Procedure 03-8083-P01

Part 1 of 2

(Ref: SECTION 10)

Inspection
and
Test Control

REVISION RECORD

Revision	Date of Issue	Description of Change	Prepared by	Reviewed by	Approved by
0	12/11/03	New	Elaine Steele	Tom Gilmore	Dave Rioux
1	01/12/04	Modified to address Rohwedder's comments	Gary Armstrong	Tom Gilmore	Dave Rioux
2	01/26/04	Modified to address Rohwedder's comments	Gary Armstrong	Tom Gilmore	Dave Rioux

INSPECTION AND TEST CONTROL

1.0 Purpose:

To establish the methods of controlling inspection and testing to ensure compliance with the requirements of contracts, regulations, Codes and Standards.

2.0 Scope:

Inspection and testing of supplied items and products manufactured by Precision Metal Works Ltd.

3.0 References:

ASME III	Subsections NCA 4134.10, 4134.11
CAN/CSA-N285.0	Section 11
ISO 9001:2000	Sections 7.1, 7.4.3, 7.5.4, 8.1, 8.2.4

4.0 Responsibilities:

4.1 Quality Assurance Manager shall be responsible for:

4.1.1 The preparation, issue, maintenance, implementation and control of this procedure.

4.1.2 Monitoring of Inspection and Test activities.

4.1.3 Preparation of Inspection and Test procedures.

4.1.4 Notifying customer representatives and/or the Authorized Inspector, with the required notice, of impending tests with ‘Verification’, ‘Witness’ or ‘Hold’ points.

4.1.5 Conducting liaison with the Authorized Inspector.

4.1.6 Final release of products for shipment, either directly or indirectly by delegation of this authority to the Quality Assurance Inspector.

4.2 Quality Assurance Inspector shall be responsible for:

4.2.1 The performance of Incoming, In-process and Final Inspections in accordance with this procedure and specified requirements.

4.2.2 Witnessing and verification of tests.

4.2.3 Recording inspection and test results in accordance with procedures and other requirements.

4.2.4 Identifying, documenting and controlling nonconforming product.

4.2.5 Updating Material Control Sheets Form F006 shown in Exhibit 2, upon Incoming Inspection.

4.3 **Receiver shall be responsible for:**

4.3.1 Receiving incoming products and materials.

4.3.2 Verification of product received in accordance with the Bill of Lading and Packing Lists.

4.3.3 Examination of packages and/or items for transit or other damage.

4.3.4 Initiating Incoming Inspection Report.

4.3.5 Placing product in designated “Incoming Hold Areas”.

4.4 **The Purchasing Manager shall be responsible for:**

4.4.1 Ensuring suppliers are advised of inspection, testing and documentation requirements.

4.4.2 Advising suppliers of pending source surveillance and ‘Verification’, ‘Witness’ or ‘Hold’ points as specified by the Quality Assurance Manager, in specifications or in other documents.

4.5 **The Production Manager shall be responsible for**:

4.5.1 That Quality Department personnel are provided with sufficient notice of impending tests with inspection ‘Verification’, ‘Witness’ or ‘Hold’ points. This notice shall observe the requirements of customer representatives and the Authorized Inspector where applicable.

4.6 **Foreman (Machine Shop and Fabrication Shop) shall be responsible for:**

4.6.1 Ensuring the inspection and testing requirements of Route Cards and other controlling documents are observed.

4.6.2 Ensuring work does not proceed beyond specified ‘Verification’, ‘Witness’ or ‘Hold’ points.

4.6.3 Reporting any nonconforming conditions without undue delay.

4.6.4 Ensuring Production personnel:

- Perform testing operations as required.
- Perform verifications of their own work and the work of others.
- Maintain product identification as directed.

5.0 Procedure:

5.1 **General Requirements:**

5.1.1 Exhibits illustrated in this Procedure may not reflect the most current revision, but are for reference only.

5.1.2 All products received for embodiment into manufactured items, components and assemblies shall be inspected on receipt to ensure compliance to the appropriate Purchase Orders.

5.1.3 In-process inspection of manufacturing operations and assembly shall be performed by qualified personnel who are responsible to pre-inspect their own work and verify the work of others in accordance with the Route Card, Form F031 shown in Exhibit 1, specifications, engineering drawings and procedures.

5.1.4 Product shall be 'Held' until the required inspections and tests have been completed and documentation verified before moving to the next operation.

5.1.5 Written approval of the Quality Assurance Manager is required to proceed beyond any 'Verification', 'Witness' or 'Hold' points.

5.1.6 Final Inspection is performed to determine that finished product has been manufactured, inspected, tested and verified to ensure that all inspections and tests have been completed.

