Supplier Quality Assurance Manual

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1.0 INTRODUCTION

1.1 Industrial Welding & Engineering (IWE) and MTC Engineering (MTC) strive for the highest standards of quality and reliability and embrace a philosophy of Continuous Improvement. We would like you, our supplier, to be a part of that business philosophy. All QAPs and WIs are available upon request or as required per contract/PO.

At a minimum, a subcontracted supplier must be compliant to a MIL-I-45208 QMS. If a contract so requires, a higher quality level may be specified.

Use of our company internal forms is encouraged but not required for compatibility purposes.

2.0 PURPOSE AND SCOPE

2.1 This manual supplements the requirements stated on IWE-MTC purchase orders and applicable commercial and military standards including a tailored ISO 9001-2008 (Tailored) and/or MIL-Q-9858. These requirements are necessary to ensure that material delivered to IWE-MTC by its suppliers will meet or exceed required quality levels. The requirements, as listed, are based on a defect prevention system, which will improve quality, lower costs and increase productivity and is not intended to replace our vendors QA System, but complement an existing vendor's quality system. If the vendor system already meets an acceptable QA standard system, then that system will supersede this manual.

2.2 Acceptance of the purchase order is considered acceptance of IWE-MTC terms and conditions as noted on the applicable purchase order and/or attachments.

2.3 Drawings and engineering specifications set tolerances and performance requirements. The responsibility of each supplier is to ensure that those requirements are met. IWE-MTC encourages each supplier to work toward continuous improvement in all areas regarding quality, delivery, and performance.

2.4 IWE-MTC reserves the right to audit its suppliers for compliance with the requirements stated in this document and applicable standards. Either IWE-MTC or its authorized representative may accomplish this through scheduled audits.

3.0 MANUFACTURING AND QUALITY REQUIREMENTS

3.1 In order to ensure manufacturing control, the supplier shall establish and document process standards and criteria for all aspects of the manufacturing operation. These standards shall include documented route sheets and processing specifications that identify specific requirements.

3.2 Inspection standards for evaluation of the manufactured product based on drawings and engineering specifications, shall be established and documented.

3.3 Inspection sample plans may be used to evaluate product quality. The use of established plans such as MIL-STD-105E and MIL-STD-414 for variable data is encouraged.

3.4 Acceptable Quality Levels (AQL's) must be set by the supplier to ensure acceptable product quality levels are maintained.

AQL selection is governed by the capability of the manufacturing process to maintain tolerance. In all cases, it is based on a statistical probability and does not relieve the supplier from maintaining tolerance conformance on all parts.

3.5 Workmanship standards shall be in compliance with those called out on the drawing or specification, or when not stated, best available industry standard. If internal standards are developed, or industry standards are used such as ANSI or SAE, they must be compliant with invoked standards. They must also be acceptable to IWE-MTC.

3.6 IWE-MTC encourages the use of statistical methods to control quality. Such methods include Statistical Process Control (SPC) techniques. In some cases, IWE-MTC may require the supplier to submit quality control plans and process flow charts in advance of the start of manufacturing.

3.7 The supplier shall establish procedures for the verification, storage, maintenance, and accounting of IWE-MTC owned material, products, tools, Mylar's, and equipment provided to the supplier for use in producing product for IWE-MTC. This would include drawings, specifications, and official correspondence. Any items that are lost, damaged, or unusable, shall be reported to the IWE-MTC buyer immediately.

3.8 The supplier shall have procedures for the positive identification and control of all components, including raw materials used during manufacturing, processing, and delivery.

3.9 The supplier is responsible for ensuring that all items regardless if made by the supplier or a subcontractor, meet the technical specifications for form, fit, function, and methods, using stated or recognized industry best workmanship practices.

3.10 The supplier shall assure that all incoming materials and components used in the manufacture of products to be delivered to IWE-MTC shall be inspected, tested or otherwise verified to be conforming prior to use or processing. Non-conforming material shall be conspicuously identified and segregated to prevent commingling with acceptable material until properly dispositioned. Material that is found non-conforming can only be reworked back to drawing or specification requirements. Material that cannot be reworked cannot be dispositioned as use-as-is by the supplier without the approval of the IWE-MTC. Contact IWE-MTC buyer should either of these dispositions be needed.

3.11 The supplier shall ensure prior to delivery, that the product meets all requirements, standards, and acceptance criteria. Records shall be retained for one year.

