

# SUPPLIER QUALITY CODES

This document defines the Quality Codes that will be flowed down to suppliers and their sub-tiers. The Quality Codes will be listed on the face of the PO for clear and easy visibility. Quality Codes will be issued to POs based on life cycle stage, commodity type, supplier rating, part complexity, supplier history, customer requirements, etc.

Document number: QC-001 Rev B

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Printed versions of this document are considered obsolete.

<u>Category</u>	<u>Number</u>
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Commodity Specific Supplier Quality Requirements	Various SQRs
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**GENERAL SUPPLIER QUALITY REQUIREMENTS**

SQR-001: General Supplier Quality Requirements. This document identifies and explains the basic quality requirements for Lithionics Battery's suppliers.

**COMMODITY SPECIFIC QUALITY REQUIREMENTS:**

**SQR-PCB: Supplier Quality Requirements for Printed Circuit Boards.**

A Printed Circuit Board (or Printed Wiring Board) is defined as an item that mechanically supports and electrically connects electronic components using conductive tracks, pads and other features etched from copper sheets laminated onto a non-conductive substrate.

**SQR-CCA: Supplier Quality Requirements for Circuit Card Assemblies.**

A Circuit Card Assembly is defined as a PCB populated with electronic components.

**SQR-Castings-Forgings:**

Supplier Quality Requirements for Castings and Forgings. Castings and Forgings are defined as parts made through the pouring of liquid material into a mold or the shaping of metal via the use of compressive forces; including any required post-processing (e.g., machining).

**SQR-Composites:**

Supplier Quality Requirements for Composites. Composites are defined as low weight & high-performance fiber-reinforced structures such as reflectors, yokes, covers, randoms, etc.  
Category Number

**SQR-Electrical Components:**

Supplier Quality Requirements for Electrical Components. Basic electrical components such as resistors, capacitors, diodes, transistor, integrated circuits, resistor arrays, logic gates, etc.

**SQR-Machined Parts:**

Supplier Quality Requirements for Machined Parts. Machined Parts are defined as parts that are fabricated from sheet metal, bar stock, etc. through metal forming/blanking/chemical milling operations, i.e., stampings, stretch form, brake form, routing, punch press, drop hammer, joggling, hand forming, hydro forming. This includes those that have minor assembly work such as installation of bushings or bearings or have been welded.

**SQR-Raw Materials: Supplier Quality Requirements for Raw Materials.**

Raw Materials are defined as metallic (ferrous and non-ferrous) or non-metallic materials that are controlled by a material specification, i.e., sheet, bar/plate/round stock, ingots, extrusions, tubing, bare wire, fiberglass, graphite, Kevlar, plastics, rubber sheets, etc.

**SQR-E-M Assemblies:**

Supplier Quality Requirements for Electro-Mechanical Assemblies. Electro-Mechanical Assemblies are defined as assemblies or sub-assemblies that usually require acceptance/functional testing (ATP), i.e., LRUs, amplifiers, power supplies, slip rings, etc.

**SQR-Cable Assemblies:**

Supplier Quality Requirements for Cable Assemblies. A Cable Assembly is defined as item comprised of one or more wires running side-by-side and bonded, twisted, or braided together to form a single assembly, the ends of which can be connected to two devices, enabling the transfer of electrical signals from one device to the other.

**SQR-Brazed-Welded: Supplier Quality Requirements for Brazed and Welded items.**

Brazed and Welded items are defined as items joined by either adding filler metal via heating and capillary action, or by melting the work pieces causing coalescence.

**SQR-Antennas: Supplier Quality Requirements for Antennas.**

An antenna is defined as specialized electro-mechanical assembly typically consisting of a reflector surface mounted on a motorized platform, in addition to other assemblies.

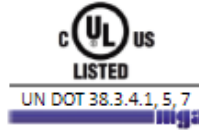
**SQR-Software: Supplier Quality Requirements for Software.**

This document contains requirements for contract deliverable software.

**SQR-Hybrids: Supplier Quality Requirements for Hybrids.**

A Hybrid Microcircuit is defined as a microcircuit consisting of elements that are a combination of film circuitry and semiconductor and/or integrated circuit die (or dice), or a combination of one or more of these into a sealed unit.

