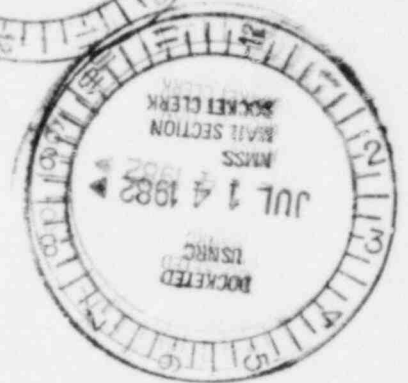


QUALITY CONTROL MANUAL  
MERCURY METALS, INC.  
P. O. BOX 771269  
HOUSTON, TEXAS 77215-1269



This manual is designed to assist quality control by the establishment of rules and regulations governing the standards of inspection and product quality.

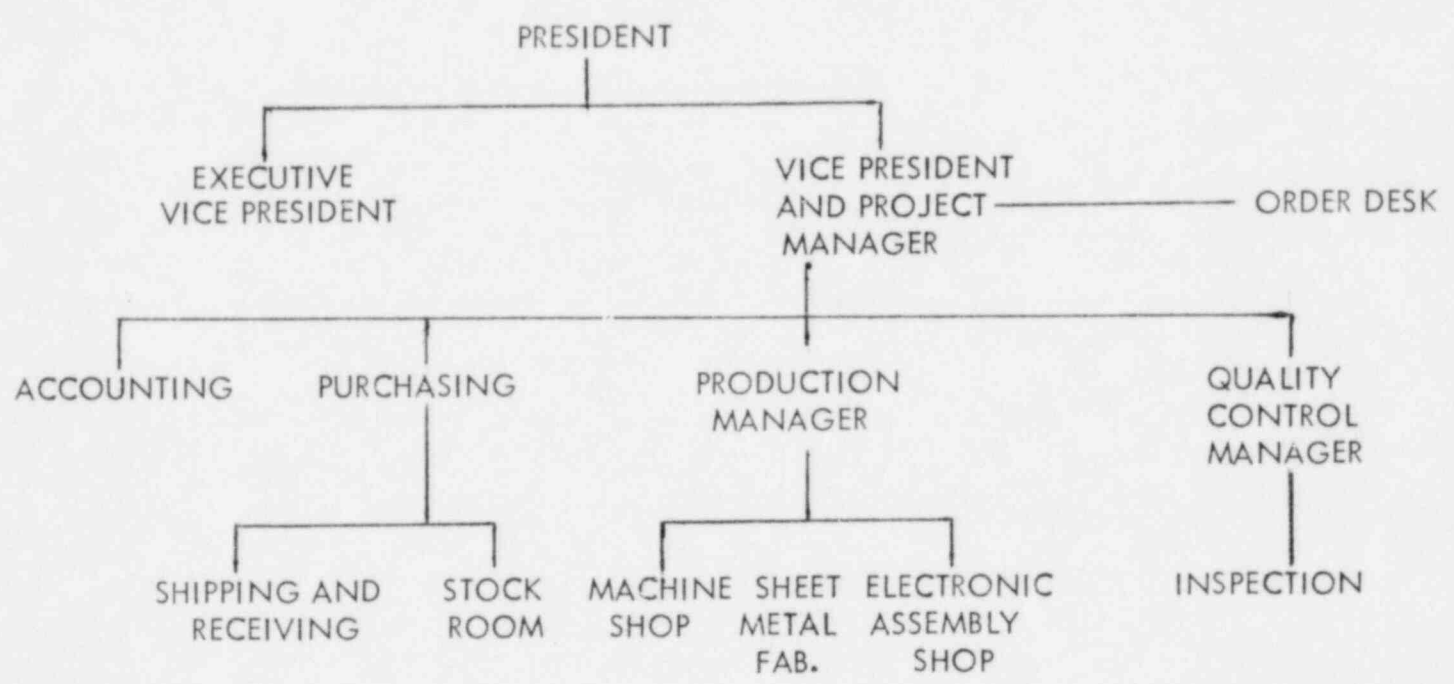
*James D. Howers*

MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
INSPECTION METHODS

INDEX

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Organization Chart  
Mercury Companies



MERCURY METALS, INC.  
QUALITY CONTROL MANUAL

Subject: Inspection Procedure and Quality Control

Applicable Documents:

The following documents form a part of this manual to the extent specified herein:

MIL-145208A	Inspection System Requirements
MIL-L45208 Ord.	Inspection Requirements
MIL-Q-984A	Sampling Procedures and tables for Inspection by variables for percent defective. Not applicable on Boeing Contracts.
MIL-1-45607	Inspection Equipment supply and Maintenance Ordnance
MIL-C-45662	Calibration of Standard
MIL-Q-9858A	Quality Program Requirements
10-CFR-71	Appendix E transportation packages for normal/ special form radioactive material

- 1.0 Scope and Use  
This specification provides instructions and general requirements for proper inspection of work in process and completed items prior to next assembly or delivery to customer thereby insuring quality of workmanship and to promote quality consciousness among the employees.
- 1.1 Enforce adequate inspection during the entire process of manufacture to insure reliable function of the end product. Interchangeability of parts where required and general compliance with customer's requirements and specifications.
- 1.2 Establish better quality at lower cost by emphasizing preventive rather than routine inspection.
- 1.3 The quality control procedures will assure that non-conforming materials, tools, or test equipment will be identified as discrepant, segregated, and reviewed for disposition.
- 1.4 Provide evidence of inspection for all material, parts, and assemblies.

Our quality control system shall assure that adequate records of materials review on discrepant material actions are maintained and kept available for review and analysis. These records shall show the cause and responsibility for the discrepancy, the way in which the discrepancy was corrected, and shall note what action was taken to prevent its recurrence.