3.12 The packaging methods used by the supplier shall ensure that the product will not be damaged during transit.

3.13 IWE-MTC may require the supplier to participate in pre-production review and readiness meetings. Items covered in these meetings may include, but are not limited to the following or any combination thereof:

- ∇ Quality Planning
- ∇ Specifications & drawing requirements
- ∇ Process flowcharts and control
- ∇ PFMEA (Process Failure Modes and Effects Analysis)
- ∇ Critical characteristic selection
- ∇ Process capabilities
- ∇ Test and Qualification
- ∇ First Article Inspection
- ∇ Metrology, gauging, and measurement methods
- ∇ Statistical Process Control
- ∇ Packaging, labeling, and delivery
- ∇ Documentation and record retention
- ∇ Welding procedure and testing

4.0 IN-BOUND INSPECTION

4.1 All parts delivered to IWE-MTC must comply with all drawing and specification requirements by the manufacturer before shipment.

4.2 All dimensions and requirements must be assured by the supplier. IWE-MTC will verify all dimensions on a predetermined number of pieces of an incoming lot and minor attributes are checked on a sample basis. Any deviations must be explained.

4.3 The supplier is to provide measurement / test results and attribute type data in a report format detailing specified test parameters and results when required by PO.

5.0 CORRECTIVE ACTION

5.1 Suppliers must have a system for Corrective Action. Corrective Action refers to an internal problem solving process initiated to prevent future delivery of defective product. Emphasis should be on identifying potential problems and implementing a solution at the source.

5.2 Corrective action should be performed by an individual knowledgeable in the area or process that caused the defect. That person will conduct a failure analysis to identify the cause of the problem, propose and implement a solution.

5.3 The solution should be verified to ensure the problem is solved.

5.4 IWE-MTC may request that a supplier take corrective action via a written Corrective Action Request (CAR). A CAR may be initiated by the rejection of material at IWE-MTC or may be based on a trend or repeated rejections or failures.

6.0 DOCUMENT AND DATA CONTROL

6.1 General

Documents and data can be in any type or form. Received documentation such as specifications, standards, material, and process certification will be stored electronically in a master job folder on line and designated by job number, the national stock number (NSN) or part number and/or any combination thereof.

6.2 Document and data approval and issue

6.2.1 Drawings:

Upon award of contract, a contract review will be initiated. The listed drawings in the contract will be verified to ensure all drawings and revisions are at the correct level. This review will be documented on a Contract Review Sheet. (CRS)

6.2.2 Specifications:

A specification review will be initiated when the contract review is complete. Each drawing will be analyzed to determine the material and process requirements. The review will ensure that each specification is in-house and at the current level. If a specification is cancelled or replaced the new specification replacement will be obtained. All information on the specification review will be documented on the CRS.

6.2.3 Inspection number:

Inspection number will be determined by the customer, or if there is no contractual inspection number a number will be determined based on the C=0 table in the quality assurance provision (QAP). This number will be stated on the CRS.

6.2.4 Obsolete data:

Obsolete data will be discarded unless it is needed for legal or historical reasons. Such data will be identified as obsolete and for reference only.

6.2.5 Document and data changes

The person(s) responsible for the original CRS will review any changes.

7.0 PURCHASING

7.1 General

Material and processing will be obtained from approved contractors and a list of approved sources will be developed and updated. All material shall satisfy current governmental and safety constraints.

7.2 Evaluation of subcontractors

Subcontractors will be evaluated on their ability to meet contract requirements.

7.3 Material:

All material suppliers will have the ability to certify material supplied is in conformance with the material specification as specified on the purchase order and shall provide material certifications and certificate of conformance including heat-lot traceability when required.

7.4 Processes:

Processes that go into the completion of a product need to be assured of quality. Heat-treating, plating, and painting need process certification and documentation.
Forming and machining operations will be inspected to a predetermined sample size based on the C=0 table in the QAP. This sample size will be established based on critical, major, and minor attributes and sample size. This sample size will be documented in the CRS and provided to the supplier. The supplier will inspect said established number and IWE-MTC will randomly check the same said number upon delivery of parts.

7.5 Approved Supplier Listing

A list of approved suppliers of material and processes will be established and maintained by IWE-MTC. This document will be known as the Approved Supplier Listing (ASL). Suppliers with ISO Certification or an approved QA System and having an active government Cage code are considered pre-approved “Grandfathered” on the ASL until such time of disapproval or re-approval is so warranted.