A Hybrid Piece Part is defined as any inner component of a hybrid such as a micro die, resistor chip, capacitor chip, or metalized substrate (this does not generally include packages and lids).



**SQR-Special Process: Supplier Quality Requirements for Special Processes.**

A Special Process is defined as a process where the resulting output cannot be verified by subsequent monitoring or measurement, and includes any processes where deficiencies become apparent only after the product is in use, or the service has been delivered. Each Special Process applicable to the PO is called out as a separate Quality Code on the PO. Suppliers that manufacture product where CSW is the design authority shall use only CSW approved Special Process Suppliers. Should suppliers choose to perform special processes in house, the supplier must qualify as a CSW Approved Special Process Supplier in accordance with SQR-001. Suppliers who opt to use sub-tier special process suppliers shall only use Lithionics CSW approved Special Process Suppliers. Suppliers shall review the approved special process list to ensure sources have not expired and independently verify the source's capabilities to meet Lithionics requirements.

**SQR- Lithium**

Defined as a lithium cell or laser welded lithium module which includes cell arrangement, compression fixtures, laser welded bus bars, and wire harnesses.

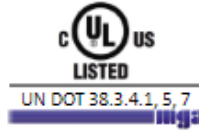
**SQR- Distributor**

Responsible, for purchase, storage, splitting of lots and sale of products without affecting product conformance.

**INSPECTION/WITNESS**

**QAP 100. FAI Specifications.**

The Supplier shall conduct First Article Inspection that meets the requirements of AS9102 for any parts built to Buyer's specifications, including modifications to COTS parts. The Supplier shall use a representative item from the first production run of a new product to verify that the production processes, production documentation, and tooling have the capability to produce products that meet established requirements. This is defined as one or more parts that are the result of a planned process designed to be used for future production of these same parts. This process shall be repeated,



when changes occur that invalidate the original results (e.g., engineering changes, manufacturing process changes, tooling changes, lapse in production for 2 years). First Article Inspection (FAI) shall be conducted per QC-100. FAI Report (FAIR) shall be validated via the Supplier signing in Block 21 of AS9102 Form 1. The Supplier shall ship the completed FAIR (Forms 1, 2 & 3 and supporting data) with the product. If CSW has a current FAI on file and there have been no changes in accordance with AS9102 Paragraph 4.6.f, the FAI requirement is non-applicable. Unless otherwise directed, a Full FAI is required when there is a lapse in production of more than two (2) years (items such as Qualification Tests may not be required). Partial FAIs shall be submitted in accordance with AS9102 Paragraph 4.6 except for lapse of production. If a Partial FAI is submitted instead of a Full FAI, the rationale for why the Partial FAI is considered acceptable shall be included on Form 1 Block 14 of the FAI.

Note:

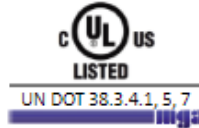
Forms other than those contained in the AS9102 Appendix may be used; however, they must contain all “Required” and “Conditionally Required” information and have the same field reference numbers.

**QAP 101. Buyer FAI Validation.**

First Article Inspection (FAI) shall be conducted per QC-100. FAI Report (FAIR) shall be validated at the Supplier’s facility. The Buyer’s Quality representative shall sign in Block 23 of AS9102 Form 1 signifying Buyer’s validation of the FAIR. The Supplier shall notify the Buyer a minimum of 3 weeks prior to the anticipated date of validation to allow for scheduling. The Supplier shall ship the completed FAIR (Forms 1, 2 & 3 and supporting data) with the product. If CSW has a current FAI on file and there have been no changes in accordance with AS9102 Paragraph 4.6.f, the FAI requirement is nonapplicable. Unless otherwise directed, a Full FAI is required when there is a lapse in production of more than two (2) years (items such as Qualification Tests may not be required). Partial FAIs shall be submitted in accordance with AS9102 Paragraph 4.6 except for lapse of production. If a Partial FAI is submitted instead of a Full FAI, the rationale for why the Partial FAI is considered acceptable shall be included on Form 1 Block 14 of the FAI.