If we are not authorized by customer to hold formal materials review on the discrepant material, we shall submit his request for action to the customer Quality Control Representative assigned to our plant, if any, or to the customer Material Department. Materials covered by such a request shall be withheld from production and delivery until the customer has completed the Materials Review action and advised us as to the materials disposition.

We cannot conduct Materials Review actions on customer design items unless and until specific authorization for such actions has been received from the customer. We may request authority from the customer to hold formal materials review action by establishing adequate procedures to be approved by the customer, and designating qualified quality control and engineering personnel to act on the materials review as authorized by the customers. A material review decision is binding upon all members of the suppliers organization. When we are approved to hold materials review actions, the customer reserves the right to reject the decisions of the suppliers material review.

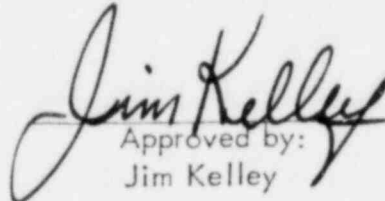
We shall maintain, on a trend basis, a system of quality level or defect level reporting for the purpose of demonstrating progress in quality improvement. When requested, we will submit reports on defect levels and trends to customer. We shall take prompt and effective action to correct and prevent recurrence of discrepancies referred to us by the customer for which the supplier is responsible or for which we are best able (as determined by negotiation with the customer) to direct the corrective and/or non-recurrence action. We, when requested, shall send to the customer a descriptive report of the action taken.

If articles are proprietary designed, we cannot conduct Materials Review action on a discrepancy which will result in a departure from the requirements of the customer control drawing or specification as noted on the purchase order. Such departures must be authorized by the customer Materials Review Board action.

- 1.4.1 Our quality control system shall incorporate provisions for the assurance of required reliability and for the collection and transmission of reliability data as specified by the customer. The details of reliability assurance and failure data reporting will be determined by the requirements of the purchase order.
- 2.0 Quality Control exercises control over the following functions.
  - 2.1 Inspection to safeguard the quality of:
    - A. Raw Material
    - B. Purchased Components
    - C. Tooling
    - D. Fabrication
    - E. Processes
    - F. Assembly and Adjustment
    - G. Outside Production
    - H. Completed Products
    - I. Shipping Standard and Packaging
    - J. Initiates L. M. R. and/or customer MRB
  - 2.2 Compliance with specification and standard including procurement, engineering and customer requirements.
  - 2.3 Control of measuring, testing and other equipment and processes employed in evaluation of the end product.
  - 2.4 Maintenance of up-to-date drawing and drawing change information.
  - 2.5 Maintenance of Inspection and certification records necessary to the performance of all above functions.
  - 2.6 Full responsibility for quality control is assigned to the inspector who is responsible to the plant manager.
  - 2.7 All inspection performed by others: Radiographic, Penetrant, Magnetic, etc. will be controlled by the Quality Control Department. All such results recorded.
  - 2.8 Reject and properly identify supplied not conforming to the requirements.

Segregation and disposition of the material which does not meet established standards.

  
Written by:  
Jim Flowers

  
Approved by:  
Jim Kelley

MERCURY METALS INC.  
Lot Inspection Record and Inspection Instructions

Part Name \_\_\_\_\_ Part No. \_\_\_\_\_ Lot Size \_\_\_\_\_ SS \_\_\_\_\_  
Date of Insp. \_\_\_\_\_ Job No. \_\_\_\_\_ Code No. \_\_\_\_\_ CR(100%) \_\_\_\_\_  
Lot No. \_\_\_\_\_ Issue No. \_\_\_\_\_ M-A(AQL 1%) \_\_\_\_\_ M-B(AQL 2.5%) \_\_\_\_\_  
Dwg. and Rev. No. \_\_\_\_\_ No. Acc. \_\_\_\_\_ No. Rej. \_\_\_\_\_ M(AQL 4%) \_\_\_\_\_ M(AQL 4%) \_\_\_\_\_

Sampling in Accordance with MIL-STD-105

Class	No.	B/P Dimension and/or Characteristics	Insp. Tools	Insp. Tools	Equipment and Procedure Type
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				

Remarks \_\_\_\_\_ Lot Disposition: Accepted \_\_\_\_\_

Insp. \_\_\_\_\_ Rejected \_\_\_\_\_

Prod. \_\_\_\_\_ Screen: \_\_\_\_\_

Method Eng. \_\_\_\_\_



MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
RECEIVING INSPECTION

PURPOSE: To outline the procedure for the operation of Mercury Metals Inc. receiving inspection.

1.0 General

1.1 Receiving inspection will conduct the necessary inspection of all material received for the company.

2.0 Inspection

2.1 The inspector will inspect the material for conformance to applicable purchase order requirements, specifications, blueprints, E. O.'S, Inspection check sheets, test procedures, and inspection tooling.

2.2 Material provisionally accepted by Mercury Metals Inc. source inspection will be checked for count, identity, damage and required inspection not performed by source inspection.

2.3 Disposition of discrepant material.  
Material received in a damaged or otherwise unusable condition will be rejected using our standard form MR per section 160.00 to define subject discrepancy. Whether it is the suppliers deficiency or damaged in transit, we will treat the same except damage in transit will be photographed and so stated on the way bill and attested by the carrier. Material of a discrepant nature will be tagged and stored in material review crib pending disposition to use the material or scrap.

3.0 Designation of Inspection Status

3.1 The inspection status of Material routed through inspection will be designated at all times by the proper Mercury Metals Inc., forms.

3.2 The following forms will be used:

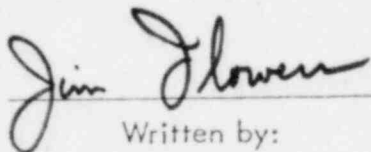
3.2.1. Receiving report or indicate actual count and that material has been inspected for damage and that it conforms to material ordered. This can be written on our copy of shipper, a copy of which will be kept in appropriate job folder. Shipper must be stamped by receiving inspector.

