

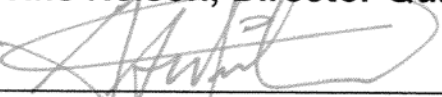


VACCO Quality Flow-Down Instruction

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DOCUMENT CHANGE RECORD

Administrative Change Request

Rev	Date	Responsibility	Description of Change
Initial Release	8/27/2013	John Harmon	Initial Release
1.0	11/12/2013	John Harmon	See IQS History
1.1	12/11/2013	John Harmon	See IQS History
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VACCO Quality Flow-Down Requirements

1. PURPOSE

To document and control contractual and internal quality requirements required to be flowed down to suppliers.

2. SCOPE

This instruction is applicable to those internal clauses related to the quality requirements that are published on purchase requisitions, purchase orders and on the Internet for supplier and subcontractor access. The following documents are replaced in-part, or complete by this instruction.

- PNM101-B - Purchasing Notations Manual 400-900
- VI-PUR-009 - Quality Clauses Q0001 – Q0051
- VI-PUR-010 - Quality Engineer Contact Clauses C0001-C0020
- VI-PUR-011 - Special Notes Codes Clauses S0001-S0075

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4. ACRONYMS

- a) **ASL** – Approved Suppliers List
- b) **COTS** – Commercial Off The Shelf
- c) **CAR** – Corrective Action Request
- d) **OEM** – Original Equipment Manufacturer
- e) **FAI** – First Article Inspection
- f) **NADCAP** – National Aerospace And Defense Accreditation Program
- g) **NDT/NDE** – Non-Destructive Test/Evaluation
- h) **QPL** – Qualified Products List

5. PROCESS

- a) Quality clause flow down shall be commensurate with customer requirements. Technical risk shall be considered when selecting Quality Clauses with the goal of mitigating and/or eliminating risk. It is the responsibility of the individual performing Quality Clause flow

down to perform adequate contract review. They must understand all applicable program requirements and technical risk to ensure that the appropriate clauses are flowed down to the sub-tier level. Boiler plates are provided in VI-QFD-001 section 11. Boiler plates should be reviewed and tailored as necessary to meet specific contract requirements.

- b) Each clause will be listed on the purchase in the following format: (QFD- paragraph number and title), for example paragraph 6.25 Supplier Quality Control System Requirements would be listed as, QFD-6.25 Supplier Quality Control System Requirements.

6. GENERAL QUALITY CLAUSES

6.1. SPECIFICATION EFFECTIVITY

VACCO may flow down superseded revisions to specifications and standards; if a supplier questions the revision of a standard they may contact the buyer who will direct them to the Project Q.E. for further clarification. Suppliers shall certify work to standards and revisions directed in the purchase order. When no specific revision is called out in the purchase order and unless otherwise directed in writing, the most current revision shall apply.

6.2. VACCO PROPRIETARY PROCEDURE AND DRAWING REQUIREMENTS

Drawings and procedures furnished with this purchase order are proprietary in nature. VACCO Industries retains the exclusive rights to these documents, and they must be returned upon completion of this purchase order.

6.3. PACKING REQUIREMENTS

All items are to be packaged in suitable containers for protection in shipment and storage, and in accordance with applicable specifications. Each container of a multiple container shipment shall be identified to show the number of the container and the total number of containers in the shipment and the number of the container containing the packing slip. All shipments by supplier shall include a packing sheet containing VACCO's purchase order number, quantity, part number/size, description of the items shipped, and appropriate evidence of inspection. Materials from different purchase orders shall be listed on separate packing slips.

For custom machined, externally threaded, ground or machined material/hardware, the external areas must be protected by plastic webbing and/or plastic protective caps. Items requiring protection from physical and mechanical damage shall be protected by wrapping cushioning, compartmentization, cartonizing or other means to mitigate shock and vibration to prevent damage during handling and shipment, at no time is it acceptable for machined parts or precision parts to be loose or free floating.

6.4. MATERIAL SAFETY DATA SHEETS

Supplier must provide material safety data sheets meeting the requirements of 29 CFR 1910.1200 (g) and the latest version of Federal Standard No. 313 in effect on the date of this purchase order for all hazardous materials (FAR 52.223-3). Data shall be submitted for all items included in this purchase order, whether or not the supplier is the actual manufacturer of the items.

6.5. SHEET OR STRIP STOCK – METALLIC

- a) Sheet/strip material must be of chemical milling quality. Surfaces shall be free from

scratches, pits, inclusions and mill rolling marks. Additionally, no waviness or curl on the edges of the sheet/strip material will be accepted.

- b) Sheet/strip material shall be flat within 1/2 inch T.I.R. over an 18 inch length, and within 1/4 inch T.I.R. over a 12 inch width for material over .010 inch thickness.
- c) When a coil is to be provided, the maximum individual coil weight shall not exceed 300 pounds and have a minimum core I.D. of 16 inches.
- d) Material provided must be degreased (28 dry finish) to be acceptable.
- e) Upon cutting an 18 inch long sample of coil, on a flat surface, coil set cannot exceed 1/8 inch on either end for the material under .010 inch thickness.

6.6. TUBING – METALLIC

Supplier shall provide a certification that stipulates the tubing is in fact "seamless" in condition.

