



NFM Industrial Park 8 Progress Drive Morrisville PA 19067  
[WWW.ACCU-FIRE.COM](http://WWW.ACCU-FIRE.COM)

# QUALITY CONTROL MANUAL

*Call toll-free: 1-800-641-0005*

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## **Introduction**

Accu-Fire Fabrication, Inc., is one of the leading fabricators of turnkey fire suppression systems, with the ability to provide all industry related supplies. We serve a broad base of fire sprinkler contractors. The technical support offered, includes the ability to fabricate directly from our customer's blueprints.

Since founded in 1991 we at Accu-Fire Fabrication, Inc., have been recognized for the quality and integrity of our sales, stocklisting, fabrication, and supply personnel, and their dedication to provide uncompromising work for our customers.

In addition to our state-of- the- art facility we have personnel that efficiently and effectively support our customer's requirements.

## **SECTION 1**

### **CUTTING**

#### **1.1**

- A. Pipe will be cut to length specified on (green) assembly sheet with  $\pm$   $\frac{1}{4}$ " tolerance.
- B. Machine operator must measure one of each 10 pieces cut to verify length. If a piece is found exceeding the  $\pm$   $\frac{1}{4}$ " tolerance, the previous nine pieces must be measured and replaced if necessary.
- C. If cross mains (identified on assembly sheet with letter A, B, etc.) are being cut, the letter must be marked on the pipe by the cut-off machine operators.
- D. If pipe is to be threaded on one end of grooved, the cut-off machine operator must mark the applicable code to the specific piece of pipe: T.O.E., G.O.E., G.B.E.
- E. The length and line number must be marked on each piece of 1" — 2" line pipe over 2'0" long.

### **THREADING**

#### **1.2**

- A. All pipe is to be threaded on both ends unless specified otherwise. See Cutting Item D above.

- B. All thread lengths are to be uniform and within  $\pm$  one thread tolerance. The thread length must be verified (by use of standard thread length gauge) on one of each pieces of 25 pieces for 1 to 2" sizes, and one of each 25 pieces for 2-1/2" through 4" sizes, and after each die or reamer change.
- C. Threads are to be free from defects (chips, rough thread crest). Threading machine operator must check thread depth by using standard ring gauges provided. Thread depth tolerance is  $\pm$  one thread. Ring gauge inspection will be performed in accordance with following schedule:

<b>Pipe Size</b>	<b>Inspection</b>
1" — 2"	1 of each 50 threads
2 1/2" — 4"	1 of each 15 threads
5" 6" 8"	Each threaded end

- D. Threads are to be cut perpendicular to the pipe axis to assure proper alignment. Alignment can be determined by the visual inspection of the thread crest, being sure that not more than five thread crests are still showing the dull color of the pipe surface. The thread crest should be of bright cut metal appearance from the end of the pipe to the shoulder for exact alignment, provided the threads are within the ring gauge tolerance of + one thread.
- E. All Sch 40 pipe must be reamed and chamfered and can be visually inspected for compliance. Properly reamed pipe will be free of burrs and ridges on the inside diameter wall.
- F. Standard compound is Teflon based and not approved for nuclear applications. Rector Seal compound should be used for all nuclear applications. Rector Seal compound should be used for all nuclear systems.
- G. The overall length (face to face) dimension of spool piece must be maintained at a + 1/8" tolerance.

**Make-On  
1.3**

- A. Fittings are to be selected in accordance with the (green) assembly sheet – by — line and made – on tight.
- B. The department supervisor must approve material substitutions of fittings. All substitutions must be recorded on the material substitution form and given to the department supervisor at the end of each day. The supervisor will accumulate forms and submit to production and inventory control daily.

- C. Fittings are to be machine tightened in accordance with the following pressure regulator settings:

<b>Pipe Sizes</b>	<b>Pressure</b>	
	<b>Cast Iron</b>	<b>Malleable</b>
1 "	22-24 lbs.	20-22 lbs.
1-1/4"	35-40 lbs.	25-30 lbs.
1-1/2"	70-75 lbs.	40-45 lbs.
2"	95-100 lbs.	55-60 lbs.
2-1/2"	55-60 lbs.	60-65 lbs.
3"	70-75 lbs.	65-70 lbs.
4"	110-115 lbs.	100-105 lbs.