**QAP 103. FAI - Procurement Control Drawing.**

First Article Inspection (FAI) shall be conducted per QC100. Full or Partial FAI’s shall only be accomplished on those features which have been identified on the CSW drawing, signified with a



superscript 3, as being modified from the supplier's standard catalogue product. Unless otherwise directed, a Full FAI is required when there is a lapse in production of more than two (2) years (items such as Qualification Tests may not be required). The FAI Report (FAIR) shall be validated via the Supplier signing in Block 21 of AS9102 Form 1 and supplying applicable AS9102 Forms 2 & 3 and supporting documentation(s) are required. The Supplier shall ship the completed FAIR and supporting data (as required) with the product. If CSW has a current FAI on file and there have been no changes in accordance with AS9102 Paragraph 4.6.f, the FAI requirement is non-applicable. Partial FAIs shall be submitted in accordance with AS9102 Paragraph 4.6 except for lapse of production. If a Partial FAI is submitted instead of a Full FAI, the rationale for why the Partial FAI is considered acceptable shall be included on Form 1 Block 14 of the FAI.

**QAP 104. Buyer Source Inspection.**

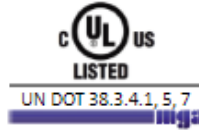
Prior to shipment of product, source inspection shall be conducted at the Seller's facility by the Buyer's Quality representative. The Supplier will notify the Buyer a minimum of 3 weeks prior to date that source inspection is required. If the Buyer's Quality representative waives a required source inspection, an inspection waiver shall be issued to the Seller and shall accompany the shipment.

**QAP 105. Buyer's Customer Source Inspection.**

The Buyer's customer will perform final inspection at the Supplier's facility prior to shipment of product. The Supplier will notify the Buyer's representative at a minimum of 3 weeks prior to date that source inspection is required.

**QAP 106. Government Source Inspection.**

Government inspection of the purchased product is required, prior to shipment from the Supplier's facility. Upon receipt of the PO, the Supplier shall promptly notify the government representative(s) who normally service the supplier's facility to establish a plan for government source inspection.



**QAP 107. In-process Source Inspection.**

In-process source inspection shall be conducted at the Supplier's facility by the Buyer's Quality representative. Prior to the beginning of the build process the Supplier shall coordinate with the Buyer's Quality representative to establish specific inspection stop point(s). The Supplier will notify the Buyer's Quality representative at a minimum of 3 weeks prior to date that source inspection is required. If the Buyer's Quality representative waives a required In-process source inspection, an inspection waiver shall be issued to the Seller and shall accompany the shipment.

**QAP 108. Qualification Test Witness.**

The Buyer's Quality representative shall witness qualification tests at the Supplier's or Supplier's sub-tier's facility. The Supplier shall coordinate the test schedule, a minimum of 3 weeks prior to test date with the Buyer's Quality representative.

**QAP 109. Acceptance Test Witness**

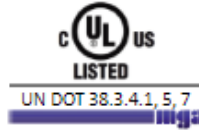
The Buyer's Quality representative shall witness acceptance tests at the Supplier's or Supplier's sub-tier's facility. The Supplier shall coordinate the test schedule, a minimum of 3 weeks prior to test date with the Buyer's Quality representative.

**QAP 110. Direct Ship/Ship in Place Authorization.**

Prior to granting authorization to the Supplier for direct shipment or ship in place of product, the Supplier shall provide, as a minimum, the following documentation to the Buyer's Quality representative:

- a. Certificate of Conformance
- b. Shipper
- c. Required documents - as applicable: first article inspection report, material certificate of analysis, special process certification, dimensional inspection data, acceptance test data, test coupons, pictures of the product showing general condition and identification of the product and other unique documentation as requested by the Buyer. Source inspection may also be required at the Supplier's facility.





## **DELIVERABLES WITH PRODUCT**

### **QAP 201. Certificate of Conformance.**

The Supplier shall provide a Certificate of Conformance (C of C) certifying that product conforms to the requirements of the Purchase Order. The C of C shall accompany each shipment on the PO and shall provide:

- The Supplier's name and address
- Lithionics Battery Part Number and Revision Level (of the product or service being delivered)
- Lithionics Battery Purchase Order number, Line Number and quantity shipped
- Serial Number or other unique identification information, as applicable
- Traceability information to the Original Equipment Manufacturer, if different than Supplier
- Any exceptions to CSW requirements must be clearly documented on the C of C (prior approval of shipment with noted exceptions must be in writing by the Buyer and a copy must accompany the shipment.)