This shall include verification that Incoming and In-Process have been carried out and meet the specified requirements and may be achieved by reviewing supporting documentation and data for authorization, completeness, accuracy, visual examination and testing performed, as applicable, or any other suitable means.

5.1.7 Only product, which has passed Final Inspection, shall be released for storage, packaging and shipment, as applicable.

5.1.8 Only product, which has passed Final Inspection, shall be presented to customer representatives or the authorized Inspector for acceptance, unless otherwise permitted.

5.1.9 Inspections shall be performed by qualified personnel who are independent of the work being inspected.

5.1.10 Inspections and tests shall be performed using measuring and testing equipment calibrated in accordance with established procedures. Personnel shall be responsible for ensuring the equipment being used is labeled, and in a known state of calibration.

5.1.11 Where applicable, the Quality Assurance Manager shall ensure the Authorized Inspector is provided with a copy of the Design Specifications before fabrication begins. Also that the Authorized Inspector and Authorized Customer representatives shall have the opportunity to indicate 'Verification', 'Witness' or 'Hold' points at any stage of Inspection and Testing.

5.1.12 Documents specified by Standard/Code, Contract of this manual shall be maintained.

5.2 **Incoming Inspection and Testing:**

5.2.1 The Receiver shall verify the quantity of items or products received against the Bill of Lading and ensure any damaged products are duly noted on the Bill of Lading prior to acceptance.

5.2.2 Product shall be moved to an Incoming Hold Area to await Inspection and Testing.

5.2.3 The Receiver shall initiate an Incoming Inspection Report, Form F029 as shown in Exhibit 3. Section 1 of the report shall be completed and all documentation received attached. The Receiver shall forward the Incoming Inspection Report to Purchasing.

5.2.4 Purchasing shall attach a copy of the Purchase Order to the Incoming Inspection Report and record that product has been received but not accepted. Purchasing shall ensure that all documentation required by the Purchase Order has been received and shall contact the supplier to obtain any that are missing.

5.2.5 Purchasing shall forward the Incoming Inspection Report to Quality Assurance for Inspection.

5.2.6 The Quality Assurance Inspector shall complete any dimensional and test verifications needed to ensure compliance with the requirements specified in the Purchase Order and associated documents. Consideration may be given to documented evidence of compliance provided, or the results of any source inspections, surveillance or audits conducted.

5.2.7 Mill Test Reports, Test Reports, Certificates of Compliances and Examination Reports shall be verified for conformance to applicable Codes and Standards, by the Quality Assurance Manager, and the results shall be available to the Authorized Inspector when required. Records shall be identifiable by Precision Metal Works Ltd. purchase order number.

5.2.8 The Quality Assurance Inspector shall complete the Incoming Inspection Report (Form F029) and file it in the corresponding job file. Materials to be incorporated into Registered components shall be documented on the Dimensional Inspection Report, Form F034, shown in Exhibit 5. All characteristics required to be reported by the material specification and Code shall be documented.

5.2.9 Product found acceptable shall have an “Accepted” tag Form F030A shown in Exhibit 4, firmly attached and be moved to hold area for the given job number.

5.2.10 Product found unacceptable shall have a “Reject” tag, Form F030C shown in Exhibit 4, firmly attached, have a Nonconformance Report initiated and be moved to a designated nonconformance hold area size permitting.

5.2.11 The Quality Assurance Inspector shall forward a copy of the Nonconformance Report to Purchasing for notification of nonconforming product.

5.2.12 Purchasing shall arrange for nonconforming product to be returned or replaced. This may be applied at Incoming Inspection, or at any other stage, should the product prove deficient in any way.

5.2.13 The Quality Assurance Inspector shall update the Material Control Sheet to indicate the items or products have been accepted.

5.2.14 Supplier generated documents shall remain part of the Incoming Inspection document package. Changes to these documents shall be made by sending an amendment to the Purchasing Manager or written authorization to amend documentation on file.

5.3 **In-process Inspection and Testing:**

5.3.1 Product shall be held until the required inspections or tests have been completed.

5.3.2 Production personnel will inspect or test their own work at the completion of each process operation on the Route Card.

5.3.3 Route Card operations which 'Release' items from one department to another shall require inspection by someone other than the person who performed the work.

5.3.4 A Quality Assurance Inspector shall perform all Quality Assurance inspection points.

5.3.5 Nonconforming product shall be identified with a "Reject" tag and reported to the Quality Assurance Manager for further processing and disposition.

5.3.6 Production personnel shall initial and date adjacent to the Route Card operation signifying completion and acceptance. The Route Card shall remain with the product signifying its identification and inspection status.

