Supplier Quality Requirements Manual

This guideline describes Corvus Energy's (CORVUS') expectations for suppliers and provides detailed definitions of terms used in purchasing packages.

This document is maintained by CORVUS and linked in every Purchase Order. It is our expectation that the supplier accesses the latest approved online version.

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General Expectations

CORVUS is committed to delivering defect free products to our customers and working closely with supply chain partners to continuously improve products and procedures.
CORVUS expects all its suppliers to comply with all applicable laws and regulations in all jurisdictions where the suppliers operate. Refer to the "Code of Conduct for Suppliers of Goods and Services" document for details.

Our selection of and collaboration with suppliers is based on specific requirements defined in this guideline, which contains the minimum set of rules and standards required and design outputs. It is applicable to all CORVUS' suppliers of products, components, and services in all CORVUS locations.

The requirements defined in this guideline are integral to our shared success and considered an addendum to all contractual documents including framework agreements, Terms and Conditions for Corvus Purchases, purchase orders, schedules, and all other applicable agreements.

Suppliers are expected to:

- Fully comply with the requirements in contractual agreements, purchasing packages, code of conduct, and extend these requirements to the supplier's subcontractors.
- Implement and take accountability of product nonconformities and communicate to CORVUS where products are not meeting requirements.
- When First Article Inspection (FAI) and Production Part Approval requirements apply, submit the documents to CORVUS for approval before shipping the product, unless otherwise instructed.
- Support cost reduction initiatives, manufacturability improvements and initiatives to reduce quality concerns.
- Inform CORVUS of any required changes to the product's source or manufacturing procedures, tools, and fixtures throughout the product's life. Product Change Notices shall be formal and timely.
- Keep proprietary information confidential.
- Maintain product related quality records.

First Article Inspection - FAI

First Article Inspection – an activity where CORVUS reviews supplier manufacturing and inspection records to verify the product meets the design requirements.

FAI requests are specific to the part and list the documents and samples that CORVUS representatives require to validate their design and the manufacturing process.

Shipment of samples shall be held until FAI documents are approved and communicated to the supplier unless otherwise agreed.

Where CORVUS or the supplier initiates a change to the product definition, this exercise must be repeated and notice of a change must be given before the change occurs and with enough time to plan the necessary reviews and approvals.

Where CORVUS requires on-site verification of prototypes, samples, and/or production products, this will be formally communicated to the supplier.

Production Process Approval – PPA

While the activities and documentation of First Article Inspection prove the validity of the design documentation to product acceptable output, and the supplier's ability to produce it, the activities of Production Process Approval prove the product can be produced in high quantities within acceptable tolerances and that risk of nonconformity is low.

Where CORVUS or the supplier initiates a change to the product or its manufacturing tools and processes, this exercise must be repeated.

> *These terms FAI + PPA are used in the SQR request document to group these activities into two sections allowing for the supplier to send records in separate document packages.
>
> In the FAI/LAI document used for some CORVUS products, all the activities to validate the design and manufacturing process, satisfy regulatory requirements, etc., are listed in one table.

Where the supplier initiates a change, they must inform CORVUS prior to making the change, with enough time to plan the necessary verification activities.

First Article Inspection and Production Part Approval terms and definitions

Tooling Assessment

A drawing/model, dimensional report showing the geometry of the tooling/fixture. An analysis of the lifetime of the tool and the procedure for controlling the tool; evaluation, continued suitability, contingency plan, replacement plan.

CORVUS will review the tool design, against the requirements of the product design and the procedure for maintaining the tool, to ensure requirements are clear and being met and the risk of nonconformity due to the tool is low. The tool design documentation shall include the CORVUS' identification details.

Design Records

Records of the design work done by the supplier (Drawings, calculations, 3D models, etc.). If requested, a CORVUS representative should be included in any formal design review and/or review copies of design documentation prior to design approval. Design records must include records of change, risk analysis and verification activities and reviews.

