the definitions of the Flight Conditions;
- call sign is registered with the relevant CA;
- radio operation permission is present;
- transponder Mode S registration is present;
- liability insurance is present;
- configuration of the aircraft matches the definitions provided by the flight conditions;
- deviations are verified to be acceptable and not invalidate the flight conditions;
- other conditions imposed by FC are complied with (such as required ground tests, system tests, etc.).

The AM may issue the Permit to Fly under privilege of the Production Organisation. After positive completion of the factory acceptance flight test and when issuing the conformity declaration, the PtF is withdrawn.

The Certifying Staff ensures that a copy of the PtF is submitted to the relevant CA, and that the CA is informed about revocation, latest within three days of issuing or revocation of the PtF.

When in need for Permit to Fly for other purposes, the manufacturer is obtaining approval of Flight Conditions from EASA, possibly involving Design Organisation, and approval of the Flight Conditions from the relevant CA for the call sign used.

Document Management

1. Purpose:	Provision of the QAM per 21.A.139(b) using AMC-ELA; ASTM F2972
2. Objective:	Ensuring production of products, parts and appliances in confomity with applicable design data
3. Process Owner:	Accountable Manager
4. Inputs:	Type Design, Airworthiness Data
5. Outputs:	Products, parts and appliances in confomity with applicable design data
6. KPI:	Not applicable
7. Interfaces:	Design Organisation, Competent Authority

Normative References	
Annex I of the Commission Regulation (EU) 748/2012 (Part 21), as amended by Regulations (EU) Nr. 7/2013, 69/2014, 2015/1039	
Sections:	Subpart G
ASTM F2971-14	
Sections:	All sections
Associated Documents	
	- none -
Literature	
Annex I of the Commission Regulation (EU) 748/2012 (Part 21), as amended by Regulations (EU) Nr. 7/2013, 69/2014, 2015/1039	
Sections:	AMC-ELA to Subpart G

Terms and Definitions

Not applicable	Not applicable

Abbreviations

AM	Accountable Manager
AMC	Acceptable Means of Compliance
CA	Competent Authority
CS	Certifying Staff
DMS	Document Management System
ERP	Enterprise Resource Management
FC	Flight Conditions
FTOM	Flight Test Operations Manual
FTP	Flight Test Plan
FTP	Flight Test Plan
ICA	Instructions for Continued Airworthiness
LA	Light Aircraft
LSA	Light-Sport Aircraft
MRB	Materials Review Board
PO	Production Organisation
POA	Production Organisation Approval
POE	Production Organisation Exposition
PtF	Permit to Fly
QAM	Quality Assurance Manual
QAR	Quality Assurance Record
QM	Quality Management

Appendix 1 – List of Nominated Staff

Funktion / Scope Limitations (if any)	***Name***	***Nomination***		***Authority***	***F4***
		starts	***ends***		
Accountable Manager	Duck Duckling	1.1.17	n/a	n/a	X
Quality Manager	Duck Tape	1.1.17	n/a	n/a	-
Certifying Staff / Composites	Resin Hardener	1.1.17	n/a	-	-
Certifying Staff / Metals	Alu Steel	1.1.17	n/a	-	-
Certifying Staff / Systems, Final Assembly	Fuse Brake	1.1.17	n/a	-	-
Certifying Staff / unlimited	Master Inspect	1.1.17	n/a	F1, F52, F53	-