GE Additive

Product Qualification Requirements

1	Design Records	Depending on the responsibility for the drawing (GE Additive or Supplier) Provide a list of all GE Specifications, and GE Drawings, including revision level. If applicable, this includes, but not limited to: - Ordering spec. - Equipment/functional spec. - General spec. - Outline drawing copy - P&ID drawing copy - Electrical drawing copy - Design Calculation or DFMEA - Bill of Material (BOM) - Deviation requests - Engineering change documents / Approvals
2	Process Flow Diagrams	The organization shall have a process flow diagram in an organization-specified format that clearly describes the production process steps and sequence, as appropriate, and meets the specified customer needs, requirements and expectations.
3	Process Risk Assessment	Provide a copy of the Process Risk Assessment (FMEA or equivalent). The P-FMEA focuses on potential weaknesses in the production or performance process. When required by the qualification team, the supplier will perform a risk assessment of its manufacturing and quality assurance processes to evaluate the effectiveness of these processes to consistently produce the component or provide the qualified service. Failure Modes & Effects Analysis (FMEA) is one example of an accepted process risk assessment format.
4	Control Plan / Router	The Control Plan / Router details how product quality is controlled and confirmed at each stage of the manufacturing process, including defining the actions to be taken when the process becomes unstable and/or non-conforming product is detected. The Control Plan / Router will include any Special Processes i.e. Welding, Painting, Heat Treat, FPI.. 1) Drawing number, reference to Additive part number and latest revision level of the control plan. 2) Sequential listing of all operations and associated procedures including equipment identification and serial numbers. 3) Identification of all component parts and sources. 4) Identification of all critical sub-tier suppliers and their manufacturing locations. Critical sub-tier suppliers include but are not limited to Raw Material and any process supplier. 5) A sequence plan of all manufacturing and inspection steps with appropriate sign-off documentation. Supplier proprietary processes/documentation may be available for inspection/review by SQE and GE Engineering. 6) The manufacturing location. 7) Part marking and serialization - include method to ensure proper marking and prevent serial number duplication. 8) Any change in the qualified manufacturing process (frozen process) including method, equipment and control shall be formally submitted for GE review and approval. During the qualification, GE Additive and Supplier will define which steps of The Control Plan / Router cannot be changed without approval of GE Additive. If changes are needed, a 'Supplier Deviation Request' shall be submitted by the Supplier before changes are implemented and wait for approval by GE Additive before implementing changes.

5	Measurement System Analysis	When applicable, the following may be requested: 1) Provide Measurement System Analysis (MSA) (ANOVA Gage R&R, Isoplot, etc...) for all critical measurements. 2) Provide calibration certificates for all critical measurement tools.
6	Drawing / Specification Conformity	Dimensional Results (First Article Inspection Report (FAIR) or equivalent) shall include, at a minimum, the following items: 1) Identification of components. 2) Characteristics and feature accountability e.g. dimensional, part marking, cleanliness, other special processes. 3) Inspection and test results - nonconforming results must be clearly identified. 4) Inspection method - If special tooling is needed, review and approval by GE Additive may be required. *5) Production Product Acceptance Criteria. Product acceptance criteria shall be established during the qualification process review of the provided documentation. Once the level of inspection and product acceptance requirement has been determined, it shall be applied to all production components hereafter to ensure controlled processes for maintaining drawing features and characteristics. A FAIR form (or equivalent) shall be completed and maintained by the supplier. Note: Review and or approval of special processes may be required by GE Additive prior to shipping.
7	Records of Material / Performance Test Results	Provide copies of Material Test Reports for all material used on this project to include, but not limited to the following: Piping, Structural Steel, Bolting materials (Bolts, nuts, washers), Tubing, Raw Materials, Welding Consumables. Provide copies of all Mechanical, Electrical, and Functional Tests performed. This should include testing procedures, documented data of all testing performed and test results.
8	Process Capability	When applicable, the following may be requested: The level of initial process capability or performance shall be determined to be acceptable prior to submission for all Special Characteristics designated by the customer or organization. The organization shall obtain customer concurrence on the index for estimating initial process capability prior to submission.
9	Qualified Laboratory Documentation	When applicable, the following may be requested: certifications for Inspection and testing for part qualification shall be performed by a qualified laboratory as defined by customer requirements (e.g., an accredited laboratory). The qualified laboratory (internal or external to the organization) shall have a laboratory scope and documentation showing that the laboratory is qualified for the type of measurements or tests conducted. When an external/commercial laboratory is used, the organization shall submit the test results on the laboratory letterhead or the normal laboratory report format. The name of the laboratory that performed the tests, the date(s) of the tests, and the standards used to run the tests shall be identified.

10	GE Specific Requirements - Records of Conformance	**When applicable, the following may be requested:** Provide a copy of certificate for all Domestic and International **Code Compliances** that this product meets. Examples: - IEC (International Electrotechnical Commission) - ATEX - NEC (National Electrical Code) - UL - REACH **Welding Procedure** Provide a copy of the Welding / Brazing Procedure, Specification, all welder qualification records used on the Project and weld reports. **Surface Preparation, Painting and Coating** Include all Metal Preparation, Prep for coating, coating procedures along with QA Coating data, signoffs, coating specifications and certs. **Sub-tier Supplier Qualification Documentation** All outsourced processes and purchased parts require a qualification by first tier supplier. The supplier shall give evidence that its sub-suppliers are capable and released according to the supplier requirements. **Cleanliness** Provide a copy of the cleanliness procedure/work instruction used to verify cleanliness (including any passages). **Other Documentation as requested or required by the drawing / specification (weld report, coating thickness, etc.)** **Final Inspection Checklist** **Certificate of Conformance** Any other documentation requested by the SQE.
11	Preservation and Packaging	Provide packaging proposal that includes how to preserve, crate, mark, and label your product (as applicable). Requirements may contain the following information: - part number - supplier code - Box quantity - Box number - Manufacturing date - PO Number - Manufacturer - Serial Number - Lot number - Photo of individual component and packaging configuration - Special / safe handling or storage instructions.
12	Product Submission Requirements Warrant	Form used for: 1) GE Additive notification to supplier of requirements. 2) Supplier certification that they satisfy requirements and declaration of compliance. 3) Communication of Ongoing Quality Requirements. 4) GE Additive disposition of submission.