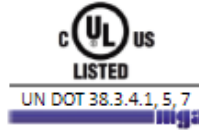
The C of C may be a separate document or included on the packing sheet. The Supplier's Quality representative or authorized delegate shall sign and/or stamp this document (an electronic signature is acceptable). The Supplier shall provide a complete inventory list when delivering kits of parts.

### **QAP 202. Material Certificate of Authenticity/Analysis.**

The Supplier shall provide actual chemical, physical, and/or mechanical test data to substantiate the materials provided meet the requirements of the engineering drawing or specification. The tests shall be provided with the first lot and whenever requested thereafter and minimally whenever a material is changed. The report shall contain the following information: PO number, material number, material description, quantity, lot/batch identification, itemized results, printed name, signature and title of individual authorized to certify compliance.

### **QAP 203. Material Certification.**

The Supplier's sub-tier material certifications shall accompany each shipment of material. Material certifications shall be traceable through lot/batch/serial numbers to the original



mill documentation.

**QAP 204. Acceptance Test Data.**

Supplier shall furnish with each shipment an acceptance test report/data sheet. Acceptance data shall reflect actual readings (variable data) taken during test, or a check-off sheet when attribute (Go/No-Go) type test equipment is used. Acceptance data sheets shall list the parameters tested in each case. The data shall reference the product number and product tracking number (e.g., serial number, batch number), if applicable.

**QAP 205. Dimensional Inspection Data.**

Supplier shall furnish with each shipment a report of the actual measurements of variable data or pass/fail of attribute data of drawing characteristics. Reported dimensional inspection criteria may be tailored by the Buyer's Quality representative.

**QAP 206. Deliverable Data Package.**

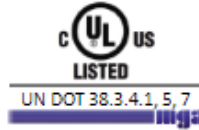
Unique detailed data items that are identified in the specification, statement of work, drawing or PO shall be supplied with each shipment of product. Format and content of the data package shall be coordinated and approved by the Buyer's representative prior to product shipment.

**QAP 207. Test Coupons.**

Test specimen or coupon, as detailed in the specification, drawing or PO, must be included with each shipment.

**QAP 208. Submit Documentation Prior to Shipment.**

Supplier shall submit all required documentation prior to shipment of product. Buyer's Quality representative shall review and return an Authorization to Ship (ATS). The Supplier shall ensure the submittal allows for 10 business days for CSW review and response while ensuring PO delivery date is met. Upon receiving ATS, the Supplier shall ensure the ATS, and all required documentation accompanies the product. The Supplier shall not



Ship product without authorization and ATS form.

**QAP 209: Shelf-Life Control.**

Shelf-life information, including manufacturer's lot/batch number or date code and expiration date shall be marked on the material container. The Supplier shall only deliver shelf life items having a minimum of \_\_\_ month's shelf life remaining upon receipt at buyer's facility.

**QAP 209a:**

Shelf-Life Control (50% life): Supplier shall provide on the certifications, shipping documents, and/or package/container:

- Lithionics Battery Purchase Order number
- Chemical name and part/code number, type, size, and quantity
- Manufacturer's Control Number (Compound/Batch/Lot)
- Date of Manufacture, Cure Date and/or Shelf Life Start Date
- Shelf-Life Expiration Date
- Specification number with type and class
- Storage and special handling information (when specified material has variable shelf life periods based on specific storage conditions, e.g., 1 year at -40° C or 6 months at 0° C)
- Environmentally sensitive material (temperature, humidity, barometric pressure, ambient light, or other) must be identified with the storage conditions, as applicable on the outside

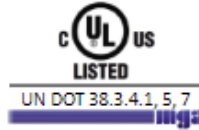
shipping container and the lowest level packages containing the material.

All materials furnished under this Purchase Order must arrive at Buyer's facility with at least 50% of the useable product shelf life remaining.