6.7. O-RINGS AND ELASTOMERS

All synthetic O-rings and elastomers provided to VACCO industries shall be individually sorted and packaged. Each package shall have a minimum marking requirement:

- a) Quantity per bag
- b) VACCO part number and revision
- c) Manufacturer part number
- d) Compound code
- e) Specification number and revision
- f) Cure date in quarters
- g) Batch code
- h) VACCO purchase order number
- i) Expiration date per MIL-HDBK-695

Components shall not have exceeded 25% of their shelf life (as defined by MIL-HDBK-695) at the time of shipment.

6.8. RAW MATERIAL WELD REPAIR PROHIBITION (OTHER THAN CASTINGS)

If any weld repair is necessary during the fabrication process (other than castings), VACCO Industries approval must be obtained prior to the performance of any such repair.

6.9. QUALIFIED PRODUCTS LIST IDENTIFICATION

The items listed on this purchase order that are controlled by the government issued Qualified Products List must be procured from a qualified source noted within that document and must conform to the testing and processing requirements of the latest revision of the designated specification.

6.10. QUALIFIED PRODUCTS LIST CERTIFICATION

Seller of qualified products (government or buyer) shall supply with each shipment, one legible copy of the certification capable of reproduction through three (3) iterations. The certification shall state that the product is a qualified product under the applicable government or buyer specification requirements. If the qualified product is incorporated into a prime item, the certification must attest to this fact and designate the supplier's name and approval number.

6.11. VACCO-SUPPLIED MATERIAL

Any material provided to the supplier with this purchase order shall be used exclusively. Supplier shall not substitute any material for material provided. All material not used shall be returned to VACCO. Supplier shall maintain accurate records to account for attrition.

6.12. TITANIUM MATERIAL CONTAMINATION

Titanium must not come into contact with halogenated fluids, such as; trichloroethylene, Freon, hydrochloric acid, anhydrous methyl alcohol and substance containing mercury, cadmium, silver and gold. Any fluorinated and sulfonated lubricants are prohibited for use on titanium hardware. Cleaning shall be performed in accordance with the cleaning procedure approved for this job order. Handling shall be performed with glove-protected hands as bare skin contact is prohibited. Tools which are used on titanium, such as grinding wheels, must be controlled in such a way that they do not come into contact with other alloys. During grinding operations no sparking is allowed.

6.13. FIRST ARTICLE REPORT

a) First Piece Production Run

Whenever a supplier fabricates a part number for the first time, the part has changed or two years has lapse since manufacturing a part, the supplier shall complete a first article inspection. A First Article Report shall be completed and contain the actual values of all drawing and other contractual requirements, including all drawing notes. This report shall be maintained by the supplier, and shall be made available to VACCO industries upon request.

b) F.A.I.R. PER AS9102

Suppliers fabricating parts requiring a First Article Report shall submit required report to VACCO per AS9102. They shall document physical and functional processes to verify that prescribed production methods have produced an acceptable item as specified by engineering drawings, planning, purchase order, engineering specifications and/or applicable design documents. First article requirement can be met by supplying a copy of a previous qualifying first article report provided the manufacturing process has not changed.

6.14. AGE CONTROLLED MATERIAL

The supplier is required to submit with each shipment a certificate attesting conformance of elastomeric/organic materials/parts listed on/or used in the performance of the purchase order. Age controlled materials shall be identified and packaged in accordance with the applicable procurement specification. Other age sensitive materials such as adhesives, sealants, coating materials, and potting compounds, etc.; shall as a minimum be identified on each container or certification for material used in processes with the following:

- a) manufacturer's name
- b) batch number
- c) storage temperature
- d) compound/spec number
- e) date of manufacture

6.15. ITEM LOT/HEAT NUMBER INDIVIDUALITY

Supplier to provide each purchase order line item from one lot/heat. In the event that this is not possible, notify VACCO Industries' purchasing immediately for disposition.

6.16. AGE-SENSITIVE MATERIAL

Special storage requirements must be defined; material shall have no less than eighty percent (80%) of its shelf life remaining at time of delivery to VACCO, materials and/or articles having age degradation characteristics must include:

- a) manufacturer's recommended expiration date
- b) shelf life, cure date, retest date
- c) compound number, etc. (as applicable) so as to indicate useful life of the material

6.17. SUPPLIER'S VARIABLES DATA (WITH SHIPMENT)

Supplier shall provide one (1) copy of all inspection variables data, which records objective evidence of acceptance traceable to each assembly, sub-assembly, or component. The form used for documentation of variables data shall be optional.

6.18. GIDEP ANNOUNCEMENTS

If a GIDEP (Government-Industry Data Exchange) announcement is issued on any product on this order an immediate response to VACCO is required.

6.19. CHANGES IN APPROVED PROCESSES

Supplier may not change any drawing, process, material or procedure originally subject to VACCO's approval without written authorization. Contact the buyer to request any changes to purchase order requirements.

6.20. MANNED SPACE FLIGHT

For use in human space flight; materials, manufacturing, and workmanship of highest quality standards are essential to astronaut safety. If you are able to supply the desired item with a higher quality than that of the items specified or proposed, you are requested to bring this fact to the immediate attention of the purchaser. This clause will be inserted in all subcontracts and purchase orders for such items down to the lowest tier.