7.6 Purchasing data

All purchase orders will detail the requirements of the material or process ordered. This will include compliance with specifications and will document the need certification.

7.7 Verification of purchased product

The customer or customer representative will be afforded the right to verify at the subcontractors premises that supplied product conform to specified requirements.

8.0 CONTROL OF CUSTOMER SUPPLIED PRODUCT

8.1 General

Incoming material will be inspected to ensure compliance with purchase order and all relevant specifications. The quantity and size of all material will be inspected. Material that is in conformance will be identified and held in a secure area until production. Any material found to be out of conformance will be documented in a Quality Deficiency Report (QDR) and returned to the supplier.

8.2 Customer-owned tools and equipment will be permanently marked to show ownership.

9.0 PRODUCT IDENTIFICATION AND TRACEABLITY

9.1 General

Product will be identified during production and delivery.

- ∇ Incoming material
- ∇ Incoming material will be tagged, boxed, or identified with a paint marker.
- ∇ Scrap material
- ∇ Scrap will be identified with red marker or tagged and will be discarded or sent to storage rack for use in non-product application.

10.0 INSPECTION AND TESTING

10.1 General

A system that allows zero defects will be used. The required inspection, testing, and records will be documented in the quality plan.

10.2 Receiving inspection and testing

Material will not be used until it is inspected and all certification is accounted for.

Product will be received and evaluated based on statistical data, inspection, and test results. An inbound inspection form (IBF) will be completed.

10.3 In-process inspection and testing

A predetermined inspection plan will be established for each product or contract. This inspection number will be established by the QAP and process stability. In-process inspection instructions will be provided to the machine operator and product will be inspected at set intervals. If a variance occurs at the set inspection interval all pieces from the previous inspection point will be evaluated. Parts out of tolerance will be marked in red and discarded or quarantined for repair. The process will then be corrected to ensure zero defects.

10.4 Final inspection and testing

Final inspection will be in accordance with a QAP and a final inspection form will be filled out. The final inspection will include dimensional compliance and any secondary processes such as painting and plating. All parts will be visually inspected to ensure paint, plating, and proper assembly.

10.4.1 Functional testing will be completed based on customer's request

10.4.2 Final packed product will be handled by a government-packaging specialist.

10.5 Inspection and test records

Inbound material, in-process, and final inspection forms will be created and maintained for each product and stored electronically by job number, national stock number or part number and maintained in the Master Job Folder.

In house laboratory service will include the calibration of measuring equipment using certified gage blocks.

11.0 CONTROL OF INSPECTION, MEASURING AND TEST EQUIPMENT

11.1 General

All testing equipment will be calibrated and documented.

11.2 Control Procedure

11.2.1 Each product will be examined and the appropriate measuring device will be selected to ensure that correct accuracy is obtained.

11.2.2 Inspection tools will be calibrated a regular intervals to maintain accuracy as well as before each production run to further eliminate errors. The inspection equipment will be calibrated against NIST traceable standards.

11.2.3 The process of inspection will be at a minimum of one year and may be adjusted based on gauge R & R results. A certification sticker will be placed on each certified tool.

A calibration logbook or on-line system will be maintained that includes the tool, calibration, date, and status

11.2.4 The logbook will be maintained at the inspection interval.

11.2.5 If inspection tool is found to be out of calibration, all product inspected with non-calibrated tool will be re-inspected with calibrated tool and product will be accepted/declined.

11.2.6 Suspect inspection tools will be held in a separate room from the production environment to safeguard tool from accidental use on deliverable product and will be controlled by the quality department and no adjustments will be made without re-calibration.

11.3 Inspection, measuring, and test equipment records

The calibration record shall include any out off specification readings from the calibration. Any suspect material or product sent to a customer will warrant a notification.

11.4 Measuring analysis

Each inspection tool will be statistically studied to analyze any variation.

12.0 INSPECTION AND TEST STATUS

12.1 General

Only product that has been inspected and identified as acceptable shall be used in production. Identification shall be in the tag form.

13.0 CONTROL OF NONCONFORMING PRODUCT

13.1 GENERAL

Suspect and non-conforming material will be marked in red or tagged and quarantined until disposed of or reworked.

13.2 Review and disposition on nonconforming product

Nonconforming product will have a quality deficiency report (QDR) filled out and an engineer will determine appropriate action.

