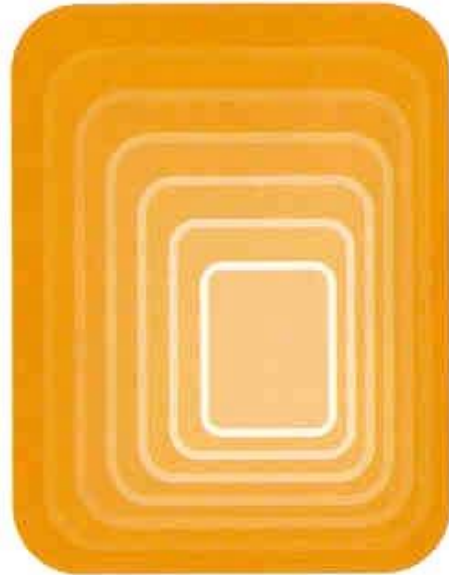


Quality Assurance Manual



General Fabricating Services, LLC.

1 Lewis Avenue

Coraopolis, PA 15108

2020 Edition

www.gfsfab.com

1.0 Scope and Purpose

1.1. Purpose

The purpose of this manual is to define and publish a quality control system for implementation by GFS

1.2. Policy

1.2.1. GFS will implement systems and procedures necessary to assure that all manufactured products and services offered, meet the requirements and standards established by our management team and customer requirements, to provide a better product and service to our customers.

1.2.2. This manual is subject to review by customer representatives at any time prior to issuance of a contract and at all times when a contract is in force.

1.2.3. Procedures to document and resolve Customer complaints have been established in a separate GFS standard.

1.3. Application

The Quality Assurance System defined herein conforms to the requirements of the GFS Management Team.

1.4. Responsibilities

1.4.1. This manual and supporting documents will be reviewed on an annual basis, and revised as necessary to ensure conformance.

1.4.2 Revisions will be issued by the Quality Assurance Manager and controlled in accordance with the applicable procedures.

2.0 Responsibilities

- 2.1 The Quality Assurance Team Leader reports to the President of the company in matters relating to Quality and for manufacturing priorities.
 - 2.1.1. The QA Team (Shop Superintendent and Foremen) will have the authority and organizational freedom to resolve any quality problems.
- 2.2 The Quality Assurance Review Board responsibilities include.
 - 2.2.1. Planning how to meet customer's quality requirements.
 - 2.2.2. Reviewing customer drawings and specifications.
 - 2.2.3. Determining inspection points.
 - 2.2.4. Writing inspection and test plans.
 - 2.2.5. Establish and monitor effectiveness of quality program procedures.
 - 2.2.6. Keeping adequate quality assurance records.
 - 2.2.7. Reviewing quality assurance records and overseeing follow-up for correction and correction of defects.
 - 2.2.8. Assure that supplier quality control and follow-up are adequate.
 - 2.2.9. Coordinating in-plant correction of items rejected by customers, explaining to customers what action will be taken, and evaluating the actions for effectiveness.
- 2.3 The GFS main office is responsible for establishing job costs, client liaison, in-process project management and job close out. A standard has been set up for these procedures.

3.0 Configuration Control

3.1 We manufacture to customer drawings and specifications. Sets of these are filed in job number folders in our main office.

3.2 Any detail drawings made by GFS, Inc., from customer supplied design drawing will conform to GFS, CAD standards.

3.3 The main office is responsible for the following:

3.3.1. Charging out and keeping track of drawings and specifications.

3.3.2. Receiving Engineering changes from our customer and sending these changes to our shop immediately.

3.3.3. Voiding outdated Engineering changes, drawings, and specifications.

3.4 A standard procedure has been set up to control changes by effective date.

4.0 Purchase Order Control

- 4.1 When a purchase order is issued to subcontractors, our buyer will send our supplier all required drawings, specifications, and quality requirements (such as GFS fabrication terms and conditions, material or process certifications, physical or chemical analysis, source inspection) with the purchase order. The PO Number and Job Number will be identified on all material processing.
 - 4.1.1 If there is a drawing or specification change after our order is placed with the supplier our buyer will send the supplier a purchase order amendment including our latest Engineering change and the latest drawings or order specifications.
- 4.2 When a purchase order is issued for raw material, the supplier will issue mill certification test reports to GFS where they will be kept on file. The PO Number and Job Number will be identified on all material.
- 4.3 Copies of all purchase orders will be kept on file for our customers to review.

6.0 INPROCESS INSPECTION

- 6.1 Item identification shall be maintained at all times. Detail piece marks, sub-assembly piece marks and/or shipping piece marks must be maintained as applicable. Plant personnel are responsible for maintenance of identification and Foreman will monitor compliance

- 6.2 Material that has been cut (sawed, sheared, burned, etc.) will be dimensionally checked.

- 6.3 During “Fitting” stage of fabrication, dimensional checks will be made routinely per section 7.2 and customer requirements.

- 6.4 Foremen will be responsible for visual inspection of product thru out the fabrication and assembly process per section 15.0.

7.4 Cope and Block Cuts:

7.4.1 All cope cuts and re-entrant cuts will be notch-free and cut to a radius of at least 1/2", unless otherwise shown on shop detail drawings.

