



Supplier Quality Manual

Bladon Micro Turbine

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1. FOREWORD

Bladon Micro Turbine (hereinafter referred to as BLADON MT) operates in a highly competitive environment. To be successful, it is essential to pursue continuous improvement to the quality of our products and services.

It is recognised that safety, quality, environment, productivity, cost effectiveness, efficiency and reduction of waste are essential in achieving BLADON MT's goals and that suppliers (of materials, products or services to BLADON MT) play a major role in meeting the requirements.

BLADON MT intends to establish long term relationships with suppliers who share these values and seek to encourage relationships so that continuous improvements may be pursued for mutual benefit.

Copies of this document will be issued to specific suppliers through the BLADON MT quality/supply chain department. Future revisions of this document will be posted on the BLADON MT website; therefore, suppliers should ensure they conduct periodic reviews of the BLADON MT website to ensure they are working in accordance with the latest version.

This Supplier Quality Manual sets the rules, standards and requirements for all production suppliers to meet and will be applied when screening new suppliers.

2. POLICY

It is BLADON MT's policy to procure supplies and services from suppliers who gain BLADON MT's approval by demonstrating that their quality system consistently meets the quality requirements specified in this document.

All communication, written and verbal, between both parties shall be in English.

BLADON MT has an expectation of ZERO DEFECTS on all products and services delivered from the supplier.

It is BLADON MT's objective to progressively introduce a ship to stock policy, where goods delivered by suppliers are all of an acceptable quality standard, meeting the requirements and are suitable to go straight to stores with zero verification.

In line with our ZERO DEFECTS objective the supplier (including its sub-tier suppliers) is required to:

- a) Demonstrate compliance with:
 - 1 Design, performance, reliability and applicable legal requirements
 - 2 Process controls and capability requirements
 - 3 All provided drawings, specifications and requirements.

- b) Explicitly review and understand all requirements provided to the supplier concerning BLADON MT's products and ensure appropriate resources are available to participate in product quality planning as requested.
- c) Establish a change control system that reacts to changes in a timely and accurate fashion. In all cases, acquires written approval from BLADON MT prior to implementing any change that is detailed in section 15 (Request for Change)
- d) Measure their own performance on all given and agreed Key Performance Indicators (KPI's) from BLADON MT
- e) BLADON MT recognizes that suppliers providing items such as traded goods, catalogue parts and services, may not be able to meet all the requirements of the Supplier Quality Manual. Any exception or deviation to the requirements, terms and conditions of this manual require an addendum where the exceptions are documented.

3. SUPPLIER MANAGEMENT SYTEMS AND COMPLIANCE

The supplier must maintain an effective documented quality management system that communicates, identifies, coordinates and controls all key activities necessary to design (if applicable), develop (if applicable), produce, deliver and service products and services to BLADON MT.

The supplier shall be certified/registered to one of the following international quality management standards by a recognised, independent and accredited third-party certification/registration body:

- a) ISO 9001 Latest release
- b) IATF 16949 Latest release
- c) AS 9100 Latest release
- d) VDA 6.3 Latest release

If the supplier does not hold a third-party certification, BLADON MT will audit the supplier's QMS as necessary to verify conformance to BLADON MT expectations, until one is in place.

The supplier shall notify BLADON MT if their registration expires and shall send an updated copy of the certificate each time it is renewed within 2 weeks after having received it.

The supplier shall notify BLADON MT if there is any threat to, or removal of their certification

4. BLADON MT SUPPLIER QUALITY AUDITS

BLADON MT reserve the right as part of the initial supplier approval process to either conduct a site assessment audit or request the supplier completes a self-assessment. If a supplier fails to achieve an acceptable score this may require a recovery plan or may result in a supplier being rejected.

Ongoing, BLADON MT is always entitled to audit the supplier with reasonable notice. During this audit, supplier shall grant access to all facilities, supply chain, staff and BLADON MT documents relevant for the audit. Any exceptions are to be agreed in advance with the lead auditor.