- ∇ Reworked to meet specifications
- ∇ Accepted without rework
- ∇ Re-graded for alternative application
- ∇ Scrapped

13.3 Control of Reworked Product

All reworked product will have a rework order form (ROF) completed before repair that outlines the steps and processes to get product into conformance. An IWE-MTC engineer shall approve the ROF.

13.4 Engineering approved product authorization

Any product or process that is used that is different than the current production plan shall complete a process change request (PCR) and have it approved by a IWE-MTC engineer. Once the PCR is approved then production can continue.

14.0 CORRECTIVE AND PREVENTIVE ACTION

14.1 GENERAL

Corrective and preventive action will be taken to eliminate causes of actual and potential non-conformances.

14.2 Corrective Action

- ∇ Customer complaints should be recorded as a QDR
- ∇ Investigate the QDR and determine the cause of the nonconformity.
- ∇ Determine what, if any, corrective action is needed.
- ∇ Application of controls to ensure corrective action is effective.

14.3 Preventive Action

Process stability, fixturing, and tooling should be analyzed to determine improvements in quality.
A detailed work plan will be established prior to product that will list the necessary steps to complete the product.
After initial run of product, modifications to the work plan can improve the quality and time required to complete product.

15.0 QUALITY RECORDS

15.1 General

All documents relevant to the product will be maintained in paper form while product is in production. Upon completion of the product all paper documents including inspection forms, certifications, etc. will be stored electronically for a minimum of one year or according to customer's request.

16.0 DEFINTIONS

CRS: Contract Review Sheet
First document used to review contract to determine if all drawings and specifications are in house. Also displays the inspection points and numbers.

PCR: Process Change Request
Form to be filed out if a process or material change is requested from contract or previous production run.

QAP: Quality Assurance Provision
Document used to determine if dimension or attribute is minor, major, or critical. Based on this determination the sample inspection size is determined from C=0 table.

QDR: Quality Deficiency Report
Form to document any incoming or in-house quality issues. Form will state the corrective action plan, and a rework order form may be initiated.

ROF: Rework Order Form
Form used to detail steps to get product into conformance. Filed out after completion of a quality deficiency report (QDR)

WP: Work Plan
After initial contract review and completion of CRS a work plan will be written that details the step involved in manufacturing. Work plan will include in-process inspection points.

17.0 QUALITY FORMS

(For Reference Only)

17.1 The reason for rejection will be stated on the CAR that accompanies the returned parts. The supplier has the responsibilities described above and must describe the implemented corrective action in the reply.

17.2 The CAR form originates from IWE-MTC and is addressed to a designated individual at the supplier's facility.

- ∇ The CAR specifies quantities of parts rejected and the nature of the rejection. The supplier is responsible for analyzing the defect as stated.
- ∇ The supplier block shall provide information on the specific reason, which caused the defect.
- ∇ The corrective action block shall state the change to the operation or process that the supplier/manufacturer has implemented to eliminate the defect on future parts.

17.3 The CAR should be reviewed by the management for concurrence and then returned to IWE-MTC for review and approval.

17.4 Suppliers must provide a CAR response within 15 calendar days. If a response is not received, a reminder call, email, or letter will be sent. If CARs are not responded to within 30 days of receipt, IWE-MTC reserves the right to terminate for cause any open purchase orders with the supplier. The supplier through IWE-MTC should arrange unusual circumstances that require additional time to resolve in advance.

18.0 SURVEYS AND SOURCE INSPECTIONS

18.1 General

18.1.1 IWE-MTC may perform an on-site survey prior to the first scheduled delivery of the product. The purpose of this survey is to determine the supplier's ability to produce a product that will meet the requirements of the drawing, specification, and purchase order.

18.1.2 Pre-arranged surveys normally will take at least a day to complete. The date and time of the survey will be arranged in advance through IWE-MTC surveys are based on the requirements defined in the applicable drawing or specification. Other commodity specific military specifications may also be applied.

