WENCOR GROUP

PMA SUPPLIER QUALITY REQUIREMENTS

QS100.006

Revision M

Wencor, LLC

Corporate Ph. (678) 490-0140

416 Dividend Drive
Peachtree City, GA 30269

3577 S Mountain Vista Parkway
Provo, UT 84606

APPROVAL	NAME
WRITTEN BY:	Lisa McQuillen Quality Engineer **Signature:** Lisa McQuillen Lisa McQuillen (Jun 26, 2020 07:49 EDT)
CHECKED BY:	Kevin Cook **Email:** lmcquillen@wencor.com Senior Manager Technical Purchasing **Signature:** Kevin Cook Kevin Cook (Jun 29, 2020 07:10 MDT)
QUALITY:	Mark Ginn **Email:** kevinc@wencor.com Director of Quality **Signature:** mARK gINN mARK gINN (Jun 29, 2020 09:16 EDT) **Email:** mark.ginn@wencor.com

REVISION SUMMARY

Revision	Change Description	Rev Date	Approved
A	Initial release.	12/20/11	W. Cunningham
B	See historical files.	4/6/12	W. Cunningham
C	See historical files.	12/7/12	W. Cunningham
D	See historical files.	11/6/13	D. Johnston
E	See DCR 46 as needed.	8/8/14	J. Nelson
F	See DCR 356 as needed.	6/19/15	M. Ginn
G	See DCR 709 as needed.	9/9/15	M. Ginn
H	See DCR 880 as needed.	7/29/2016	M. Ginn
J	See DCR 1249 as needed.	1/2/18	M. Ginn
K	See DCR 1374 as needed.	9/4/18	M. Ginn
L	Added 3.1 step “C”. Moved supplier employee awareness to section 4.4. Changed record retention for Safety Critical parts from 25 to 10 years. Added section 3.4 on counterfeit parts. Added clarification to section 5.2 “Sampling Plan” that a sample may be taken **once processes are stable**. Adjusted the sample size chart for Critical Parts. Added rework orders and RTV form to required certifications in section 5.3. Added clarification to section 5.3.1.1. Added instructions in 8.2 to get Wencor approval on RTV “rework” plan. Other minor formatting and grammatical corrections. See also DCR 1551.	12/23/19	M. Ginn
M	Added to 2.0 “Requirements of a Quality System must be met in compliance to/with 14 CFR 21.137.”, added section 1.1, updated UT address. Added to 4.5, requirement to identify sub-tier suppliers for special processes. Added 3.5, frozen process requirement. DCR 1656	6/25/2020	M. Ginn

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1.0 Scope

The requirements found herein apply to all orders produced by suppliers of Wencor, LLC for Wencor PMA (cage code 26647 or 0FWK8) or OOP Parts/Assemblies. It is the supplier's responsibility to flow down all applicable sections of this specification to sub-tier suppliers used in the manufacture of product.

1.1 Order of Precedence

In the event of conflicting contractual requirements, the order of precedence is as follows:

A. Purchase Order
B. Engineering Drawing
C. Applicable Engineering Specification
D. QS100.006 PMA Supplier Quality Requirements (this document)

2.0 Quality Management Systems (QMS)

The supplier shall maintain a documented QMS that conforms to the latest revision of AS9100 as demonstrated by ANAB-accredited certification or by Wencor assessment. Loss/Suspension of QMS certification shall be communicated within five (5) business days of receiving notification. Requirements of a Quality System must be met in compliance to/with 14 CFR 21.137.

3.0 General

3.1 Communication

The supplier shall notify Wencor (supplierquality@wencor.com) of any significant business changes/events in a timely manner. Notification shall include the effective date with associated details. Examples of required notification include:

A. Change in location of facilities, or change in place of manufacturing.
B. Change in ownership, name, senior company management, or change in quality leadership.
C. Changes to processes, products, or services and obtain approval for disposition.
D. Termination of business activity.

3.2 Documentation/Record Requirements

The supplier shall supply documentation as evidence of conformance to the Wencor purchase order requirements for the specific product(s) provided. Quality records shall be in English, complete and fully legible.

- The supplier shall retain Quality Records for a minimum of 7 years.
- The supplier shall retain Critical Safety Parts' Quality Records for a minimum of 10 years.

3.3 Configuration Management

The supplier shall maintain and control all revisions of Wencor purchase orders, drawings and specifications. When a new revision is released, the supplier shall notify all required personnel of the changes and the old revision destroyed or controlled.

3.4 Counterfeit Parts

Supplier shall plan, implement, and control processes, appropriate to the organization and the product, for the prevention of counterfeit or suspect counterfeit part use and their inclusion in product(s) delivered to Wencor.

