

REVISIONS				
Rev	Initiated By	Date (MM/DD/YY)	Description	Approval
AD	K. Colvard	03/08/11	Reworded section 5.2	W. Wayne
				K. Colvard
AE	K. Zenkert	08/02/12	AS9100 audit-added scope of approval Change notice ISO-0398	K. Colvard
				G. Spencer
AF	J. Robison	10/22/12	Correct errors and add D2 clause for HSD process ISO-0401	K Colvard
				C Cosgray
AG	J. Robison, C. Cosgray, R. Ortiz	03/20/13	Update Class codes and QA clauses ISO- 0440	K. Colvard
				R. Porrett
				M. Siebert
AH	J. Robison R. Ortiz	08/05/13	Update Class codes and QA clauses ISO-0486	R. Porrett
				K. Colvard
				M. Seibert
AJ	J. Robison R. Ortiz	10/07/13	Update Procedure, Class Codes, QA clauses ISO-0494	R. Porrett
				K. Colvard
				M. Seibert
AK	J. Robison J. Kelly S. Johnson R. Ortiz	02/20/15	Update Appendix I and II ISO-0576	T. Regan
				K. Colvard
				M. Seibert
AL	J. Robison R. Ortiz S. Johnson	02/08/16	Added new Class codes, updated verbiage in Clauses, moved items to new Class codes. ISO-0676 Z:\ISO Change Notices\ISO-0676.pdf	J. Vektor
				K. Colvard
				M. Seibert
AM	R. Ortiz J. Kelley P. Yonkers	10/24/19	Added new Class codes, updated Clauses. ISO-0970 Z:\ISO Change Notices\ISO-0970.pdf	M. Bergin
				K. Colvard
				M. Seibert
AN	Supply Chain Quality Assurance	04/23/20	Update procedure, class codes, clauses. ISO-1055 Z:\ISO Change Notices\ISO-1055.pdf	M. Bergin
				K. Colvard
				M. Seibert



Crane Electronics, Inc.

**FORT WALTON BEACH,
FLORIDA 32548**

WORK PROCEDURE

Quality Assurance Clause Assignment

When Printed "FOR REFERENCE ONLY"
unless issued as Controlled Copy.

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WP 0603

SHEET

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REV

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1.0 PURPOSE

This procedure outlines the process to assure customer deliverable purchased products and services conform to the purchase order or subcontract, and meets in-house and customer requirements.

2.0 SCOPE

- 2.1 This procedure applies to product and services purchased using a purchase order or subcontract in support of deliverable Crane Electronics-FWB product. These QA clauses are not applicable for In-house make items. This procedure applies to the individuals responsible for ensuring product conformance.
- 2.2 Pac 3 contract requires additional QA clauses, A1A (instead of A1), A7A, A7B, D1, and D3 on all purchase orders.

3.0 REFERENCE

- 3.1 AS9100, Quality Management System Requirements
- 3.2 QP 060, Purchasing Policies and Procedures
- 3.3 QP 160, Control of Quality Records
- 3.4 WP 0603, Appendix I, Guidelines for application of Quality Assurance Clauses
- 3.5 WP 0603, Appendix II, Quality Assurance Clauses
- 3.6 WI 10002, Receiving Inspection
- 3.7 WI 02010, Control of Supplier Deviation and Waivers
- 3.8 WI 05005, Control of Part, Component and Inventory Master

4.0 DEFINITIONS

- 4.1 COTS – Commercial off the shelf
- 4.2 QE – Quality Engineer
- 4.3 QA – Quality Assurance
- 4.4 C of C – Certificate of Conformance
- 4.5 FAR - Federal Acquisition Regulation
- 4.6 WI – Work Instruction
- 4.7 WP – Work Procedure
- 4.8 QP – Quality Procedure



Crane Electronics, Inc.

FORT WALTON BEACH, FLORIDA 32548

SIZE
A

CAGE CODE
09062

WP 0603

SCALE

NONE

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5.0 PROCEDURE

- 5.1 Materials and/or services procured that will be part of a deliverable product are required to have QA clauses (Appendix I & II) on the purchase order. Each line item or different part/component/service shall have QA code and clauses clearly identified on the purchase order.
- 5.2 Quality Assurance will assign the Class Codes to all new components and update current items as needed.
- 5.3 Class codes are selected per Appendix I and entered/updated by configuration department per form WI 05005-1. Class codes are linked to specific item numbers in accordance with this procedure.
- 5.4 QA Code assignment is made using Appendix I and may be tailored as required by contract requirements or supplier performance. Class Code of Appendix I is used as the Commodity Code to define the supplier scope of approval.
- 5.5 QA Clause definitions (reference Appendix II) apply to the QA clauses on purchase orders.
- 5.6 The QA Clauses for each item will automatically print on the purchase order based on the class code for each line item part number.
- 5.7 Purchase orders will be reviewed periodically during internal audits for verification of QA Code, Clause inclusion and correctness.
- 5.8 Changes to QA Class Codes or Clauses on Purchase Orders

Changes may be required to QA Class Codes or Clause assignment due to the following reasons:

- 5.8.1 Due to Specification/Source Control Drawing, Vendor Item Drawing, Altered Item Drawings, specific job, etc., the standard QA Class Code or Clauses may not be appropriate or necessary.
- 5.8.2 When a contract invokes a MIL-STD or a FAR, Quality Engineering shall consider if any additional QA clauses are required when determining the quality requirements.
- 5.8.3 QA Class Code or Clause assignment may be in error, missing or have changed for the type product being ordered.
- 5.8.4 A Supplier waiver/deviation, WI 02010-1, or exception may have been approved requiring QA Class code or Clause change/deletion (documentation must accompany purchase order during review). A copy of the supplier waiver/deviation shall be attached to the PO and included in the shipment.
- 5.8.5 If a Class code change is required, form WI 05005-1 must be completed.

 <p>CRANE AEROSPACE & ELECTRONICS</p> <p>Crane Electronics, Inc. FORT WALTON BEACH, FLORIDA 32548</p>	SIZE A	CAGE CODE 09062	WP 0603	
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6.0 DEPARTMENTS RESPONSIBLE FOR IMPLEMENTATION

- 6.1 Configuration Control
- 6.2 Quality Assurance
- 6.3 Supply Chain

7.0 RACI

Responsible, Accountable, Consult, Inform

Accountable: Delegates and approves work Responsible: Those who do the work
 Consult: Subject Matter Experts Inform: Kept up-to-date on progress

Tasks	Quality Assurance	Configuration Administrator	Supply Chain
Assign QA class/code to each part number	A, R, C, I	I	I
Review programs for quality requirements, as needed	A, R, C, I	I	I
Review drawing/specifications for quality requirements, as needed	A, R, C, I		I
Verify QA clause accuracy on Appendix I/ERP system	A, R, C, I		I
Add/Update class codes per WI 05005-1	A, C, I	R	I
Maintain WI 05005-1	C, I	R	I
Notify QA on any discrepancies with QA clauses/codes	R, C		R, I
Ensure "Planner" code matches QA clause on WI 05005-1/ERP System	I		R

NOTE:


Application of QA Class Codes and Clauses is required to be done once unless contractually required otherwise. QA Class Codes and Clauses become a permanent part of the record for the reviewed part numbers.