5.4 **Final Inspection:**

5.4.1 Final Inspection shall be the last operation of each Route Card.

5.4.2 The Quality Assurance Inspector shall verify that all previous operations have been completed, signed off and dated where required.

5.4.3 The Quality Assurance Inspector shall complete a Dimensional Inspection Report, Form F034 shown in Exhibit 6, documenting the dimensional criteria for the component and the results obtained when required by Code or contract.

5.4.4 The Quality Assurance Inspector shall initial and date adjacent to the Final Inspection operation signifying completion and acceptance of Final Inspection and Testing.

5.4.5 The Quality Assurance Manager shall compile, review and authorize history dockets or files for completion and accuracy to specified requirements, when required. History dockets shall provide documented evidence that the items conform to the appropriate Code or Standard. History docket formats shall conform to customer requirements where applicable.

5.4.6 The Quality Assurance Inspector shall verify identification, packaging and crating to approved procedures.

5.4.7 The Quality Assurance Inspector shall verify that all nonconformances have been closed.

5.4.8 When applicable the 'Summary of Inspection – Vacuum Chamber' Form F055 shown in Exhibit 7, shall be completed and sent to the Customer indicating all inspections and tests that have been completed.

5.4.9 The Quality Assurance Manager shall verify details of 'Name Plate' stamping conform to the Manufacturer's Data Report (Exhibit 8) and any other applicable requirements, when applicable.

5.5 **Testing:**

5.5.1 Qualified personnel shall perform testing.

5.5.2 Test results shall be documented and verified by someone other than the individual performing the test.

5.5.3 The Quality Assurance Inspector shall evaluate documented test results for acceptance.

5.5.4 Tests shall be performed in accordance with approved, written procedures, which shall reference Standard/Code specifications and/or applicable design documents that are relevant.

5.5.5 Where applicable, test procedures shall include, or reference, test requirements and acceptance criteria of applicable Codes, Standards and regulations, or design documents.

5.5.6 Where applicable, test procedures shall include, or reference, test objectives and provision for applicable prerequisites for the test have been met and maintained.

5.5.7 Final Helium Leak Test as performed on vacuum chambers shall be documented on 'Helium Leak Test Report – Vacuum Inspection', Form F056 shown in Exhibit 8, and sent to the Customer for their reference.

5.5.8 Testing shall not proceed beyond 'Verification', 'Witness' or 'Hold' points without approval by the responsible authorities.

5.5.9 Minimum test records shall be specified and documented as outlined on the Route Card or Manufacturing, Inspection & Test Plan.

5.7 **Customer Property:**

5.7.1 Product received from the Customer shall be processed in accordance with this Section (10).

5.8 **Nonconformances:**

5.8.1 Nonconforming product shall be recorded, identified, segregated and dispositioned in accordance with Control of Nonconforming Product.

5.9 **Records:**

5.9.1 Quality Records retained in accordance with Control of Quality Records by the Quality Assurance Manager shall include, but not be limited to:

a) Incoming Inspection Report.
b) Route Card.
c) Dimensional Inspection Report.
e) Summary of Inspection – Vacuum Chamber.
f) Helium Leak Test Report – Vacuum Inspection.

5.9.2 Inspection and Test Control records shall be available for review to the Customer and/or Authorized Inspector as required.

6.0 Related Exhibits:

Exhibit 1	Form F031	Route Card
Exhibit 2	Form F006	Material Control Sheet
Exhibit 3	Form F029	Incoming Inspection Report
Exhibit 4	Form F030A	Accepted Tag
Exhibit 4	Form F030C	Rejected Tag
Exhibit 5	Form F034	Dimensional Inspection Report
Exhibit 6	Form F055	Summary of Inspection – Vacuum Chamber
Exhibit 7	Form F056	Helium Leak Test Report – Vacuum Inspection

Exhibit 1:

PRECISION
metal works

The Fusion of Quality and Innovation

ADTECH
manufacturing

Form: F031	ROUTE CARD	Revision: 0

Job Number:		**Company:**	
Quantity:	**Lot:**	**Drawing Number:**	**Rev:**
Material:		**Description:**	
PO Number:		**Route Card:**	**Item:**

Op.	Dept	Processing Information	Qty.	Performed By	Date

Page 1 of 1

Exhibit 2:

PRECISION
metal works

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ADTECH
manufacturing

Form: F006	MATERIAL CONTROL SHEET	Revision: 0

Job Number: ____________ Page ___ of ___

Item	Part Description	Material Description	Drawing Number	PO Number	Order Date	Delivery Date	Date Received	Comments

Exhibit 3:

PRECISION
metal works

ADTECH
manufacturing

Form: F029 — **INCOMING INSPECTION REPORT** — Revision: 0

Receiving

Supplier: _____ Purchase Order Number: _____

Carrier: _____ Packing Slip Number: _____ Quantity: _____

Item	Description	Yes	No	Comments
1	Is material visually free from damage or defects?			
2	Is material suitably packaged?			
3	Is special storage required?			

