
 Venture Aerobearings	Quality Procedure	No. QP-74-04
		Rev: 6
 Approval Signature	PURCHASE ORDER QUALITY REQUIREMENTS	Date: 11/5/2018
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1. Purpose:

This document specifies the quality requirements that are communicated in the procurement documents to sources that provide product or product related services to Venture Aerobearings (VA).

2. Scope:

This procedure applies to product or product related services for Venture Aerobearings.

3. Definitions:

None.

4. Procedure:

- 4.1. Purchase order requirements are identified by commodity and/or services as related to product manufactured by VA.
- 4.2. Requirements are listed in the appendices of this procedure.

5. Responsibility:

5.1. Primary: Quality

- 5.1.1. Quality is responsible for the development and maintenance of this procedure.
- 5.1.2. Quality is responsible for identifying the quality assurance requirements to be flowed down for products and product related services.

5.2. Additional: Engineering

- 5.2.1. Engineering is responsible for identifying engineering requirements to be flowed down for products and product related services.
- 5.3. Supply chain is responsible for communicating the requirements to suppliers of products and product related services.
- 5.4. Requirements are listed in the appendices of this procedure.

6. References:

- 6.1. AS9100: Quality Management Systems – Requirements for Aviation, Space and Defense Organizations
- 6.2. GE S-1000: GE Aviation Quality System Requirements for Suppliers

7. Revision History:

Section	Change Made	Revision	Date
All	Initial release.	-	4/21/09
Appendix 1 c)	Add option to submit certifications electronically. Add specification (in addition to drawing) requirement.	1	11/6/09
Appendix 1j)	Add paragraph outlining visual inspection damage.		
Appendix 1 q)	Add flow down of GEAE S1000		
Appendices 2-10	Add statement "...in addition to Appendix 1"		
Appendix 6 c)	Add surface finish inspection/ reporting requirement		
Appendix 9	Add copper strip		
Appendix 10	Add statement of applicability for clarification		
Appendix 1 j)	Added the exception to preservation oil requirement on Black Rings.	2	09/30/2014
Appendix 1 p)	Added "no metal banding" statement.	3	6/26/17
Appendix 2 f)	Added specification requirement per CID 558714, Design Change Number 558714 (Sub: P3TF30, P3TF52 and P29TF82 Update)	4	4/3/18
Appendix 2 f)	Delete. Engineering review indicates specifications not applicable to current product. Formatting updates.	5	9/26/2018
Appendix 2b) Appendix 3 e) Appendix 4c) Appendix 5b)	Clarification of significant/ frozen processes	6	11/5/2018



Appendix 1 – General Requirements

The requirements outlined in this section apply to all commodities and services directly related to the manufacture of product at Venture Aerobearings.

- a) ISO 9001/AS9100/ Quality Management System is required.
- b) ISO 10012-1/ANSI 2540-1 or Non-Destructive testing (Magnetic Particle Inspection) and Chemical Processing quality system requirements in accordance with Nadcap/PRI documents AC7114 and AC7108/2 if applicable.
- c) Certifications required: The certification, identifying the organization performing the process/service, shall be supplied to VA with each shipment or electronically prior to receipt of shipment at VA. The certification report must contain all information necessary to demonstrate conformance to the requirements reflected on the drawing and or specification and shall at a minimum contain the following:
 - PO number
 - Part number
 - Manufacturing Lot number
 - Quantity of parts
 - Serial or process numbers as applicable
 - Specification(s) and revision
 - All certifications must be part number and lot number/heat number specific. Different part numbers must be on separate certifications.
 - Signature and title of authorized representative
 - Pages must be identified "Page _ of _ "
- d) All processing such as heat treating, electroplating, plating, anodizing, etc. Shall be accomplished by GEA approved process vendors (GEA Yellow Page approved) or those controlled in accordance with GEA S1001 Category 1 approval.
- e) Traceability: The supplier shall maintain systematic controls/records to insure capability of tracing backwards to materials from which manufacture originated, and forward to determine the location of like articles or materials within a given lot (process, component or assembly).
- f) All parts on the Purchase Order are subject to inspection at VA for acceptance.
- g) VA reserves the right to perform source inspection. When source inspection is performed, the supplier's measuring equipment is to be made available for use to determine product conformance to requirements. Supplier personnel are to be made available for operation of the equipment and otherwise assist as requested. Source inspection may include review of systems, procedures and facilities for compliance with purchase order requirements.