7.5 Fit-Up:

7.5.1 The parts to be joined by fillet welds shall be brought into as close contact as possible. The root opening is not to exceed 3/16" except in cases involving either shapes or plates 3" or greater in thickness. After straightening and fit-up, if the root opening cannot be sufficiently closed to meet this tolerance, a maximum root opening of 5/16" is acceptable, provided suitable backing is used. If the separation is greater than 1/16", the leg of the fillet weld can be increased by the amount of the root opening. The separation between faying surfaces of the plug and slot weld, and of butt joints landing on a backing bar, is not to exceed 1/16".

7.6 Tack Welds:

7.6.1 Tack welds are made by the fitter and or helper to hold assembly together before final welds are made.

7.6.2 Tack welds are subject to the same quality requirements as the final welds, with the following exceptions:

A. Preheat is not mandatory for single-pass tack welds that are remelted and incorporated into the final weld, regardless of whether it is a continuous weld or a stitch weld.

B. Discontinuities, such as undercut, unfilled craters and porosity need not be removed before the final weld is made.

7.6.3 Tack welds, which are incorporated into the final weld, will be made with the electrodes meeting the requirements of the final welds and are to be cleaned thoroughly.

7.6.4 Fitter will mark the weld size and length on assembled section, regardless of whether it is a continuous weld or a stitch weld.

7.6.5 Fitter will tack and assemble section in such a manner so that all tacks are in the welded area.

7.6.6 Fitter will layout all stitch welds in such a manner as to have a full-length stitch weld at each end of a weld run.

7.7 Control of Distortion and Shrinkage:

- 7.7.1 In assembling and joining parts of a structure or built-up member, and in welding reinforcement parts to members, the procedure and sequence shall be such to minimize distortion and shrinkage.
- 7.7.2 All welds will be made in a sequence that will balance the applied best of welding while the welding progresses.

9.0 PIPING PROCEDURES

9.1 Procedures for Pipe Installation

9.1.1 Piping information will be obtained from contract documents and drawings. If no information is available, GFS will use standard practices from The Pipe Fitters and Pipe Welders Handbook, latest edition, published by Glencoe Publishing Company.

10.0 MACHINING PROCEDURES

10.1 Procedures for Machining

10.1.1 Machining information will be obtained from contract documents and drawings.

If no information is available, GFS will use standard practices from The Machinery's Handbook, latest edition, published by Industrial Press, Inc.

13.0 REFRACTORY PROCEDURES

13.1 Procedures for the installation of refractory

13.1.1 All refractory specifications (installation instructions, material type, expansion joints, stud patterns, etc.) will be obtained from the contract documents and drawings. If this information is not available, GFS will use procedures that are recommended by the refractory manufacturer and approved by the customer.

15.6.3 Large, multi threaded connected pipe assemblies will not be pressure tested due to the inability to prevent the vibration during transit from loosening the connection.

15.7 Electrical

15.7.1 Any inspection on electrical items will be done by the customer or by GFS in accordance with instructions supplied by the customer.

15.8 Refractory

15.8.1 Any inspection on refractory items will be done by the customer or by GFS in accordance with instructions supplied by the customer.

15.9 Painting

15.9.1 The initial paint inspection will be a visual inspection to check for runs, sags, light spots, and missed spots. Appropriate corrective measures will be taken for any imperfections that are found.

15.10 Inspection Documentation

15.10.1 All gas tight weld testing and pressure testing will be documented on the appropriate form and signed by the Quality Control/Production Team member and forwarded to the Shop Supervisor's office.

15.10.2 Each department will use the standard inspection report to document inspection and repairs, if any. The report will be signed by the Quality Control/Production Team member and forwarded to the Shop Supervisor's office.

- 15.10.3 Any special inspection witnessed or performed by the customer or his designated representative will be documented on the appropriate form, signed by the Quality Control/Production Team member and the customer representative then forwarded to the Shop Supervisor's office.
- 15.10.4 At completion of job, all forms will be placed in the Job folder at the Main Office where they will be stored for a period of 2 (Two) years.

16.0 SHIPPING PROCEDURES

16.1 Piece Marking

16.1.1 All pieces that are to be shipped will be properly identified in accordance with the marking instructions found in the contract documents and drawings. The shop foremen will monitor compliance.

16.2 Shipping papers

16.2.1 All shipping papers will be completed in accordance with the instructions found in the contract documents and drawings. The shop foremen will insure that what is listed on the shipping papers corresponds to what is loaded on the truck.

16.3 Bracing

16.3.1 All fabricated members will be braced for shipping in accordance with instructions found in the contract documents and drawings. If no bracing instructions are given, GFS will use good shop practice to provide sound bracing for shipment.

16.4 Refractory

16.4.1 All refractory shipped (either loose or installed in a fabricated structure) will be 100% tarped regardless of distance to be traveled or predicted weather conditions.

16.5 Lifting Lugs

16.5.1 Customer approved Lifting lugs may be installed on fabricated structures in order to aid in loading. Lifting lug placement will be done in such a way as to avoid any distortion during lifting.

16.6 Tie Down Points

16.6.1 Tie down points will be determined in such a way as to avoid any distortion in transit. GFS and the trucking company responsible for the load will agree upon tie down points.