- **Design Records - Engineering Change Documents:**

  Where design work is outsourced from CORVUS to the supplier, the supplier shall have a process for controlling design changes and maintaining records. Records for design change must be maintained whether CORVUS asks for copies or not. Design change records must capture the reason for change, the details of the change including an in/out BOM or drawing revision notes, etc. where appropriate.

- **Design Failure Modes Effects Analysis (DFMEA)**

  To approve the design work, CORVUS needs to review the risk analysis results that informed the design outputs. The supplier shall have a procedure that they follow for determining design risk.

  Design Failure Modes and Effects Analysis (DFMEA) is a methodical approach used for identifying potential risks introduced in a new or changed design of a product/service. Where the supplier is responsible for design or a portion of the design work, CORVUS may request a copy of the DFMEA record, (or other risk analysis tool records), to review prior to approval. CORVUS can supply a DFMEA template and offer some coaching if required.

Dimensional Inspection Report

On CORVUS drawings, dimensional tolerances, and key characteristics (KC) are indicated. When requested for FAI, CORVUS requires a record of these measurements.; Minimum requirements for FAI are 100% measurement of 5 parts, unless otherwise agreed with CORVUS. When KC's are present, there should be a 30-piece cpk study, unless otherwise agreed with CORVUS

Test Reports

Please refer to the product specifications and FAI request for test report requirements. Test reports may include functional, destructive, and non-destructive tests, interface, assembly, thermal, electrical, paint inspections, etc.

Test reports shall show conformity to any standards cited in the specifications, in addition to the design requirements. CORVUS may require additional records to support test records, for example, calibration certificates for the tools used or a copy of the procedure used in the test. These requirements will be listed in the specifications and/or SQR/FAI request.

Material Certificates

Record of material composition and test results from the mill/foundry, Laboratory, or the material's safety data sheets., Material certificates, also known as a Mill Test Certificate or MTC, include traceable heat or lot number, and typically chemical or physical properties, including density, strength, hardness and more. Material certificates are traceable to the materials used. Material compliance reports, and/or safety data sheets include compliance to performance standards, chemical properties, thermal properties, electrical properties, fire resistance, potential hazards, recommended protective measures, and safety precautions for handling, storage, and transportation of chemicals. Material Certificates are traceable to industry standards (e.g., ISO, ASTM).

*Note: Safety data sheets require documentation with every shipment of hazardous materials, regardless of CORVUS' FAI requirements.

European Agency for Safety and Health at Work
Canadian Center for Occupational Health and Safety
US Department of Labour

Weld Procedure

When requested, CORVUS will review the Supplier's controlled and approved Weld Procedure Specification (WPS) that will be used on the product. The welding procedure should match the standard requested in the engineering design outputs.

Visual Inspection Report

A visual examination of the product against the drawing requirements. The inspection plan should list the characteristics of the product that can be visually assessed and the results; molded defects, inconsistency in coating, dents, cracks, misalignments, poor fit, missed connections, pitting, rust, warping, delamination, product marking and packaging. The request might ask for photos of specific views as well. Inspections should be performed by qualified personnel in well-lit areas. Some inspections may require magnification and/or photos or golden samples for comparison.

Process Plan

When requested, CORVUS requires a representation of the manufacturing process shown graphically, as in a flow chart or a list showing the consecutive processes.

The process flow should include all inputs and outputs, i.e., incoming material, assembly steps, test, rework, packaging, and shipping. The process plan should show the complete manufacturing method in enough detail to make clear any risk areas or potential cost build ups.

Process Failure Modes Effects Analysis (PFMEA)

The PFMEA reviews all the steps in the production process to identify risk in the process quality and applied controls. When requested, this analysis should be sent to CORVUS but also maintained as a live document while production occurs.

Control Plan

Output from PFMEA and other risk analysis tools, the control plan documents the process by which all aspects of the product will be met in production, inspection, and testing. Where products have critical and key characteristics (these are noted in the plan directly), and complex manufacturing procedures, and the control plan is also driven from statistical analysis via initial process studies and measurement system analysis. Control plans include in-process and end of line inspection; what will be measured, when and with what tools. Control Plans include checking tools controlled with a preventive maintenance and calibration program where applicable. If custom tools are created to perform measurement and monitoring on CORVUS product, the supplier must communicate this to CORVUS before work begins.