3.5 Fixed or Frozen Manufacturing Process

Frozen processes may be required depending on the criticality of the part. Supplier shall refer to and comply with PS300.076 Review and Approval of Fixed or Frozen Manufacturing Processes when required by the applicable part drawing, test plan, purchase order or within another specification referenced by the part design. When a manufacturing process is frozen, approval is required to be received from Wencor before manufacturing is started. Changes to the process are required to be approved by Wencor and documented per PS300.076 before the change is fully implemented and acted upon.

4.0 Product Realization

Products delivered to Wencor must meet all applicable purchase order, drawing and specification requirements.

4.1 Traceability

Items shall be segregated into lots and each lot shall be clearly identified to maintain lot integrity. The supplier shall package each lot ensuring that no mixing of lots occurs at any time.

If a lot is split; traceability to the original lot must be maintained.

Each certificate (dimensional, material, process, etc.) shall be clearly traceable to the Wencor part number and/or purchase order and applicable serial numbers.

4.2 Contract Review

The supplier shall perform **and record** a thorough contract review that covers (but is not limited to) purchasing, quality, engineering and manufacturing requirements. The supplier shall notify Wencor purchasing for resolution when any requirement is identified that cannot be met.

Note: If updated drawings and/or specifications are sent by Wencor before delivery is made, Wencor requests that the supplier incorporates the updated requirements, or advises if this is not possible.

4.3 Manufacturing Plans (aka Router, Traveler, Control Plan, etc.)

The supplier shall develop/maintain a manufacturing plan which provides evidence that the process was completed in a controlled manner. This plan shall define the steps and processes to be employed in the manufacture of the part/assembly.

4.4 Employee Training

The supplier shall ensure that all personnel performing activities affecting the quality of products/services are trained and competent to perform each process task.

The supplier shall also ensure that persons are aware of:

- Their contribution to product or service conformity;
- Their contribution to product safety;
- The importance of ethical behavior.

4.5 Sub-Tier Suppliers

The supplier shall notify Wencor of the intention to use a non-USA sub-tier for any manufacturing operation (prior to initiation of work.)

The supplier shall approve, manage and monitor sub-tier suppliers ensuring that they comply with the applicable portions of this quality specification. At a minimum, the supplier shall flow down the following

portions of this specification:

A. Right of access
B. Record retention
C. Applicable portions of AS9100

The supplier shall utilize NADCAP, OEM approved or Wencor approved sub-tier sources for each special process required by the Wencor design. A special process is defined as a manufacturing process controlled by an industry specification or standard.

The supplier shall identify the sub-tier supplier to Wencor and provide copies of any certifications (e.g. NADCAP, OEM or other) of any sub-tier suppliers used for special processing (prior to initiation of work). Compliance with this requirement is required for any new PMA drawings or designs released after July 1, 2020.

5.0 Lot Inspection at Supplier

5.1 Inspection Requirements

5.1.1 Inspection Tools

The supplier shall utilize measuring instruments that are accurate to 1/10th of the specified tolerance ("1:10 Rule"). When 1/10th is not possible, the accuracy shall be at least 1/4th of the tolerance.

All inspection equipment used for final product acceptance shall be traceable to international or national measurement standards and controlled within a tool calibration system.

Note: *When Wencor-owned measurement and test equipment is loaned to a supplier, the supplier is responsible to ensure that the calibration status is maintained. Loaned measurement and test equipment must be returned in the same condition the supplier received it. Any modification or repairs must be approved by Wencor.*

5.1.2 Inspection Data Interpretation

If accurate data can be collected one decimal place beyond the tolerance specified by the engineering drawing, that digit is significant and should be used to accept or reject the part. If accurate data can be collected two decimal places beyond the drawing tolerance, that number is rounded into the significant digit (0-4 rounds to zero, 5-9 rounds to one).

Example: If the upper tolerance limit is 1.51; a result of 1.511 is out of tolerance whereas a result of 1.5104 is within tolerance.

5.1.3 Inspection Records

The supplier shall retain inspection records clearly traced to the lot/job number. Inspection records shall contain the following:

A. Measurement results.
B. Part number, lot, and date of inspection.
C. Serialized part information (as applicable).
D. Inspector name with signature, stamp, or identifying mark (or captured electronically through user controls).

5.1.4 First Article Inspection (FAI)

The supplier shall complete and submit a FAIR when required by SAE AS9102 or the Wencor purchase order. The first article inspection report shall be completed using the AS9102 format.

Wencor reserves the right to be present at the time of the first article inspection. This includes in-

process inspections such as inspection of castings or dimensions before coating.