6.21. VACCO FURNISHED MATERIAL/TOOLING

Supplier shall ensure that all material furnished by VACCO is free from shipping damage prior to commencing work. Supplier is liable for the total value of material, parts, etc., when scrapped as a result of damage due to vendor processing or handling. Supplier is not responsible for VACCO controlled parameters, but is responsible for protecting VACCO's investment in raw materials and partially completed items. A certification stating that applicable items were manufactured from the material furnished by VACCO is required and VACCO lot and/or other traceability numbers must be identifiable to the items.

6.22. VACCO INDUSTRIES PRELIMINARY CERTIFICATION REVIEW

Supplier test reports and material certifications shall be submitted and approved by VACCO Industries' Quality Assurance Department prior to release for shipment. Documentation shall be submitted to the buyer who will forward them to the Quality Assurance Department.

6.23. FRAUDULENT STATEMENT REQUIREMENTS

- A. The federal statement notification requirements are hereby passed down to our suppliers. "The recording of false, fictitious or fraudulent statements or entries on this document may be punishable as a felony under federal statutes, including Federal Law, Title 18, Chapter 47."

- B. "Fraud and falsification statement" applies to this order in its entirety and must be completed and returned to VACCO industries with the items on this purchase order. Failure to provide this certification will delay acceptance and payment. **(Statement below to be included on suppliers applicable documents when imposed by the purchase order)**

Fraudulent Statement

The federal statement notification requirements are here by passed down to our suppliers. "The recording of false, fictitious or fraudulent statements or entries on this document may be punishable as a felony under federal statutes, including Federal Law, Title 18, Chapter 47."

6.24. SUPPLIER QUALITY CONTROL SYSTEM REQUIREMENTS

As a minimum, supplier shall establish and maintain an orderly system that provides for defect detection, identification, segregation and correction. Such system shall further comply with one or more of the following specifications as indicated on the purchase order. The latest revision of each specification shall apply.

- | | |
|-------------------|----------------------------|
| A. MIL-I-45208 | H. MIL-STD-45662 |
| B. ISR-1E | I. ANSI /NCSL Z540.3 |
| C. MIL-Q-9858 | J. ANSI / NCSL Z540-1 |
| D. QRC-82 | K. ISO 10012 |
| E. NHB 5300.4(1C) | L. ISO 9001 2008 |
| F. NHB 5300.4(1B) | M. ANSI/ISO/ASQ Q9001 2008 |
| G. MIL-STD-1535 B | N. AS9100C |

If work is subcontracted, the applicable requirements of these specifications must be imposed on the subcontractor (calibration is mandatory). At a minimum, the supplier shall impose compliance to either ANSI/NCSL Z540-1 or ANSI/NCSL Z540.3. VACCO industry reserves the right to perform on-site surveys or inspections to maintain system and product quality.

6.25. COUNTERFEIT WORK

For the purpose of this clause, work consists of those parts delivered under this contract that are the lowest level of separately identifiable items (e.g., articles components, goods and assemblies). "Counterfeit work" means work that is or contains items misrepresented as having been designed and/or produced under an approved system or other acceptable method. The term also includes approved work that has reached a design life limit or has been damaged beyond possible repair, but is altered and misrepresented as acceptable.

- Seller agrees and shall ensure that Counterfeit Work is not delivered to VACCO Industries.
- Seller shall only purchase products to be delivered or incorporated as work to VACCO Industries directly from the Original Component Manufacturer (OCM)/Original Equipment Manufacturer (OEM), or through an OCM/OEM authorized distributor chain. Original Component Manufacturer, or Original Equipment Manufacturer's sell products or components under their brand name, they are the companies that manufacture the original part. Work shall not be acquired from independent distributors or brokers unless approved in advance in writing by VACCO Industries.
- Seller shall immediately notify VACCO Industries with the pertinent facts if seller becomes aware of or suspects that it has furnished counterfeit work. When requested by VACCO Industries, seller shall provide OCM/OEM documentation that authenticates traceability of the affected items to the applicable OCM/OEM.
- Seller shall consult with the OCM/OEM or authorized distributor / franchise to confirm that the authorized distributor / franchise has been authorized by the OCM/OEM to sell the

specific item being procured, prior to issuing a purchase order. If not procuring from the OCM/OEM, the seller shall provide evidence from the OCM / OEM that the supplier used was indeed authorized by the OCM/OEM. For example, an OCM/OEM list of authorized distributors on OCM/OEM letterhead or website would suffice. If OCM/OEM does not have an authorized list of distributors/franchises, documented evidence shall be provided stating such.

6.26. HANDLING PRECAUTIONS

Supplier to exercise extreme care in the handling of parts to ensure no dents, nicks, dings or scratches occur. Suppliers shall perform a visual inspection when receiving hardware to ensure no damage has occurred in transit. **Any damage shall be reported to VACCO Industries within 24 hrs.** Protective end caps shall be used on all tube end parts, VACCO Industries shall provide end caps.

6.27. MANUFACTURING AND INSPECTION PLAN

Seller shall prepare and maintain an inspection test plan or shop traveler which provides records of all performed operations and inspection. As a minimum, routing sheets shall show operational sequence, inspection and test points and other pertinent control media. The documents shall provide traceability to personnel performing operations and inspection, acceptability by inspection, and reference of any associated documents such as rejection reports, processing procedures, inspection procedures, etc. One (1) reproducible copy of the plan shall be submitted to the buyer for approval, prior to the start of production.

