

Qualifying the “Chef”

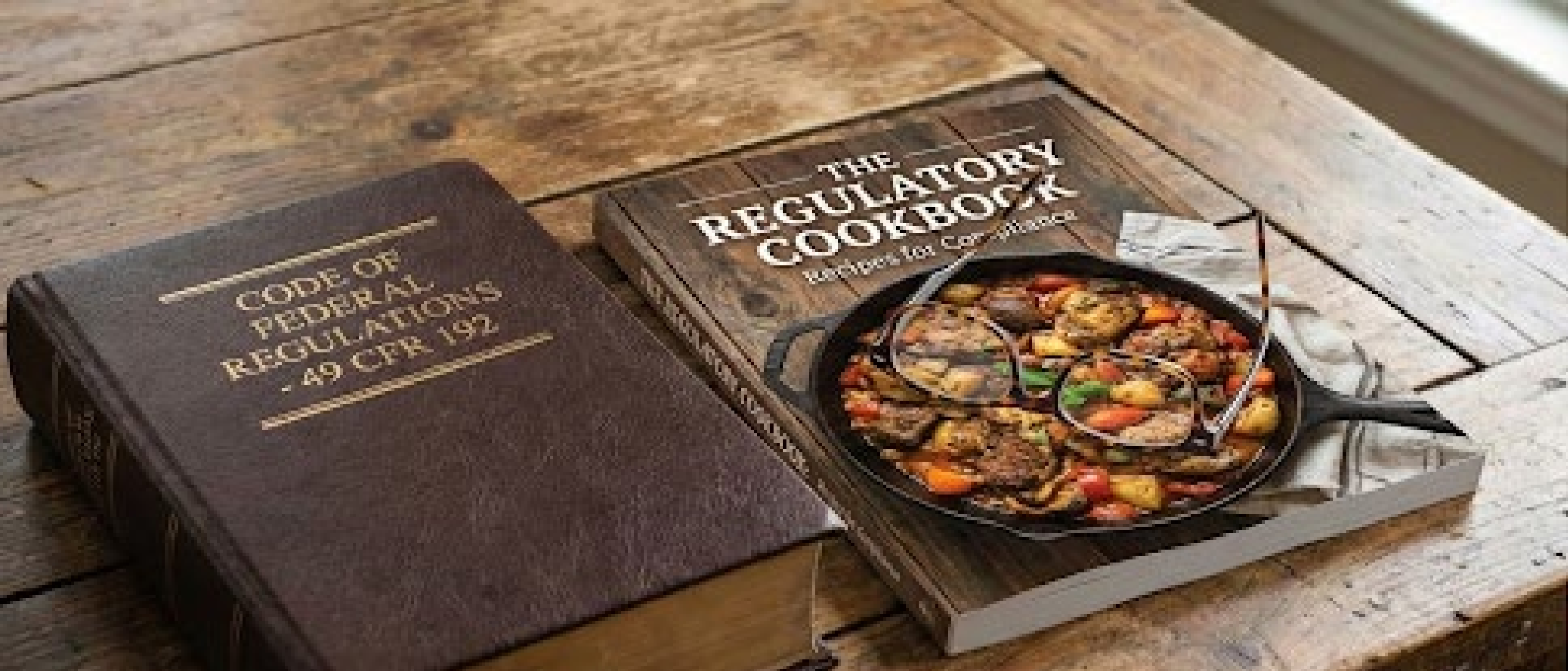


49 CFR 192.285 and PE Joining Standards

Personnel Qualification for PE Pipe Joining

49 CFR 192.285 &
Incorporated ASTM
Standards





Section 1: The Regulatory Framework



The Regulatory Hierarchy

Goal: Explain how the law points to the technical standard.

The Hierarchy:

- **49 CFR § 192.285:** The Federal mandate (The "What" - Qualify the Person).
- **Incorporated by Reference (§ 192.7):** The technical specs (The "How").

The "Big Two" Incorporated Standards for Joining:

- **ASTM F2620:** Heat Fusion Joining of Polyethylene Pipe & Fittings. (Butt, Saddle, Socket - Crucial for visual criteria).
- **ASTM F1055:** Standard Specification for *Electrofusion* Fittings.