The supplier shall clearly identify the article (via label, product separation, etc.) on which the FAI was performed.

5.1.5 Hidden Features

If inspection of a feature requires destructive testing, is a hidden feature, or has other significant complications, the supplier must provide acceptable proof, based on control of process or statistical methods, that the feature meets the requirements. Fulfilling this requirement may include requirements for third party verification.

5.1.6 Visual Inspection

Obvious blemishes (e.g., stains, discoloration, corrosion, dings, pits, scratches, etc.) are not permitted. Visual inspection shall be performed ensuring compliance to workmanship requirements stated in PS300.014.

5.2 Inspection Methods

Each feature is to be inspected according to one of the following three options.

Option 1 – 100% Inspection

The supplier shall inspect 100% of all characteristics of the product and all parts in the lot.

Option 2 – Statistical Process Control (SPC) Method

The supplier shall meet the minimum requirements below when using SPC.

A. Critical Characteristic ≥ 2.00 Cpk
B. Key Characteristic ≥ 1.67 Cpk
C. Standard Characteristic ≥ 1.33 Cpk
D. If any feature is found to be outside the specification then 100% inspection and sort is required for the nonconforming feature (C=0)
E. Control charts shall be provided to Wencor on each shipment

Option 3 – Sampling Plan

Once processes are proven stable the supplier may select a random (non-sequential, representative of all parts) sample that meets the minimum sample size identified in the table below. If any feature is found out of tolerance then 100% inspection and sort is required for the nonconforming feature (C=0). These tables are based on Zero Acceptance Number Sampling Plans, 5th edition, by Nicholas Squeglia.

Non-Critical Parts

	Sample Size with C=0	
Production Size (At time of inspection)	**Standard Characteristic (2.0)**	**Key Characteristic (1.0)**
2-8	5	100%
9-15	5	13
16-25	5	13
26-50	5	13
51-90	7	13

91-150	11	13
151-280	13	20
281-500	16	29
501-1200	19	34
1201-3200	23	42
3201-10000	29	50

Safety Critical Parts

	Sample Size with C=0		
Production Size (At time of inspection)	**Standard Characteristic (1.0)**	**Key Characteristic (0.65)**	**Critical Characteristic**
2-13	100%	100%	100%
14-15	13	100%	100%
16-150	13	20	100%
151-280	20	20	100%
281-500	29	47	100%
501-1200	34	47	100%
1201-3200	42	53	100%
3201-10000	50	68	100%

Note: If the supplier wishes to use an alternate inspection plan (Mold or fixture produced parts for example) they shall submit that plan to Wencor for consideration and obtain written confirmation of acceptance of that plan prior to implementation.

5.3 Required Certifications

At a minimum, the following is required for each documentation approval request:

Documentation Type	First-Time Buy (PO ending in FB or QF)	Repeat Buy	Rework Orders
Certificate of Conformance	Yes	Yes	Yes
Photos of part marking & labeling	Yes	Yes	Yes
Photos of Packaging	Yes	Yes	Yes
FAI Report (AS9102)	Yes	As required	No
Dimensional Inspection Report	Yes	As required*	No
Material Certs	Yes	Yes	No
Special Process Certs	Yes	Yes	No
Test Reports (per ATP/DTP or Drawing)	As required on PO/Dwg	As required on PO/Dwg	No
Sub-tier component/machining C of C	Yes	Yes	Yes
SPC control charts (when inspection Option 2 is used)	Yes	Yes	Yes
Return to Vendor/Debit Memo Form	N/A	N/A	Yes

5.3.1 Certificate of Conformance (C of C)

The C of C may be a separate document, or included as part of the shipping declaration/packing slip text. The C of C shall contain the following:

A. Supplier name and address
B. Statement that parts conform to the P.O.
C. Wencor P.O. and line item number (if more than one line)
D. Original manufacturer's name and part number (when the Supplier is not the manufacturer)
E. Wencor part number and revision level

F. Shipped quantity (by lot)
G. Date of shipment and/or date of QA approval
H. Authorized signature of quality representative or company official
I. Supplier job, lot, or equivalent tracking number(s) unique to the production lot and traced through underlying certifications
J. Manufacturing country of origin (if not manufactured in U.S.A.)
K. Applicable serial numbers
L. Date code and shelf life, when applicable
M. DFARS compliance statement, when applicable

5.3.1.1 Material & Special Process Certifications

Material/Special Process certifications must meet type, specification, and specification revision level required by the current revision of the Wencor drawing, and must list the test results with trace to the supplier.

All Chemical and Alloy requirements on Wencor drawings will require source (manufacturers – mill) certifications to be included in the Certification packages with trace through and to the supplier. Lab tests showing the elements meet the requirements of drawing required elements may be accepted in some cases as an alternate to materials manufacturer certs but they must be clearly identified as independent lab certifications.