There may be times where audits of the manufacturing process, product or technology will be needed due to continuous improvement requirements, projects, or non-conformances. Where these cases exist, specific audits will be conducted at the supplier's facilities and supply chain.

5. PRODUCTION

The elements listed in 5.1 are used by BLADON MT to demonstrate that all BLADON MT engineering design record and specification requirements are properly understood by the supplier and that the process has the potential to produce product consistently meeting these requirements during an actual production run at the quoted production rate.

It provides BLADON MT with evidence that:

- a) Component suppliers have understood the requirements
- b) The product meets the customers' requirements
- c) The production process is capable of consistently producing conforming product.

Submissions shall be made in accordance with BLADON MT Supplier Quality Assurance (SQA) requirements (electronic/hard copy) and approved by BLADON MT before start of serial production.

For volume production, unless otherwise agreed with BLADON MT in writing, suppliers shall not manufacture or ship any products, until full or interim approval is received from BLADON MT through a Part Submission Warrant (PSW). In cases where full approval is not granted, BLADON MT will advise the supplier of the areas of concern and may issue a concession for a specific period of time or the manufacture of a specific batch size/quantity. The supplier shall make corrections accordingly and resubmit the PSW and any required documentation.

The supplier shall submit the specified documentation, according to BLADON MT requirements, to the authorised supplier quality representative or Head of Quality as communicated to the suppliers.

All dimensions, specifications, standards stated or referenced on the BLADON MT 2D drawing shall be evaluated and the results/confirmation of compliance documented in the dimensional, material and performance tabs of the submission and the appropriate evidence included.

After approval the supplier shall not make any changes to the product or process, without approval from BLADON MT. In case of such a need for change, the supplier shall refer to the required process for change request (refer to section 15 Request for Change).

5.1 Production Part Quality Submission Requirements:

From the following list of elements, the requirements by part number or family of parts will be defined by BLADON MT in accordance with the below table.

Critical Supplier Rank		Audit Requirements		NPI Requirements	
Supplier Rank	Criteria	Certification Requirements	Audit Requirements	APQP	PPQS / PSW
A	Bespoke parts - Critical components	ISO 9001 (Required)	Site Audit (Required)	Y	Lvl 3
B	Bespoke parts - Non-critical components. E.g (COTS 6.1)	ISO 9001 (Required)	Self Assessment (Required)	N	Lvl 4
C	Class C Fastners / Proprietary	ISO 9001 (Preferred)	Self Assessment (Preferred)	N	Lvl 1
D	Other - E.g. Special one off / reworks / samples / etc.	N/a	Self Assessment (Preferred)	N	Lvl 4
E	Indirect Suppliers	N/a	N/a	N/a	N/a

The defined list shall be kept live for the life of the product. Specific templates will be provided where required by BLADON MT

Level Criteria	Required	No Elements
PPQS Checklist Level 1	PSW/CofC	1
PPQS Checklist Level 3	PSW	15
	AAR	
	Samples	
	Control Plan	
	ISIR (Dims)	
	Material certs + Testing Certs	
	CAP Study	
	MSA	
	Design Records	
	Lab Scope + Accreditation	
	Process Flow	
	PFMEA	
	Run at Rate (When Requested)	
	Packaging	
	Customer Specifics	
PPQS Checklist Level 4	PSW	6
	ISIR (Dims)	
	Material certs + Testing Certs	
	Design Records	
	Process Flow	
	Packaging	
*Note not all elements will always apply. Supplier to liaise with BMT Quality team, after PO.		