6.28. GRAIN STRUCTURE TEST PROCEDURE

When determining grain structure for A286 CRES materials made to AMS 5737 and subsequently welded, VI-MPT-1932 Modification of Test Procedure shall be used.

6.29. DEGREASING - CLEANING

Machined parts shall be degreased, cleaned and free of contaminants before shipment to VACCO Industries.

6.30. SPECIAL USE VARIANCE

The Special Use Variance clause may be used to purchase materials and processes from suppliers not on VACCO's ASL.

Supplier is not approved on the VACCO ASL so usage has been approved by VACCO Management.

VICE PRESIDENT QUALITY DATE

DIRECTOR, SUPPLY CHAIN DATE

6.31. VACCO APPROVED SUPPLIER LIST

If suppliers do not have a sub-tier control system they may use VACCO's approved suppliers listed on the VACCO website, or as a secondary alternative they may contact their buyer to get VACCO's most up to date Approved Supplier List.

6.32. PROCUREMENT SOURCE PROHIBITION

No material from Western Titanium, Inc. and/or Mach-2 Metals will be acceptable to VACCO Industries.

6.33. GOVERNMENT TOOLING IDENTIFICATION

Supplier to attach a tag or mark on tool surface, depending on the size of the tool, the following information per FAR 52.245-1:

1. TOOL NUMBER: _____ REV: _____
2. SYMBOL: _____
3. SERIES: 1 _____
4. DUPLICATE: _____
5. PO NUMBER AND LINE ITEM: _____
6. SALES ORDER NUMBER: _____
7. OWNERSHIP: _____
8. USED-TO-MAKE VACCO P/N (IF APPLICABLE): _____

If there is insufficient space on the tooling surface, mark on VACCO supplied I.D. Tag. Tool must be placed in a storage container for protection and tag must be affixed to container. Mark tool with revision when required on the tooling surface and rework tag. Also, if possible, insert picture of purchased tool inside the container.

7. SUPPLIER INSPECTION REQUIREMENTS

Unless otherwise specified, material supplied and operations performed by the supplier must be inspected by the following (referenced) quantitative and verifiable methods.

7.1. VACCO SOURCE INSPECTION

VACCO source inspection is required at your facility. Notify VACCO Industries' buyer at least forty-eight (48) hours in advance of the time the items are to be inspected. Inspection documents, specifications, drawings and the purchase order covering the

Items on this order shall be available for VACCO inspection at your facility. Any dimensions that apply prior to any type of plating or coating must be inspected and accepted by VACCO Source Inspection prior to that plating or coating taking place.

- a) **IN-PROCESS INSPECTION:** VACCO will advise supplier of the in-process inspection points for which in-process inspection is required.
- b) **FINAL INSPECTION:** Inspection reports, certifications, and/or shipping documents must be stamped and/or signed by the VACCO source representative prior to shipping.

7.2. GOVERNMENT SOURCE INSPECTION

Government Source Inspection is required on this order; it may involve in-process and final inspection. Upon receipt of this purchase order, promptly notify the Government Representative who normally services your plant, so that appropriate planning for Government Inspection can be accomplished. On receipt of this order, promptly furnish a copy to the Government Representative who normally services your plant or, if none, to the nearest Army, Navy, Air

Force, or Defense Supply Agency Inspection Office. In the event the representative or office cannot be located, notify VACCO Industries' buyer immediately.

DCMA Review: _____
QAR/EXTBF S4306A _____ Date

7.3. VACCO FIRST ARTICLE INSPECTION

VACCO inspection of the first acceptable piece is required at your facility prior to continuing your production run. Notify VACCO industries' buyer at least forty-eight (48) hours in advance of the time the items are to be inspected. Inspection documents, specifications, drawings and the purchase order covering the items on this order shall be available for VACCO inspection at your facility. The FAI item and report shall be presented, together with all completed items, at the time of such inspection.

7.4. VACCO WITNESSING OF FUNCTIONAL AND/OR ACCEPTANCE TESTING AT SUPPLIER'S FACILITY

Supplier's acceptance/functional testing must be witnessed by a VACCO representative. Notify VACCO Industries' buyer at least forty-eight (48) hours in advance to schedule VACCO witnessing. Test documents, specifications, drawings and the purchase order covering the items on this order shall be available for VACCO witnessing at your facility.

7.5. 100% FINAL INSPECTION BY SUPPLIER

Supplier shall perform 100% component and end item final inspection of all characteristics and items listed on both the purchase order and drawing to assure conformance to the specification requirements. Supplier inspection sheets must be provided to VACCO Industries with the hardware at the time of shipment.

7.6. SAMPLING INSPECTION

Items may be inspected by the supplier's sampling inspection plan which has been pre-approved by VACCO's Quality Assurance Department and which complies with ANSI/ASQC Z 1.4 (normal, level II, single sampling procedures). If the supplier employs an inspection sampling plan, to MIL-STD-105, the latest revision shall apply.

8. CERTIFICATION REQUIREMENTS

Certification requirements are objective quality evidence of materials and processes performed. A review shall be performed of specifications, drawings and customer requirements to determine required certifications.

8.1. MANUFACTURER/MILL TEST REPORTS

Supplier shall furnish copies of the original manufacturer/mill test reports, containing all acceptance test results required by the material specifications. Test reports provided shall conform to the requirements of government specification DI-MISC-81020.