- h) The supplier is required to notify VA immediately when "VA Supplied Material" is lost, damaged or found to be nonconforming. Non-conforming "VA Supplied Material" must be segregated and tagged with the discrepancy listed prior to shipment to VA. The supplier is not to process any nonconforming "VA Supplied Material" without written authorization from VA. The supplier is also required to notify their supplier of any nonconforming product identified and make arrangements for VA disposition of the sub-tier supplier nonconforming material prior to use.
- i) Prior to shipments to VA or drop shipments to a VA customer or vendor, all material is to be cleaned and protected as required to be free of all foreign material, substances or residue. Handling and packaging is required to prevent physical damage.
- j) All parts are to be suitably corrosion protected by immersing and lubricating parts in accordance with Mil-PRF-16173, Mil-PRF-6085, or Mil-PRF-8188. Black Rings do not require preservation, provided they have no ring surfaces that are in the finished condition. Other Exceptions are called out on VA drawings.
- k) All product must be handled with care to prevent handling damage during processing. VA may reject product based on the following visual inspection criteria: VA WI-82-03-01 Visual Inspection Ball and Roller Bearings.
- l) Material Safety Data Sheets (MSDS) are required.
- m) Systems or processes used to fulfill the requirements of this order are subject to "Right of Entry" by VA, its customers, suppliers, subcontractors and/or regulatory agencies to determine and verify the quality of the contracted work, records and/or materials. If the VA proposes to delegate product verification to a subcontractor, VA will define the requirements for the delegation and maintain a list of the delegations.
- n) Seller shall accurately label, consistent with section 611 of the Clean Air Act, any products that are supplied to the buyer that contain controlled substance or are manufactured with a controlled substance.
- o) The supplier is required to notify VA, prior to implementation, of any changes in processes or systems that would impact product quality. Changes that may affect quality include but are not limited to: use of new procurements sources, new part number or materials, loss of survey/ certification approval, and significant changes within the supplier's or supplier's subcontractor facilities. VA may require a new First Article to assure purchase order and drawing conformance.
- p) Suppliers are required to flow down to sub tier suppliers the applicable requirements of the VA purchasing documents, including key characteristics where required. No metal banding shall be used without written approval from VA.
- q) Product shipped to VA shall be packaged in such a manner as to protect them from damage that may occur during the shipping process.
- r) GEAE is the end user of this order. GEAE S-1000 requirements apply to the items contained within this PO. The supplier is responsible for maintaining a current revision of S-1000. This may be supplied by VA if requested by the supplier.

Appendix 2 – Black Ring Requirements

The requirements outlined in this section apply to black rings purchased by VA. These requirements are in addition to those outlined in Appendix 1.

- a) Raw material certification shall be supplied with each shipment. Raw material certification is required to include the chemical and physical properties reflecting numerical values for all tests required by the applicable specifications, the material specification and mill source. Certifications are required to identify the material by the melt or heat number, and the material specification. The applicable specification number and latest revision at the time of purchase order are required. The material certification requires the signature and title of the supplier's authorized representative; bar stock shall come from the same heat lot unless approved in writing by VA. Each forging/casting certification is to be identified with the mill heat number or code, serial number (if required), and foundry identification.
- b) This [following processes are to be](#) frozen and cannot be deviated from without written approval from VA. The frozen/fixed processing number must be included on all certifications.
 - [Material bar size & form](#)
 - [Forging, including ring rolling](#)
 - [Carburizing](#)
 - [Hardening](#)
 - [Stress Relief](#)
 - [Drilling and finishing through race lubrication and drain holes](#)
- c) Part marking is required on all parts. Part marking must include manufacturing or heat treat lot number and process or serial number.
- d) All oil holes to be clean and clear of obstruction.
- e) Variable data to be provided for all parts as follows:
 - M50 rings:
 - 100% measurement and recording of ring warp and out of roundness.
 - M50 NiL rings:
 - 100% measurement and recording of ring warp and out of roundness,
 - raceway offset data sheets to be supplied to ensure case depth requirements are met on split ball bearing inner rings,
 - raceway diameter targets to be supplied to ensure case depth requirements are met for all ball and roller bearing rings.