5.2 Master Samples (samples from PPQS run)

The supplier shall:

- a) Provide the required number of sample components, as specified on the purchase order. All products are to be produced consecutively during the supplier's run at rate event (If applicable)
- b) Complete the dimensional analysis and performance test reports, as required along with the required master samples
- c) Retain master samples for the same period as the submission records, unless otherwise agreed with BLADON MT
- d) Identify the master samples as such and with a label or marking containing the BLADON MT approval and date

5.3 Special Characteristics

Critical Characteristic (CC)

Any design characteristic for which reasonably anticipated variation could impact, contribute or cause any of the following:

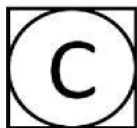
- a) Non-compliance to any regulatory requirement
- b) Potential degradation of safety to all parties
- c) Environmental Impact

Significant Characteristic (SC)

Any design characteristic for which reasonably anticipated variation is likely to significantly affect performance of the product (such as its fit, function, mounting or the ability to process or build the product), contribute or cause any of the following:

- a) Non-compliance to customer requirements
- b) Non-compliance to legislation/regulation requirements (non-compulsory legislation/regulation and non-safety related)
- c) Increase in warranty claims
- d) Export requirements
- e) Process variability

All CC/SCs are identified by the defined drawing call outs below:



Critical Characteristic



Significant Characteristic

It is the responsibility of the supplier to include all special characteristics and special process characteristics (as defined by the supplier) in the PFMEA and control plan.

When a significant/critical characteristic is identified, an acceptable level of process capability must be established prior to submission to the customer or from a sub-supplier.

Significant/critical characteristics require the use of on-going statistical process control, process capability must exceed the following:

Critical characteristics - $CPK \geq 1.67$

Significant characteristics - $CPK \geq 1.33$

Refer to the latest version of BJL0000313 for details.

5.4 Measurement System Analysis (MSA) Studies

Gauge repeatability and reproducibility (gauge R&R) is a methodology used to define the amount of variation in the measurement data, due to the measurement system.

A gauge R&R and MSA is required by BLADON MT for all gauges that are used to monitor Significant/Critical Characteristics.

Gauge R&R	Status
$GR\&R \leq 10\%$	The Measurement System can be approved
$10\% \geq GR\&R \leq 30\%$	The Measurement System can be approved if BLADON MT accepts, in writing, the measurement uncertainty. Corrective actions may be required
$GR\&R \geq 30\%$	The Measurement System cannot be approved

5.5 Failure Mode and Effects Analysis (FMEA)

When specified on the submission checklist (5.1) the supplier is required to develop a Process FMEA and submit to BLADON MT for approval. The FMEA is a living document and shall be revised as changes are made to the process or when quality issues are found. FMEAs shall be reviewed and updated as part of the non-conformance process as defined in section 6 of this manual.

5.6 Control Plan

The supplier shall prepare a control plan based on the PFMEA/process flow for the complete process. The control plan shall detail the control and inspection activities that have been implemented to ensure conformity to drawings and specifications. Special characteristics shall be marked accordingly.

The control plan is to be identified by part number and revision level.

The supplier shall:

- Monitor actual processing of the product
- Report any changes/deviations from the control plan to BLADON MT and obtain approval from BLADON MT, prior to actual implementation

6. NON-CONFORMANCE

Products that do not comply with the engineering drawing (and any referenced material or process specifications) are considered as non-conforming to the engineering design requirements and their acceptance must be subject to authorisation by BLADON MT.

The supplier is responsible for applying to BLADON MT, via the supply chain department, to obtain formal authorisation on any non-conforming products before being dispatched to BLADON MT. If authorisation to ship non-conforming product is agreed by BLADON MT, then this will be formally authorised with a concession.

Suppliers shall not deliver components to BLADON MT with open concessions, i.e. unanswered concession applications. Such products and the relating certificate of conformity must be suitably identified with the concession number allocated by BLADON MT. The supplier's certificate of conformity shall declare all applicable BLADON MT concession numbers on delivery of non-conforming products that have been accepted via approved concessions. A copy of the approved concession shall be included with the supplier's delivery documentation.