4.0 Receiving Raw Stock

- 4.1 Receiving inspection will ascertain that certification or test reports required by the purchase order accompany the receipt of raw stock such as:
  - 4.1.1 Sheet, Bar Tubular, and extruded stock of metal or plastic.
  - 4.1.2 Hardware and Etc.
  - 4.1.3 Bulk liquids or solids
- 4.2 When physical or chemical analysis of incoming raw stock is questionable, an impartial analysis shall be obtained from a licensed laboratory. The raw stock shall be held pending the results of the test sample.
- 4.3 Inspection will maintain a systematic verification of certification and test report for each vendor.
- 4.4 Acceptable raw stock will be identified.
- 4.5 Our receiving inspection system shall include, but not be limited to, the following:
  - 4.5.1 All incoming materials shall be inspected by an approved statistical quality control plan. Such inspection shall include visual, dimensional, functional, hardness, magnetic particle, penetrant, etc., or other methods necessary to affirm required material composition and quality.
  - 4.5.2 Material test reports shall be checked 100% against the purchase order requirements. Material certifications and test reports shall be filed and preserved as specified in the purchase order.
  - 4.5.3 Independent laboratory facilities equipped to perform required tests shall be used by Mercury Metals Inc. when testing material.
  - 4.5.4 An identification system shall be provided to preclude the use of wrong materials during manufacture. All material purchased for or furnished by a customer

shall bear sufficient identification to identify it with the purchase order and/or certification form of standard identification or it shall be rejected. When material is sheared or cut in such a manner as to remove this identification from the remaining portion, inspection shall be responsible for the proper reidentification of the remaining portion.

- 4.5.5 All materials shall be properly stored to prevent damage, corrosion, etc., and will be properly segregated. Material will be used on a "First-in-first-out" basis.
- 4.5.6 Materials shall be stored in such a manner as to prevent withdrawal by unauthorized personnel.
- 4.5.7 Our Receiving Inspection acceptance shall be based on the requirements of our purchase orders.



Written by:  
Jim Flowers



Approved by:  
Jim Kelley

MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
MANUFACTURING INSPECTION

PURPOSE: To establish the procedure for inspection of parts and assemblies manufactured by or for Mercury Metals, Inc.

1.0 General

- 1.1 Inspection will be conducted in accordance with the planned inspection operations called for on the shop order, and any detailed information. Roving inspection will maintain preventive surveillance.
- 1.2 Each controlled characteristic will be inspected at the planned inspection station in the production cycle. Thereafter, the same characteristic will be re-inspected only if subsequent events indicated that:
  - 1.2.1 The original inspection was inadequate.
  - 1.2.2 The characteristic has been damaged or has deteriorated in storage or handling.
  - 1.2.3 The inspection history is lost or has become invalid.
- 1.3 Characteristics which are under satisfactory control will be inspected in accordance with the approved inspection plan.
- 1.4 Characteristics which are not under satisfactory control will be subjected to 100 per cent screening until they are brought under control.
- 1.5 Characteristics which are designated as being so important that no fault can be tolerated, will be subjected to 100 per cent screening at some point in the manufacturing cycle. This normally will be the original inspection point for the characteristic.
- 1.6 Characteristics acceptability of which is determined by control of the manufacturing process will be inspected to assure that the process produces satisfactory parts. Thereafter, periodic inspection in accordance with approved plan (S) will be performed.
- 1.7 Every inspection which is made will be recorded in the appropriate inspection space on the shop order, and validated by the application of the inspection stamp.

2.0 Acceptance Criteria

2.1 Inspectors will use as criteria of acceptance only the following:

- 2.1.1 Blueprints, specifications, and E. O.'s issued via production control.
- 2.1.2 Officially released shop practice standards.
- 2.1.3 Inspection tool, gages, and instruments which have been calibrated as scheduled.
- 2.1.4 Production tooling which has been classified and calibrated for inspection use.

3.0 Identification

3.1 Material, at all times shall be positively identifiable by markings either on the material or on accompanying paper work.

3.2 All material shall be accompanied by a shop order, blueprint, traveler, etc., which identifies the material and indicates its production and inspection status.

3.2.1 While material is undergoing actual machining or processing, the paper work may be temporarily detached. During this interval, particular care shall be exercised to avoid the mixing of lots or other compromise of inspection continuity.

3.2.2 Material in storerooms and accumulation areas will be identified as required by paragraph 3.1.

4.0 Condition of material before inspection.

4.1 Material shall be free of dirt, loose particles, burrs, oil and moisture.

4.2 All paper work shall be complete and in good order.

4.3 Operations scheduled to be performed prior to inspection shall have been completed.

4.4 The producing department shall present to inspection only material which to their knowledge is acceptable, or shall indicate to inspection the known or suspected discrepancy.

5.0 Inspection

5.1 The inspector will pass to next operation or stores only lots or material whose characteristics are within acceptable limits.

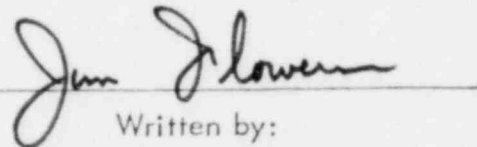
- 5.2 The inspector will suspend any part which contains a known defect, even though the lot is acceptable.
- 5.3 The inspector will reject any lot if the number of defectives in the lot causes the quantity to be less than the number indicated in parentheses on shop order.
- 5.4 The inspector will tag the lots as out of control per shop order.