Clarifying the "283 vs. 285" Confusion

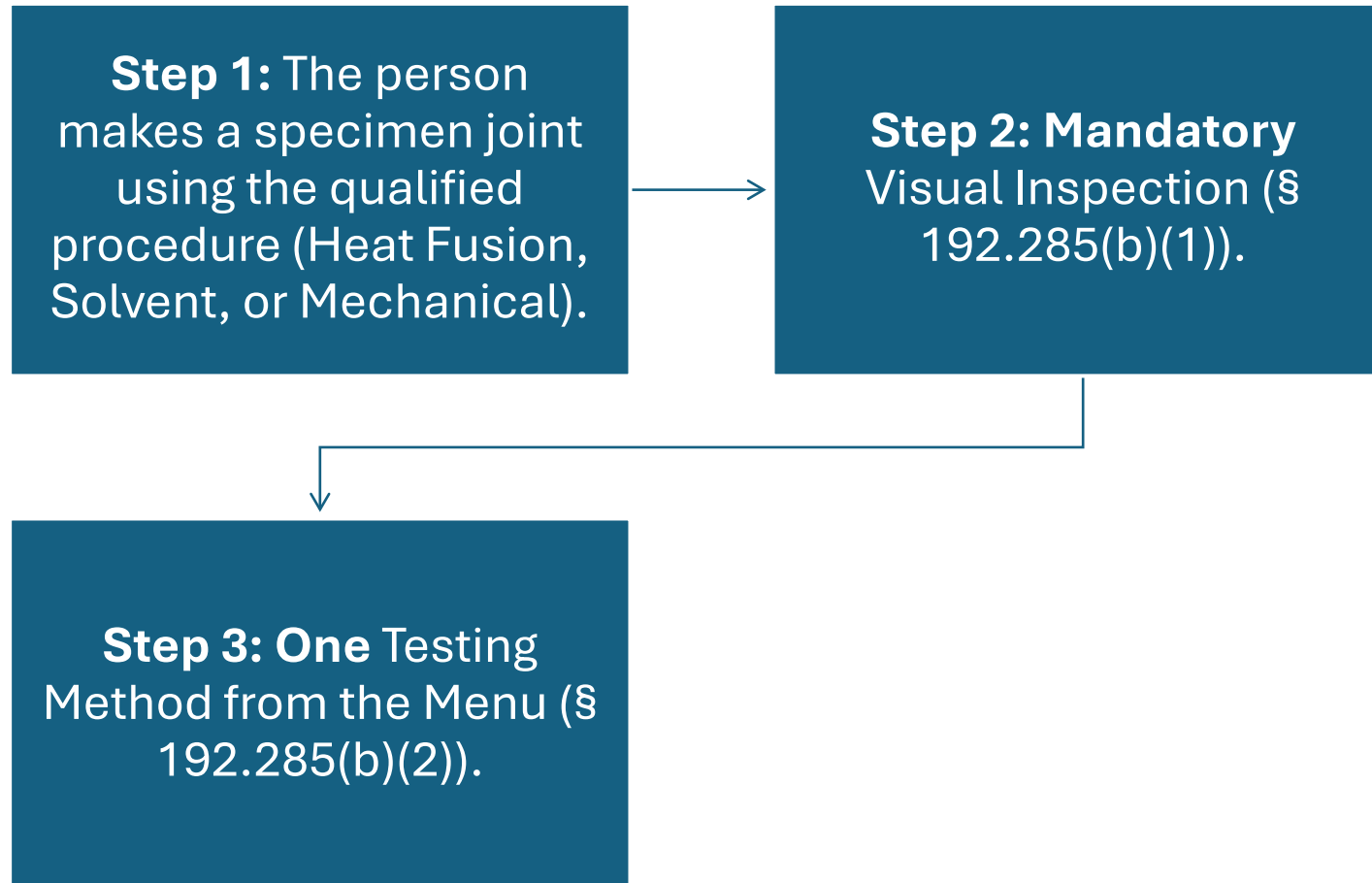


- **§ 192.283 = The Recipe (Procedure Qualification)**
 - Tests the *process* to ensure it produces strong joints.
- **§ 192.285 = The Chef (Personnel Qualification)**
 - Tests the *person* to ensure they can follow the recipe.
- **Key Takeaways:**
 - You cannot qualify a person using an unqualified procedure.
 - You must know which "cookbook" you are using (F2620 or F1055) before testing the Chef.