Note: Data to be recorded by heat treat lot and process number.



Appendix 3 – Separator Requirements

The requirements outlined in this section apply to separators purchased by VA. These requirements are in addition to those outlined in Appendix 1.

- a) Raw material certification shall be supplied with each shipment. Raw material certification is required to include the chemical and physical properties reflecting numerical values for all tests required by the applicable specifications, the material specification and mill source. Certifications are required to identify the material by the melt or heat number, and the material specification. The applicable specification number and latest revision at the time of purchase order are required. The material certification requires the signature and title of the supplier's authorized representatives; bar stock shall come from the same heat lot unless approved in writing by VA. Each forging/casting certification is to be identified with the mill heat number or code, serial number (if required), and foundry identification.
- b) Special labeling requirements apply to all parts on this order. Individual part packaging shall include part number and manufacturing lot number at a minimum.
- c) Silver plating certification is required. Silver plating is required to be performed by a GEA approved source (GEA Yellow Page Approved) unless source is approved and monitored by a GEA Category 1 approved source.
- d) Silver plated separators shall be shipped dry.
- a) The [following processes are to be](#) frozen and cannot be deviated from without written approval from VA. The frozen/fixed processing number must be included on all certifications.
 - [Forging, including ring rolling](#)
 - [Hardening](#)
 - [Plating \(e.g. Silver – Ag\)](#)



Appendix 4 – Roller Requirements

The requirements outlined in this section apply to rollers purchased by VA. These requirements are in addition to those outlined in Appendix 1.

- b) Raw material certification shall be supplied with each shipment. Raw material certification is required to include the chemical and physical properties reflecting numerical values for all tests required by the applicable specifications, the material specification and mill source. Certifications are required to identify the material by the melt or heat number, and the material specification. The applicable specification number and latest revision at the time of purchase order are required. The material certification requires the signature and title of the supplier's authorized representative; bar stock shall come from the same heat lot unless approved in writing by VA. Each forging/casting certification is to be identified with the mill heat number or code, serial number (if required), and foundry identification.
- c) The following processes are to be frozen and cannot be deviated from without written approval from VA. The frozen/fixed processing number must be included on all certifications.
- [Material bar size & form](#)
 - [Fording](#)
 - [Roller blanking \(ceramic rollers\)](#)
 - [Ceramic roller handling](#)
 - [Hardening](#)
 - [Hard grinding](#)
 - [Nitriding](#)
 - [Honing](#)



Appendix 5 – Ball Requirements

The requirements outlined in this section apply to balls purchased by VA. These requirements are in addition to those outlined in Appendix 1.

- a) Raw material certification shall be supplied with each shipment. Raw material certification is required to include the chemical and physical properties reflecting numerical values for all tests required by the applicable specifications, the material specification and mill source. Certifications are required to identify the material by the melt or heat number, and the material specification. The applicable specification number and latest revision at the time of purchase order are required. The material certification requires the signature and title of the supplier's authorized representative; bar stock shall come from the same heat lot unless approved in writing by VA. Each forging/casting certification is to be identified with the mill heat number or code, serial number (if required), and foundry identification.
- b) The following processes are to be frozen and cannot be deviated from without written approval from VA. The frozen/fixed processing number must be included on all certifications.
 - Material bar size & form
 - Ball forming (e.g. forging, cold heading, hot heading)
 - Ball blanking
 - Ceramic ball handling (blanks, finished, assembly)
 - Annealing
 - Hardening
 - Peening/ tumbling
 - Hard grinding
 - Nitriding
 - Lapping



Appendix 6 – Titanium Nitride (TiN) Requirements

The requirements outlined in this section apply to outside vendor operation: titanium nitride (TiN) coating. These requirements are in addition to those outlined in Appendix 1.