8.0 RECORDS

- 8.1 Records developed as a result of this work instruction shall be filed in accordance with QP 160, Control of Quality Records.
- 8.2 Training requirements for this work instruction shall be determined by the department manager/supervisor. Training documentation shall be maintained using form WI 18001-2.

9.0 FORMS

- 9.1 WP 0603-2, No longer used
- 9.2 WI 02010-1, Crane Supplier Deviation Form
- 9.3 WI 05005-1, Master Change Request Form

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Crane Electronics, Inc.

**GUIDELINES FOR APPLICATION
OF CLASS CODES AND
QUALITY ASSURANCE CLAUSES
(Appendix I)**

Category	Class Code	Description of Class Code Items	Quality Clauses
DRAWINGS	00	Drawings for information only, Wiring diagrams, Schematic, Envelope drawings, ATP's, SCD's (Hughes), Prep Sheets, Work Procedure, Software, Test Set Assy's, Firmware	X
ASSEMBLIES	01	MAKE IN HOUSE PRODUCTS Assy Drawings, Final Assy, PWB Assy, Terminal Board Assy	X
ASSEMBLIES	02	MAKE IN HOUSE PRODUCTS Cable/Wire Assembly	X
ASSEMBLIES	03	MAKE IN HOUSE PRODUCTS Transformer/Inductors/Magnetics Assemblies	X
MAGNETICS	31	Crane Controlled Drawings - SCD (Magnetics, Transformers, Inductors, Planars, Chokes, Bobbins)	A, A1, A3, A7, A7A, A8, C, D1, E1, F1, F4, G, H1, P, R, S1, W, W3
MECH/MAG	40	Combined with Class Code 41 (Rev AM)	
METAL	41	Crane Controlled Drawings – SCD Machine Shop & Magnetics machined items (Panels, Covers, Heatsinks, Baseplates, Housing, etc.)	A, A1, A3, A7, A7A, A8, B4, B6, C, D1, E1, F1, F4, G, H1, P, R, S3, W, W5
METAL	41A	Crane Controlled Drawings-Fixtures, Molds	A, A3, A8, A9, B6, C, E1, F4, G, H1, R, S3
METAL	41B	Crane Controlled Drawings - SCD Non-Metal Machine Shop or Magnetics machined items (Panels, Covers, Heatsinks, Terminal Boards, Baseplates, Housing, etc.). Non-metallic Hardware, Screws, Washers, Nuts, Bolts, Standoffs, Eyelets, Handles, Retaining Rings, Bushing	A, A1, A3, A8, B6, C, E1, F1, F4, G, H1, P, R, W, W5
METAL	41C	Crane Controlled Drawings – SCD Made to Crane Specifications (Hardware, Screws, Washers, Nuts, Bolts, Standoffs, Eyelets, Handles, Retaining Rings, Bushing)	A, A1, A3, A7, A7A, A8, B4, B6, C, D1, E1, F1, F4, G, H1, P, R, S3, W, W5
CCA	49	Crane Controlled Drawing – SCD Circuit Card Assemblies	A, A1, A3, A7, A8, C, D1, F1, F4, G, H1, K, P, R, W, W1
COTS ASSY	50	COTS Assemblies, COTS Power Supplies, DC-DC Converters, Power Modules	A, A3, A8, C3, F1A, F4, F5, G, H1, K, P, R, W2
SEMIS	53	MILITARY Diodes, Bridges, LED's, SCR's, Transient Suppressors, Rectifiers, Optocoupler, Microcircuits, Transistors, FET's, Integrated Circuits, Voltage Regulators, EPROM	A, A3, A8, C, D1, D2, E2, F1, F4, F5, G, H1, K, P, R, S1,
SEMIS	53A	COMMERCIAL Diodes, Bridges, LED's, SCR's, Transient Suppressors, Rectifiers, Optocoupler, Microcircuits, Transistors, FET's, Integrated Circuits, Voltage Regulators, EPROM	A, A3, A8, C3, E2, F1A, F4, F5, G, H1, K, P, R, S1

SEMIS	53B	Crane Controlled Drawings – AID, SCD (Diodes, Bridges, LED's, SCR's, Transient Suppressors, Rectifiers, Optocoupler, Microcircuits, Transistors, FET's, Integrated Circuits, Voltage Regulators, EPROM)	A, A1, A3, A8, C, D1, D2, E2, F1, F4, F5, G, H1, K, P, R, S1, T
	55	Combined with Class Code 53	
	55A	Combined with Class Code 53A	
	57	Combined with Class Code 53	
	57A	Combine with Class code 53A	
	58	Combined with Class Code 59 and 65	
PASSIVES	59	MILITARY Capacitors, Filters, Surge Guards, Spark Gaps, Relays, Potentiometers, Resistors, Rheostats, Variable Resistors, Varistors, Thermistors	A, A3, A8, C, E2, F1, F4, F5, G, H1, K, P, R, S1
PASSIVES	59A	Crane Controlled Drawings – AID, SCD (Capacitors, Filters, Surge Guards, Spark Gaps, Relays, Potentiometers, Resistors, Rheostats, Variable Resistors, Varistors, Thermistors)	A, A1, A3, A8, C, E2, F1, F4, F5, G, H1, K, P, R, S1
HV CUSTOM	60	High Voltage Capacitance Pack, Custom Diode Bridge, Voltage Multipliers, Optocouplers	A, A1, A3, A8, A9, C, D1, E1, E2, F1, F4, F5, G, H1, K, P, R, S1, T
CONNECTORS	61	COMMERCIAL Connectors, Contacts, Sockets, Headers, Plug Assy's, Jack Plugs, Pin Receptacles, Shunts	A, A3, A8, C3, F1, F4, G, H1, P, R, S1
CONNECTORS	61A	Crane Controlled Drawings – AID, SCD (Connectors, Contacts, Sockets, Headers, Plug Assy's, Jack Plugs, Pin Receptacles, Shunts)	A, A1, A3, A8, C, F1, F4, G, H1, P, R, S1, T
CONNECTORS	61B	MILITARY Connectors, Contacts, Sockets, Headers, Plug Assy's, Jack Plugs, Pin Receptacles, Shunts	A, A3, A8, C, F1, F4, F5, G, H1, P, R, S1
PASSIVES	65	COMMERCIAL Capacitors, Filters, Surge Guards, Spark Gaps, Relays, Potentiometers, Resistors, Rheostats, Variable Resistors, Varistors, Thermistors, Shunts	A, A3, A8, C3, E2, F1A, F4, F5, G, H1, K, P, R, S1
	66	Combined with Class Code 53, 53A, 59, or 65	
ELECTMECH	67	Blowers, Fans, Finger guards, Valves, Switches, Circuit Breakers, Elapsed Time Meters, Cabinets	A, A3, A8, C3, F4, G, H1, R
ELECTMECH	67A	Crane Controlled Drawings – AID, SCD Blowers, Fans, Finger guards, Valves, Switches, Circuit Breakers, Elapsed Time Meters, Cabinets	A, A1, A3, A8, C3, F4, G, H1, R
	68	Combined with Class Code 67 (Rev AL)	
PWB	69	Crane Controlled Drawings (Printed Wiring Boards, Printed Circuit Board, Flex Board	A, A1, A3, A8, C, D1, F2, F4, H1, P1, R, W1