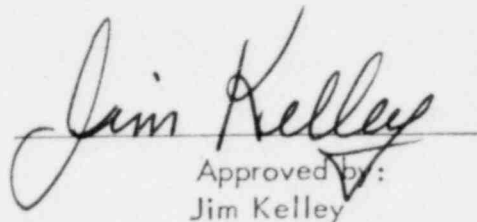
#### 6.0 Disposition of Parts and Assemblies

- 6.1 Acceptable parts and assemblies will be released to the area dispatcher with the shop order properly stamped off.
- 6.2 Non-acceptable parts will be handled as follows:
  - 6.2.1 Discrepant parts, with properly accomplished rejection report, will be routed to the salvage area for preliminary review.
  - 6.2.2 Defective parts to be removed from an assembly will be rejected with properly accomplished rejection report, indicating replacement requirement and travel with the assembly until defective part is removed. The assembly will be tagged as out of control per shop order until replacement is assembled and assembly re-inspected.
- 6.3 Non-acceptable assemblies will be handled as follows:
  - 6.3.1 Assemblies which can be reworked shall have all the discrepancies listed on assembly discrepancy log and routed back to the submitting department.
  - 6.3.2 Assemblies which cannot be reworked by the submitting department shall have all discrepancies listed on the assembly discrepancies log and then routed through the preliminary review.
  - 6.3.3 When a reworked assembly is returned for reinspection the inspector will verify that the rework has been properly accomplished and place his inspection stamp on the accompanying paper.
  - 6.3.4 Assembly rework resulting from assembly discrepancies log will be reinspected mechanically. If acceptable, the discrepancy will be stamped off prior to additional testing.
- 6.4 Unidentified material, i. e., material which has no tags, shop traveler, etc., attached will be brought to the attention of proper supervision. If immediate corrective action is not obtained, the material shall be sent to the salvage area.

7.0 Process Control

- 7.1 Our quality control system shall monitor all processing operations and shall enforce all applicable process requirements. We shall manufacture to detail drawings and specifications listed unless exception is authorized by the customer.
- 7.2 Processing to specifications listed on the customer detail design drawing or to our specification used in lieu of the customer specification shall be accomplished by the customer approved facilities.
- 7.3 Process control shall not eliminate the requirements for final inspection and test of the end item, but it may be used to reduce these requirements. Records such as the Quality Control Charts, Frequency Distribution Charts, etc., of process controls used as acceptance devices shall be retained as inspection records.

  
Written by:  
Jim Flowers

  
Approved by:  
Jim Kelley

MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
FINAL ACCEPTANCE

PURPOSE: To establish the requirements for quality control of productions assembly functional testing procedures.

1.0 General

- 1.1 As considered necessary by the company to fulfill contractual requirement, assemblies and sub-assemblies shall be subjected to functional tests or inspection.
- 1.2 Final Inspection data sheets are not subject to interpretation. The unit inspection either does, or does not fail within the limits specified.

2.0 Types of Inspection

- 2.1 Two types of Inspection are maintained by the Company Manufacturing and Final Acceptance. The limitations of manufacturing inspection are covered by this manual.
- 2.2 Final acceptance inspection shall commence at inspection stations where recorded data for insertion on the inspection data sheet first appears.
- 2.3 The compiling of this data may begin in sub-assembly stages or not be recorded until final, prior to Government inspection.
- 2.4 Any inspection conducted requiring the data to be recorded on the inspection data sheets shall be witnessed by a member of quality control department.
- 2.5 This witnessing of inspection is not indicative of the acceptance of the unit. A qualified representative of the quality control staff office shall review the recorded data and accept or reject the unit.

3.0 Final Acceptance

- 3.1 Assemblies will be acceptable for final review by Quality Control Staff member when:
  - 3.1.1 Shop order clearly indicates that the preceding operations have been completed.
  - 3.1.2 All applicable procedures, inspection data sheets (properly stamped off as being witnessed), and specifications are available.



MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
FINAL ACCEPTANCE


- 3.2 The staff representative may request any or all of the inspections to be re-run at his discretion.
  - 3.3 The staff representative shall survey the parts for final visual inspection.
  - 3.4 The staff member, upon being completely satisfied with the function and appearance of the parts shall sign and stamp off the parts in behalf of the company.
- 4.0 Disposition - Government Contracts
- 4.1 Government items bought off for the company shall be so indicated on the shop order.
  - 4.2 Non-acceptable assemblies will have the discrepancies listed on the assembly discrepancy log sheet, and a rejection report filled out. The unit will be handled as follows:
    - 4.2.1 The parts will be returned to manufacturing if a part needs replacement.
    - 4.2.2 When rework has been accomplished, the assembly will be submitted for mechanical inspection.
    - 4.2.3 If the part passes inspection it will be handled as paragraph 4.1 of this section.
    - 4.2.4 If a defective part is removed and replaced, the discrepant item will be rejected and forwarded to preliminary review.
- 5.0 Disposition - Commercial Items
- 5.1 Commercial items bought off by quality control shall be forwarded to shipping for further processing.
  - 5.2 Defective items will be processed as follows:
    - 5.2.1 The item will be returned to the manufacturer or vendor if a part needs replacement, with rejection report.
    - 5.2.2 Returned items will then be processed per 4.2.3 through 4.2.6 above.

6.0 Government Inspection

- 6.1 Units cleared through Government inspection shall be sent to shipping and be processed per job order.
- 6.2 The Quality Control representative shall be responsible to process all paper work in accordance with procedures and to obtain all signatures as required from the Government representatives.
- 6.3 If a unit is formally rejected by Government inspection, a meeting shall be convened of the material review board per this manual.
- 6.4 If Government inspection reveals an apparent anomaly, the functional review board shall be convened per this manual.
- 6.5 Rework and reinspection shall be indicated by either of the boards called out in paragraph 6.3 or 6.4.

