AMETEK AEROSPACE

QUALITY OPERATING PROCEDURE

QOP NUMBER: **8.001.583**-BNG		**REVISION LTR: G**

TITLE: BINGHAMTON QUALITY CONTROL CODE ASSIGNMENT & SUPPLIER DATA REQUIREMENTS

FOR USE

NAME/LOCATION

AMETEK POWER AND DATA SYSTEMS
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BINGHAMTON N.Y 13905

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Document Revision Log

Rev:	Date:	Description:	Changed By:
Initial	11-03-07	New Document	J. Zeoli
A	2-06-12	Document up Rev to A, and number change to reflect Binghamton	S.Asante
B	3-02-15	Changed beginning format of document to conform to other Binghamton documents. Added clarification to existing Quality Codes in section Form. Updated Score card in Exhibit A and fixed format of table. Added new Quality Codes	R. Lerner
C	4-21-15	Quality Code 'F' - Added rev B to AS9102 requirement and added comments on solid model vs drawing. Quality Code 'Q' – removed spec reference to 8.012.583 in Quality Code 'K' Documentation updates to Exhibit B Fixed typos.	R. Lerner
D	4/13/2016	Added Quality Code A-7 – DPAS DO-A1	R. Lerner
E	6/06/2017	Added Quality Code A-8, requiring sub-tier certs. Changed SQA to Quality. Clarified supplier information/actions required for Codes 'B' and 'L'. Removed section 5.1.8.	R. Lerner
F	03/30/2018	Remove QC Code Y	R. Lerner
G	11/30/2018	Pulled Form out of this document. Renamed Form for PDS, and identified where Master SDR's are kept.	R. Lerner

1.0 PURPOSE

1.1 To establish a procedure, which requires the Quality function to review production material purchase documentation, utilized by AMETEK Power and Data Systems (PDS). In addition, this procedure describes how AMETEK flows down quality or other data requirements on supplier purchase orders.

2.0 SCOPE

2.1 Quality requirements are assigned to all purchased production and pre-production engineering material using Quality Control codes (referred to as "QC Codes" - see Exhibit A).

2.2 When the assignment of a QC code cannot fully describe a quality requirement, a Supplier Data Requirement Form is utilized.

3.0 REFERENCE DOCUMENTS

3.1 Quality Operating Procedure (QOP) 8.003.583, "Supplier Quality Requirements."

3.2 QOP 8.002.583, "Selection and Control of Suppliers."

3.3 03.QA.02, "Incoming Inspection."

3.4 8.001.583-BNG.FORM1. (Supplier Data Requirements Form)

4.0 DEFINITIONS

4.1 Procurement - the process of obtaining material, equipment, supplies, processes, goods, reports, computer software, parts, data, and any other property or service necessary for AMETEK's business operations.

4.1.1 Buy Part - an item/service that is to be used in production. Such items/services are contained on a product's bill of material (BOM), or identified as a planned operation on applicable manufacturing routing which is sub-contracted to an AMETEK supplier, e.g., plating, heat treat, etc.

4.2 Purchase Order (PO) - written documentation provided to an AMETEK

supplier, which defines the requirements of procurement.

4.3 Quality Control (QC) Code - a letter or group of letters used to specify quality requirements for a specific part, commodity or process in an abbreviated form.

4.4 Supplier - the terms subcontractor, supplier, vendor, seller or any other term used to identify the source of procurement are considered synonymous.

5.0 PROCEDURE

5.1 QC Code Assignments

5.1.1 All items that are designated "Buy Parts" are assigned an appropriate QC Code by AMETEK's Quality function. These codes are maintained in AMETEK's Oracle database. Assignment of appropriate QC codes ensures that adequate quality requirements are properly documented on a PO and transmitted to AMETEK's suppliers.

5.1.2 When AMETEK’s engineering function generates a new buy part and entered in the Oracle database, Quality will assign an appropriate QC code (refer to Exhibit A). Applicable codes are automatically printed onto AMETEK's POs. If, during new product development, a possibility exists that new material purchased on an RFM by AMETEK's design engineering function will be utilized in production hardware, an appropriate QC Code will be assigned.

5.1.3 QC Codes are determined via a review of engineering drawings or other ordering specifications.

5.1.4 QC codes amplify, supplement or clarify, but do not supersede drawing and specification requirements, as well as referenced documentation. The following factors are taken into consideration in the selection of a QC Code:

5.1.4.1 Type of procurement or supplier.
5.1.4.2 Part/assembly complexity or Process/Service used in manufacturing.
5.1.4.3 Customer contractual requirements.
5.1.4.4 Incoming Inspection/Test capability.
5.1.4.5 Quality history and/or corrective action associated with the item.
5.1.4.6 Input from design and/or productions engineering functions.