All Process certifications such as Heat Treatments, NDT or Coating applications are to be provided from the processor whom performed the process and reflect the specification listed on Wencor drawings. Provide Material certs that pertain to the special process.

Materials/Items that are shelf life limited shall have the following information on the material certificates:

Material or Item	Certification Data required
Elastomers, rubbers, synthetic rubbers	Cure date; batch number; compound or specification
Adhesives, sealants, paints, coatings	Batch date; compound or specification; expiration date
Lubricated bearings or bearing lubricant	Lubrication date; lubrication specification or compound; percent of fill
Miscellaneous item, shelf life limited	Manufacture date; life limiting compound

5.3.2 First Article Inspection Report (FAIR) Requirements

The FAIR shall include:

A. The complete dimensional report (layout) of all features listed on the drawing. Each line item must include the dimension specified on the drawing with the corresponding tolerance, the measurement result, how measured (including gage used), and be traceable to the inspector.
B. The certification for all special features (that are not on the dimensional report), including certifications for all materials and processes.
C. A FAIR for each of component part in an assembly.
D. All in-process dimensions or requirements specified by the Wencor drawing. For example: Include values for features noted as "dimensions apply before coating."
E. The inspector's printed name and signature.

5.3.3 Non-Destructive Testing (NDT)

The supplier shall provide certification and recorded results for any NDT. Any artifacts from NDT such as x-ray film are to be retained with the quality records for the lot. When NDT is specified on the drawing, the supplier shall inspect and report 100% of the lot.

5.3.4 Gears and Splines

The supplier shall measure and certify all measurements of gears or splines. A copy of the results shall be included with the certification of the lot.

6.0 Nonconforming Material (NCM)

The supplier authority for disposition of Wencor PMA parts is limited to rework to print and scrap. Nonconforming Material must be identified, documented, and segregated to prevent unintended release or use. The supplier shall complete containment activities within 48 hours (2 business days).

6.1 Waiver

The supplier may seek Wencor approval of a contractual nonconformance by completing a Wencor "Supplier Waiver Request" document. It is found at the following location: www.wencor.com → Documentation → PMA Supplier Documentation.

A. Waiver requests are P.O. and lot specific and pertain to the features/conditions identified
B. Handwritten, lined-out, initialed, verbal and/or email authorizations are not permitted to any Wencor requirement including purchase orders, drawings/specification or technical data
C. An approved waiver shall be identified by Wencor authorized signatures
D. Segregate the waived items into a separate lot
E. Include a copy of the approved waiver form with the shipment
F. As applicable, document a root cause and corrective action process

7.0 Documentation Approval prior to Shipment

The supplier shall submit certification pack/shipping documents to Wencor for approval prior to shipment by emailing the full documentation package to pmaquality@wencor.com. Upon approval; a Shipment Approval Form will be returned to the supplier. Allow up to 48 hours for approval.

The supplier shall include the shipment approval form with the physical part shipment.

Note: Documentation submission requires photos of part marking, labeling and packaging. If the certification package is too large to deliver through email, an OwnCloud (Cloud Storage Folder) link and password may be requested through supplierquality@wencor.com.

8.0 Post Shipment Activities

8.1 Supplier Notification of Escape

When an escape of nonconforming material has been identified, the supplier shall notify Wencor within 1 business day. Notification shall include P/N's, traceability (lot, serial, and manufacturer numbers), ship dates, quantities and a description on the nonconformance.

8.2 Return To Vendor (RTV)

When the Wencor Material Review Board (MRB) dispositions parts as RTV, the parts will be returned to the supplier to either be reworked or scrapped at the supplier's location. Wencor purchasing will be the main point of contact for all RTV correspondence and will arrange financial, shipping, and RMA (Return Materials Authorization) details.

If rework is to be performed the supplier must fill out the applicable section of the *Return to Vendor/Debit Memo Form (PMA)* and return it to supplierquality@wencor.com for Wencor approval. Approval is required before rework has begun.

The supplier shall complete the supplier section of the *Return to Vendor/Debit Memo Form (PMA)* WQAF-06-00-05 and return it with replacement/reworked parts.

8.3 Supplier Corrective Action Report (SCAR)

The supplier may be required to complete a SCAR for any quality or on-time delivery issue. The supplier shall respond within 30 days unless otherwise notified. The SCAR may be completed on the Wencor SCAR form or the supplier's format but must contain at least the following elements:

A. Short term containment plan
B. Root cause analysis
C. Long term corrections
D. Verification of implementation and effectiveness