		or Jumpers)	
MAGNETICS	71	COMMERCIAL Transformers, Inductors, Chokes and Reactors	A, A3, A8, C3, D1, E1, F1, F4, G, H1, P, R, S1, W4
TUBES	72	Traveling Wave Tubes (TWT's)	A, A3, A8, C3, D1, F1, F4, G, H1, R, T, T7, W1, W5
MAGNETICS	73	Cores, Toroid's, Ferrite Beads, Bobbins, E-cases, Laminations, Coil Forms	A, A3, A8, C3, D1, E1, F4, G, H1, R, W6
RFCOMP	74	COMMERCIAL RF Components, Waveguides, Attenuators, and Terminations	A, A3, A8, C3, D1, F, F4, G, H1, R, T
RFCOMP	74A	Crane Controlled Drawings – AID, SCD (RF Components, Waveguides, Attenuators, and Terminations)	A, A1, A3A7A, A8, C, D1, F1, F4, G, H1, R, T
INSULATORS	77	COMMERCIAL Gaskets, Insulators (Mica, Rubber, Silicon, Polyimide, Finish Gap Filling, Mylar, Nomex, Etc.)	A, A3, A8, C3, F1, F4, G, H1, N, R
INSULATORS	77A	Crane Controlled Drawings – AID, SCD Gaskets, Insulators (Mica, Rubber, Silicon, Polyimide, Finish Gap Filling, Mylar, Nomex)	A, A1, A3, A8, C, F1, F4, G, H1, N, R
LABELS	78	Crane Controlled Drawings – AID, SCD (Labels, ID Plates, Decals)	A, A1, A3, A8, C3, F4, G, H1, N, R
LABELS	78A	COMMERCIAL Labels, ID Plates, Decals	A, A3, A8, C3, F, F4, G, H1, N, R
PACKAGING	79	Containers, Shipping Crates, Packaging, and Packing Supplies	X
SUPPLIES	80	Production Floor Supplies (Lotion, Gloves, Bags, Shop Coats Etc...)	X
TOOLROOM	81	Hand Tools and Machine Shop Tools	X
ELECTMECH	82	Test Equipment, Measuring Tools, Meters	A, A8, C1, C2, C3, G, H1, R
MISC	83	ADP Equipment, Software and Computer Supplies, Printing Forms	X
	84	Combined with Class Code 84	
MISC/PROD	85	Terminal Strips, End Bellows, Sensors, Fuses, Terminal Block	A, A8, C3, D1, F1, F4, G, H1, R
	86	Combined with Class Code 97	
TOOLROOM	87	Misc., Expendable Items (Non-deliverable)	X
	88	Combined with Class Code 99	
	88A	Combined with Class Code 99A	

SILKSCREEN	89	Silkscreens, Marking, Stencils	A, C3, F4, G, H1, R
CHEM/COMP	90	Paints, Sealers, Chemicals, Compounds, Adhesives, Flux	A, A3, A8, C3, F1A, F4, G, H1, M, N, N2, R
WIRE/CABLE	91	COMMERCIAL Wire, Cable, Wire Jumpers	A, A3, A8, C3, D1, F1A, F4, G, H1, R, S1
WIRE/CABLE	91A	Crane Controlled Drawings – AID, SCD (Wire, Cable Assy)	A, A1, A3, A8, C, D1, F, F4, G, H1, R, S1, T
WIRE/CABLE	92	COMMERCIAL Sleeving, Tubing, Cable ties, Straps, Wire Markers, Lacing Cord, Etc.	A, A3, A8, C3, F4, G, H1, N, R
	93	Combined with Class code 90	
RAW MATL	94	Non-metallic Crude Compounds (Plastic, Fiberglass Sheets, Gap Filler, Silicon Sheets/Chemicals, Nomex, Foils, Fish/Polyimide/Mica Paper	A, A3, A8, C3, F1A, F4, G, H1, N, R
RAW MATL	95	Metallic Crude Compounds Solder (Raw Metals)	A, A3, A8, B2, C3, F, F4, G, H1, M, N, R, S3, T5
TAPE	96	Tape (Mylar, Glass cloth, Kapton, etc.)	A, A3, A8, C3, F1A, F4, G, H1, M, N, R
CHEM/COMP	97	Misc. Fuels, Lubricants, Oils, Waxes, Mechanical (Non-deliverable)	X
MISC	98	Misc. Services (Non-deliverable)	X
HARDWARE	99	COMMERCIAL Hardware, Screws, Washers, Nuts, Bolts, Standoffs, Eyelets, Handles, Retaining Rings, Connector covers, Dusts caps, Bushing, Torlon, inserts, helicoils	A, A3, A8, C3, F, F1A, F4 G, H1, R, S3
HARDWARE	99A	Crane Controlled Drawings – AID, SCD Altered COTS Hardware (Hardware, Screws, Washers, Nuts, Bolts, Standoffs, Eyelets, Handles, Retaining Rings, Connector covers, Dusts caps, Bushing, Torlon), inserts, helicoils	A, A1, A3, A8, C, F, F1A, F4, G, H1, R, S3



Crane Electronics, Inc.

QUALITY ASSURANCE CLAUSES

(Appendix II)

A ACCEPTANCE AT DESTINATION

Articles ordered in this contract are subject to final acceptance at destination. Supplier and/or Manufacturer shall notify Crane Electronics Inc. of any changes to design, materials or processes. No change shall be implemented unless written prior approval has been given by Crane Electronics Inc. Product or assembly shall not be moved or outsourced to another production facility unless a documented request for change is approved by Crane Electronics Inc. in advance. If there are multiple facilities that produce the same product any additional facilities must be approved by Crane Electronics Inc. in advance.

Printed Wiring Boards ordered in this contract are subject to final acceptance at destination. Supplier/Manufacturer shall notify Crane Electronics Inc. of any changes to the design, materials, processes or removal of Pad stack up on inner layers. No change shall be implemented unless written prior approval has been given by Crane Electronics Inc. Product or assembly shall not be moved or outsourced to another facility unless a documented request for change is approved by Crane Electronics Inc. in advance.

MATERIAL AUTHENTICITY – All material delivered under this purchase order shall be authentic and traceable to the original manufacturer. Seller shall provide authenticity and traceability records to Buyer upon request. Seller shall immediately notify Buyer if Seller cannot provide electronic parts, components, and/or assemblies traceable to the original component manufacturer (OCM)/the original equipment manufacturer (OEM). Upon receipt of such notification, Buyer reserves the right to terminate the purchase order at no cost to Buyer or provide specific material validation test and inspection protocol requirements. In the event that Seller delivers items that are determined not to be authentic, Seller shall take corrective action as required by the terms of this purchase order. Seller shall establish and maintain a material authenticity process which ensures the requirements of this clause are met. Seller's obligation to substantiate authenticity shall survive acceptance of and payment for supplies delivered under this purchase order.