Initial Process Studies

Studies done on all production processes, including statistical process control data on the key characteristics of the product (identified in engineering outputs and PFMEAs). This exercise should demonstrate that processes are stable, and results are within acceptable tolerances. Processes that produce products identified with key characteristics shall be developed using statistical analysis.

Minimum process capability requirements

Characteristics	Customer Effect	Possible Consequences	Process Requirement
Critical Characteristics Symbol:	Safety Issue / Certification violation	Nonconformity - if occurs may lead to potential safety issues and/or code violations.	Required Cpk> 1.67 All critical characteristics that do not comply with an acceptable Cpk require an action plan and should be inspected 100% until Cpk values are considered acceptable.
Significant Characteristics Symbol:	Mission disabling failure / Reduced performance / Parts will not fit	Nonconformity - if occurs may lead to a potential mission disabling or a customer disturbance/ dissatisfaction	Cpk 1.33 – 1.67 – Acceptable for short term only, improvement required Cpk > 1.67– Corvus target

Measurement System Analysis (MSA)

A mathematical method of determining the amount of variation that exists within a measurement. Variations include the processes, tools, equipment, gauges, fixtures, software, environment, and personnel involved in the measurement system. The analysis should use golden samples, random samples, multiple persons, tools etc. to determine the amount of variation between the factors and adapt the system of measurement to reduce the variation. Custom checking aids are included in MSA requests.
The goal of MSA is to reduce the risk that measurement itself could be a root cause of product nonconformity.

Environmental Records

Records of conformity to any drawing requirements and requests to comply with CORVUS' Code of Conduct, environmental policies, and efforts to reduce climate emissions and hazardous waste in the supply chain. Environmental records will show conformity to environmental legislation and any additional requirements cited in the purchasing package.

Traceability Process

The supplier shall have a process or plan for how products, when required by CORVUS' specifications or drawings, are traceable from PO →·receiving → manufacturing →·CORVUS' serialized product.

When a CORVUS' Drawing or specification requires traceability, the expectation is that the supplier maintains traceability to date of manufacture, material certificates, process reports (welding, heat treat, etc.) and test reports as well as internal process records, so that if there is an issue after delivery, the serial number can be communicated and the supplier can investigate the root cause.

Where specific data is required to be communicated to CORVUS with the serial number, this will be specifically noted in a drawing or referenced as a supplementary document.
Where the process for managing traceability is required, it will be indicated in the quality records request. (Either the “Supplier Quality Requirements Request” or the First Article Inspection scope.

Marking Procedure

Some CORVUS designs require marking to meet compliance requirements and may also include a reference to a marking requirements procedure.

Where requested in the Supplier Quality Requirements, CORVUS also needs to verify the supplier has a procedure for marking and that it is controlled in the production process and that it meets the internal requirements.

Serial numbers must be traceable to the supplier’s records of material conformity, date of manufacture, internal process records, test reports and other conformity evidence as needed. This includes records of conformity that the manufacturer has subcontracted from their suppliers.

Packaging Plan

A plan to safeguard and preserve the product during transit to CORVUS. Packaging plans should include cleanliness standards and preservation methods where applicable. CORVUS may include specific packaging requirements in the purchasing package that shall be included.

Part Submission Warrant

A “PSW” to summarize the submission of all requested Production Process Approval and/or FAI documents and to declare the conformity of the product to CORVUS’ requirements. This is sometimes referred to as a Certificate of Conformity or a Declaration of Compliance

Sample Production Parts

CORVUS may require samples. To ensure that pre-production or sample parts will not be mixed with regular production parts they shall be marked as such.
First Article samples shall be identified as such on the packaging to prevent confusion with other parts.

Golden Sample

This is a final off-tool, off-process sample that has passed all inspections, tests and meets all quality requirements to be kept that the supplier location or a CORVUS location (or both). The Golden sample is a benchmark for comparison for manufacturing.