18.1.3 The success of the audit depends on the supplier's ability to demonstrate its capability to consistently produce the product in compliance with the purchase order, applicable drawings, and military specifications. Areas subject to survey are:

18.2 Management structure and organization

18.2.1 Supplier's manufacturing system and processes

- ∇ Manufacturing process control
- ∇ Work instructions
- ∇ Control of work-in-process
- ∇ Tooling/fixture control
- ∇ Machine capability

18.2.2 Quality control and inspection

- ∇ Quality Assurance policy manual
- ∇ Inspection and test instructions
- ∇ Data analysis

- ∇ Control of documentation and record keeping
- ∇ Statistical methods

18.2.3 Engineering capability

- ∇ Design review process
- ∇ Failure analysis

18.2.4 Performance history and certifications.

- ∇ Government approvals
- ∇ Customer approvals

18.2.5 Facilities, general upkeep, and maintenance.

18.2.6 Calibration system

18.2.7 Problem analysis and corrective action

18.2.8 Quality improvement plans and methods

18.2.9 IWE-MTC may also survey qualifying suppliers for the purpose of Supplier Certification to supply parts on a dock-to-stock basis. Certification surveys will normally take one to two days to complete. Certification will be done on a part number basis arranged with IWE-MTC through the buyer.

18.2.10 Source inspections may be performed at the supplier's plant by IWE-MTC or a designated representative.

18.3 The source inspector will verify that the material to be shipped complies with the requirements in the purchase order and the drawing or specification.

18.4 The supplier will provide required inspection information and manufacturing documentation to provide evidence of control and acceptability.

18.5 The supplier will provide required inspection/test equipment and personnel to permit the source inspector to verify inspection results

18.6 A Certificate of Compliance (CoC) will be supplied with each shipment of parts when required by the purchase order.

- ∇ CoC shall include as a minimum:
  - ∇ Supplier name, address, and telephone number
  - ∇ Part number
  - ∇ Lot number and quantity (if applicable)
  - ∇ Date code (if applicable)

- ∇ Certification references, i.e. Mil, FAA, DOD (if applicable) Statement that all parts comply with drawing, specification, Technical Order (T.O.), and purchase order requirements
- ∇ Statement of traceability for raw materials and processes to the products delivered to IWE-MTC.
- ∇ Approval signature(s) by an authorized supplier representative
- ∇ IWE-MTC Purchase Order number
- ∇ Copies of all material, plating, heat treating, paint certification

19.0 REQUESTS FOR CHANGES AND DEVIATIONS

19.1 The supplier must thoroughly review the documentation and Purchase Order provided by IWE-MTC. All associated drawing changes and related engineering specifications and test procedures should be in the supplier's possession. Questions should be directed to IWE-MTC.

19.2 When quoting a commodity, the supplier must thoroughly evaluate its capability to deliver. The supplier is solely responsible for making a quote based on drawings and specifications. IWE-MTC should be contacted for any clarification.

19.3 The supplier is responsible for alerting IWE-MTC to any discrepancies or problems as soon as they arise or are anticipated.

19.4 A request can be made to IWE-MTC to accept the product with a minor deviation. The deviation should be of an inconsequential nature such that it will not affect form, fit or function. The product should be of a value that scraping it would be uneconomical. Requests will be considered only for unusual circumstances. They will not be accepted on a routine basis.

19.5 Deviation requests must include the part number, purchase order number, number of pieces affected, a clear description of the discrepancy, and the corrective action to prevent recurrence. Deviations will be considered only for those pieces being shipped.

19.6 Lots with the same discrepancy will not be accepted. The supplier must implement corrective action to prevent recurrence. If a specific parameter is impossible to meet, the supplier should request a review by IWE-MTC.

NOTE: THE ACCEPTANCE OR REJECTION OF DEVIANT MATERIAL IS AT THE SOLE DISCRETION OF IWE-MTC. THE SUPPLIER MUST SECURE APPROVAL OF IWE-MTC IN WRITING PRIOR TO DELIVERING MATERIAL THAT HAS ANY DEVIATIONS AND SHOULD OBTAIN SUCH APPROVAL THROUGH AN AMENDMENT TO THE PURCHASE ORDER.