5.1.5 For standard components (i.e. resistors, capacitors), hardware (nuts, bolts, rivets), MIL-SPEC or other standard agency specified products, a code determination may be based on item description.

5.1.6 Each discrete purchased part has a specific QC code. In the event a QC Code will not fully define the necessary quality requirements, Quality will assign an "X" code and generate a written description on an SDR Form, refer to paragraph 5.2.

5.1.7 Once assigned, codes are entered into the procurement section of AMETEK's manufacturing database. Revisions to existing QC Codes are made by Quality based on changes in the criteria previously defined or to meet the needs of the business.

5.1.7.1 A PO shall not be generated without an appropriate QC code(s).

5.1.7.2 Initial code entry or revisions thereto are limited by system security to Quality personnel. Codes are entered in "real time."

5.1.8 Upon AMETEK's receipt of purchased materials, the latest QC Code is automatically entered on the applicable receiving ticket. This establishes the basic quality criteria for incoming inspection to verify as required by 03.QA.02

5.1.9 In the event a QC Code must be revised based on results of incoming inspection, Quality will make appropriate adjustments.

5.2 Supplier Data Requirements

5.2.1 Where no QC code fully satisfies a needed requirement, the letter "X" is assigned and an Supplier Data Requirement Form 8.001.583-BNG.FORM1. is generated by Quality. SDR's are used to request data or other certifications.

5.2.2 More than one drawing or part number may be assigned to an individual SDR if requirements are identical.

5.2.2.1 Where multiple parts are listed on one SDR sheet, each part will be coded "X" in AMETEK's database.

5.2.2.2 Revision control of SDR's is maintained in this database. Original issue documents will show "X" or "X0" (zero) with subsequent revisions showing "X1," "X2," etc. As "X" is the only letter code referencing a physical document, no other code letters require revision control.

5.2.3 The SDR must identify:

5.2.3.1 The drawing number with part(s) or group(s) number.
5.2.3.2 The date of issue and revision level of the SDR sheet. Revision levels are numeric: 0,1,2,3 etc.
5.2.3.3 The date and revision of superseded document, if applicable.
5.2.3.4 The part (item) name.
5.2.3.5 The specific requirements to be provided by the supplier at

initial qualification, periodic interval and individual lot submittal. For periodic assurance, the interval frequency must be specified, as well as, checking the blank requesting that supplier submit or retain data for review. The three categories are elective choices: any single or combined category may be specified.

5.2.3.6 The originator's name.

5.2.4 When completed, the originator will place one copy in the incoming inspection part folder. A second copy will be sent to procurement. The master is filed on Public Drive at P:\MATERIAL\SDRs.

5.2.4.1 Procurement will issue the current SDR to an AMETEK supplier when a request for quotation (RFQ) is initiated or with the applicable PO.

6.0 RESPONSIBILITIES

6.1 Quality will implement the requirements of this procedure.

6.2 Purchasing will maintain and distribute current PO attachments (showing QC Codes) and SDR Sheets to suppliers.

6.3 Design Engineering will request Quality assistance on the proper QC code assignment for any material purchased on an RFM that may be transferred to production use after engineering needs have been withdrawn.

EXHIBIT A - Quality Control Code Definitions and Applications

QC Code	Description	Application
A	Material specified by this PO requires a Certificate of Conformance (C of C) with each shipment. The C of C must state that the subject material conforms to all PO requirements and, when applicable, must identify special process sub-tier suppliers. The supplier must have available for review all sub-tier certifications (materials and processes) that support the C of C. C of C must be signed (electronic stamped traceability to originator is acceptable, or actual signature).	Used when Quality determines the need for a C of C.
B	Material specified by this PO is subject to age control. The manufacturer's "lot" or "batch" number, manufacturing (cure) date, and expected shelf life data must accompany the shipment. Minimum remaining shelf life must be 75%. Suppliers must get prior authorization from AMETEK buyer to ship with less than 75% shelf life.	Used for applicable age sensitive chemicals, solutions, adhesives, elastomers, O-Rings, lubricated items, etc.
C	Flexible circuits specified by this PO must be certified as meeting the requirements of MIL-P-50884. All units (100%) must be certified as passing circuit continuity testing and short circuit testing.	Used for flex circuits procured to military specifications MIL-P-50884 or mil PRF-31032. Note these have been migrated to IPC 6013.
D	Printed wiring boards must be subjected to and certified as complying to quality conformance inspection requirements of IPC-	Used when procuring commercial rigid boards to IPC Class 2.