QC-209b 75% Life:

Supplier shall provide on the certifications, shipping documents, and/or package/container:

- Lithionics Battery Purchase Order number



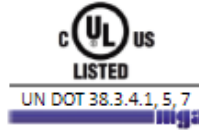
- Chemical name and part/code number, type, size, and quantity
- Manufacturer's Control Number (Compound/Batch/Lot)
- Date of Manufacture, Cure Date and/or Shelf Life Start Date
- Shelf-Life Expiration Date
- Specification number with type and class
- Storage and special handling information (when specified material has variable shelf life periods based on specific storage conditions, e.g., 1 year at -40° C or 6 months at 0° C)
- Environmentally sensitive material (temperature, humidity, barometric pressure, ambient light, or other) must be identified with the storage conditions, as applicable on the outside shipping container and the lowest level packages containing the material.

All materials furnished under this Purchase Order must arrive at Buyer's facility with at least 75% of the useable product shelf life remaining.

QC-209c 90% Life: Supplier shall provide on the certifications, shipping documents, and/or package/container:

- Lithionics Battery Purchase Order number
- Chemical name and part/code number, type, size and quantity
- Manufacturer's Control Number (Compound/Batch/Lot)
- Date of Manufacture, Cure Date and/or Shelf Life Start Date
- Shelf-Life Expiration Date
- Specification number with type and class
- Storage and special handling information (when specified material has variable shelf life periods based on specific storage conditions, e.g., 1 year at -40° C or 6 months at 0° C)
- Environmentally sensitive material (temperature, humidity, barometric pressure, ambient light, or other) must be identified with the storage conditions, as applicable on the outside shipping container and the lowest level packages containing the material.

All materials furnished under this Purchase Order must arrive at Buyer's facility with at least 90% of the useable product shelf life remaining.



**QAP 210. Date/Lot Codes.**

Supplier's packing slip and/or certificate of conformance shall identify the manufacturer's date code/lot/batch/tracking number, for traceability purposes. The supplier shall ensure each date/lot code shipped is identified and packaged separately. Date/Lot codes shall not be comingled. The shipping document and individual part containers shall list date/lot codes and quantity. Each tape and reel package shall consist of one date/lot code only.

**QAP 211. OEM/OCM.**

The supplier shall include on the documentation, packaging, and/or part the name of the OEM/OCM and the OEM/OCM's part number.

**QAP 212. Prototype/Engineering.**

The supplier shall mark on the product and packing list the words "Prototype Unit (Engineering Use Only)". Marking on the product may be by stencil, label, or attached tag. If product cannot be marked due to the lack of marking space or the marking would have a detrimental effect on the product, the marking shall be applied to the supplemental container (bag, box, etc.).

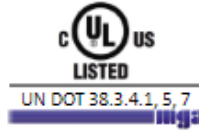
**QAP 213. QPL Control.**

These items are purchased to military and/or industry specifications and must be manufactured by suppliers listed on the applicable Qualified Products Listing (QPL). If no QPL exists for the item, then this clause is not applicable.

**PLANS & PROCEDURES**

**QAP 301. Quality Assurance Program Plan (QAPP).**

The Supplier shall provide a QAPP to the Buyer's Quality



representative for review. The plan shall detail contractual and unique quality requirements that must be incorporated into the Supplier's build process. Plan review dates shall be coordinated with the Buyer's Quality representative.

**QAP 302. Key Characteristics Plan.**

The Supplier shall create a process control plan that documents the product and process key characteristics that must be monitored during the manufacturing process, including measurement methods and necessary reaction plans for possible non-conforming conditions. The Supplier shall provide a copy to the Buyer's Quality representative for review. Plan review dates shall be coordinated with the Buyer's Quality representative.

**QAP 303. Test Procedure Acceptance.**

Initial release and subsequent revision changes to the acceptance test procedure shall be approved by the Buyer's representative. Prior to the first product test the Supplier shall provide a review copy to the Buyer's Representative for approval.