COUNTERFEIT PARTS AVOIDANCE - (a) If this purchase order is for the (1) supply of electronic parts, (2) supply of end items, components, parts or assemblies containing electronic parts, or (3) provisioning of services where the Seller will supply electronic parts or components, parts, or assemblies containing electronic parts as part of the service then the provisions of paragraphs (a)–(e) of DFARS 252.246-7007, "Contractor Counterfeit Electronic Part Detection and Avoidance System," in effect on the date of this purchase order, including its definition of "electronic parts", are incorporated in this paragraph by reference.
(b) Supplier shall maintain a counterfeit item risk mitigation process internally and with its suppliers using SAE AS5553 as a guide.

SUB-TIER SUPPLIER FLOW-DOWN - All relevant requirements identified on a Purchase Order shall be flowed down to sub-tier suppliers. Sub-tier suppliers are responsible to be in compliance with all Quality Notes as well as the requirements on the specification, drawing, Purchase Order descriptions, quality system requirements, regulations, state and federal laws, and any other means where requirement details are provided. This requirement does not apply to commercial-off-the-shelf (COTS) items as defined by FAR 2.101 definitions for COTS.

A1 FIRST ARTICLE (REFERENCE AS9102)

Product will not be accepted without objective evidence of an AS9102 compliant format First Article Verification. A First Article Inspection shall be provided for the initial shipment of any Crane Electronics controlled or designed part number. Drawings that require a First Article Inspection are:

- a. Standard Drawing
- b. Specification Controlled Drawings
- c. Selected Item - All characteristics specifically selected for Crane Electronics use as identified on the drawing.
- d. Altered Item Drawing - All characteristics altered for Crane Electronics use as identified on the drawing. If the altered part is a Designed part, a First Article is required on the detail drawing.

Source Control, Off-The-Shelf, Commercial, Supplier or Vendor Item Drawings do not require a First Article Inspection, unless specifically stated on the purchase order.

Evidence of Supplier's First Article Verification Documentation shall include:

1. Recorded inspection and test variable data for all characteristics, requirements and parameters. The Supplier shall record all measurable characteristics (i.e. drawing dimension, tolerance, measured dimension, electrical tests, etc.), including a verification of drawing notes. If the report is not 100% complete, please explain omissions. The supplier shall forward a reproducible, signed copy of the report along with applicable material certifications (ex. coating, paint, plating, composition, etc.) with the initial lot. Certifications are required for all items listed on the Crane Electronics drawings or bills of material for the item or assembly purchased.
2. Verification Quality Notes listed on the Purchase Order have been satisfied.
3. First Article Verification Report shall include supplier name and be validated with an appropriate Quality Acceptance, by stamp or signature and date of inspection. It must include purchase order number, part number, revision letter, drawing number, drawing and parts list revisions, and date code (if applicable).
4. PWB Suppliers only: As a supplement to a supplier inspection document, a copy of the applicable drawing or specification can be used to record the actual measurements or dimensions. Coordinate measuring machine printouts are acceptable as long as a dimensional map is provided.

NOTE:

Results recorded on drawings will not be acceptable if drawing does not include current revision letter.

Additional First Article Clarifications:

A complete or partial documented First Article Verification is a requirement of this purchase order when:

1. The order is the first from the supplier or there have been changes in manufacturing location. This applies to each part number identified on the purchase order.
2. There is a change in drawing revisions, inspection methods, tooling, or materials with the potential to affect form, fit, or function. A First Article Update (Delta FAI) is required and shall address the affected changes only.
3. There has been a 2-year or greater lapse in production (not applicable for distributors). If subsequent shipments are from the same lot/date code as a previous shipment, a copy of the previously submitted First Article report is acceptable.
4. A natural or man-made event, which may adversely affect the manufacturing process, or as deemed necessary by Crane Quality Assurance.

The First Article sample shall have been fabricated using the same parts, materials and processes where production will be performed. A First Article shall not be performed on prototype parts, unless specified by the Purchase Order.

NOTE:

First Article Verification Report shall be shipped to Crane Electronics with the deliverable lot.

NOTE:

At the discretion of Crane Electronics actual confirmation of the First Article Verification data at the supplier's plant may be required.

A1A FIRST ARTICLE (REFERENCE AS9102)

Product will not be accepted without objective evidence of an AS9102 compliant format First Article Verification. A First Article Inspection shall be provided for the initial shipment of any Crane Electronics controlled or designed part number. Drawings that require a First Article Inspection are:

- a. Standard Drawing
- c. Selected Item - All characteristics specifically selected for Crane Electronics use as identified on the drawing.
- d. Altered Item Drawing - All characteristics altered for Crane Electronics use as identified on the drawing. If the altered part is a Designed part, a First Article is required on the detail drawing.

Source Controlled Drawings, Off-The-Shelf, Commercial, Supplier or Vendor Item Drawings do not require a First Article Inspection, unless specifically stated on the purchase order

Evidence of Supplier's First Article Verification Documentation shall include:

1. Recorded inspection and test variable data for all characteristics, requirements and parameters. The Supplier shall record all measurable characteristics (i.e. drawing dimension, tolerance, measured dimension, electrical tests, etc.), including a verification of drawing notes. If the report is not 100% complete, please explain omissions. The supplier shall forward a reproducible, signed copy of the report along with applicable material certifications (ex. coating, paint, plating, composition, etc.) with the initial lot. Certifications are required for all items listed on the Crane Electronics drawings or bills of material for the item or assembly purchased.
2. Verification Quality Notes listed on the Purchase Order have been satisfied.
3. First Article Verification Report shall include supplier name and be validated with an appropriate Quality Acceptance, by stamp or signature and date of inspection. It must include purchase order number, part number, revision letter, drawing number, drawing and parts list revisions, and date code (if applicable).
4. PWB Suppliers only: As a supplement to a supplier inspection document, a copy of the applicable drawing or specification can be used to record the actual measurements or dimensions. Coordinate measuring machine printouts are acceptable as long as a dimensional map is provided.

NOTE:

Results recorded on drawings will not be acceptable if drawing does not include current revision letter.

Additional First Article Clarifications:

A complete or partial documented First Article Verification is a requirement of this purchase order when:

1. The order is the first to the supplier's facility or changes in manufacturing location part number identified on the purchase order.
2. There is a change in drawing revisions, inspection methods, tooling, or materials with the potential to affect form, fit, or function. A First Article Update (Delta FAI) is required for the affected by the change only.
3. There has been a 1-year or greater lapse in production (not applicable for distributors). If subsequent shipments are from the same lot/date code as a previous shipment, a copy of the previously submitted First Article report is acceptable.
4. A natural or man-made event, which may adversely affect the manufacturing process, or as deemed necessary by Crane Quality Assurance.

The First Article sample shall have been fabricated using the same parts, materials and processes where production will be performed. A First Article shall not be performed on prototype parts, unless specified by the Purchase Order.

NOTE:

First Article Verification Report shall be shipped to Crane Electronics with the deliverable lot.

NOTE:

At the discretion of Crane Electronics actual confirmation of the First Article Verification data at the supplier's plant may be required.

A2 GOVERNMENT INSPECTION

Government Inspection is required prior to shipment from your plant. Upon receipt of this order, promptly notify the Government Representative who normally services your plant so that appropriate planning for Government Inspection can be accomplished. In the event the representative or office cannot be located, our purchasing agent should be notified immediately. A reproducible copy of Government Source Inspection shall be submitted with each shipment. Government inspection is required prior to shipment of this material.