7.0 Inspection Report

- 7.1 Each lot or release submitted for inspection as specified by shop order shall be entered in the Inspection Report, number of samples per MIL-STD-105, or 100% as stated by the shop order.
- 7.2 Inspection Reports to be reviewed by the Plant Manager. His signature indicating complete acceptance by company inspection.

  
Written by:  
Jim Flowers

  
Approved by:  
Jim Kelley

MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
PACKAGING AND SHIPPING INSPECTION

PURPOSE: To establish requirements for packaging and shipping inspection for all parts and assemblies.

1.0 General

1.1 It is the responsibility of the Quality Control Department to inspect all packaging and accompanying shipping instructions for compliance with applicable specifications and requirements.

2.0 General Inspection Requirements

2.1 Prior to delivery to shipping, all parts shall:

2.1.1 Be accepted 100% by all previous inspections and so stamped. All "D" stamped, "Witheld for Material Review", articles must be cleared with a triangle "Accepted by Material Review" stamp.

2.1.2 Be tested and stamped, if required.

2.1.3 Show no evidence of damage.

2.1.4 Be free of dirt, excessive grease or moisture and foreign matter.

2.1.5 Be identified with specific marking(s), part or article number(s), special nomenclature, identification and serial number tags, etc. if required.

3.0 Receipt of Articles in Shipping

3.1 Upon receipt of articles to be shipped, the inspector will:

3.1.1 Inspect for possible damage during transit.

3.1.2 Reject all articles considered to be below Mercury Metals Inc. standards of quality and workmanship.

3.1.3 Check parts against shipping specifications.

4.0 Inspection of Packaging Material

4.1 The inspector will inspect, on a spot-check basis, the packaging material and contents before the package is closed.

4.2 Packaging must conform to applicable specifications for:

4.2.1 Container

4.2.2 Cushioning or damage

- 4.2.3 Type and Date of preservation
  - 4.2.4 Wrapping
  - 4.2.5 Taping
  - 4.2.6 Sealing
  - 4.2.7 Marking
- 5.0 Government Inspection Prior to Closing
- 5.1 The Government representative may choose to inspect the package at this or any point.
- 6.0 Closing the Package
- 6.1 The copy of the shipping order will be placed inside the package before sealing.
  - 6.2 The closed package will be inspected and the inspection stamp shall be affixed to the package.
- 7.0 Prior to Shipping
- 7.1 The shipping department will submit the shipping documents to a Quality Control representative.
  - 7.2 If the documents conform to requirements the representative will stamp the document with the acceptance stamp and present it to the Government inspector.
  - 7.3 The packaging inspector will assure that the required exterior markings comply with MIL-STD-129.
- 8.0 Storage
- 8.1 The packaging inspector will take normal precaution to assure that the material is safely stored on the carrier.
- 9.0 List of Approved Processing Sources:
- 9.1 Finco, Inc.
  - 9.2 Quality Paint
  - 9.3 Julian's Paint

PACKAGING AND SHIPPING INSPECTION (con't)

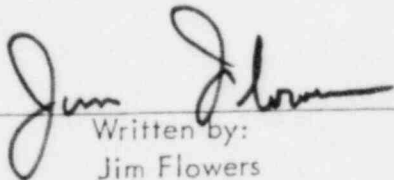
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9.4 Hawkin's Paint

9.5 Del's Plating Works

9.6 Thermo-Electron

9.7 Dixie Electro Plating

  
Written by:  
Jim Flowers

  
Approved by:  
Jim Kelley

MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
QUALITY CONTROL STAMPS

PURPOSE: To establish the types, use, and regulation of Quality Control Stamps.


1.0 General

- 1.1 The Chief Inspector will be responsible for approval of the issuance of all stamps and for the maintenance of complete written records of stamp type and assignment.
- 1.2 Stamps shall be rubber or steel, impression types, of a size suitable to the particular application. For general use, rubber stamps approximately 3/8" in diameter will be standard.

2.0 Use of Stamps

- 2.1 Quality Control stamps are used to indicate the acceptance or rejection of material, parts, and assemblies. All items going to stock must bear evidence of inspection; stamps will also be used to show acceptance of critical stages of manufacture.
  - 2.1.1 Inspectors will normally use only the acceptance stamps: salvage analyst will be responsible for disposition of in-process rejections by:
    - A. Scrapping obviously unusable material.
    - B. Reference to material review board for decision.
    - C. Originating necessary paper to rework the material to conform to prints and specifications.Quality Control stamps are available for items A and B. Stamps are not used for identifying material to be reworked.
  - 2.1.2 Whenever practical the stamp impression shall be applied to the part itself. For parts which are too small or otherwise unsuited to stamping, the inspector will affix this stamp to the package (if necessary arranging for individual or group packaging of the parts).
  - 2.1.3 Stock room personnel are responsible for refusing to accept unstamped material and for assuring that parts which are container-stamped are maintained in their original package until issuance to the line.

- 2.2 Stamps shall be kept clean and must produce a legible impression worn and damaged stamps will be replaced immediately.
  - 2.3 Inspectors may use only the stamp assigned to them; they must not lend or borrow stamps. Lost stamps are to be reported immediately to the Chief Inspector.
- 3.0 Regulation
- 3.1 Assigned stamps will be turned in prior to approval of employee transfers, leaves of absence, or terminations.
  - 3.2 Stamps assigned to one inspector and turned in for any reason, will not be re-assigned to another inspector for a period of one year.

  
\_\_\_\_\_  
Written by:  
Jim Flowers

  
\_\_\_\_\_  
Approved by:  
Jim Kelley

MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
DRAWING AND CHANGE CONTROL

PURPOSE: To establish procedures for control of drawings and changes.