Section 2: The Qualification Process



The Qualification Logic Flow



Step 2 - Visual Examination (§ 192.285(b)(1))

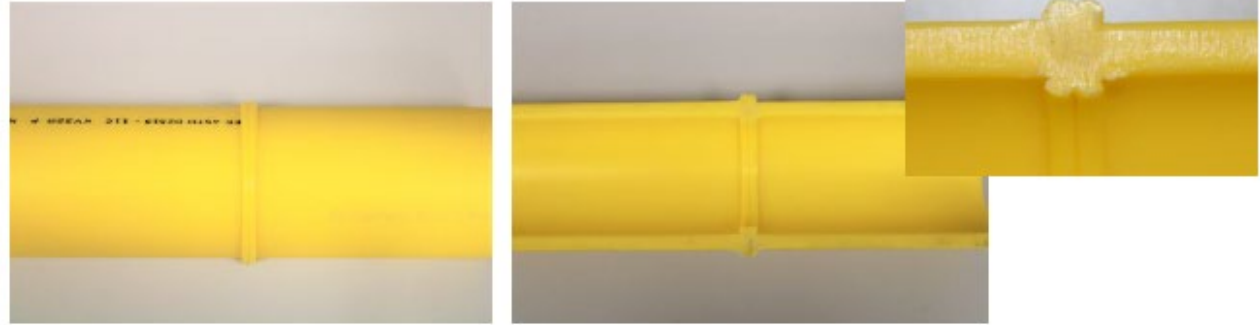
- **The Rule:** The joint must be visually examined and found to have the "same appearance" as a joint acceptable under the procedure.
- **The Standard (ASTM F2620/F1055):**
 - *Butt Fusion:* Proper double roll-back bead, no gaps, symmetrical bead size.
 - *Electrofusion:* No molten material flowing out, proper alignment, scraped surfaces visible.
- **Common Visual Failures:**
 - Misalignment (High-Low).
 - Incomplete bead roll-over.
 - Contamination in the bead.

Visual Criteria

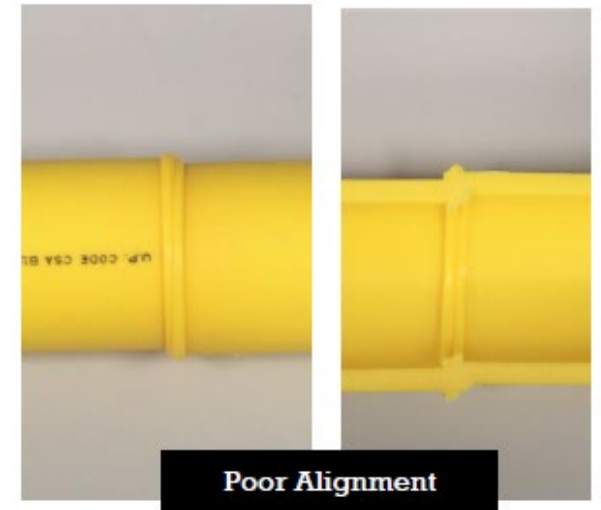
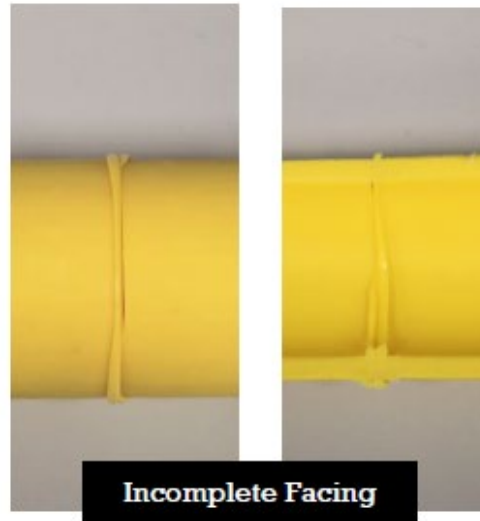
A - Heat Fusion (ASTM F2620)

- **Used for:** Butt Fusion, Socket, Saddle Fusion.
- **The F2620 Standard of Acceptance:**
 - **Bead Appearance:** Must have a proper double roll-back bead against the pipe surface.
 - **Symmetry:** Beads on both sides should be uniform in size.
 - **No Gaps:** No visible voids or contamination in the bead area.