NOTE:

This clause should be used only at the Customer/Government's request.

A3 QUALITY SYSTEM REQUIREMENTS

The Suppliers Quality & Inspection System shall conform to the requirements of AS9100/9120 or as a minimum ISO9001 and is subject to review and approval by Crane Electronics Quality Assurance. The Supplier shall implement and maintain an effective quality system, which will assure that all materials and services conform to purchase order requirements. The Supplier's quality system shall be documented and provided for early detection of non-conformances. Records generated by the quality systems shall be made available for periodic review when deemed necessary or requested.

If the Supplier is not registered to ISO 9001 or AS9100/9120 the supplier shall request exemption by Crane Electronics Quality Assurance through Crane Electronics Purchasing. (Example: conforms to MIL-I-45208A and MIL-Q-9858A)

A4 DELETED

A5 ACCEPTANCE TEST PROCEDURE IN-PROCESS AND FINAL

The Supplier/Contractor shall prepare separate detailed test procedures, encompassing tests required for in-process and final acceptance. Each item of hardware, or part thereof, which requires acceptance and testing, shall be covered by an acceptance test procedure. Final and in-process acceptance test procedures require Crane Electronics Quality Assurance approval prior to the delivery of the first unit of hardware. Subsequent changes are subject to Crane Electronics Quality Assurance approval prior to incorporation.

A6 CRANE ELECTRONICS SOURCE INSPECTION

At Crane Electronics discretion, source Inspection may be conducted by Crane Electronics or its representative at the Supplier/Contractor's facilities or where designated in the contract prior to shipment. Inspection/test and in-process inspection/test of the articles defined in this contract shall be subject to witness by Crane Electronics Quality Assurance Inspection. Inspection and/or test performed in accordance with the agreement between the Contractor and a Crane Electronics Quality Source Representative will fulfill the acceptance inspection/test requirements of Crane Electronics. Contractor shall contact the Crane Electronics Quality Source Representative prior to the start of fabrication so that mandatory in-process inspection/test points can be agreed. The contractor shall notify Crane Electronics at least 10 days prior to the date acceptance is required. Contractor shall have available and present upon request, documented evidence of his inspection/test performance including in-process and/or final test. This may be used for the acceptance of hardware or material. Required documentation for shipment must be completed and signed by the contractor's authorized quality personnel, and available for the Crane Electronics Quality Representative's review.

A7 SPECIAL PROCESSES CONFORMANCE

Supplier/Contractor and any sub-tier supplier engaged in special processes such as soldering, welding, cleaning, X-ray, welding, magnetic particle and penetrate inspection, heat treating, plating, potting, etc. shall be in accordance with specifications and standards stated on the drawings and/or purchase order. Contractor shall have records of approval on file, available for review by Crane -Electronics and/or its customers may require certification and approval of special processes.

Suppliers shall ensure that all personnel performing such processes as welding, soldering and Non-destructive Evaluation or Testing are certified in accordance with the specifications contained on the drawings and purchase orders. Suppliers shall also ensure the associated equipment used is certified as appropriate.

A7A NADCAP APPROVAL

Supplier shall be responsible to ensure that all special processes are performed either by the supplier or sub-contractor be accredited by the National Aerospace and Defense Contractors Accreditation Program (NADCAP). Retain all non-destructive testing records and results, including X-ray film for a minimum of 4 years from product shipment. Non-Destructive Testing (NDT) records or Certification approval shall be provided to Crane Electronics upon request.

A7B LOCKHEED MARTIN APPROVED SOURCES

Supplier shall be responsible to ensure that all Lockheed Martin controlled processes are performed either by the supplier or a Lockheed Martin approved source. Lockheed Martin approved sources can be found on the Lockheed Martin home page which can be requested from the buyer.

A8 SURVEILLANCE

During purchase order performance, a Crane Electronics or other authorized Q.A. Representative may visit the supplier's facilities to monitor the items being manufactured for Crane Electronics. The representative may audit both the product and the Quality/Inspection System to determine compliance with quality requirements. Advance notification of such visits, whenever possible, will be made to avoid schedule disruption.

A9 ENVIRONMENTAL

Seller shall comply with federal, state and local environmental laws and regulations. Seller shall establish and implement a Hazardous Materials Management Plan (HMMP) IAW National Aerospace Standard (NAS) 411. A hazardous Materials Management Program Plan shall be prepared IAW DI-MISC-81398 and NAS 411 if no plan has been provided on previous contracts or if significant changes occur. To the greatest extent possible, the Seller shall avoid the use of hazardous materials found on 5 lists know as EPA 17, Class 1 ODC's, EPCRA 302, 313, & 313A. Priority for avoidance shall be given to chemicals identified as one of the EPA 17 and Class 1 ODC's. Use of any chemical from these 5 lists, or products containing such chemical shall be approved in writing by the Buyer prior to use through approval of the annual HMMP Progress Reports. HMMP Progress Reports shall be prepared IAW DI-MISC-81397 and NAS 411. These reports shall be submitted 60 DAC and annually on the anniversary of any previous annual reports or more frequently if significant changes have occurred. A statement of nonuse of any of the above listed chemicals shall suffice for a report.

NOTE:

This is a Lockheed Martin (PAC-3) contract requirement and as such must be complied with-in order for Crane Electronics to fulfill SDRL requirement of the contract.

B1 RADIOGRAPHS

Radiographs shall be supplied with the material to Crane Electronics.

B2 CASTINGS, SHEET, TUBULAR AND BAR STOCK, BAR SOLDER AND OTHER BULK METALS AND ALLOYS

Evidence of inspection/test or physical/chemical analysis must be submitted with each shipment of material on this order. Marking: Material supplied under this purchase order must be identified in accordance with the applicable MIL Specification for the material.

B4 CHEMICAL CONVERSION COATING (MIL-DTL-5541)

Appearance of the MIL-DTL-5541, Type I, Chemical Coating on treated surfaces shall be yellow in color unless specified otherwise, and uniform in appearance without objectionable iridescence or evidence of drain marks, inadequate rinsing or water marks.

B5 RAW CASTINGS AND FORGINGS

Two samples of all raw castings and forgings are required from new or reworked dies or molds and must be approved by Crane Electronics Quality Assurance prior to run of production parts. Unless Quality Clause A6 is a requirement of this contract and is exercised, the samples shall be forwarded to Crane Electronics Receiving Inspection with actual results of lay-out inspection, radiographs and actual chemical and physical test results. When Quality Clause A6 is exercised, the lay-out and test data shall be evaluated at the Supplier/Contractor's facility. In either case, first article approval by Crane Electronics Quality Assurance is required prior to start of production. The Supplier/Contractor is responsible for obtaining Crane Electronics approval of any change to process or tooling using the same process listed above.

B6 PROHIBITED MATERIALS

Cutting fluids and cleaning agents containing the below listed materials shall not be used during the machining, fabrication processing or cleaning of the items on the purchase order.