- a. In addition to quantitative chemical and mechanical properties, the material test reports shall include the class, form, condition (heat treated, annealed, forged, cold/hot finished, hot/cold drawn, etc.), grade, type and finish, as applicable, of the material supplied.
- b. The manufacturer/mill test reports must be on the manufacturer/mill's letterhead and must contain the name, title of the company representative and be signed by the suppliers' quality

representative or management at the time of shipment or submittal of preliminary review. Transcription of test report data is prohibited, unless the original manufacturer/ mill test report is attached. Statements on test reports must be positive and unqualified. Disclaimers such as "to the best of our knowledge" or "we believe the information contained herein is true" are not acceptable.

- c. All test reports provided to VACCO Industries shall be legible and capable of reproduction through three (3) iterations of copying.
- d. If material is purchased from a distributor, a Certificate of Conformance from the distributor which meets the requirements of clause 8.2 must accompany the manufacturer/mill test report.
- e. All certified material test reports (except for mill or independent laboratory test report) shall include a statement that "the results shown in this report are the results of testing performed by our organization".
- f. When a supplier quality document is revised, it shall be identified as a "corrected copy" and all changes shall be identified; i.e., (*). The revised document shall be re- signed and dated at the time of shipment or submittal of preliminary review.

8.2. CERTIFICATION OF CONFORMANCE

A Certification of Conformance on your company's letterhead must accompany all shipments to VACCO Industries. The certification must contain the typed name and title and be signed by the supplier's quality representative or management. Failure to provide an appropriate certification will delay acceptance and payment.

Statements on material certifications must be positive and unqualified. Disclaimers such as "to the best of our knowledge" or "we believe the information contained herein is true" are not acceptable. Certification of Conformance shall contain all applicable information including part numbers, revisions, descriptions and quantity. Material and/or processing specifications and their revisions are also required if not accompanied by material test reports (chemical and physical or original mill test reports). This also applies to processing test reports. All certifications provided to VACCO industries shall be legible and capable of reproduction through three (3) iterations of copying.

If VACCO supplied the raw material, the supplier must reference VACCO's material certification number (as noted on VACCO's shipping documents) on all certifications provided to VACCO. If the raw material is supplied by the supplier, the requirements of clause 8.1 also apply.

Vendor is required to provide documented certification(s) that the material and/or services supplied against this order meet all applicable drawing, specification and purchase order requirements. All certifications, documents and/or reports provided by the supplier related to this order must be legible and reproducible, and shall contain the following:

- a) VACCO's purchase order number
- b) Company name
- c) Item part number, revision, name and quantity
- d) Title of authorized representative e) Applicable specification number(s)
- e) Printed name of authorized representative
- f) Date and signature of authorized representative at the time of shipment or submittal of preliminary review.

Records of materials, processes and tests must be maintained for seven (7) years minimum.

8.3. BASIC CERTIFICATION OF CONFORMANCE

Supplier must include with each shipment a signed certificate of conformance or compliance to the requirements of the VACCO purchase order and references. Certification must include VACCO purchase order number, the part number or catalog number with dash number if applicable, and revision of product supplied, quantity, and a supplier lot, work order, sales order, or other number through which all quality records necessary to verify conformance can be traced. Quality records must be available for VACCO review upon request.

8.4. SPECIAL CERTIFICATIONS

The following referenced certifications(s) are required with each shipment against this order:

- a) **RAW MATERIAL CERTIFICATION.** A physical and chemical test report from the mill source, indicating quantitative values of ingredients and referencing applicable specifications is required.
- b) **RAW MATERIAL CERTIFICATION.** A certification disclosing the "typical" chemical and physical properties of the material supplied is required.
- c) **RAW MATERIAL CERTIFICATION.** A chemical composition test report from the mill source indicating quantitative values of ingredients and referencing applicable specifications is required.
- d) **RAW MATERIAL CASTINGS/FORGINGS.** Seller shall furnish two (2) test bars from the same mill master melt with the first shipment and with each melt change thereafter. Specimens shall conform to Federal Test Standard No.151 identified with supplier's name or trademark.

8.5. SPECIAL PROCESS CERTIFICATION

A certification is required for material subject to "special processes" (such as heat treating, welding, surface treatment, etc.). It shall include identification of the process (by applicable specification number, revision, type, class, etc.), name of subcontractor (if other than supplier), signature and certification level of the person performing the process, and serial numbers of parts processed (if applicable).

8.6. WIRE/CABLE CERTIFICATION

Each type of wire or cable on this order must include a certification indicating the size, color, class, type and military specification to which the material conforms.

8.7. LOX COMPATIBILITY

A certification attesting to the material's compatibility with liquid or gaseous oxygen per VACCO PS-325 (Impact Test Procedure) and NHB 8060.1 is required.

8.8. INDEPENDENT LABORATORY ANALYSIS

A certification, indicating the quantitative values of ingredients (as required by applicable material specification and/or purchase order requirements), from an independent laboratory, is required.

8.9. MERCURY FREE CERTIFICATION

A mercury free certification must accompany all shipments to VACCO Industries on this purchase order. The mercury free statement may be made directly on the test report/certificate

of conformance or may be a separate certification. The statement shall certify that during the manufacturing process, material furnished on the above purchase order did not come in contact with mercury or its compounds or any mercury containing devices with a single boundary of containment. Failure to provide this certification will delay acceptance and payment.

