



SUPPLIER QUALITY REQUIREMENTS

1.0 SUPPLIER INTRODUCTION

- 1.1 Welcome To Essex Cryogenics Of Missouri, Inc:** We are pleased to welcome you as an existing or as a potential supplier to provide products and services for our company. Essex Cryogenics is an original equipment manufacturer of liquid oxygen systems and related components. We have assembly operations as well as highly developed x-ray, welding, painting and chemical processing departments.
- 1.2 Quality Policy:** Essex Cryogenics is committed to exceeding the expectations of our customers and to continually improving our Business and Quality Management System.
- 1.3 Our Commitment:** Essex Cryogenics' purchasing department is responsible for negotiating contractual agreements with our suppliers that result in the lowest overall total costs. In addition to prices, this includes consideration to delivery, quality, and innovative technical support and services. Our commitment allows Essex Cryogenics to provide continuing value to its customers through improved product quality. To ensure that this commitment is met, suppliers are selected and continuously evaluated for effectiveness based on these criteria.
- 1.4 Supplier Relationship:** Essex Cryogenics will deal with its supplier with integrity, fairness and impartiality at all times. We will extend to our suppliers the same considerations we expect to receive from our customers. Suppliers of goods and services to Essex Cryogenics will be selected on the basis of value, quality and service. No employee may profit personally from a relationship with a supplier.
- 1.5 Supplier Qualification:** Purchase orders are only awarded to approved suppliers evaluated to be responsible and reliable to perform the required work in full accordance with the requirements of Essex Cryogenics purchase order. New suppliers are added as new needs are developed or current suppliers cannot meet agreed upon commitments.
- 1.6 Certification Of Compliance:** By delivering material(s) to fulfill Essex Cryogenics purchase order requirements, you are certifying that the material delivered conforms to all applicable drawing, specification, and purchase order requirements. A certificate of conformance is required on all components and materials purchased for incorporation into an Essex Cryogenics product, and that evidence of that conformance is on file and available for review.

2.0 SUPPLIER EXPECTATIONS

- 2.1 Supplied Product:** Suppliers have the responsibility to implement and maintain controls that assure products / materials meet all drawing, specifications, quality and Essex Cryogenics purchase order requirements. Order of precedence shall be: 1) Drawing; 2) Purchase Order (PO) Notes; 3) this Document. Suppliers are responsible for developing the appropriate objective quality evidence necessary to demonstrate compliance to the requirements of the purchase order for each item being procured (including sub-components and special processes) and to support the Certificate of Compliance.



2.2 SUPPLIER QUALITY PROGRAM / SYSTEM REQUIREMENTS

- 2.2.1** The supplier shall develop, document, implement and maintain a quality system. Unless compliance to a specific standard is required on the purchase order, the quality system may be patterned after or in accordance with AS9100, ISO9001, QS9000 or another recognized standard used for quality system implementation.

Certification to AS9100, ISO9001 or other system by a third party is desirable. Objective evidence shall be on file verifying that such a system exists and is being maintained. Procedures and records shall be available for examination by authorized Essex Cryogenics representatives upon request.

2.2.2 Quality Documentation and Record Retention

2.2.2.1 Supplier shall have a system for establishing and maintaining control of records documenting product compliance to applicable procurement documents, drawings specifications, and standards.

2.2.2.2 Records shall provide traceability to specific products (i.e. purchase order, date of inspection, drawing and revision level, etc.) and use actual data when required by applicable specifications to indicate acceptability of the product. Inspection records are to indicate the nature (characteristic) and number of observations made (including sample plans), type of deficiencies found, quantities approved and rejected, and the disposition of deficiencies.

2.2.2.3 Records shall be maintained for a minimum of ten (10) years after final shipment. Essex Cryogenics reserves the right to request any supporting documentation on product purchased.