Nitrites mixed with the following:

- Mixed mono and diamides of an organic acid
- Triethanolamine salts of a substituted organic acid
- Triethanolamine salt of tricarboxylic acid
- Tricarboxylic acid

C CERTIFICATE OF COMPLIANCE FOR MATERIAL AND PROCESS CONFORMANCE

The Contractor shall submit with each shipment a certificate by the Supplier/Contractor's Quality Representative that the materials furnished to Crane Electronics are in conformance with applicable requirements of the contract, drawings and specifications and that supporting documentation is on file and will be made available to the Crane Electronics or Government representatives upon request.

Military Specifications and standards referenced shall be to the latest revision level in effect on the date of this order, unless specified otherwise.

The C of C shall include a statement that the items meet the requirements of the purchase order and/or specifications referenced on the drawing and/or purchase order. C of C's **MUST** include, as a minimum, the following information:

- Supplier name and address
- Serial number(s), as applicable
- Crane Electronics purchase order number
- Quantity of parts in shipment
- Part number as indicated on the purchase order
- Statement certifying product compliance
- Part revision as indicated on the purchase order, if applicable
- Signature, stamp, or Electronic ID of authorizing agent
- Date code(s) or lot number(s) covering all items and quantity for each date code/lot number
- Date of C of C

An example of an acceptable statement of certification of conformance is as follows:

"This is to certify that all items noted above are in conformance with the purchase order, contract, drawings, specification and other applicable documentation and that all process certifications, chemical and physical test reports, are on file at this facility and are available for review by Crane Electronics."

C1 CERTIFICATE OF CALIBRATION

A certificate of calibration, traceable to the National Institute of Standards and Technology (NIST) is required in accordance with MIL-STD-45662A. ISO 10021-1 and ANSI Z540-1 may be accepted in lieu of MIL-STD-45662A.

C2 CALIBRATION AND IDENTIFICATION

This item must be routed to Crane Electronics Calibration Department upon initial receipt for calibration and/or identification.

C3 CERTIFICATE OF COMPLIANCE FOR MATERIAL AND PROCESS CONFORMANCE – COTS

The Contractor shall submit with each shipment a certificate by the Supplier’s Quality Representative that the materials furnished to Crane Electronics meet the requirements of the Purchase Order.

The C of C shall include a statement that the items meet the requirements of the purchase order. C of C’s **MUST** include, as a minimum, the following information:

- Supplier name and address
- Serial number(s), as applicable
- Crane Electronics purchase order number
- Quantity of parts in shipment
- Part number as indicated on the purchase order
- Statement certifying product compliance
- Part revision as indicated on the purchase order, if applicable
- Signature, stamp, or Electronic ID of authorizing agent
- Date code(s) or lot number(s) covering all items and quantity for each date code/lot number
- Date of C of C

An example of an acceptable statement of certification of conformance is as follows:

"This is to certify that all items noted above are in conformance with the purchase order, contract, drawings, specification and other applicable documentation and that all process certifications, chemical and physical test reports, are on file at this facility and are available for review by Crane Electronics."

D DESIGN CONTROL

Items procured to Specification Control Drawings shall meet the specific requirements of the drawing. The supplier shall not modify the manufacturing process, methods or material which affect form, fit or function without prior written approval from Crane Electronics.

D1 USE OF TIN OR TIN COATING

Unalloyed or commercially pure tin or tin coatings shall not be used inside electrical, electronic or electro-mechanical parts (EEE) or as a final finish on EEE parts or associated metal parts (heatsinks, base plates, etc.) or mounting hardware on Crane – Electronics products without prior written approval from Crane Electronics.

D2 HOT SOLDER DIP

If devices and components contain more than 97% tin in the finish plating, on the leads and /or terminals, the finish plating shall be replaced by Hot Solder Dip in accordance with GEIA –STD-0006. This alteration shall be performed by the device manufacturer, or by a Crane Electronics, Inc. approved facilities. If Vendor schedule does not permit the use of these facilities’ vendor shall submit a request to use an alternate source but use of other HSD vendors is not permitted without prior written approval from Crane Electronics Inc.

- | | | |
|---|--|--|
| 1. Tintronics Industries
2122 Metro Circle
Huntsville, AL 35801 | 2. Six Sigma Services
905 Montague Expy
Milpitas, CA 95035 | 3. Corfin Industries, LLC
7-B Raymond Ave.
Salem, NH 03079 |
|---|--|--|

D3 PURE TIN RESTRICTION

The use of unalloyed or pure tin in the internal or external construction of electrical, electronic and electromechanical (EEE) parts is prohibited without Buyer written approval. Product that does not

contain any tin or tin alloys meets the requirements of this clause. Tin-plated electrical wire compliant to applicable military or industrial standards is considered standard and is not restricted.

The solder, plating and coating of the products supplied on this purchase order shall meet the following:

1. The solder used shall contain a material composition of less than or equal to 97% tin by weight and the remainder shall be any combination of silver and/or lead.
2. All plating or coating utilized to manufacture the deliverable hardware shall contain a minimum of 3% lead by weight; this includes all associated hardware that is a part of a EEE component

E MARKING REQUIREMENTS FOR MIL-PRF-55681 AND MIL-PRF-55342 DEVICES

Parts shall be marked IAW MIL-PRF-55342 or MIL-PRF-55681. Marking shall be as defined within the applicable standard. Marking size, orientation, and method used is at the discretion of the manufacturer but must be legible and permanent.

Marking must be in contrasting color per FED-STD-595 and must meet permanency requirements of MIL-STD-202, Method 215

E1 PRODUCT IDENTIFICATION

Parts shall be marked in accordance with the applicable drawing. The marking shall be accomplished IAW MIL-STD-130. Marking shall be applied in the approximate location and using the same method as depicted on the drawing. Identify with 09062-part number, apply appropriate revision letter, date code and serial number (optional or if required) per MIL-STD-130. If the supplier is not Crane Electronics Inc., add the supplier cage code. Marking must be contrasting color per FED-STD-595 and must meet permanency requirements MIL-STD-202, METHOD 215.

Parts not required to be marked per drawing shall be individually bag and tagged, IAW MIL-STD-130. Tag shall be identified with 09062-part number, apply appropriate revision letter, date code and serial number (optional or if required) per MIL-STD-130. If the supplier is not Crane Electronics Inc., add the supplier cage code. Do not mark part.

E2 MOISTURE SENSITIVE PARTS OR PLASTIC

The supplier/manufacturer must determine the moisture sensitive level (MSL) of parts in accordance with J-STD-020A - Moisture/Reflow Sensitivity Classification for Non-Hermetic Solid State Surface Mount Devices. It shall be ensured that plastic encapsulated components that are moisture or reflow sensitive are adequately received, stored, processed, packaged and marked to prevent degradation due to moisture in accordance with J-STD-033 - Standard for Handling, Packing, Shipping and Use of Moisture/Reflow Sensitive Surface Mount Devices or equivalent.

NOTE:

If parts are Moisture Sensitive, Supplier shall state on packing slip/C of C. No other supplier action required.

Components shall be dry packed with desiccant (MIL-D-3464, Type 1 and 2) in moisture barrier bags (MIL-D-81705), and a humidity indicator card that are virtually impermeable to water. When Moisture Sensitive Devices are to be shipped in carriers or trays, the carriers and trays must be able to withstand baking at 125°C. A label is to be affixed to the container indicating the elapsed time from bake out to vacuum sealing. Sealed bags shall bear a label indicating the original manufacturer's part number and date code(s).