**QAP 304. Advanced Product Quality Planning (APQP).**

Seller is required to implement APQP (Advanced Product Quality Planning) to focus resources on upfront quality planning and the quantitative assessment of process capabilities as they relate to Lithionics design specifications. This requirement is consistent with the AIAG (Automotive Industry Action Group) APQP (Advanced Product Quality Planning and Control Plan) and AS9145 Aerospace Series – Requirements for Advanced Product Quality Planning and Production Part Approval Process. APQP elements that shall be required to be developed, but are not limited to, are listed below. If an approved APQP package is on file for this part, and with prior approval by Lithionics, with no changes in location, process or design or a lapse in production of more than 2 years, a resubmittal is not required. However, if changes or lapse in production has occurred, Seller shall submit a delta APQP package validating only those conditions that have changed since the last APQP package approval.

- Packaging Agreement
- First Article Inspection Report if required by contract, otherwise AS9102 form3 or equivalent
- Critical to Quality (CTQ) characteristics
- Control Plan(s)
- Process Flowchart(s)
- Failure Mode & Effects Analysis (FMEA)
- Measurement Systems Analysis (Gage R&R)

The APQP package shall be submitted using QC-001-C1, or equivalent, a minimum (7) day prior to shipping for review and approval prior to delivery of hardware include:

304a. Level 1

- Packaging Agreements
- First Article Inspection Report if required by contract, otherwise AS9102 form 3 or equivalent

304b. Level 2

- Packaging Agreements
- First Article Inspection Report if required by contract, otherwise AS9102 form 3 or equivalent
- Critical to Quality (CTQ) characteristics • Control Plan(s)

304c. Level 3

- Packaging Agreements
- First Article Inspection Report if required by contract, otherwise AS9102 form 3 or equivalent
- Critical to Quality (CTQ) characteristics
- Control Plan(s)
- Process Flowchart(s)
- Failure Mode & Effects Analysis (FMEA)
- Measurement System Analysis (Gage R&R)

304d. Level 4

- Packaging Agreements
- First Article Inspection Report if required by contract, otherwise AS9102 form 3 or equivalent
- Critical to Quality (CTQ) characteristics
- Control Plan(s)
- Process Flowchart(s)
- Failure Mode & Effects Analysis (FMEA)
- Measurement System Analysis (Gage R&R)
- Short-Term Process Capability Analysis
- Long-Term Process Capability Analysis (SPC)

304e. Level 5

- Supplier Quality Engineer onsite review and approval of all required elements identified prior to shipping

**REVIEWS & AUDITS**

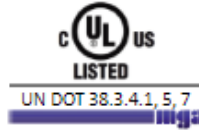
**QAP 401. Product/Process Audit.**

Product and Process Audits shall be conducted by the Buyer's Quality Representative. The audit will evaluate operations or methods against a predetermined set of instructions, standards, and/or verification that a product conforms to requirements. Audits shall be performed at the Supplier's facility. The audit shall be coordinated with the Supplier by the Buyer's Quality representative.

**QAP 402. Post - Contract Award Review.**

After PO award to the Supplier a review shall be conducted by a cross-functional team consisting of members from the Supplier's and Buyer's subject matter experts. The review will be conducted at the Supplier's facility. The purpose of the review is to document and assess the supplier's understanding and implementation of contractual requirements including PO,





terms and conditions, Statement of Work, and the Technical Data Package.

**QAP 403. Quality Requirements Review (QRR).**

After PO award to the Supplier a review shall be conducted by a member of the Buyer's Quality Representative. The review will be conducted at the Supplier's facility and will likely occur in conjunction with the Post-Contract Award Review (Quality Code 502). The purpose of the review is to document and assess the Supplier's understanding of the quality requirements that are flowed to them via Quality Codes on the PO. The review will also demonstrate the usage and navigation of the Lithionics Supplier Resources.

**QAP 404. Manufacturing Readiness Review (MRR).**

An MRR shall be conducted at the Supplier's facility prior to commencing production. The Buyer's Contacting Officer and Quality representative shall jointly provide acceptance of the review to the Supplier.

**QAP 405. Test Readiness Review (TRR).**

A TRR shall be conducted at the Supplier's facility prior to commencing final acceptance testing of product. The Buyer's Quality representative shall provide acceptance of the review to the Supplier.

**QAP 406. Physical Configuration Audit (PCA).**

A PCA shall be conducted to establish baseline to the design using MIL-HDBK-61 as a guide. It shall consist of a formal examination of the "as-built" configuration of the product against its technical documentation to verify configuration product baseline. The PCA shall be coordinated with the Supplier by the Buyer's Quality representative.