6.1 Rejected Items

Non-conforming items will be returned to the supplier, in exceptional circumstances accepted with a concession (see section 6 Non-Conformances). In these cases, a 'non-compliance' form will be raised and submitted to the supplier for corrective/preventative action to be taken. All costs associated with the non-conforming items shall be covered by the supplier.

6.2 Disposal of Scrap

Scrap product material shall be conspicuously and permanently identified as scrap before being destroyed or rendered unusable, to prevent unauthorised salvage or inadvertent use by the supplier.

BLADON MT must be notified of free issue items scrapped by the supplier and the and the supplier shall request disposal instructions.

7. NON-CORRECTIVE AND PREVENTIVE ACTIONS

When non-conforming products are identified, the supplier shall submit a formal written corrective action report to address the specific defects identified.

The format of the corrective and preventative action will be a non-conformance report or standard 8D format as used by the supplier.

When a non-conformance report is issued, containment measures need to be put into place by the supplier prior to any further shipment.

Root cause of the issue should be determined and communicated to BLADON MT within 5 working days. The supplier should utilise appropriate tools for determination of root cause (i.e. fishbone diagram, 5 why, is/is not, etc.).

The issue should be closed, documented and the completed report communicated to BLADON MT within 4 weeks.

8. SUPPLY CHAIN

The supplier is responsible for adhering to all terms and conditions of the purchase order.

Acceptance of the purchase order or vendor schedule must be received in writing within 5 working days or the order will be deemed to be accepted in full by default.

Flow down of specific requirements will either be by engineering documentation or by notes or quality clauses defined on the purchase order.

Should further sub-contracting be required, a formal request shall be made to the BLADON MT quality department. Any sub-contractors will also be expected to comply with the requirements of this document.

The supplier must assume total responsibility for the second stage sub-contract activity and is totally accountable for compliance to the BLADON MT requirements.

The supplier shall maintain an up to date list of the suppliers and sub-tier suppliers used on BLADON MT programs (including special process suppliers). The list shall include details of the supplier approvals and any approved processes and shall be available on request.

The supplier may only procure raw materials from approved sources which hold recognised quality approvals and issue an appropriate certificate with the material. Copies of material certificates must be either:

- a) Supplied with the goods to BLADON MT
- b) Retained in accordance with section 18.

It is the responsibility of the supplier to receive and adequately ensure conformance of any BLADON MT supplied raw material that is directly shipped from the material stockist to the supplier. Evidence of the on-receipt acceptance activity will be required by BLADON MT for release certification purposes.

9. SPECIAL PROCESSES

A special process is an operation or series of operations in the manufacturing process which is liable to cause a change to the physical, chemical or metallurgical properties of the material or product including non-destructive testing (NDT) and surface finishes, not directly detectable in the normal sequence of the manufacturing process (e.g. plating, heat treatment, brazing, etc).

The supplier may not carry out or sub-contract any special processes unless BLADON MT's quality department formally approves that facility to do so either by written acceptance of the proposal or BLADON MT may elect to conduct an audit of the proposed facility. The approval status of any facility should be checked by contacting BLADON MT's quality department prior to processing. Any changes to a previously approved special process, or change of plant, must also be re-approved by BLADON MT's quality department.

Where applicable (e.g. for NDT processes, welding) operators shall be subject to training and certified to a qualification acceptable to the specification.

10. TEST & ANALYSIS

The supplier shall comply with any test piece requirements requested on the purchase order or associated engineering documentation, process specifications, quality documentation or any BLADON MT requirements flowed on to the supplier.

11. CONTRACT REVIEW

The supplier must carry out a review of the requirements related to the product and ensure that they can fulfil all delivery requirements. The supplier must ensure that all information required to manufacture the part e.g. drawings, specifications, engineering instructions are formally obtained from BLADON MT prior to commencing part manufacture.