Fittings adequately made on will be warm to the touch when removed from the make-on head.

- D. Pipe is to be bundled by line number or main letter and secured in bundles that can be handled by one man. The number of pieces per bundle will be determined by pipe length and diameter. Pipe sizes 2-1/2"; 3" and 4" are to be loaded on carts loose for banding prior to shipment.
- E. All pipe bundles are to be identified by line number or main letter, which is to be marked on a tag and attached to the bundle or painted on the exterior wall of the pipe.
- F. All 1" through 4" pipe less than 24" in length is to be placed in bags at the make-on station and identified by shipping order number. Bag weight to be limited to 50 lbs.
- G. Unless otherwise specified, bare threads should be capped when material is for export.

## **Roll Grooving**

### **1.4**

- A. Pipe sizes 2", 2 1/2", 3" and 4" will be grooved on the roll groover if threading is specified on the opposite end. Each groove is to be checked with snap gauges for groove depth.
- B. The operator must check each of grooved end on the 1-1/4" – 8" pipe sizes to determine excessive flaring of the pipe after grooving.
- C. Pipe sizes 2-1/2", 3", 4", 5", 6" and 8" will be roll grooved on if the assembly sheet specifies G.B.E., and/or of welding is required. Depth and flare inspection are to be used on each piece as outlined in items A and B.
- D. The operator must visually inspect each grooved end for split seams

during the gauging of groove to depth and flare inspection.

- E. Machine operator will refer to page 2 showing abbreviations for various sizes and types of pipe required based on computer sheets
- F. Roll grooved pipe will not be reamed unless specified on the order except in cases where schedule 40 pipe is furnished with one thread end. The threaded end would be reamed.

## **Stationary Head Machine**

### **1.5**

- A. Pipe will be cut to length specified on assembly sheet with ¼" tolerance.
- B. Machine operator must measure each piece fabricated, legibly marking each piece with the main letter, length, and shipping order number.
- C. All schedule 40 pipe is to be threaded on both ends unless specified otherwise on the assembly sheet and/or weld sketches.
- D. All thread lengths are to be uniform and within the  $\pm$  one thread tolerance. Each thread length must be verified by use of the thread length gauge provided.
- E. Machine operator will refer to page 16 showing abbreviations for various sizes and types of pipe required based on computer sheets (green assembly sheets).
- F. Each threaded end must be checked with the standard ring gauge. The thread tolerance is + one thread.
- G. Each threaded pipe end must be reamed and beveled.
- H. Pipe compound is to be applied to the entire thread area prior to making-on screwed fitting.
- I. The overall length (face to face) dimension of spool piece must be maintained at a + 1/8" tolerance.
- J. Fittings made-on in the stationary head machine are to be pulled in until the machine begins to stall or the motor sounds as if it is laboring.
- K. Fittings will be made-on hand tight on nipples 12" and shorter, without compound, except spool pieces which will be machine tight, with compound.

## SECTION 2

### Welding Procedures

This Specification covers the standards and inspection procedures to be followed when inspecting steel fabricated sprinkler pipe. All welders employed by Accu-Fire shall be certified to meet or exceed the requirements of AWS B2.1 specifications for welding procedure and performance; this certification to be issued by the Welder Training & Testing Institute (WTTI). Upon certification each welder is provided a welding stamp by Accu-Fire that shall be unique to that individual. These certifications and welder identification marks are to be maintained by Accu-Fire's Operations Manager. They are available by contacting Vincent Murphy at [VBMurphyIV@accu-fire.com](mailto:VBMurphyIV@accu-fire.com). The procedures they shall conform to are as follows:

1. Applicable Specifications and standards.
  - a. Factory-Made Wrought Steel Buttweld Fittings ASME B16.9
  - b. Buttwelding Ends for Pipe, Valves, Flanges, and Fittings ASME B16.25
  - c. Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures ASTM A 234
  - d. Steel Pipe Flanges and Flanged Fittings ASME B16.5
  - e. Forged Steel Fittings, Socket Welded and Threaded ASME B16.11
2. Material Requirements
  - a. Ferrous Piping (Welded and Seamless)
    - i. Specifications for Bland and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use ASTM A 795
    - ii. Specifications for Welded and Seamless Steel Pipe ANSI/ASTM A53  
ANSI B36.10M
    - iii. Wrought Steel Pipe
    - iv. Specification for Electric-Resistance-Welded Steel Pipe ASTM A 135
3. Filler Metal
  - a. The filler metal shall be AWS ER70-S-3 wire (National Standard-NS115) with a diameter of 0.45". For stainless steel the filler metal shall be alloy ER308.
4. Shielding Gas
  - a. The shielding gas shall be a mixture of 90 Argon, 10% CO<sub>2</sub>. No backing gas is to be used. Flow rate shall be 20 to 25 CFH.
5. Joint Design and Tolerances
  - a. The joint geometry shall be shown in the sketch at the end of this procedure standard.
6. Preparation of Base Metal

- a. The edges of the parts to be joined shall be prepared by grinding, filing or flame cutting. Flame cut edges shall have all slag removed. Rust, scale, slag or other foreign materials shall be removed from the edges by brushing, grinding or chipping prior to welding. Joint alignment shall be maintained by clamps, fixtures or tack welds. Tack welds may be welded over, but must be ground to a size and shape that will allow welding over them without creating weld defects.
7. When Welding is performed, the following procedures shall be completed.
- a. Welders will review and follow design instructions from the “weld-set” noting the pipe size, length of pipe, outlet location, size of outlet, type of outlet, as described in these sheets.
  - b. Holes in piping for outlets shall be cut to the full inside diameter of fittings prior to welding in place of the fittings.
  - c. Disks shall be retrieved from holes with a magnetic stick.
  - d. Openings cut into piping shall be smooth bore and all internal slag and residue shall be removed. Slag will be chipped away with welder’s hammer and then removed with his magnetic stick.
  - e. Upon removal of disk, slag and any residue, the welder shall make a mark adjacent to the hole to demonstrate that the hole and surface areas have been prepared for the welding operation of the outlet.
  - f. Fittings shall not penetrate the internal diameter of the piping.
  - g. Steel plates shall not be welded to the ends of piping or fittings.
  - h. Fittings shall not be modified.
  - i. Nuts, clips, eye rods, angle brackets, or other fasteners shall not be welded to pipe or fittings, except as permitted in NFPA 13 6.5.2.2.3 and 6.5.2.4.5.
  - j. Completed welds shall be free from cracks, incomplete fusion, surface porosity greater than 1/16 in. diameter, and undercut deeper than 25 percent of the wall thickness or 1/32 in. whichever is less.
  - k. Completed circumferential butt weld reinforcement shall not exceed 3/32 in.
8. Visual Inspection
- a. Welds shall be visually inspected to ensure a continuous weld with no pin holes or slag inclusions.
  - b. Each outlet shall be tested using an SKD-S2 Developer applied to the outside of each weld and an SKL-SP1 Penetrant applied to the inside of the weld-o-let.
  - c. After application of Developer and Penetrant each weld shall again be visually inspected to verify there are no pin hole leaks.
  - d. If the welding is performed on galvanized pipe, the completed outlet and any prepared areas will be sprayed with a cold-galvanizing compound.
  - e. At completion of job requirements, welder will date and sign-off on the “Weld-set.” These sheets shall then be submitted to his Quality Control Manger for inspection.

- f. Accu-fire's Quality Control Manager will visually inspect each welder's work, sign off on the "Weld-set" and fill out a Quality Control Checklist. Both the "Weld-set" and Checklist will be filed and stored until at least one month after completion of the job or for the duration of project at the request of the customer.