Acceptable Butt Fusion Joints:



Unacceptable Butt Fusion Joints:



Visual Criteria B - Electrofusion (ASTM F1055)

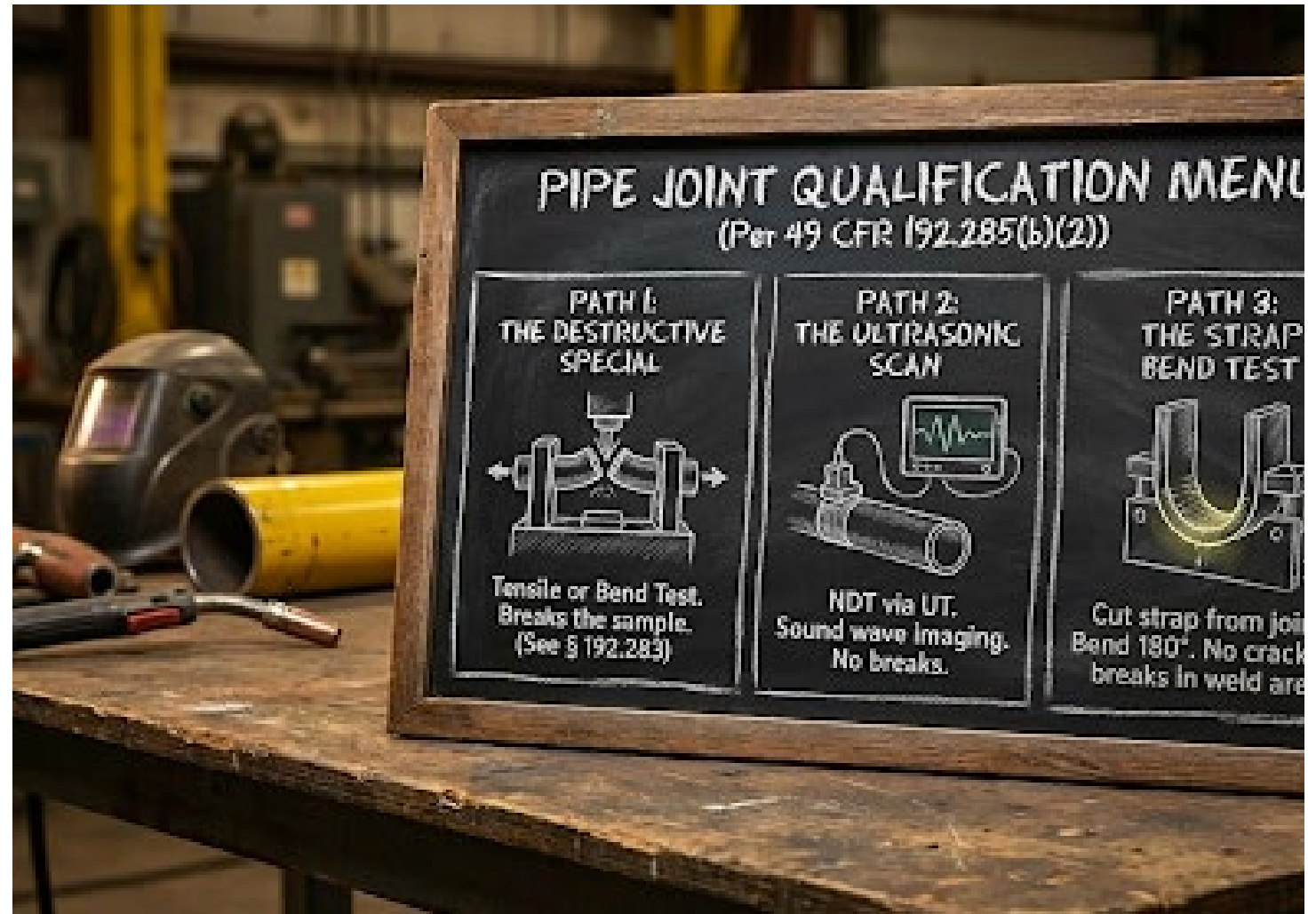
Used for: Couplings, EF Saddles/Tees.

The F1055 Standard of Acceptance:

- **Fusion Indicators:** Did the pins pop up (if equipped)?
- **Pipe Preparation:** Are scraped surfaces visible just outside the fitting hub? (Crucial!).
- **Alignment:** Is the pipe straight going into the coupling? No severe binding.
- **Melt-out:** No excessive molten plastic seeping from the fitting edges.