	6012, class 2. All boards must be certified as passing electrical opens and shorts testing. Via hole boards must be electrically tested both sides simultaneously. The qualification and reliability sections of the specification are not required.	
E	Flexible circuits must be subjected to and certified as complying to quality conformance inspection requirements of IPC-6013, class 2. All boards must be certified as passing electrical opens and shorts testing. The qualification and reliability sections of the specification are not required.	Used when procuring commercial flexible boards to IPC 6013 -Class 2.
F	Material specified by this PO requires a First Article Inspection (FAI) Report. Report must be in AS9102 (Current Revision)Format. The report must be furnished with the initial shipment of each drawing number item and must verify all drawing dimensions, notes, reference specifications and material identification. The supplier shall perform a new full FAI, or partial FAI for affected characteristics, when any of the following events occur: 1. A change in the design affecting fit, form or function of the part. 2. A change in manufacturing source(s), process(es), inspection method(s), location of manufacture, tooling or materials, that can potentially affect fit, form or function. 3. A change in numerical control program or translation to another media that can potentially affect fit, form or function.	Typically used for mechanical items, circuit boards, and wire harnesses. This excludes standard or simple parts and items of supplier/industry design, which are inspected per incoming inspection planning. Not required for Commercial off the shelf parts.

	4. A natural or man-made event, which may adversely affect the manufacturing process. 5. A lapse in production for two years or as specified by the Customer. (6. Exception for Item 5 above: Parts shipped after a lapse in two years since last delivery to Binghamton, but were built prior to a two year lapse in production, may be shipped without a new FAI report. Binghamton Buyer must be informed of this condition prior to shipment. Note: When performing the final inspection for the FAI to the drawing, if any discrepancy is found between the solid model and the drawing, notify AMETEK SQE and buyer immediately, and wait for direction to proceed.	
G	Material specified by this PO requires Government Source Inspection (GSI) prior to each shipment. Upon PO receipt, the supplier must promptly notify the government representative who normally services their plant so that planning for GSI can be accomplished. The government representative must stamp packing slip and/or CofC.	Used when required by government contract or specified by AMETEK's local government quality assurance Office. To be performed at the Supplier’s location before shipment.
I	Material specified by this PO requires final test and inspection data. This data must substantiate acceptance of product against PO requirements and must accompany each shipment. Data must specify serial numbers when the applicable products are serialized.	Used when specific test and/or inspections are required per drawing, *and must be sent in with shipments.*
J	Material specified by this PO	Used for castings or

	requires non-destructive tests (NDT) per MIL-STD-2175, MIL-STD-453, MIL-C-6021 or other specification(s) listed on the drawing. All radiographic plates must be included with each shipment, including inspection records.	other commodities requiring radiographic inspection. Mil-Std-2175 and Mil-C-6021 are Superseded by SAE-AMS-STD-2175. Mil-std-453 is Superseded by ASTM-E1742
K	Material specified by this PO requires source inspection by AMETEK prior to shipment. Seventy-two (72) hours advance notice must be given to AMETEK's buyer in order to schedule the source inspection.	Used on a temporary or permanent basis as specified by Quality.
L	Material specified by this PO is sensitive to cosmetic defects. Any dents, scratches, nicks or other visual blemishes which can be seen at a distance of 18 inches with the unaided eye are cause for rejection. 100% visual final inspection is required to assure conformance (Supplier must indicate 100% visual inspection has been performed on the Certificate of Conformance, or with an additional certificate). Individual part packaging, which can withstand normal shipping and handling, is also required.	Used when specified by Quality. The use of this code is for material used as an exterior surface or component on AMETEK final products.
N	Material specified by this PO requires penetrate inspection per MIL-I-6866 or other specification(s) listed on the drawing. Certification of such inspection must be included with each shipment.	Typically used for machined parts where penetrate inspection is required by drawing. Mil-I-6866 is superseded by ASTM E1417-95a
P	Printed Wiring Boards (PWBs) specified by this PO must be certified as meeting the requirements of MIL-P-55110. All boards (100%) must be certified as having passed circuit continuity and shorts testing. Representative coupons are required with each	Used for hard PWB's procured to Military specifications. Mil-P-55110 is superseded by MIL-PRF-31032