12. HEALTH AND SAFETY & ENVIRONMENTAL & GENERAL COMPLIANCE

The supplier shall notify BLADON MT of any circumstances whether related to materials, manufacturing, processing methods, disposal or design which might affect the safe operation of the product or be hazardous to BLADON MT employee, third party or the environment, prior to or after delivery. Health and safety data sheets for material, where applicable, shall be supplied at the start of supply for each new item.

Please ensure all goods are packed and shipped in a safe manner to allow for safe handling upon receipt.

The expectation of BLADON MT is that suppliers are certified to the latest releases of ISO 14001 and ISO 18001/45001 or be working towards accreditation.

Suppliers shall be compliant with the latest releases of RoHS & REACH:

<https://www.gov.uk/guidance/rohs-compliance-and-guidance>

<https://www.hse.gov.uk/reach/>

Suppliers shall maintain processes that ensure their entire supply chain is free from conflict minerals and shall respond to requests to confirm compliance when made.

We, at Bladon, have set high standards for business ethics, working conditions and environmental protection within our workforce and existing facility that will also be replicated in any other facility we may have in the future.

Since a large portion of the value creation is done in the supply base, we naturally have the same expectations to our suppliers as we have for ourselves.

Below you will find links to Bladon's Responsible Sourcing manual & Supplier Declaration which all our suppliers are required to adhere to and comply with:

<https://s3.us-east-1.amazonaws.com/bladonmt/YeTNr5EaQteNij8mLI3Q-responsible-sourcing-manual-august-2018-pdf>

<https://s3.us-east-1.amazonaws.com/bladonmt/SZOUic4ySSOH9EiNG3EH-supplier-declaration-august-2018-pdf>

13. SECTION 13 DELIBERATELY BLANK

14. IDENTIFICATION & TRACEABILITY

Identification marking of components shall be in accordance with drawing specification requirements.

15. REQUEST FOR CHANGE

After receiving approval of a Production Part Quality Submission from BLADON MT, the supplier shall not make any changes to the product or process without prior written notification and approval by BLADON MT. In all cases, a robust plan shall be submitted to BLADON MT detailing the supplier's proposal, lead times and plan for sufficient buffer stock to cover the change, any evaluation/test requirements from BLADON MT. Plans to support change activities shall be approved by BLADON MT SQA before approval is granted to make the change.

The following types of change are included but not restricted to:

- a) Any product changes
- b) Material changes, material composition changes in products
- c) Production process change
- d) Change in storage method or location
- e) Changes in production parameters
- f) Relocation of processes within the shipping site or relocations of the shipping site itself
- g) Moving products to a new sub-supplier

16. DELIVERY & PACKAGING

All products delivered in connection with BLADON MT shall be correctly identified and packaged to provide suitable protection, preserve quality of the product's and addressed by the supplier as specified on the purchase order. Bar coding/direct part marking will be introduced in line with BLADON MT's customer requirements and/or specific requirements, identified within BLADON MT specifications and drawings etc.

When required via the purchase order, certificate of conformity, engineering drawing or other associated engineering documentation or process sketch, key characteristic measurements or other specified measurement result shall be supplied as part of the delivery documentation.

Each batch shall be inspected by the supplier, prior to dispatch, to ensure conformance to drawing requirements.

16.1 Certificate of Conformity

A certificate of conformity (C of C), uniquely serial numbered, must be included with each delivery. The C of C shall identify the following information:

- a) The BLADON MT purchase order number
- b) Supplier's name
- c) The part number & description
- d) Quantity dispatched
- e) "Country of origin" for delivered item(s)
- f) The individual serial numbers/batch numbers of the items, such as to provide traceability for materials, products, treatments, and services used in the manufacture of the product
- g) Where shelf life is specified, a minimum of 90% shall still be remaining
- h) For goods manufactured from rubber materials, the life group must be quoted on the C of C and be in accordance with British Standard No. BS F69 or applicable customer requirements
- i) Certification signed/stamped by an authorised release signatory employed by the supplier, that materials and/or process items comply in every aspect with the requirements of the purchase order and drawing or specification therein
- j) References, as applicable, to concession or production permit approved by BLADON MT
- k) Reference to test results, when applicable

NOTE: The term "drawing" shall be taken to mean specification where appropriate.