Checking Aids

Checking aids are those that are specially made to verify a specific design, i.e. a custom fixture, gauge or device made for the verification of a designed item. Checking aids must be controlled under a monitoring and measuring device procedure and periodically assessed for

continued conformity. When requested in the Supplier Quality Requirements the supplier must submit evidence that the checking aids can perform as intended, can discriminate to the extent required by the design record tolerance for the characteristic or feature in question. This might be drawings, samples, or other evidence.

Document Submission

If you receive a purchasing package with "Supplier Quality Requirements request" please follow the directions in that document and submit your quality records to SQR@corvusenergy.com

If you received a purchasing package with a "FAI_LAI" requirements, follow the instructions in that document and submit your quality records to
Fuelcell.supplierquality@corvusenergy.com

If your documents are too large for email, please zip them before sending. If you have a CORVUS FTP site, you may also use that and send an email to the appropriate address, as well as the buyer, letting them know of the location.

Document Naming

If you received an "SQR (Supplier Quality Requirements) request Submission type - Part number – document type – (Add an ID or serial number, as marked, if more than one sample)
Example: FAI-20001111REVA-COC
IF you receive a FAI request – follow the naming requirements in the FAI Scope. Example, a Process Plan document is named "Ref.-7"

Please use your own reports and templates in this submission if you have them.
If you need a template for any of the requested items, CORVUS can forward you some sample documents to adapt.

Only after all the requirements in the Supplier Quality Requirements request are met, as per the purchase order agreement, will CORVUS approve parts for production and issue purchase orders at production quantities.

Product Changes

Change Orders from CORVUS will go through the purchasing process and require FAI and PPA activities to be repeated

Product Change Notice (PCN) – Supplier initiated changes that could affect product quality could include:

- design change
- manufacturing process changes
- tooling changes
- personnel changes
- sub-supplier changes
- location changes etc.

Change may be initiated by CORVUS or the supplier but must be approved by CORVUS before implementation.

All changes must be formally communicated with **Product Change Notice** in the subject line to the appropriate supplier quality address. (as above, SQR@corvusenergy.com or Fuelcell.supplierquality@corvusenergy.com depending on the source of the original order) enough notice to review the change, retest, and perform FAI and PPA activities as needed.

Product non-conformity

Suppliers must have a systematic method for managing products found to be non-conforming (NCR). CORVUS products must be conforming and pass any required reviews and tests prior to delivery.

Nonconformities found after delivery to CORVUS will be processed through CORVUS' nonconforming material process (NCR). Suppliers are expected to submit 8D reports (or equivalent), and participate in root cause analysis, corrective and containment action discussions as needed.

Inventory and Traceability

The supplier shall maintain a system that includes traceability in all aspects of manufacturing that ensures CORVUS parts are identified and traceable to their production and design history.

Additional specific requirements might apply as documented in appendices to frame agreements and contractual documents.

Suppliers are responsible to have inventory control systems that positively identify and control obsolete material to prevent the use of expired or nonconforming items in CORVUS products.

Tools, Equipment and Gauges

Measurements must be performed using the appropriate, calibrated equipment. Supplier shall maintain a calibration program that ensures only calibrated tools are used for inspection and testing.

The supplier shall have a preventive maintenance program that prevents damage and unintended use of tools.

Tools, equipment, and gauges shall be traceable to maintenance and calibration records where appropriate.

The supplier is expected to monitor the lifespan of tooling, i.e., injection mold and die, and report it to CORVUS. End of life reports must consider lead time + two months' notice.

Where requested, checking fixtures shall be approved by CORVUS before use in production.

Where requested, calibration records must be shared with CORVUS. For all critical components supplier must ensure traceability through the supply chain to specific lots, sub-components, parts, and raw material and share these records with CORVUS when requested in First Article Inspection and Part Production Approval requests.

The traceability system should account for re-work and repair procedures, including re-testing.

Sample products shall be labeled appropriately to define the part, revision, and “sample” to prevent any mix up with production parts.

Please reach out to the buyer if you have any questions

Thank you.