F TRACEABILITY

The Supplier/Contractor shall submit with each lot a certificate of traceability signed by the Suppliers Quality representative. If the shipment is comprised of several lots then the certificate of traceability must reference each lot. (i.e. lot and date code)

F1 LOT NUMBER, DATE CODE OR SERIAL NUMBER TRACEABILITY TO MANUFACTURERS LOT

Supplier shall provide manufacturer's lot number, date code or serial number information for each item shipped against this purchase order. Documentation accompanying each shipment shall state how many of each lot number(s), date code(s) or serial number that is being provided.

F1A LOT NUMBER, DATE CODE OR SERIAL NUMBER ON PACKAGING

Lot number, Date Code or serial number must be visible on the part or on the intermediate packaging to include reels, tubes, or other packaging.

F2 TRACEABILITY (PWB)

PWB's must be traceable to the panel. It is recommended the supplier know the exact location for each PWB in each panel for troubleshooting purposes.

F3 DELETED

F4 FOREIGN OBJECT DAMAGE/DEBRIS (FOD) PREVENTION

The Supplier shall establish and maintain an effective FOD prevention program to control and eliminate FOD and/or contamination assuring work is accomplished in a manner preventing foreign objects or material from entering and remaining in deliverable products. The Supplier's program shall utilize effective FOD prevention practices. National Aerospace Standard 412 (NAS412) may be used as a guide to establish and implement the Supplier's FOD program.

Maintenance of the work and control of tools, parts, and materials shall preclude the risk of FOD incidents. Prior to closing inaccessible or obscured areas and compartments during assembly, the Supplier shall inspect for foreign objects/materials.

F5 DATE CODE RESTRICTION

All material supplied must have a date code that is within 5 years of receipt by Crane Electronics or current solderability testing per QA clause S1. If date code is more than 5 years and no solderability tests have been performed, supplier must have Crane written approval prior to shipping parts.

G PACKAGING

Items supplied on this purchase order shall be packaged IAW best commercial practice for shipment by commercial transportation. When required, items shall be individually packaged to prevent handling and shipping damage. Individual packages shall be designed and sealed to prevent the encroachment of moisture and contaminants as required by manufacturer. All packages must be marked with part number listed on the Crane Electronics Inc. purchase order.

Items supplied on this purchase order shall NOT be packaged using packing peanuts. Any packages received with packing peanuts will be rejected as non-conformance.

H DELETED

H1 SUBSTITUTIONS

Substitutions are not allowed for this item without written prior approval by Crane Electronics.

J HANDLING OF CLASSIFIED DOCUMENTS/MATERIAL/PRODUCT

All classified documents/material/product delivered to Crane Electronics by suppliers shall adhere to the following requirements:

- Supplier shall follow guidelines set forth in DOD 5220.22 National Industrial Security Program for handling of classified material at the supplier facility and any relevant subcontractors.
- When this clause is invoked on Crane Electronics purchase order(s) the supplier shall not send documentation including drawings and/or data sheets with the material/product.
- Upon receipt of classified documentation or classified material/product the item shall be directed to Crane Electronics Security Officer. Upon delivery to Crane Electronics only a cleared shipping person, the Facility Security Officer (FSO) or his/her assistant FSO may sign for any classified material/product. If received by the cleared shipping person, he/she brings the documentation/material/product to the FSO or the assistant FSO to open, record delivery and for safeguard keeping in a GSA security container.

K ESD

Electrostatic discharge protection shall be maintained in a manner that is routine, with controls exercised over parts during receipt and test of parts, through the manufacture and inspection cycles, storage, and shipping. Electrostatic discharge protection criteria, as a minimum, shall be in accordance with ANSI/ESD S20.20, MIL-STD-1686 and MIL-HDBK-263 current revisions at the time of purchase order. Static sensitive devices shall be protected from damage due to electrostatic discharge with packaging in accordance with MIL-B-81705; and labeled IAW MIL-STD-129.

M SAFETY DATA SHEET (SDS)

Supplier/Manufacturer is required to supply a current SDS on every shipment of product. If product is made up of two or more chemicals, an SDS for each part is required.

Hazard information must be transmitted to Crane Electronics Inc., on the SDS. They must be distributed to Crane Electronics at the time of shipment. The Hazard Communication Standard requires that SDS's be updated by the chemical manufacturer or supplier within three months of learning of "new or significant information" regarding the chemical's hazard potential.

N AGE SENSITIVE MATERIAL

Applies to any item that is deemed age sensitive by the manufacturer. C of C for age-sensitive materials shall contain the following as a minimum: lot/batch number, date of manufacture, shelf life expiration date and storage conditions to achieve shelf life. The C of C must identify any material that is not age-sensitive.

NOTE:

Shipments with less than 50% of its total shelf life remaining when received by Crane Electronics will not be accepted without prior written approval.

N2 SHELF-LIFE AND TEMPERATURE SENSITIVE MATERIAL

Shelf-life and temperature storage conditions are to be attached to the packaging sheet and accompany each shipment to be delivered. The outer-most shipping box must be marked to

indicate "Shelf-life and Temperature Sensitive Material" and "Temperature Storage Range in Degrees."

P PERMANENCY OF MARKING ON ELECTRONIC COMPONENTS, PARTS, ASSEMBLIES AND HARDWARE

Resistance to solvents shall meet the requirements of MIL-STD-130 and the applicable marking ink specification as called out on the drawing.

P1 GROUP A ACCEPTANCE TEST (For PWB's)

Lot acceptance data shall be performed in accordance with MIL- PRF-55110, Appendix A, Table A-II and Table A-III. Lot acceptance data shall reflect actual readings taken during test, or a check-off sheet when go-no-go type test equipment is used. Data sheets shall list the actual parameters tested in each case and shall accompany each shipment.

Multi-layer boards require 100% continuity testing per MIL-PRF-55110 Appendix A, Table III.

Printed Wiring Boards shall be fabricated and tested IAW MIL-PRF-31032 and/or MIL-PRF-55110. Printed Wiring Boards shall meet the requirements of IPC-A-600, CLASS 3. Solder mask, when specified, shall be per IPC-SM-840E and shall be applied over bare copper. Solderability testing shall be in accordance with IPC-S-804. The following are required on each lot of PWB's:

One coupon per panel is to be retained by the supplier for 7 years and available upon request to Crane - Electronics.

Date codes of the PWB's shall be within 180 days of the receipt of the item by Crane - Electronics.

NOTE:

PWB's, with date codes exceeding 180 days, may only be shipped by providing new solderability testing results with the shipment. If the PWB passes solderability testing, the boards will be accepted.

- Individual PWB's shipped to Crane Electronics must be stored and shipped individually in sealed Electrostatic Discharge (ESD) shielding bags. Desiccant material and HIC card will be packed without touching each PWB in the ESD bag, to minimize moisture in storage.