Comments:

_____

_____

Received By: _____ Date: _____

Purchasing

Item	Description	Yes	No	Comments
4	Is Mill Certification/ Certificate of Compliance present?			
5	Is Purchase Order attached?			

Comments:

_____

_____

Reviewed By: _____ Date: _____

Quality Assurance

Item	Qty	Items Received	Accept	Reject

Item	Description	Yes	No	Comments
6	Is material as ordered?			
7	Is material correctly identified?			
8	Is Mill Certification/ Certificate of Compliance acceptable?			

Comments:

_____

_____

Nonconformance Report Number: _____

Inspected By: _____ Date: _____

Exhibit 4:

PRECISION
metal works

ADTECH
manufacturing

Form: F030	IDENTIFICATION TAGS	Revision: 0

ACCEPTED

CUSTOMER _____

W.O.NO. _____ DATE _____

NO. OF PCS. _____ MATERIAL _____

PO# _____ SER.NO. _____

PART NAME _____

INSPECTOR _____

Exhibit 30A – 'Accepted' Tag
Green in Color

REPAIRABLE or REWORK

CUSTOMER _____

JOB NO _____ DATE _____

PART NO _____ PART NAME _____

PO NO _____ SER NO _____

NO. OF PIECES _____

DISPOSITION _____

_____

INSP. _____ STAMP _____

REASON FOR REWORK (OVER)

Exhibit 30B – 'Repair/Rework' Tag
Blue in Color

REJECTED

JOB NO. PO NO.

_____

PART NO _____ SERIAL NO. _____

PART NAME _____

NO. OF PIECES REJECTED _____

REASON _____

_____

DISPOSITION _____

_____

INSPECTOR _____ DATE _____

Exhibit 30C – 'Reject/Scrap' Tag
Red in Color

Exhibit 5:

PRECISION
metal works

ADTECH
manufacturing

Form: F034 **DIMENSIONAL INSPECTION REPORT** Revision: 0

Job Number: _____ Description: _____ Drawing: _____

Revision: _____ Item/Lot: _____ Sheet _____ of _____

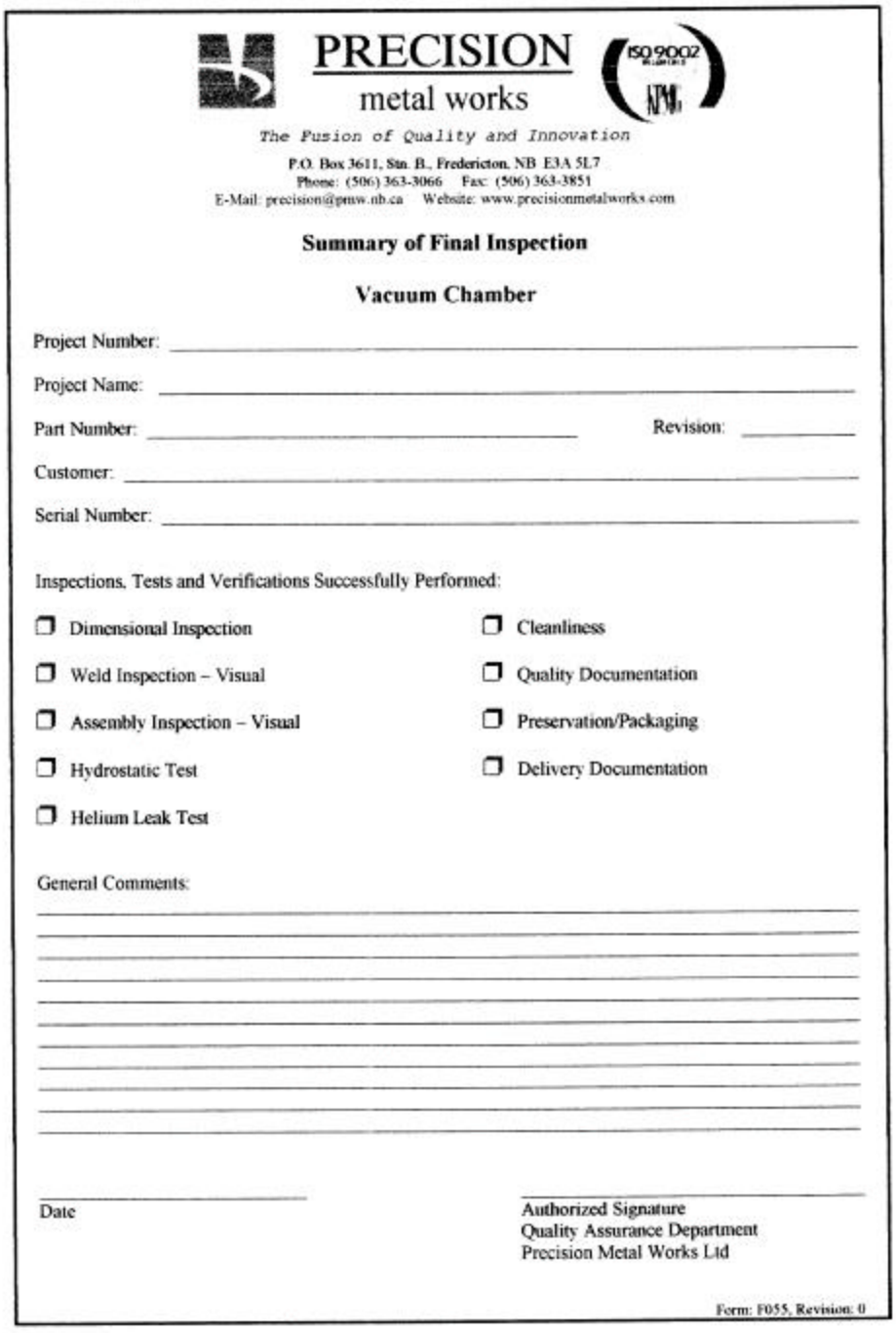
Zone	Drawing Dimension	Tolerance	Measured Dimension	Accept (A) Reject (R)	Gauge Identification