9. TRACEABILITY AND IDENTIFICATION REQUIREMENTS

Traceability and identification requirements are a verifiable means of tracing materials and parts back to the mill, and or processes from which parts were fabricated. The level of control shall be commensurate with customers' contractual requirements.

9.1. MCS-6 LEVEL A REQUIREMENT

MCS-6 Level A traceability shall be maintained at all intervals of production. If work is subcontracted, this requirement must be contractually imposed on the subcontractor, material test specimens or samples required by sections 4.5 and 4.6 of MCS-6, shall be retained by the supplier for at least seven (7) years after completion of this purchase order.

9.2. MCS-6 LEVEL B REQUIREMENT

MCS-6 level B traceability shall be maintained at all intervals of production. The over-check frequency shall meet the additional requirements of PNM-101A addendum. If work is subcontracted, this requirement must be contractually imposed on the subcontractor. Material test specimens or samples required by sections 4.5 and 4.6 of MCS-6 shall be retained by the supplier for at least seven (7) years after completion of this purchase order.

9.3. MCS-6 LEVEL C REQUIREMENT

MCS-6 Level C traceability shall be maintained at all intervals of production. The over-check frequency shall meet the additional requirements of PNM -101A addendum. If work is subcontracted, this requirement must be contractually imposed on the subcontractor. Material test specimens or samples required by sections 4.5 and 4.6 of MCS-6 shall be retained by the supplier for at least seven years after completion of this purchase order.

9.4. "LEVEL I" TRACEABILITY

The items on this purchase order are designated as "Level I" (for crucial Navy shipboard applications). Traceability shall be established by heat/lot, supplier shall ensure that heat/lot segregation is maintained at all times and is not lost, mixed or co-mingled. This requirement for traceability must be imposed on any subcontractor if work is subcontracted.

9.5. RAW MATERIAL TRACEABILITY

Supplier shall identify each piece of material and each test report to provide traceability to the corresponding heat/lot, casting, forging or batch number. This marking shall be applied with waterproof ink or other permanent process.

9.6. MIL-STD-130 MARKING REQUIREMENTS

Parts and materials shall be identified per latest revision of MIL- STD-130.

9.7. POSITIVE TRACEABILITY OF PARTS

Parts traceability is required by cross-referencing all manufacturing and shipping documents with reports and certifications for raw material lots or batches.

9.8. NASA CERTIFICATION/ TRACEABILITY

Documentation, showing date of manufacture and heat, batch or lot number, must accompany the material furnished on this order. Each lot must not be intermixed with subsequent lots of the same piece.

9.9. SUPPLIER FURNISHED MATERIAL IDENTIFICATION

Producer's heat lot or unique identifier assigned and cross-referenced on test reports, representing a single heat, batch or melt, is required. In the event that more than one lot of material is supplied, each fabricated batch must be identified so as to maintain individual lot integrity.

9.10. ADDITIONAL MATERIAL TRACEABILITY REQUIREMENTS

- a) Supplier is required to purchase extra raw material to provide a test sample to VACCO Industries.
- b) One sample per heat lot used to produce parts for VACCO must be shipped with the first shipment of the parts made in the same heat lot per given contract as a test coupon. This requirement applies to each and every contract number on the VACCO purchase order, which means that if the contract number changes or the material heat lot number changes, a new sample will be required.
- c) It is permissible to make multiple lots of parts, dash numbers, or even different part numbers from the same heat lot of material, as long as the date, heat lot, and PO number of the original submission are referenced on the C of C for subsequent shipments. Records adequate to account for all use of the original heat lot must be maintained. A copy of the traceability record must be maintained with un-used material and updated as material is issued.
- d) The test sample is to be 8" +/- 0.25" long, by the dimensions of the stock supplied by the mill or distributor to make the parts. For example, if parts are made from 1" diameter rod, then the test sample should be 8" long by 1" in diameter (1" x 8"); if the parts are made from 1" x 1.5" x 48" pieces cut by the mill or distributor from 1" thick, 8" wide, and 84" long hand-forged bars, the sample dimensions should be 1" x 1.5" x 8".
- e) The samples must be marked by legible metal impression stamp to include the original heat number and VACCO part and purchase order numbers, and be traceable through all production and conversion steps to the original heat number.
- f) The original heat number is defined as the original cast slab, billet, or ingot number from the original melter.
- g) Intermediate production and conversion steps include conversion to re-forging, rolling, drawing, or other intermediate stock, extrusion, conditioning, pickling, testing and inspections, and all other steps necessary to bring the material to the final condition, at which point it is supplied as machining stock. Each converter must provide documentary proof of conversion of a specific quantity to specification requirements.
- h) Sheet material less than or equal to 0.1875" thick, wire or rod less than or equal to 0.1875" diameter, weld wire and rod, and fasteners made to military or commercial standard are exempt from this requirement.

10. SPECIAL PROCESS REQUIREMENTS

10.1. PENETRANT INSPECTION

Liquid penetrant inspection of hardware on this purchase order is required in accordance with the listed specifications, procedures and acceptance criteria. As a minimum, the supplier shall assure that the following information is included on the certification of inspection.