2.3 PROHIBITED PRACTICES

- 2.3.1 Notification of Facility Change:** Supplier cannot relocate any production, manufacturing and/or processing facilities during the performance of the purchase order without notifying Essex within ten (10) days to give an opportunity to examine such facility for compliance to Essex quality requirements as they may apply to the purchase order and/or to obtain necessary end-customer or Government approvals.
- 2.3.2 Unauthorized Repairs:** Supplier may not, without written approval by Essex, repair by welding, brazing, soldering, or adhesive, any parts damaged or found to be faulty during fabrication. Defects in castings or forgings shall not be repaired by any method unless authorized in writing by Essex.
- 2.3.3 Changes In Processes, Material, Or Procedures:** If processes, material, or procedures were originally subject to approval by Essex Cryogenics, no changes can be made to said items without written approval. For any product which has been subjected to Essex's Customer or Government specified qualification procedures to qualify the product, or to permit the seller to become a qualified source for the product, the Supplier cannot change processes, material, or procedures from that used to qualify, without prior notification to Essex and approval by the Essex Customer or the Government, as appropriate.



2.4 SUBCONTRACTORS

Suppliers are responsible for conformance of all items procured from every tier of their suppliers and shall assure that the requirements of this document and applicable drawings and specifications are incumbent upon procurement's sources. Suppliers are responsible for the selection and control of lower tier supplier of all products, processes, or services used in the execution of all purchase orders. Documented evidence as to control of sub-tier suppliers shall be maintained.

2.5 MEASURING AND TEST EQUIPMENT AND/OR PRODUCTION TOOLING

- 2.5.1** Supplier shall establish and maintain a documented calibration system for all measuring and test equipment (M&TE) such as gages, tools, jigs, fixtures, and dies used to verify conformity to requirements. The system shall be in accordance with a recognized standard such as ISO10012-1 or ANSI/NCSL Z540.3 and shall address the criteria described in the selected standard.
- 2.5.2** If material specifications impose specific calibration requirements (e.g. heat treatment-AMS-H-6875) in addition to those identified in the preceding paragraph, the supplier must include the requirements in the calibration system.

2.6 PRESERVATION, PACKAGING, PACKING, AND CLEANLINESS

- 2.6.1** Unless otherwise specified by the purchase order or drawing/product specification, marking of each individual part is not required. The drawing requirements must always be observed for specific marking requirements.
- 2.6.2** Unless precluded by size or shape, individual packages shall be positively identified with the name of the Supplier, the part number, and quantity. This can be accomplished with the use of tags, or bulk marking methods, etc.
- 2.6.3** Unless otherwise specified, all uncoated or unprotected ferrous and nonferrous metal surfaces (internal and/or external) shall be protected against rust and corrosion for a minimum of sixty (60) days from the date of shipment. They shall be suitably packed to prevent shipping and handling damage. All openings, (i.e. fuel, hydraulic, electrical connections, etc.) shall be adequately protected by closures to prevent contamination or damage. All components shall be free of unreasonable dirt and debris.

3.0 SCOPE

This document describes the minimum elements of a Quality Assurance system required for Essex Cryogenics suppliers. The system shall provide for the control of quality throughout the manufacturing process. Supporting documentation shall be maintained and made available to Essex Cryogenics and/or our customer upon Essex Cryogenics' request.

4.0 DEFINITIONS

GOODS, ITEMS, PRODUCT, ARTICLES, PARTS, etc. may be used interchangeably in this document to refer to goods being purchased from a Supplier. Any of these terms used throughout this document include, without limitations, processes, technical information computer



software, raw materials, components, intermediate assemblies, end products, and where applicable, services to be performed.

5.0 QUALITY ASSURANCE REPRESENTATIVES & RIGHT OF ACCESS

5.1 Authority and Responsibility of Essex Cryogenics Quality Assurance Representatives

5.1.1 Essex Cryogenics may, with the supplier's cooperation:

5.1.1.1 Conduct initial and periodic surveys to assure that the supplier has a quality assurance system that meets the requirements of the document and the purchase order.

5.1.1.2 Conduct planned reviews of all phases of the supplier's quality assurance system to assure compliance. If deficiencies are found, require the supplier to take corrective action.