17. BLADON MT SUPPLIED MATERIAL, PRODUCTS, DOCUMENTATION AND TOOLING

Any tooling supplied by BLADON MT or BLADON MT's customer and used in the execution of the contract and/or purchase order shall remain, without limitation, the property of BLADON MT. The supplier shall protect BLADON MT's title in the tooling and keep it free and clear of any liens, encumbrances, mortgages or like charges or rights of any kind whatsoever and the supplier shall not do or permit to be done any act or 'thing' which may jeopardise the title rights or interest of BLADON MT to any of the tooling or part thereof.

Where not already done, the supplier shall provide and attach to each item of tooling (as referenced in the previous paragraph) and maintain a metal fireproof nameplate in a reasonably prominent position bearing an inscription "PROPERTY OF BLADON MT", to evidence the interest of BLADON MT and to protect that interest against the claims of any person.

Strict segregation and control of material is required when supplied by BLADON MT. No alternative material substitution is permitted without prior BLADON MT written approval.

- a) The supplier shall ensure that the relevant issue of BLADON MT's drawings and specifications are available, maintained and utilised in furtherance of all BLADON MT purchase orders

Additional copies are available from the BLADON MT supply chain department

NOTE: The "relevant issue" of the BLADON MT drawings or specifications will be the issue shown on the BLADON MT purchase order. Any queries relating to the applicable drawing or specification issue must be resolved with BLADON MT prior to manufacture

- b) The supplier shall ensure that any BLADON MT supplied tooling and gauging is satisfactory for the purpose intended and is maintained in an acceptable, as received condition. Any damage or error identified during periodic inspection by the supplier is to be formally reported to BLADON MT immediately. The supplier shall not dispose of, scrap-off or transfer tooling to a third party without formal approval from BLADON MT
- c) A register of all BLADON MT's tooling must be kept and audits must be carried out on these by the supplier and supplied to the BLADON MT on request
- d) BLADON MT may audit these requirements at the supplier's premises at any mutually agreed times
- e) All BLADON MT's tooling must be labelled as such and identifiable as property of BLADON MT.

The full applicable terms and conditions for tooling will be sent with the purchase order.

18. RECORDS

Products are required to be traceable through all stages of manufacture, including:

- a) All bill of material levels, including batch numbers and records of material used
- b) Lower sub tier supplier information and part data
- c) The configuration status/history of the part

The supplier shall retain records for a period ending at least five years after last manufacture. All records must remain legible, identifiable, retrievable, and stored to conserve data and provide adequate protection from deterioration, accidental damage, and fire/flood. Quality records will remain as property of BLADON MT and shall not be destroyed without the formal authorisation of BLADON MT quality department. The supplier shall supply such records to BLADON MT upon request within seven days of receipt of the request.

The supplier shall notify BLADON MT of any potential discontinuation of business activities and arrangements shall be made for the records to be forwarded to BLADON MT.

19. SOFTWARE/ELECTRONIC DATA

The supplier shall have suitable procedures to ensure the adequate and effective control of all software and/or electronic data used for the purpose of design, manufacture, or inspection of all parts manufactured for BLADON MT.

BLADON MT will establish a formal validation/verification process with the supplier to ensure that digital data supplied by BLADON MT has been translated correctly. This will include any customer specified requirements.

The supplier's procedures shall also provide for adequate and effective control of BLADON MT software and/or electronic data provided by the supplier to their sub-tiers.

Cyber security guidelines are available to download from the BLADON MT website.

19.1 Development of Software

Where development of software is required for internal test use or delivery to BLADON MT, either embedded or stand alone, the controls under which it is developed will be agreed and referenced in any order placed.