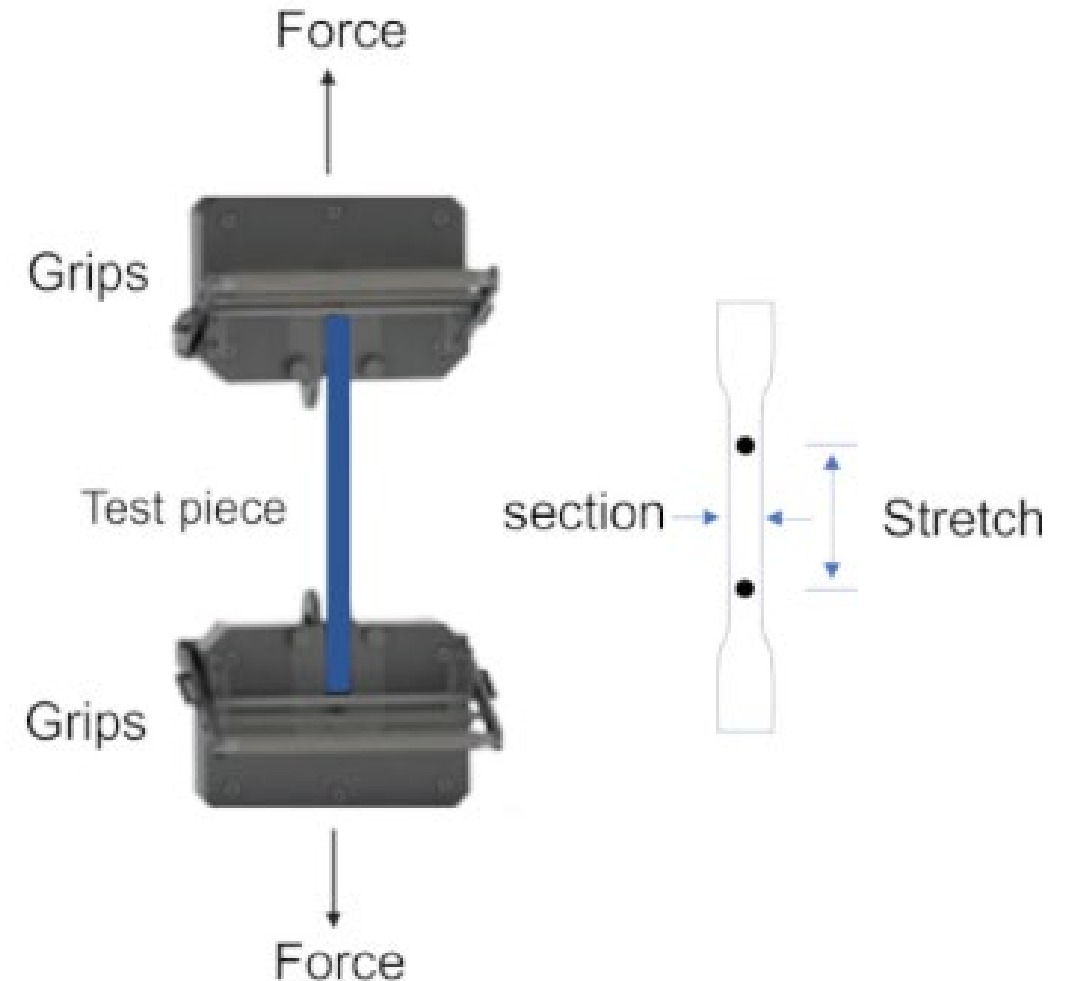
Step 3 - The Testing Menu (§ 192.285(b)(2))

- **Path A:** Destructive Testing (referencing § 192.283).
- **Path B:** Ultrasonic Inspection.
- **Path C:** The Strap Test (Most common for field qualification).



Deep Dive - Path A (Destructive Testing via § 192.283(a))

- **Method:** Tensile Test (Pulling the pipe apart).
- **Acceptance Criteria (Thermoplastic):**
 - **1. Ductile Failure:** The pipe must stretch and break *outside* the joint area.
 - **2. Elongation:** If it breaks near the joint, it must stretch at least **25%** before breaking.
 - **Rejection:** Any brittle failure at the fusion interface is an automatic fail.



Deep Dive - Path C (Destructive Testing via § 192.283(a))

- **Why use this?** It is practical and doesn't require sending pipe to a lab.
- **The Process:**
 - Cut the joint into at least 3 longitudinal straps.
 - Visually examine the cut surfaces (look for voids/bubbles).
 - Deform the straps (Bend/Torque).
- **Pass Criteria:** The material must not fail in the weld area. It must tear in the parent pipe material.



