



AND



Welding Qualifications and Operations Procedure Manual

All US Locations
Revised January - 2014

This document is confidential and distributed as a guide only to best practices.

.0 Scope

The Scope of this Manual is to define the welding processes and requirements for qualifying weld procedures and welders at Gem Fabrication.

1.1 All welding on Fire Sprinkler Systems work will be performed by welders or welding operators qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code and in compliance with NFPA 13, the National Fire Protection Association's code for Automatic Sprinkler Systems.

1.1.1 All welding on Code Work will be performed using Welding Procedure Specifications (WPS) and welders or welding operators qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code and the requirements of the applicable construction code.

2.2 Welding Procedure Specifications

2.2.1 Welding Procedure Specifications (WPS) are written by an independent and qualified code Engineering firm. The required test welds are made under the supervision of the Quality Control Manager or Quality Control Inspector. Preparation and testing of the required specimens are performed to Section IX requirements by an independent testing laboratory. The report of tests submitted by the laboratory is reviewed by the Quality Control Manager, and if acceptable, prepares the Procedure Qualification Records (PQR). The Plant Engineer and the Quality Control Manager will sign and date the Welding Procedure Specifications and Procedure Qualification Records. Standard Welding Procedures (SWPSs) that have been adopted in accordance with ASME Section IX, QW-500 may also be used; the Record of Demonstration Test shall be signed by the QC Manager.

2.2.2 WPSs or SWPSs are provided to the Shop Foreman for use by production welders as needed. The Plant Manager maintains the original copies of all SWPSs, WPSs and Procedure Qualification Records (PQRs) in his files.

2.2.3 Welding Procedure Specifications (WPS) and Procedure Qualification Records (PQR) are provided for review by the Plant Manager upon request.

2.2.4 Welding Procedure Specifications (WPS) are revised when there is a change in nonessential variables. A new or revised Welding Procedure Specifications

(WPS) is prepared and qualified whenever an essential or supplementary essential variable is changed.

3.3 Qualification of Welders and Welding Operators

3.3.1 All welders and welding operators to be used for Fire Sprinkler System welding in compliance with NFPA 13, the National Fire Protection Association's Code for Fire Protection Sprinkler Systems are qualified following the rules of ASME Section IX as provided by NFPA 13 and under the supervision of the Plant Manager or his designee. Welder's testing coupons are tested by an independent laboratory. The report of test is reviewed by the Plant Manager, and if acceptable, prepares and certifies by signature and date the QW-484 form shown in Section IX or an equivalent form showing the essential variables used during qualification, the ranges of welding conditions qualified, the test results and certification statement.

3.3.1 All welders and welding operators to be used for Code welding are qualified following the rules of ASME Section IX under the supervision of the Plant Manager or his designee. Welder's test coupons are tested by an independent laboratory. The report of test is reviewed by the Plant Manager, and if acceptable, prepares and certifies by signature and date the QW-484 form shown in Section IX or an equivalent form showing the essential variables used during qualification, the ranges of welding conditions qualified, the test results and certification statement.

3.3.2 Copies of the Welder Qualification Test Records or an index showing what welders are qualified to do shall be provided to the Shop Foreman for their respective qualified welders. The original qualification records are maintained in the Plant Manager's Welding Files.

3.3.3 Welders' qualification records are available for review by an Authorized Inspector at any time.

4.4 Re-qualification of Welders

4.4.1 Welders and welding operators are re-qualified as provided by ASME Section

IX when:

- a. A change in performance essential variable occurs.
- b. He has not welded in the specific process for six months.
- c. The Authorized Inspector or Plant Manager has questioned the welder's ability to make welds that meet the specification and requested that he be re-qualified for the conditions that are in question.

5 Production Welding

5.1 The Shop Foreman is responsible for verifying that all production welders are qualified for the processes and welding conditions that they will use and for instructing each welder in the Welding Procedure Specification (WPS) he will follow as listed on the Shop Order/Traveler for each job as applicable.

5.2 Each qualified welder is issued a unique symbol stamp by the Plant Manager that the welder will use to identify each weld he makes. The welder may also enter his symbol on the Shop Order/ Operation Traveler.

6.0 This section left blank intentionally

7.0 Welding Materials

7.1 All welding materials shall be ASME material which conforms to Section II, Part C or as otherwise permitted by Section IX.

7.2 Welding material shall be stored in a dry storage space and issued by the Shop Foreman as required. Except as listed in 7.3.1 – 7.3.3, .035 and .045 production MIG welding wire spools shall be kept in original sealed packages and in the designated shop location free from moisture and dust accumulation. Storage and distribution is the responsibility of the Shop Foreman.

7.3.1 Low hydrogen coated electrodes shall be purchased and stored in hermetically sealed containers. When opened, the electrodes will be placed in a heated oven maintained at 200° to 400° F while in storage.

7.3.2 Low hydrogen coated electrodes (e.g. any E7018, E8018, E9018, etc.

and all stainless steel and nickel electrodes) are issued by the Craft Supervisor only in a quantity sufficient to complete the weld or a four hour period, whichever is less. Low hydrogen electrodes that are designated as moisture resistant by the letter "R" following the identification on the electrode (e.g., E7018R) may be left out of the storage oven for 8 hours. Welding electrodes that are E90XX designation shall be limited to 2 hours exposure to the atmosphere.

- 7.3.3 Unconsumed low hydrogen coated electrodes returned to the storage area that have been out of the storage or portable oven longer than the permitted exposure time described in the above paragraph shall be scrapped. Damaged or unidentified electrodes or filler metal shall be scrapped. Low-hydrogen electrode that has been returned within the permissible exposure time may be reissued after 12 hours in a storage oven.

8.0 Welding Records

- 8.1 All records referenced in this section shall be available for review by an Authorized Inspector.

9.0 Production Procedures (Sprinkler Fillet Welding)

- 9.1 Identify the job and associated pipe to be welded from the appropriate schedule assignment. Procure matching pieces and line numbers and assemble in the weld station tables.
- 9.2 Inspect the pipe for correct origin, type, size, end treatment and length as required for the matching line number and shop order. Confirm that the correct pipe identification label is also applied.
- 9.2 Outlet and fitting measurements and attachments shall always be pulled from the flow end of pipe. (Normally the end with pipe label)
- 9.3 Select the correct weld-o-lets as required by shop order and confirm the origin, size, and type prior to welding.
- 9.4 Position plasma cutter to selected location and cut hole for out-let to full inside diameter of out-let.
- 9.5 Remove coupon with magnet tool and place coupon in the bucket for this job

- and accounting. Check for debris inside the pipe. Remove as necessary.
- 9.6 Check the outlet fit-up against the hole cut diameter. Grind the inside of the hole area as necessary to remove any burrs or fins prior to welding.
- 9.7 Affix and weld the selected outlet to pipe. Complete the entire rack layout in the same manner.
- 9.7.1 Visually inspect all welds for proper fillet weld standard.
- 9.7.2 Check weld outlet for proper alignment and perpendicularity.
- 9.8 Confirm the coupon count to the number of welds made for this rack layout set up. If a coupon is missing, notify the foreman before unloading the rack so each pipe may be checked and blown out if necessary.
- 9.9 Affix weld stamp to each weld and then initial the shop order for these completed welds.
- 9.10 Remove pipe into the assigned pipe cart, mark in accordance with loading procedures and start new set up.

Attachments:

WPS, PQR
Weld Wire Description
Steel Materials Grouping