1.0 General

1.1 Drawings, sketches and/or purchase descriptions and changes received from the customer will be processed as follows:

1.1.1 Drawings, sketches and purchase descriptions received with purchase order shall be checked against purchase order call out and distributed as follows:

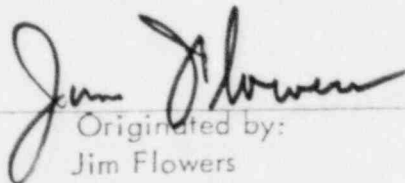
One in shop and inspection file, "supervised by inspection", and one shall accompany work order through all phases of manufacture and inspection.

1.1.2 New issue drawings and engineering changes shall be received by the management and a determination of the effect upon the job involved will be made. If not applicable one copy shall be filed in inspection only. Otherwise distribution shall be as per paragraph 1.1.

1.1.3 All obsolete drawings, etc., shall be removed and destroyed or returned to the customer as directed.

2.1 Drawing revisions listing on shippers and drawings changes control.

2.1.1 Effective April 16, 1969, it is mandatory that all shippers list the latest drawing revision letter to which the part has been made. This is the responsibility of the inspection department.

  
Originated by:  
Jim Flowers

  
Approved by:  
Jim Kelley



MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
TOOLING INSPECTION

PURPOSE: To outline the procedure for inspection of production and inspection of Tooling.

1.0 General

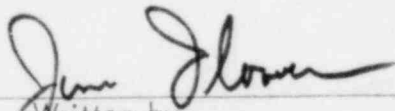
- 1.1 The Inspection Department is responsible for inspection of:
  - 1.1.1 Newly fabricated or reworked production tooling or inspection fixtures.
  - 1.1.2 Tooling or fixtures prior to shipment to outside vendors for use on Mercury Metals Inc. contract.
  - 1.1.3 Active inspection fixtures and templates within ninety (90) days of last inspection.
- 1.2 The tooling inspection record will be prepared when the tool is first inspected and is maintained as an inspection history record. All results of each tool inspection will be recorded on the applicable tooling inspection record.
- 1.3 All new or reworked tools will be identified by the latest Engineering Order change letter or number. If an E. O. is the cause for the manufacture or rework, the E. O. number will be stamped on the tools.

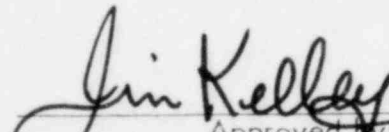
2.0 Definitions

- 2.1 "Tools" as herein referenced, include jigs, fixtures, dies, templates, patterns, form tools, adapters, specially developed machine attachments, etc., which have been individually designed or modified to meet production or inspection requirements.
- 2.2 Standard equipment of a vendor proprietary nature, articles which are adaptable to multipurpose use, and regular operating accessories to standard equipment are not included within the scope of this definition.
- 2.3 Devices which are exclusively used for the measurements determination of physical, or mechanical properties, or precision control shall be differentiated from tooling as defined herein. Such items shall be handled in accordance with section 80.02 of this manual.

- 2.4 Tooling designed for inspection purposes and production tooling which is used wholly or partially for inspection purposes shall be termed "Inspection Tooling". Tooling used by production only shall be termed "Production Tooling."
- 3.0 Mercury Metals Inc. Fabricated or reworked Tooling
  - 3.1 When new Mercury Metals Inc. fabricated or reworked tooling is accepted by inspection, the "Tool Order" will be stamped with the in-process acceptance stamp.
    - 3.1.1 If acceptance of the tool does not require inspection of the first part produced, the tool is stamped with the in-process acceptance stamp only.
    - 3.1.2 If the Tool is acceptable to the tool drawings and final acceptance is contingent on the Tool's producing satisfactory parts, a Tool Tryout Tag will be affixed to the Tool.
    - 3.1.3 When the first article has been accepted, the Tool Tryout Tag will be removed and destroyed. The Tool will then be stamped with Tool proving stamp and in-process acceptance stamp.
- 4.0 Vendor Manufactured or Repaired Tooling
  - 4.1 When new, repaired or reworked tooling is received from a vendor or customer on a receiving report, the results of the tooling inspection shall be entered on the receiving report and handled according to Section 120.00.
- 5.0 Re-Inspection of Inspection Fixtures
  - 5.1 Tooling Inspection will evaluate the Inspection Fixture Log weekly to determine the use, and schedule the re-inspection of the fixtures. This shall apply to all fixtures in current use.
- 6.0 Defective Tooling
  - 6.1 When previously accepted inspection or production tooling is found defective because of damage, wear, design change, etc., the tool shall be tagged as defective and routed to Tool control for disposition.

- 6.2 Tools shall be reinspected before each release or each 100 production parts, whichever occurs first. Such inspection shall be recorded in a log maintained by inspection.
- 6.3 Tools must be properly stored and controlled to prevent misuse, damage, and deterioration. Tools in storage shall be periodically checked for condition and preservation in compliance with applicable portions of customers documents, tooling agreements or purchase order conditions.
- 6.4 Physical inventory of government furnished property will be taken upon completion of the contract or on August 31, annually, whichever occurs first.

  
Written by:  
Jim Flowers

  
Approved by:  
Jim Kelley

MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
GAUGE CONTROL

PURPOSE: To outline the procedure for inspection and care of gauges, master gauges, Micrometers, and other Mechanical Measuring devices.

1.0 General

1.1 The Inspection Department is responsible for the inspection, care, maintenance and records of:

1.1.1 Plug, Ring and Thread Gauges

1.1.2 Micrometers, Calipers, etc.,

1.1.3 Dial Indicators

1.1.4 Thread Measuring Wires

1.1.5 Gauge Blocks and Master Gauges

1.1.6 Miscellaneous Gauges and other Mechanical Measuring Equipment.

2.0 Inspection

2.1 All new, re-designed, re-worked, and repaired Gauges, Master Gauges, Micrometers, etc., will be inspected for accuracy and conditions before acceptance for use.