- a) Part number
- b) Material and heat/lot number
- c) Description/type and/or classification of casting, forging or weldment
- d) Total quantity inspected, quantity accepted and rejected
- e) Serialization, if delineated
- f) VACCO Industries' purchase order number
- g) Supplier's internal control number
- h) Date of inspection
- i) Procedure, acceptance criteria and their effective revisions

When required, hardware found to be acceptable by nondestructive examination are to be identified by placing the proper acceptance test/inspection stamp on the physical parts. All hardware found to be unacceptable shall be identified in such a manner which will adequately distinguish the material from the acceptable lot (without physically damaging the parts). In those cases where N.D.E. is performed by a subcontractor, a copy of the subcontractor's certification must accompany any shipment to VACCO Industries. Failure to do so will delay acceptance and payment.

10.2. ULTRASONIC INSPECTION

Ultrasonic inspection of hardware on this purchase order is required in accordance with the listed specifications, procedures, scan plans and acceptance criteria. As a minimum, the supplier shall assure that a copy of the corresponding scan plan is provided and that the following information is included on the certification of inspection.

- a) Part number
- b) Material and heat/lot number
- c) Description/type and/or classification of casting, forging or weldment
- d) Total quantity inspected, quantity accepted and rejected
- e) Serialization, if delineated
- f) VACCO industries' purchase order number
- g) Supplier's internal control number
- h) Date of inspection
- i) Procedure, scan plan number, acceptance criteria and their effective revisions

When required hardware found to be acceptable by nondestructive examination are to be identified by placing the proper acceptance test/inspection stamp on the physical parts.

All hardware found to be unacceptable shall be identified in such a manner which will adequately distinguish the material from the acceptable lot (without physically damaging the parts). In those cases where N.D.E. is performed by a subcontractor, a copy of the subcontractor's certification must accompany any shipment to VACCO Industries. Failure to do so will delay acceptance and payment.

10.3. MAGNETIC PARTICLE INSPECTION

Magnetic particle inspection of hardware on this purchase order is required in accordance with

the listed specifications, procedures, technique sheets and acceptance criteria. As a minimum, the supplier shall assure that a copy of the corresponding technique sheets are provided and that the following information is included on the certification of inspection.

- a) Part number
- b) Material and heat/lot number
- c) Description/type and/or classification of casting, forging or weldment
- d) Total quantity inspected, quantity accepted and rejected
- e) Serialization, if delineated
- f) VACCO Industries' purchase order number
- g) Supplier's internal control number
- h) Date of inspection
- i) Procedure, technique sheet number, acceptance criteria and their effective revisions

When required hardware found to be acceptable by nondestructive examination are to be identified by placing the proper acceptance test/inspection stamp on the physical parts.

All hardware found to be unacceptable shall be identified in such a manner which will adequately distinguish the material from the acceptable lot (without physically damaging the parts). In those cases where N.D.E. is performed by a subcontractor, a copy of subcontractor's certification must accompany any shipment to VACCO Industries. Failure to do so will delay acceptance and payment.

10.4. RADIOGRAPH INSPECTION

Radiograph inspection (x-ray) of hardware on this purchase order is required in accordance with the listed specifications, procedures, shooting sketches and acceptance criteria. Completed films, technique sheets/shooting sketches and reader sheets shall be provided to VACCO Industries unless otherwise specified. As a minimum, the supplier shall assure that the following information is included on the certification of inspection.

- a) Part number
- b) Material and heat/lot number
- c) Description/type and/or classification of casting, forging or weldment
- d) Total quantity inspected, quantity accepted and rejected
- e) Serialization, if delineated
- f) VACCO Industries' purchase order number
- g) Supplier's internal control number
- h) Date of inspection
- i) Procedure, shooting sketch number, acceptance criteria and their effective revisions

When required hardware found to be acceptable by nondestructive examination are to be identified by placing the proper acceptance test/inspection stamp on the physical parts. All hardware found to be unacceptable shall be identified in such a manner which will adequately distinguish the material from the acceptable lot (without physically damaging the parts). In those cases where N.D.E. is performed by a subcontractor, a copy of the subcontractor's certification must accompany any shipment to VACCO Industries. Failure to do so will delay acceptance and payment.

10.5. ACCEPTANCE TEST REPORTS (FLOW, SHOCK, VIBRATION, ETC.)

Supplier must include with each shipment actual copies of acceptance test results, signed by an authorized agent of the supplier, indicating the actual results of acceptance tests required by the purchase order. Where quantitative limits are established within the procedure or

specification, the report shall indicate the actual values obtained. The test reports shall include the control identity (e.g. Heat, lot, serial number) of material/items tested.

10.6. HEAT TREATMENT CERTIFICATION REQUIREMENT

Supplier shall perform heat treatment in accordance with the specifications and revisions listed on this purchase order. Supplier shall supply a certification for the heat treatment, and mercury free statement with the shipment. Failure to provide this documentation will delay acceptance and payment.

10.7. HEAT TREAT DOCUMENTATION

In addition to the requirements of 10.6 (Heat Treatment Certification Requirement) above, copies of furnace charts and vacuum charts (if applicable) are required showing temperatures, ramp rates, time at temperature, furnace number, vacuum levels, etc.

10.8. HARDNESS REQUIREMENTS FOR HEAT TREATMENT PROCESSORS

Supplier shall record hardness readings on the heat treat certifications for items heat treated on this purchase order. Failure to provide this information will delay acceptance and payment.