5.1.1.3 Assist the supplier in obtaining interpretation of Essex Cryogenics quality, purchase order, and/or drawing and specification requirements.

5.1.2 Performance of the above by the Essex Cryogenics Quality Assurance Representative does not relieve the supplier of their contractual responsibilities.

5.2 Right of Access: All goods shall be subject to inspection and test at all times and places, including the period of manufacture, by Essex, Essex prime contractors, the Government, and/or Regulatory Authorities, as applicable. Inspectors shall have access to all areas on the premises of the Supplier or Supplier's subcontractors in which work on this contract is being performed. If this contract calls for the delivery of goods for installation on aircraft, the right of inspection and test shall extend to representatives of the Federal Aviation Administration, and if non-domestic, equivalent foreign government agencies

6.0 NONCONFORMING MATERIAL

Suppliers are responsible for establishing controls to ensure that products not conforming to the purchase order are identified, segregated, dispositioned, and controlled to prevent inadvertent use.

In addition to its other rights and remedies, Essex Cryogenics may return items that it finds to be nonconforming for appropriate rework, repair, or replacement.

6.1 Deviation from Standard: Before Supplier can ship nonconforming (deviation from standard) product, they must receive authorization to ship, in writing on Form Q.7.4P0010 Supplier Deviation Request, from an authorized Essex Cryogenics representative. Shipments received without written authorization will be rejected and may be returned at Supplier's expense. If product is shipped under deviation from standard, a copy of the Essex Cryogenics' authorization must be included with the packing slip.

6.2 Resubmitted Articles: Articles rejected by Essex Cryogenics and subsequently re-submitted by Supplier must be closely and properly identified as re-submittal articles.



Supplier's shipping document shall contain a statement that articles are replacement or reworked articles and must also refer to the Essex Cryogenics' rejection document.

7.0 CORRECTIVE ACTION

7.1 Suppliers are responsible for implementing quality systems capable of resolving problems adversely affecting quality and correcting those conditions. Suppliers shall determine root cause (primary reason which caused product nonconformance or quality system deficiency), institute measures to prevent recurrence, and implement corrective action. Nonconforming material or quality system deficiencies detected by Essex Cryogenics may require Supplier response to a Corrective Action Request (CAR.) When a CAR is issued, response is due on or before the due date identified on the CAR and is a factor in the vendor qualification process.

7.2 Corrective Action On Government Source Inspected Items: When corrective action is required for Government source inspected items, Supplier shall coordinate such action with the Government Quality Assurance Representative assigned to Supplier's plant or the nearest Defense Contract Management Area Operations (DCMAO) so that appropriate planning for Government Source Inspection can be accomplished. In the event the representative or office cannot be located, the Essex Cryogenics buyer should be notified immediately.

8.0 SPECIFIC REQUIREMENTS

All Suppliers are required to comply with the requirements listed on purchase orders and defined below:

SQR-1 SOURCE CONTROLLED ITEMS

No certificate of compliance will be required for this standard, off-the-shelf, source controlled item.

SQR-2 CHEMICAL AND PHYSICAL (MECHANICAL) ANALYSIS AND REPORTS

Suppliers must also maintain a complete file of results of all Chemical and Physical (Mechanical) Test Reports to substantiate conformance to material requirements of the drawing or specifications.

If required on purchase order, Supplier must submit a report as indicated below with each lot of material shipped to Essex Cryogenics. A copy of the mill certification and test report is required with each shipment.

Report shall list **actual physical and chemical test results** obtained from an analysis of samples, which are representative of each lot of material supplied under the purchase order.

TEST PANELS OR SPECIMENS

If test panels or specimens are used in lieu of actual parts, they must be made of the same material, alloy, and hardness and be representative of the manufacturing process.