3.0 Care and Maintenance

3.1 Unless specifically authorized by the Chief Inspector, gauges shall be returned to the crib at the end of each shift or as the job is completed, whichever is sooner, for dimensional check and inspection for wear or damage before stocking or re-issue.

3.2 When Gauges are permitted to be retained at work station, they shall be returned to the crib at least once every five days for a dimensional check.

- 3.3 At specific intervals as established by the Chief Inspector, all company owned, as well as employee owned dial indicators, Micrometer, Protractors, height gauges, master gauges, comparators, gauge blocks, calipers, etc., shall be inspected for malfunction, wear or damage. All tools, whether personal or company owned, not within established tolerance, must be tagged and removed from service at once. If rejected, tools can be repaired. They must be repaired immediately either by Mercury Metals Inc., or by some acceptable tool and gauge repair shop with the facilities to certify the accuracy of said tool. Tools belonging to employees that are beyond repair must be removed from the premises as customer Quality Control will remove us from their Qualified Vendor list upon finding a measuring device in use that has not passed our inspection.
- 3.3.1 All Master Gauges, and Master Squares are certified by outside source on a semi-annual basis. All equipment calibrated by outside source will be supported by a Certificate stating that calibration was performed using standards that was traceable to the Bureau of Standards. As a minimum the Certificate will contain the date, accuracy, equipment number, and the environmental conditions which the tests were performed.
- 3.3.2 Micrometers, Verniers, Height Gauges, Squares, and Cubes, are checked on a 90 day basis. All tooling will have a recall date for calibration before returning to Gauges Storage area. Tools will be calibrated in an environmental controlled area of 68° F / 5° .
- 3.4 All Gauges and Measuring Equipment, when found to be worn or damaged, shall be rejected in conformance with Tooling Inspection procedure, Section 80.01 para. 6.0 (Quality Control Manual).
- 3.4.1 Procedure for calibration of Micrometer, Vernier Calipers, etc., will be spelled out on each Inspection Control Card covering each tool.

4.0 Records

4.1 The Chief Inspector shall maintain a complete record of the inspection and acceptance of newly acquired, re-worked, or re-conditioned Gauges and other mechanical Measuring devices.

4.2 Each inspection tool, where possible, will have an adhesive sticker affixed to the tools in a position so as not to interfere with its function or use, which will indicate the next programmed inspection date. On tools too small for the sticker, a tag bearing the same information shall be attached.

  
Written by:  
Jim Flowers

  
Approved by:  
Jim Kelley

MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
REVISIONS

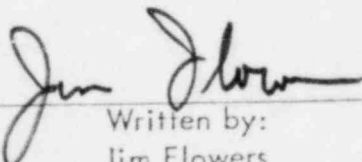
PURPOSE: To establish a revision program.

1.0 General

- 1.1 This manual shall be reviewed semi-annually or upon written request from a customer, production, inspection, or the management, in order to keep current with changing technology and to satisfy the customer requirements.
- 1.2 A letter or memo to the Quality Control Management, stating the condition and a suggested remedy, will be sufficient to initiate revision procedures.

Revisions are as follows:

NONE

  
Written by:  
Jim Flowers

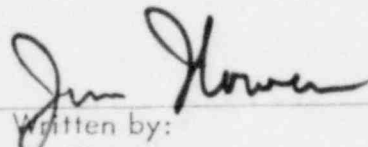
  
Approved by:  
Jim Kelley

MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
TRAINING

PURPOSE: To establish a training program.

1.0 General

- 1.1 We shall develop, implement, and maintain training programs as deemed necessary by the management, to maintain acceptable areas of performance in quality control, purchasing, and manufacturing. Training programs shall include, as needed, familiarization with parts, components, equipment, systems, inspection and tests, checkout, quality control, statistical quality control, packaging and handling. Particular emphasis shall be given to the function and mission of the end item, to new articles and to new or sensitive fabrication processes or materials. The training program shall include sufficient training to ensure personnel proficiency and means of determining the proficiency of persons completing the courses. Inspector training programs shall, where practical, include the inspection of appropriate articles with known deficiencies, in order to evaluate the inspector's proficiency. Training needs shall be periodically assessed to determine requirement for additional training.

  
Written by:  
Jim Flowers

  
Approved by:  
Jim Kelley



MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
AUDIT PROGRAM

PURPOSE: To control an audit program.

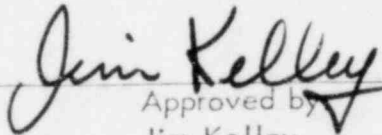
1.0 General

- 1.1 We shall audit the adequacy of the quality program procedures, inspections, tests, process controls, and certifications performed in each area on timely basis. The audit shall be performed by an impartial team familiar with written procedures and standards applicable to the areas being audited, but not having specific line responsibilities in those areas.

The audit shall include examination of all quality operations and documentation, comparison with established requirements, notification of required corrective action, and follow up to assess results of corrective action. An example of an examination of an inspection operation would include, but not be limited to:

- A. A reinspection of work accepted by the inspector in the area.
- B. An investigation of the availability of all required documents.
- C. A determination of the familiarity of personnel concerned with required documents.
- D. A review of failure analysis and corrective action taken.
- E. An evaluation of the adequacy of acceptance and rejection documents.

  
Written by:  
Jim Flowers

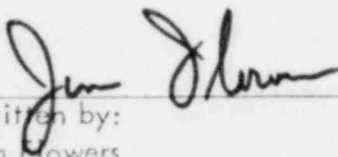
  
Approved by  
Jim Kelley

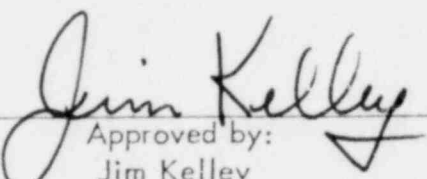
MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
APPROVED SOURCES

PURPOSE: To establish an approved source program.