10.9. SOLDERABILITY OF LEADS, ETC.

Solderability of external leads and terminals: External leads, pin and terminals of all components shall be tested and comply with the solderability requirements specified in IPC/EIA-J-STD-002.

10.10. WELDING PROCEDURE

Seller shall furnish proposed welding procedures to buyer for approval prior to production. Changes to approved procedures require VACCO Quality re-approval prior to implementation.

10.11. ELECTROSTATIC DISCHARGE (ESD) PROTECTION

Protection from electrostatic discharge (ESD) damage shall be provided to all class I, II or III ESD susceptible devices in accordance with the manufacturer's requirements. The protection level provided by the original manufacturer shall extend through all procurement, handling, storage, packaging and shipping cycles. ESD shall meet the requirements of ANSI/ESD S20.20.

10.12. PRINTED CIRCUIT BOARDS

The supplier shall assure that the materials, manufacture, testing and packaging of printed circuit boards or printed wiring boards supplied to VACCO Industries are in accordance with all the requirements of MIL-PRF-31032, latest revision, printed circuit board/printed wiring board general and detailed specification, including solderability. Conformance test data shall be provided for each lot shipped to VACCO Industries.

10.13. CUSTOMER APPROVED SOURCES AND PROCESSES

Customer Approved Sources or Processes are required on this order; suppliers will use sub-tiers or approved processes identified on the P.O. The assigned quality engineer will review and sign off the purchase order prior to release to the supplier.

Q.E. SIGNATURE

DATE

11. QUALITY CLAUSE BOILER PLATES

The following Boiler Plates may be used when establishing baseline requirements. Tailoring boiler plates to meet additional customer requirements is encouraged. Adequate contract review must be performed to ensure appropriate Quality Clause flow down.

11.1. MACHINED PARTS

QFD-8.2	Certificate of Conformance
QFD-7.1	VACCO Source Inspection
QFD-8.1	MFG/Mill Test Reports
QFD-6.13(b)	First Article Inspection Report per AS9102
QFD-6.1	Specification Effectivity
QFD-6.2	VACCO Proprietary Procedure and Drawing Requirements
QFD-6.23	Fraudulent Statement Notification
QFD-6.8	Raw Material Weld Repair Prohibition (Other Than Castings)
QFD-7.6	Sampling Inspection
QFD-6.24	Supplier Quality Control System Requirements
QFD-6.31	VACCO Approved Supplier List
QFD-6.32	Procurement Source Prohibition
QFD-6.15	Item Lot/Heat Number Individuality

ADDITIONAL REQUIREMENTS FOR LEVEL I

QFD-8.9	Mercury Free
QFD-9.4	Level I Traceability

11.2. CASTINGS & FORGINGS

QFD-8.2	Certificate of Conformance
QFD-8.1	Manufacturer/Mill Test Reports
QFD-10.6	Heat Treatment Certification Requirements
QFD-6.1	Specification Effectivity
QFD-6.2	VACCO Proprietary Procedure and Drawing Requirements
QFD-6.23	Fraudulent Statement Notification
QFD-6.3	Packing Requirements
QFD-7.6	Sampling Inspection
QFD-6.24	Supplier Quality Control Systems
QFD-9.7	Positive Traceability of Parts
QFD-6.21	VACCO Furnished Material Tooling
QFD-6.31	VACCO Approved Supplier List
QFD-6.15	Item Lot/Heat Number Individuality

11.3. OUTSIDE PROCESSING

a) OUTSIDE TESTING

NOTE: Conduct testing PER _____, REV _____, PARA _____

QFD-10.5	Acceptance Test Reports
QFD-8.2	Certificate of Conformance
QFD-6.23	Fraudulent Statement Notification

b) OUTSIDE PROCESSING NDT

NOTE: Inspection to be conducted IAW _____, REV _____

QFD-8.2 Certificate of Conformance
QFD-6.18 GIDEP Announcements
QFD-6.23 Fraudulent Statement Notification
QFD-10.1 Through 10.4 (As Applicable)

c) OUTSIDE PROCESSING WELDING

NOTE: Welding to be conducted IAW _____, REV _____

QFD-8.2 Certificate of Conformance
QFD-6.18 GIDEP Announcements
QFD-6.23 Fraudulent Statement Notification

d) OUTSIDE PROCESSING PLATING

NOTE: Plating to be conducted IAW _____, REV _____

QFD-8.2 Certificate of Conformance
QFD-6.18 GIDEP Announcements
QFD-6.23 Fraudulent Statement Notification

11.4. C.O.T.S. PARTS

QFD-8.3 Basic Certificate of Conformance
QFD-6.25 Counterfeit Work
QFD-6.1 Specification Effectivity
QFD-6.23 Fraudulent Statement Notification
QFD-6.3 Packing Requirements
QFD-6.18 GIDEP Announcements
QFD-6.31 VACCO Approved Supplier List

11.5. RAW MATERIALS

QFD-8.1 Manufacturer Mill Test Reports
QFD-8.2 Certificate of Conformance
QFD-6.23 Fraudulent Statement Notification
QFD-6.32 Procurement Source Prohibition
QFD-6.31 VACCO Approved Supplier List
QFD-6.15 Item Lot/Heat Number Individuality