- a) This process is frozen and cannot be deviated from without written approval from VA. The frozen/fix processing number must be included on all certifications.
- b) Titanium Nitride certification is required. Titanium Nitriding is required to be performed by a GEA approved source (GEA Yellow Page approved).
- c) The following measurements must be inspected per the associated Vendor Print provided by VA. Data must be supplied with certification.
 - Surface Texture of Land Riding Surface. Surface texture to be inspected and reported as Rp by ring manufacturing order number (MO# as marked on part).

Appendix 7 – Shot Peen Requirements

The requirements outlined in this section apply to outside vendor operation: shot peen. These requirements are in addition to those outlined in Appendix 1.

- a) This process is frozen and cannot be deviated from without written approval from VA. The frozen/fix processing number must be included on all certifications.
- b) Shot peen certification and Almen strips are required. Peening is required to be performed by a GEA approved source (GEA Yellow Page approved).

Appendix 8 – Nitride Hardening Requirements

The requirements outlined in this section apply to outside vendor operation: nitride hardening. These requirements are in addition to those outlined in Appendix 1.

- a) This process is frozen and cannot be deviated from without written approval from VA. The frozen/fix processing number must be included on all certifications.
- b) Nitride hardening certification is required. Nitride hardening is required to be performed by a GEA approved source (GEA Yellow Page approved).

Appendix 9 – Copper Plate and Copper Strip Requirements

The requirements outlined in this section apply to vendor operation: copper plate and copper strip. These requirements are in addition to those outlined in Appendix 1.

- a) This process is frozen and cannot be deviated from without written approval from VA. The frozen/fix processing number must be included on all certifications.
- b) Copper plate and copper strip certification is required. Copper plate and copper strip is required to be performed by a GEA approved source (GEA Yellow Page approved) unless source is approved and monitored by a GEA Category 1 approved source.



Appendix 10 – Purchase Order (PO) Specific Requirements

The requirements outlined in this section apply to a commodity or vendor operations when specifically invoked by the purchase order. This will be indicated by reference to Appendix 10 and required clause. These requirements are in addition to those outlined in Appendix 1.

- a) Final inspection reports are required with each shipment. The supplier is required to document the results of the manufactured product. The documentation shall include, but not be limited to, results of all drawing dimensions, drawing notes, and specifications. Certifications for all certifiable operations (i.e., raw material, heat treat, plating, NDT, surface preparations and testing if required) shall be included with the final inspection report.
- b) First Article Inspection Report (FAIR) is required. The supplier is required to document the actual results of the manufactured product. The documentation shall include but not be limited to: results of all drawing dimensions, drawing notes, and specifications. Certifications for all certifiable operations (i.e., raw material heat treat, plating, NDT surface preparations and testing if required). An approved First Article package shall demonstrate that the supplier's production process is capable of producing an article compliant to all design requirements. First Article inspection is required for 1st time manufacture, any change to the original processing, any change to the drawing, a lapse in production greater than 2 years or when requested by VA via the purchase order.
- c) Sampling requirements acceptable per 2.5 A.Q.L. per MIL-STD-1916 or ANSI/ASQ Z1.4 modified to a zero-acceptance level. Customer specific plans may be used as approved by VA in writing as an amendment to the PO.
- d) SPC data is required. The supplier's SPC data report must contain: lot start and end date, measuring device used, gage repeatability and reproducibility percentage for the measuring device, the operation name generating the characteristic sampled, the sample size, mean, standard deviation and Cpk calculation.
- e) Certifications must list individual process or serial numbers of parts covered by the certification.