1.0 General

- 1.1 An up-to-date list of approved suppliers and processors shall be maintained by the management for the benefit of the Purchasing and Inspection Departments, thereby assuring that only the approved suppliers and processors are used.

  
Written by:  
Jim Mowers

  
Approved by:  
Jim Kelley

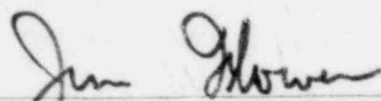
MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
RECEIVING, STORING, AND USAGE OF CUSTOMER FURNISHED TOOLING  
(Ref. P. S. SC.01)

PURPOSE: To control all functions involving the receiving, storing, and usage of customer furnished tooling.

The follow-up rework of customer tooling and any invoicing required.

METHOD: Our method for receiving of the tools shall be as follows:

- Step 1 The customer transmittal and packing list shall be checked against the tools received. Each line item to be checked to be certain the listed tool and its identity agrees with the packing list.
- Step 2 Quality assurance inspection personnel shall inspect the tools for visual damage or parts missing. If such occurs, they will advise the planning and tooling personnel
- Step 3 The production control office shall advise the customer of any rework required to the furnished tooling by providing a copy of the LMR to the customer. The supervisor of Tooling, shall advise all concerned, the estimated price of the rework. This price to be reviewed and approved by either Jim Flowers or Jim Kelley and then forwarded to the customer with the transmittal of the LMR.
- Step 4 The cost accounting office shall record all time against the work order so that verification of rework charges can be established.
- Step 5 The production supervisor shall be on the back side of the traveler list any material being used to fabricate the rework.
- Step 6 The accounting department shall follow up the written request for compensation and review same each 30 day period.

  
Written by:  
Jim Flowers

  
Approved by:  
Jim Kelley

MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
PROCEDURE FOR MERCURY METALS INC.  
MATERIAL REVIEW RECORD

PURPOSE:

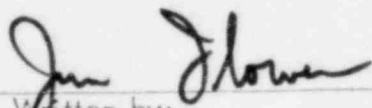
The purpose of the MRR, is to establish a system of control on all rework of parts prior to final inspection. Note: The MRR, will not replace the customer's Material Review Record where such is required.

METHOD:

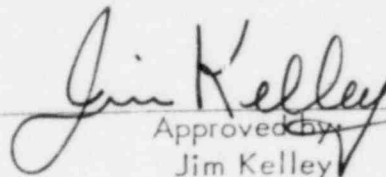
The MRR will be originated by the Inspection Department, either at the request of the Line Inspector or the Department Supervisor. The MRR form shall be filled out complete in duplicate and submitted to the Plant Supervisor and Production Control Manager for disposition. If the disposition can be established by the Inspector and Department Supervisor at the writing of the MRR, this shall be written and approval given by the Plant Supervisor and Production Manager. If the disposition cannot be made or decided upon by the Department Supervisor and the Inspector, the disposition section of the MRR shall be left blank and filled in by the Plant Supervisor and the Production Manager. The number assigned to the MRR shall be the same basic number as the shop order number and a suffix number sequentially established.

DISTRIBUTION:

The original copy of the MRR shall be placed in the shop order jacket and accompany the work thru the plant. A duplicate copy shall be filled in the Inspection's files. Upon completion of the rework the original shall be forwarded to the main office and filed in the job folder for future reference.



Written by:  
Jim Flowers



Approved by:  
Jim Kelley

MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
PROCUREMENT DOCUMENT CONTROLS

PURPOSE: To establish procurement document controls.

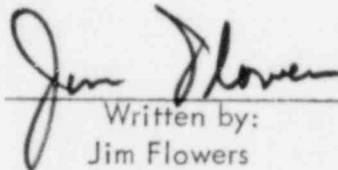
- 1.0 Mercury Metals, Inc. quality shall review purchase orders to insure that applicable quality and technical requirements have been incorporated in the purchase order.
  - 1.1 All purchase orders shall be made available to the NASA Quality representative.
  - 1.2 Applicable portions of the MSC-M-8080 Design and Procedural Standards 79 and 86 shall be incorporated in all purchase orders.
  - 1.3 Additional items of information to be required as applicable on the purchase order are as follows:
    - 1.3.1 Raw material chemical and /or physical test certifications.
    - 1.3.2 Adequate shipping instructions.
    - 1.3.3 Age control and limited life data.
    - 1.3.4 Supplier records of tests and inspections must be maintained readily available for review.
    - 1.3.5 Inspection and test characteristics to be verified at the supplier's facility.
    - 1.3.6 When applicable, Mercury Metals Inc. source inspection.
    - 1.3.7 When applicable, Government source inspection. The following statement shall be included on the purchase order:  
"All work on this order is subject to inspection and test by the Government at any time and place. The Government at any time and place. The Government quality representative who has been delegated NASA quality assurance functions on this procurement shall be notified immediately upon receipt of this order. The Government representative shall also be notified forty-eight (48) hours in advance of the time articles or materials are ready for inspection or test."

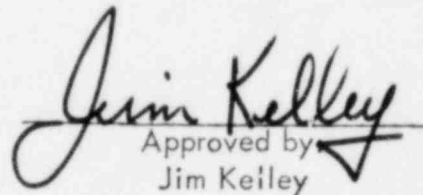
MERCURY METALS INC.  
QUALITY CONTROL MANUAL  
PROCUREMENT DOCUMENT CONTROLS

1.3.8 Procurements which do not require Government source inspection shall include the following statements:

"The Government has the right to inspect any or all of the work included in this order at the supplier's plant."

1.3.9 Mercury Metals Inc. suppliers shall be required to maintain records of inspections and tests for three years from the end of the contract period.

  
Written by:  
Jim Flowers

  
Approved by:  
Jim Keiley