Deep Dive - Destructive Testing (Heat Fusion vs. Electrofusion)

- **Heat Fusion (via F2620/D2513 criteria):**
 - Typically a Tensile Test or Bent Strap Test.
 - **Pass:** Ductile failure in the pipe, away from the joint.
- **Electrofusion (via F1055 criteria):**
 - Tensile tests often don't work well on couplings.
 - **F1055 specifies different destructive tests:**
 - **Crush Test:** Flattening a coupling to see if the wires separate from the PE.
 - **Impact Test:** Hitting a saddle fitting to ensure failure occurs in the pipe wall, not the fusion interface.

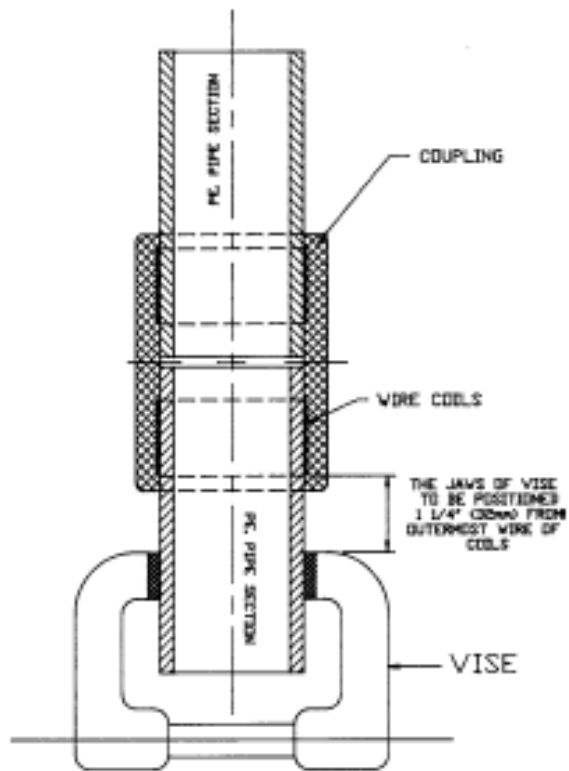


FIG. 2 Coupling Crush Test Arrangement

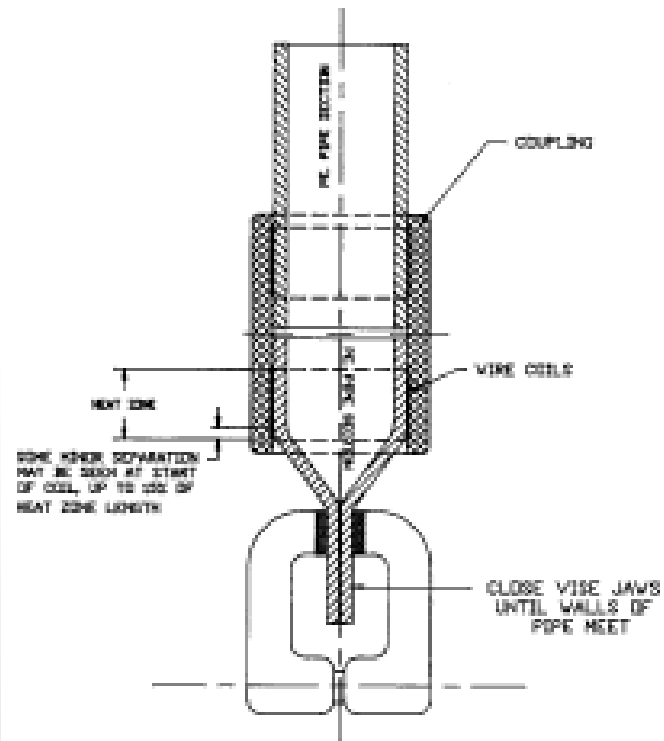


FIG. 3 Coupling Crush Test

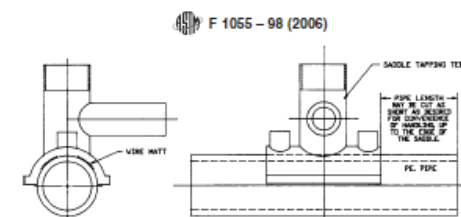


FIG. 4 Preparation of Saddle Specimen for Crush Test

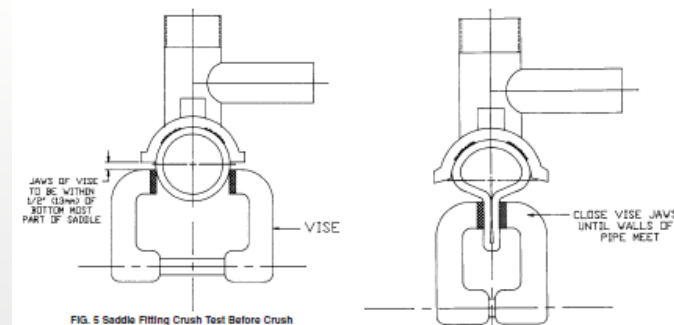


FIG. 5 Saddle Fitting Crush Test Before Crush

ASTM F2620 – 19

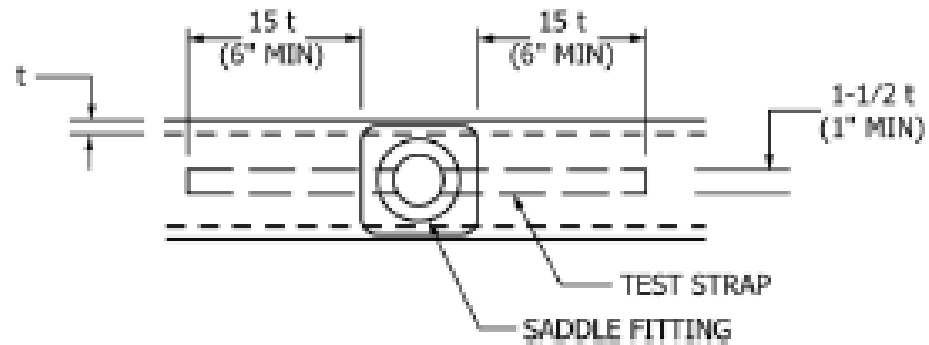
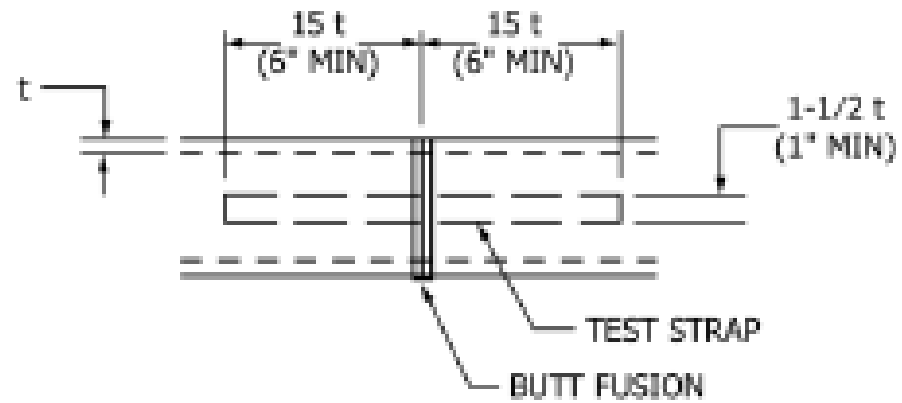


FIG. X4.1 Bent Strap Test Specimen

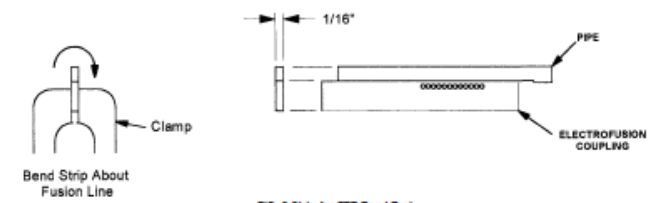
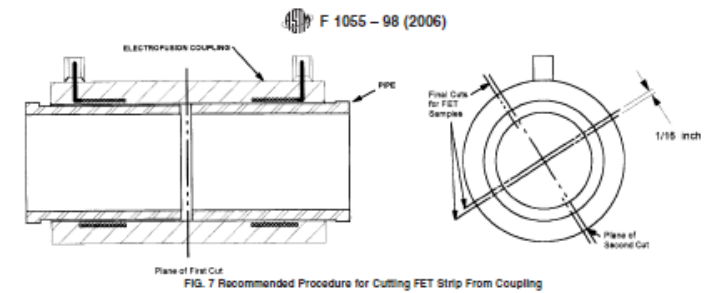
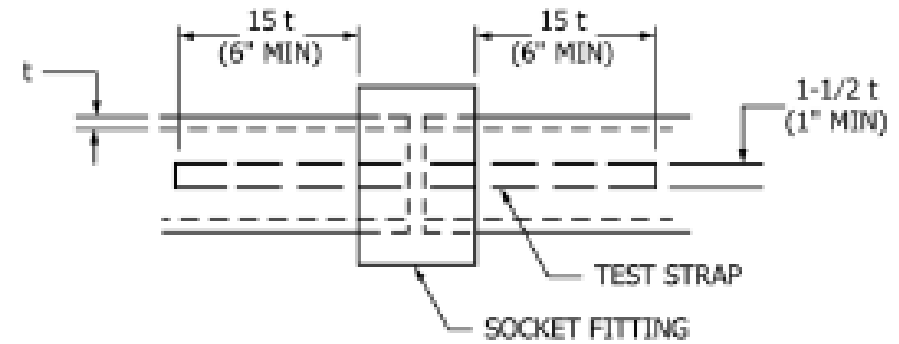