SQR-3 CERTIFICATES OF COMPLIANCE & RELATED ITEMS

All product shipped to Essex Cryogenics requires a Certificate of Compliance and a copy sent for each shipment. Supplier shall certify that the materials and processes used in performance of the purchase order meet all applicable specification requirements and that inspection/process control/test data necessary to substantiate the Certificate of Compliance are on file and available for Essex Cryogenics review. The Certificate of Compliance certifies that a product or service has met all requirements of the purchase order including drawings and specifications at the prescribed revision level.

If the article submitted has a limited shelf life, notice of shelf life expiration must be attached to the certificate of compliance.

If the article requires special storage conditions such as temperature, the special storage conditions must be attached to the certificate of compliance.

All information pertaining to cure dates for items (i.e. rubber goods) must accompany each certificate of compliance.

SQR-4 FIRST ARTICLE

First Article Inspection (FAI) is an inspection performed on the first part, or first lot of parts, produced to verify conformance to top level drawing dimensional requirements. Previous FAI reports may be utilized to satisfy the FAI requirement provided that:

- There has been continuous production with no breaks greater than 12 months.
- The manufacturing process has not changed (i.e. moved the product line, introduced new manufacturing techniques, etc.), AND
- The manufacturing facilities are the same.

If Supplier makes changes to the manufacturing process (as noted above), a new FAI is required with the first shipment after the change was made.

Where characteristics have changed, new characteristics added, or characteristics on previous reports have been impacted, only those characteristics require re-inspection (Delta FAI.)

When specified on the purchase order or product specification, documentation showing actual results (where appropriate) from measuring equipment shall be submitted along with the first article sample. Essex Cryogenics prefers the documentation be on AS9102 or similar type inspection forms. The Supplier shall identify this sample (using tags, labels, etc.) and ensure traceability to all associated documentation.

While FAI may not be specifically called out within the purchase order or within the specification, it is Supplier's responsibility to demonstrate compliance to all drawing requirements. When FAI is required, Suppliers are not authorized to produce product for Essex Cryogenics prior to acceptance and approval of the FAI.



SQR-5 FUNCTIONAL TEST REPORTS

If functional testing is required per the purchase order or product specification, each shipment must include two (2) legible and reproducible copies of actual test results, which include all test parameters. This should include, but is not limited to: operations data, mechanical functions, dimensional, electrical performance, hydraulic operation, and inspections. Seller's report must contain the signature of an authorized representative who is responsible for performing the tests and assuring conformance to the buyer's specification requirements.

SQR-6 GOVERNMENT SOURCE INSPECTION

If article being purchased is for a Government or military contract, Government Source Inspection may be required prior to shipment from Supplier facility. If required on purchase order or product specification, the Supplier must immediately notify the Government Quality Assurance Representative assigned to Supplier's plant or the nearest Defense Contract Management Area Operations (DCMAO) office so that appropriate planning for Government Source Inspection can be accomplished. In the event a representative or office cannot be located, the Essex buyer should be notified immediately.

The Supplier must furnish, at no cost, the necessary facilities, equipment, and personnel required to perform the source inspection.

SQR-7 ESSEX CRYOGENICS SOURCE INSPECTION

If required on purchase order or product specification, Essex Cryogenics may require articles be Source Inspected by an Essex Cryogenics representative. The Supplier must furnish, at no cost, the necessary facilities, equipment, and personnel required to perform the source inspection.

SQR-8 ESSEX or GOVERNMENT FURNISHED INSPECTION OR PRODUCTION TOOLING

Suppliers are responsible for the calibration and safe care, other than normal wear, for any Essex Cryogenics, our customer, or Government supplied inspection or production tooling used in the execution of a purchase order.

SQR-9 HAZARDOUS MATERIALS

A copy of the Material Safety Data Sheet (MSDS) meeting OSHA standards shall accompany each shipment for all items. (Form #OSHA-20, or similar.)

SQR-10 CALIBRATION SERVICES

For suppliers providing calibration services, all work shall be performed in accordance with ANSI/NCSL Z540.3 or an acceptable equivalent and shall address the criteria described in the selected standard. See Q7.6P0003 Control of Monitoring and Measuring Devices Table 1 for calibration requirements (accuracy, number of points, etc.).