**QAP 407. Preliminary Design Review (PDR).**

For a PO that includes design of product, and Preliminary Design

Review will be held by a cross-functional team consisting of members from the Supplier's and Buyer's subject matter experts and designers. The purpose of the review is to document and assess the preliminary design's capability to meet all the requirements as well as its' manufacturability and cost.

**QAP 408. Critical Design Review (CDR).**

For a PO that includes design of product, a Critical Design Review will be held by a cross-functional team consisting of members from the Supplier's and Buyer's subject matter experts and designers. The purpose of the review is to perform an in-depth analysis of the design and document and assess the design's capability to meet all the requirements as well as its' manufacturability and cost.

**QAP 409. QMS Audit.**

For Suppliers not AS9100 or ISO9001 certified, an audit of their QMS system is warranted to ensure their Quality Standards are acceptable for Lithionics product.

**QAP 410. Counterfeit Parts Audit.**

For Suppliers of electronics components, a counterfeit parts audit is necessary to ensure their processes prevent counterfeit parts from entering the Lithionics Supply Chain.

**QAP 411. Special Process Audit.**

For Special Process Suppliers, an initial audit is necessary to ensure the supplier has adequate process controls in place. If the Supplier is NADCAP certified, only an initial audit is needed, subsequent yearly audits can be waived by providing evidence of NADCAP certification.

**SPECIAL PROCESSES**

**QAP 501. Chemical Processing.**

Anodizing, Chemical Cleaning, Chemical Milling, Conversion/Phosphate Coating, Etching, Paint/Dry Film Coatings, Plating, Stripping, Surface Prep Prior to Metal Bond and Surface Treatment/Passivation.

**QAP 502. Heat Treating.**

Stress Relieving, Annealing, Carburizing, Nitriding, Carbonitriding, Ferritic Nitrocarburizing, Ion Nitriding, Vacuum Heat Treating, Vacuum Oil Quenching, Hardening, Induction Hardening, Furnace Brazing, Dip Brazing, Induction Brazing, Vacuum Furnace Brazing, Flame Hardening, Cryogenic Treatments, Hot Forming/Hot sizing, Die Quenching, Hipping, Hardness and Metallography to support the heat-treating function.

**QAP 503. Soldering.**

General Soldering of Circuit Card Assemblies, Surface Mount Technology Soldering, Plated Through Hole Soldering, Lead Free Soldering, and Cable and Harness Soldering.

**QAP 504. Welding.**

Torch/Induction Manual Brazing, Flash Welding, Electron Beam Welding, Fusion Welding, Laser Welding, Resistance Welding, Friction/Inertia Welding, Diffusion Welding, and Percussion Stud Welding.

**QAP 505. Composites.**

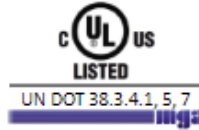
Prepreg/Adhesive Bonding/Resin Film Infusion, Metal Bonding, Core Processing, Compression Molding, and Liquid Resin Processing.

**QAP 506. Gasketing.**

O-Rings, Plate Seals/Rubber Bonded to Substrates, Molded Shapes, Compression Seals and Compounding.

**QAP 507. Coatings.**

Thermal Spray, Vapor Deposition, Diffusion Coating Process, Stripping of Coated Parts, Plating of Coated Parts, Dry Film Lubrication of Coated Parts, and Heat Treating of Coated Parts.



**QAP 508. Non-Destructive Testing.**

Liquid Penetrant, Magnetic Particle, Ultrasonic, Radiography, Eddy Current and Digital Radiography.

**QAP 509. Material Testing Laboratories.**

Chemical Analysis, Mechanical Testing, Metallography (Micro & Macro), Hardness, Corrosion, Microhardness, Differential Thermal Analysis, X-Ray Diffraction, Coating Evaluations, Fastener Testing, Mechanical Test Specimen Preparation, and Specimen Heat Treating.

**QAP 510. Non-Conventional Machining and Surface Enhancements.**

Electrochemical Machining (ECM), Electrochemical Grinding (ECG), Electrical Discharge Machining (EDM), Laser Beam Machining (LBM) and Shot Peen in.