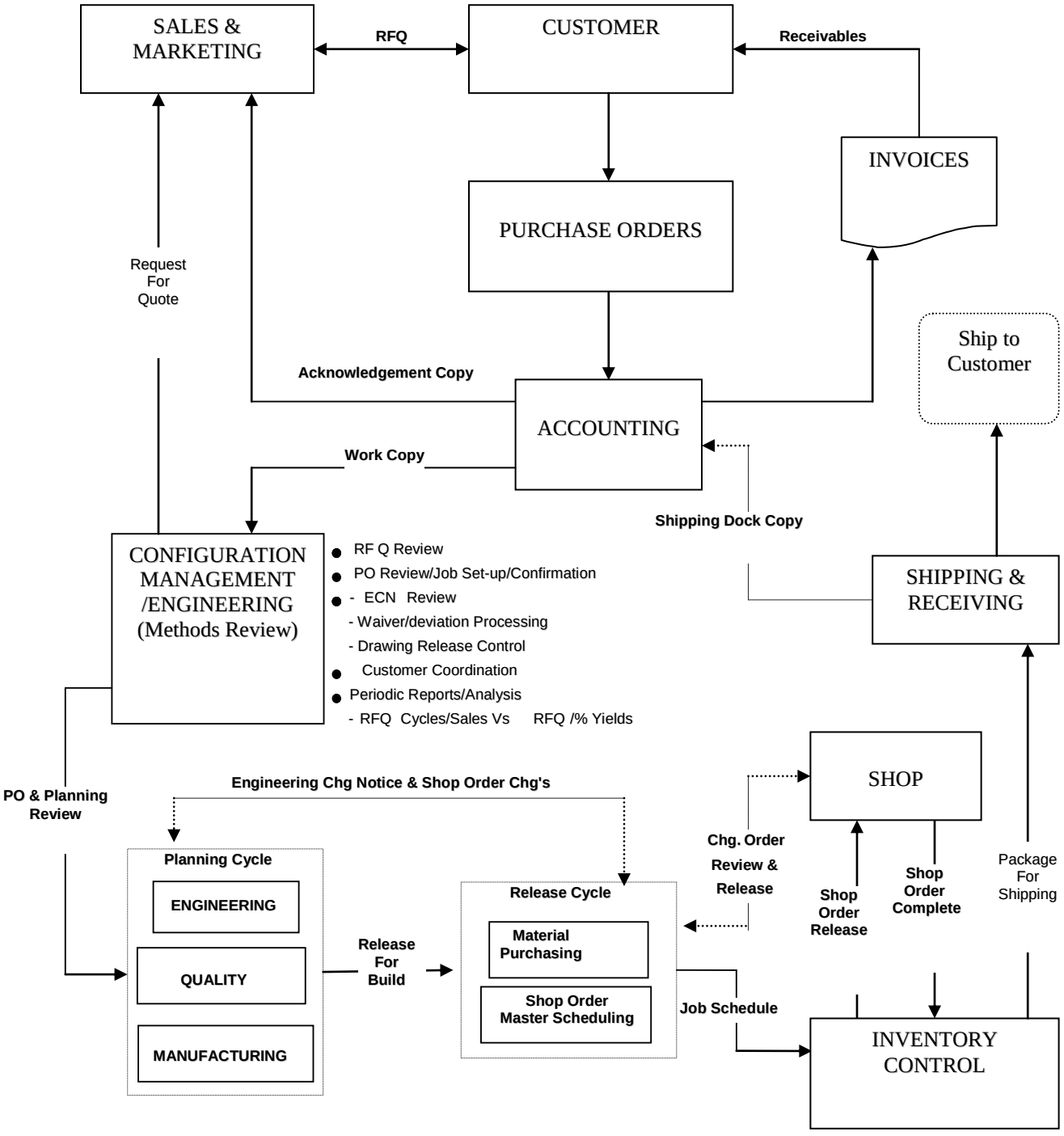
20.0 CALIBRATION

20.1 All IWE-MTC's suppliers are required to comply with the calibration system described by MIL-STD-45662 with reference to ISO 10012, ANSI/NCSL Z540-3, or equivalent.

20.2 The goals of this system are to ensure the accuracy of all measuring and test equipment used in a supplier's facility, and to prevent or readily detect inaccuracies and provide for immediate correction. The basic requirements are:

- ∇ Written description of the calibration system
- ∇ Standards and equipment of the appropriate capability
- ∇ Traceability to National Institute of Standards and Technology (NIST) for testing equipment involving mechanical testing such as tensile, charpy, hardness, etc.
- ∇ Calibration schedules and intervals should be such that inconsistencies are avoided
- ∇ Recall system to ensure specific equipment is calibrated when due
- ∇ Individual equipment records/histories
- ∇ Written calibration instructions and published standard practices
- ∇ Labeling to indicate calibration status
- ∇ Analysis of calibration results and provisions for dealing with out-of-tolerance conditions

21.0 CONFIGURATION MANAGEMENT AND DOCUMENTATION FLOW



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