Total Quantity: ____ Quantity Inspected: ____ Quantity Accepted: ____ Quantity Rejected: ____

Nonconformance Report Reference: _____

Inspected By: _____ Date: _____

Exhibit 6:



PRECISION
metal works

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Phone: (506) 363-3066 Fax: (506) 363-3851
E-Mail: precision@pmw.nb.ca Website: www.precisionmetalworks.com

Summary of Final Inspection

Vacuum Chamber

Project Number: _____

Project Name: _____

Part Number: _____ Revision: _____

Customer: _____

Serial Number: _____

Inspections, Tests and Verifications Successfully Performed:

- ❒ Dimensional Inspection
- ❒ Weld Inspection – Visual
- ❒ Assembly Inspection – Visual
- ❒ Hydrostatic Test
- ❒ Helium Leak Test
- ❒ Cleanliness
- ❒ Quality Documentation
- ❒ Preservation/Packaging
- ❒ Delivery Documentation

General Comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Date

Authorized Signature
Quality Assurance Department
Precision Metal Works Ltd

Form: F055, Revision: 0

Exhibit 7:

PRECISION
metal works

ISO 9002

The Fusion of Quality and Innovation

P.O. Box 3611, Stn. B., Fredericton, NB E3A 5L7
Phone: (506) 363-3066 Fax: (506) 363-3851
E-Mail: precision@pmw.nb.ca Website: www.precisionmetalworks.com

Helium Leak Test Report

Vacuum Inspection

Chamber Serial Number: _____

Part Number: _____

Roughing Pump – Start-up Time _____ Hours

Actual Roughing – Start Time _____ Hours

Turbo Pump – Start-up Time _____ Hours

Actual Turbo – Start Time _____ Hours

Time to Reach Base Pressure: _____ Hours

Base Pressure: _____ mbar

Calibrated Helium Leak Expiration: _____ (DD/MM/YY)

Calibrated Helium Leak Rate: _____ mbar l/s

Detected Leak Rate with Calibrated Source: _____ mbar l/s

Helium Leak Rate Sensitivity: _____ mbar l/s

Actual Helium Leak Rate: _____ mbar l/s

Rise Time (If Applicable): _____ Minutes

Detected Pressure Rise (If Applicable): _____ mbar

Contract Special Requirements: _____

Conversion Factors: 1 mbar = 0.75 Torr
1 mbar l/s = 0.75 Torr l/s

Equipment: Edwards E2M-80 Roughing Pump
Leybold 10" Turbo Pump
Pfeiffer HLT-160 Leak Detector

I certify that the component listed on this Helium Leak Test Report has been tested as per the specifications listed above and conform to all the requirements detailed on the contract/purchase order.

Date

Authorized Signature
Quality Assurance Department
Precision Metal Works Ltd

Form: F056, Revision: 0