	shipment.	
R	Expense material procured where no special Quality requirements apply. For internal AMETEK use only.	Used for incoming inspection of expense material when specified by the requisition.
S	Characteristic features identified in an AMETEK standing instruction (SI) referenced on an SDR sheet require Statistical Process Controls. A process capability study must be performed and appropriate SPC control plan must be submitted to AMETEK's Quality function for approval. Until a minimum Cpk of 1.33 is obtained, 100% inspection of these features is required.	Used when an AMETEK customer flows down SPC to a "buy part."
T	Items specified by this PO require chemical and physical property certificates for material used in fabrication. These certificates must show actual values (not typical) for the specific material used or per the original specification data and must accompany each shipment.	Used for castings, forgings, and other metal parts where special material control is required.
U	Material specified by this PO requires a composite error chart record (with tolerances marked) with each shipment. The shipment must include marked and segregated samples (a minimum sample of a 4% Acceptance Quality Level and Inspection Level S3 per MIL-STD-105 is required). All gears must be individually packaged.	Used for gears requiring special accuracy control, (usually AGMA Class 12 or higher). Mil-STD-105 has been superseded by ANSI – 'Z' tables.
V	Item specified by this PO is a source substantiation controlled part or assembly per AMETEK's General Electric Aircraft Engine (GEAE) customer. **Significant**	Used for GEAE source substantiated controlled parts and assemblies purchased by AMETEK.

	processes and substantiation conditioning, inspection, or tests that are required per the applicable standing instruction (SI) referenced on AMETEK's drawing cannot be altered without prior formal written approval.	
W	Assemblies specified by this PO, which have “stainless steel” parts, must be supplied with chemical and physical properties analysis certificates for the stainless components. The analysis report must be included with each shipment.	Used for assemblies requiring special material control of components, typically gear/shaft items.
X	Material specified by this PO requires special test data as defined in the attached Supplier Data Requirement sheet. The data must accompany each shipment.	Used when special supplier data or certifications are required. SDR must accompany PO. Refer to paragraph 5.2.
Y	Items specified by this PO require a certificate stating materials used in fabrication are to the specifications required by drawing. The certificate must accompany each shipment.	Obsoleted – covered by QC code A.
Z	Material specified by this PO must conform to the requirements of GS300-R documentation (including all test and inspection criteria).	Used for AMETEK Sellersville/Harleysville designed printed wiring boards (PWB's).
A-1	DFARs requirement – (Defense Federal Acquisition Regulation Supplement). When this Quality Code is specified, supplier must conform to this supplement.	Used for government and military products requiring compliance to DFAR requirements.
A-2	NADCAP (National Aerospace and Defense Contractors Accreditation Program) Certifications – when	Used for procured parts that require NADCAP finishes – refer to drawing for specifics.

	identified on the print the supplier must have NADCAP certification for the applicable processes being utilized.	
A-3	AS9100 – Parts may only be supplied by a supplier that has passed AS9100 certification.	Used when customer requires all parts to be supplied by AS9100 certified suppliers.
A-4	Printed wiring boards must be subjected to and certified as complying to quality conformance inspection requirements of IPC-6012, class 3. All boards must be certified as passing electrical opens and shorts testing. Via hole boards must be electrically tested both sides simultaneously. The qualification and reliability sections of the specification are not required.	Used when procuring commercial rigid boards to IPC Class 3.
A-5	Flexible circuits must be subjected to and certified as complying to quality conformance inspection requirements of IPC-6013, class 3. All boards must be certified as passing electrical opens and shorts testing. The qualification and reliability sections of the specification are not required.	Used when procuring commercial flexible boards to IPC 6013 -Class 3.
A-6	Surface mount components must be provided on reels, in full length tubes, or trays; unless otherwise directed by buyer.	For all SMT components
A-7	DPAS orders – DO-A1	Orders with this QC Code are covered under DPAS DO-A1 – Critical to National Defense – Aircraft. All DO orders have equal priority and take preference to other unrated orders (based on ship schedule).
A-8	Items purchased on PO with this quality code require a certificate from sub-tiers of the suppliers performing any	Used when sub-tier surface treatment/finish certificates showing direct compliance to

	surface treatment/finish (Example – heat treat, paint, chemical conversion…) on the purchased parts. Certificate needs to state that parts were processed in accordance to the specifications listed on AMETEK drawing or in AMETEK referenced specifications.	drawing are required.