P2 DELETED

P3 DELETED

P4 DELETED

P4A DELETED

P5 DELETED

P6 DELETED

R RECORD RETENTION

The Supplier shall maintain adequate records of inspections and tests for a minimum of seven (7) years. Records shall provide objective evidence of inspection with applicable drawings and specifications and shall be made available for review. Records include material certification,

special processing, work order/traveler, test reports, inspection reports, calibration records and first articles. Records shall include corrective actions taken when applicable.

S1 COMPONENTS WITH SOLDERABLE LEADS OR SURFACES

Solderable component leads or surfaces (including wire) must meet the requirements for solderability per MIL-STD-202 Method 208 and/or ANSI/J-STD-002 (Solderability Tests for Component Leads, Terminations, Lugs, Terminals and Wires). Leads, pins and terminals of components or parts susceptible to oxidation shall be protected by adequate packaging to minimize oxidation during storage and shipment.

S2 COMPONENT AND ITEMS WITH GOLD LEADED SURFACES

Except for surface mounted parts, gold shall be removed from the to-be soldered surfaces of gold parts. For surfaced mounted parts, the gold shall be removed from at least 95% of the total gold plated surface and there shall be no gold on the to-be soldered areas of the part. The tinning process for both types of components shall consist of two separate solder dips.

S3 SPECIALTY METALS - DFARS 252.225-7009

The Contractor/Supplier shall include (flow down) to all their suppliers of specialty metals as defined by DFARS 252.225-7008 and DFARS 252.225-7009. DOD's interpretation of this specialty metals clause is that it prohibits the contractor (including its suppliers at every tier) from incorporating into military parts, components, and/or end item deliverables "specialty metals" which have been melted outside the United States, its possessions, or Puerto Rico, unless certain limited exceptions set forth in the clause or DFARS 252.225.7002 (BERRY AMENDMENT) apply. One such exception is for specialty metals melted in a qualifying country or incorporated into an article manufactured in a qualifying country. Those countries are listed at DFARS 225.872-1(a) or (b).

S4 STATISTICAL PROCESS CONTROL (SPC):

SPC shall be implemented and maintained by the supplier. The Supplier's SPC program shall be documented and include provisions for selection and identification of key characteristics and/or processes, statistically based control charting, demonstration of continuous improvement, management supervision, corrective action, training, and flow down to sub-tier suppliers when the key characteristic and/or process is controlled by a sub-tier supplier. The requirement for and establishment of SPC key characteristics and/or key processes may be based on similar parts or processes.

T TEST REPORTS

Actual functional test reports referencing Crane Electronics Inc. Purchase Order number, contractor's name and address and/or independent laboratories name and address, part number, part name, serial number/date code if applicable, data and run time if applicable must accompany each shipment to be delivered. These reports shall be validated by an authorized representative or the Contractor's Quality Department by either an inspection stamp or signature.

T1 MIL-PRF-19500/MIL-M-38510

Requirements of the latest revision of MIL-PRF-19500/MIL-M-38510 are applicable to material furnished on this purchase order.

T2 SCREENING DATA

The seller shall provide screening results in accordance with specified documents.

T3 DESTRUCTIVE PHYSICAL ANALYSIS REQUIRED (DPA)

The seller shall perform and provide DPA results in accordance with specified documents.

T4 PRODUCT VERIFICATION TESTING (PVT)

The seller shall perform and provide PVT results in accordance with specified documents.

T5 CHEMICAL AND PHYSICAL TEST REPORTS

One copy of actual chemical and/or physical test reports, for each lot, batch or heat shall accompany each shipment.

T6 DELETED

T7 PURCHASES OF CUSTOMER DESIGNED TWT, UNITS, POWER SUPPLIES AND MODULES

This group includes purchases for products or services that are either complex or have critical application and for which conformance to contract requirements cannot or should not, for economic reasons, be fully determined upon receipt. Full acceptance will be determined on one or both of the following conditions (a) the installation of product in its intended application (b) engineering or test evaluation of the product.

W MATERIAL REVIEW

Material review authority is not delegated: non-conforming materials will require approval from Crane Electronics prior to shipment. On approval to ship, the supplier shall be responsible for clearly marking the item as "Non-Conforming".

W1 SUBCONTRACTED ASSEMBLIES AND PRINTED WIRING BOARDS (Military Products)

Soldering shall be in accordance with the requirements of ANSI/J-STD-001 Class 3. IPC-A-610 Class 3 shall be the inspection criteria. Evidence of manufacturing and inspection shall be delivered with each assembly/lot. When required by drawing or contract, each part must be serialized. Serial number sequence is to be supplied by Crane Electronics. Static sensitive devices must be processed, protected, identified, and shipped in accordance with MIL-STD-1686 and DOD-HDBK-263 or ANSI ESD 20.20.

W2 SUBCONTRACTED ASSEMBLIES AND PRINTED WIRING BOARDS (Commercial Products)

Soldering shall be in accordance with the requirements of ANSI/J-STD-001 Class 2 or comparable best commercial standard. IPC-A-610 Class 2 shall be the inspection criteria. Evidence of manufacturing and inspection shall be delivered with each assembly/ lot. When required by drawing or contract, each part must be serialized. Serial number sequence is to be supplied by Crane Electronics. Static sensitive devices must be processed, protected, identified, and shipped in accordance with MIL-STD-1686 and DOD-HDBK-263 or ANSI ESD 20.20.

W3 WORKMANSHIP FOR FABRICATED MAGNETIC ASSEMBLIES (Military Products)

Each manufacturing lot shall be identified with the manufacturer's CAGE CODE and the date code of manufacture. Soldering shall be in accordance with the requirements of IPC-J-STD-001 Class 3, latest rev. Parylene N may not be used in lieu of Parylene C as a coating for cores.

W4 WORKMANSHIP FOR FABRICATED MAGNETIC ASSEMBLIES (Commercial Products)

Each manufacturing lot shall be identified with the manufacturer's CAGE CODE and the date code of manufacture. Soldering shall be in accordance with the requirements of IPCJ-STD-001 Class 2 or comparable best commercial standard. Parylene N may not be used in lieu of Parylene C as a coating for cores.

W5 WORKMANSHIP OF MACHINED PARTS

Workmanship shall be in accordance with the drawing requirements, and any requirements of the detail equipment specification applicable to marking of parts and assemblies, welding and brazing, plating, riveting, finishes, machine operations, screw assemblies, and freedom of parts from burrs, sharp edges, press brake marks, or any other damage or defect that could make the part (or equipment) unsatisfactory for the purpose intended.

W6 CORES, TORRIDS, FERRITE BEADS, BOBBINS, E-CASES, AND LAMINATIONS

Workmanship and manufacturing of Cores, torrid, ferrite beads, bobbins, e-cases, and laminations shall meet the requirements as specified in PC 110-84, Standard Specifications for Ferrite Pot Cores and MMPA Standard No. UEI 310, Standard Specifications for Ferrite U, E & I Cores, unless specified otherwise.

X NO SPECIAL REQUIREMENT (Internal Use Only)

This code is to be applied to all purchase orders with no special or specific requirements. Only to be used for non-deliverable items. Material ordered under this note is for items under the category of office supplies, maintenance material, forms and will be accepted by the user to her/his requirements. This material is not intended for delivery to Crane Electronics Customers.

This code is to be used for all "make in house" items. Items that are built by Crane Electronics production have quality inspection operations throughout the build process.