FIG. 8 Strip for FET Bend Test

Section 3: Maintaining the Qualification





Maintaining Qualification & Re-qualification Triggers

- **§192.285(c)**
 - A person must be re-qualified under an applicable procedure once each calendar year at intervals not exceeding 15 months, or
 - after any production joint is found unacceptable by testing under [§192.513](#).
 - **Production Failures:** If a person's joint fails a pressure test or visual inspection in the field -> **Immediate Disqualification** requiring retraining.
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Documentation – Best Practices

- **What an Auditor Wants to See:**
 - Name of Joiner.
 - Date of Qualification.
 - Specific Procedure Used (e.g., "Butt Fusion - IPS 4 inch per ASTM F2620").
- **The Test Results:**
 - "Visual: Pass"
 - "Destructive Test (Strap): Pass"
 - Picture documentation or physical joint if feasible
- Name of the Evaluator.





Section 4

Wrap Up

Common Pitfalls and Key Takeaways

- 192.285 is the mandate; F2620 and F1055 are the tools.
- Visual inspection criteria are completely different for heat fusion vs. electrofusion.
- Mixing up the "Recipe" (283) with the "Cook" (285).
- Doing the destructive test but skipping the mandatory visual test or vice versa.
- Ensure your qualification records specify *which* standard was used for the test.

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Annual Joining and Fusion Qualification Procedure

SCOPE AND PURPOSE

This procedure is to provide guidelines for company employees during annual joining and fusion qualification. Note that in MNG/ING procedures, Annual Fusion and Joining "Qualification" is sometimes referred to as "Certification" do clarify that this is separate and distinct from Operator Qualification (OQ) Procedures.

RESPONSIBILITY

MNG/ING field personnel who are taking part in the annual joining and fusion process, to either receive annual certification OR to ascertain if joints are acceptable OR both, are required to be aware of and follow this procedure.

PERSONNEL SAFETY

Personnel should utilize proper safety equipment as required. Refer to the companies procedures for fusion and joining for requirements.

EQUIPMENT AND MATERIALS

Band saw

Vise

Digital Camera or Phone with Camera

Tensile Tester (See photo in this procedure)

Cloud Based annual fusion and joining form (to record results)

For other required fusion and joining equipment and materials see details in this procedure.

OPERATOR QUALIFICATION

Each person who performs fusion and joining tasks for MNG/ING must be qualified through companies' OQ Program, or another OQ program that has been approved by MNG/ING (See MNG O&M Section 330 Operator Qualification Plan). Typically a person will be OQed prior to doing their annual fusion and joining testing. Both are required before a person may perform fusion and joining tasks on an MNG/ING natural gas facility.

The work required to evaluate annual fusion and joining is not a covered task and therefore is not covered under the companies' OQ Plan. Annual Joint Qualification ("Certification") should be evaluated by a person with knowledge and experience necessary to follow this procedure. Company OQ Evaluators for fusion and joining tasks are knowledgeable and experienced and can do this.

INSTRUCTIONS: See below for process and procedures for each type of joining and fusion MNG/ING currently utilizes. Note that MNG/ING does not require every covered employee or contractor to be certified for every type of joint. They must only be certified for any joint they perform

Prepared by: TA and PSR	Approved by: PSR	Date: 9/15/2025
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Annual Joining and Fusion Qualification Procedure

on MNG/ING's Distribution or Transmission system. For example, as MNG typically never forms socket fusion, MNG employees would typically not be certified or OQed on this joint.

A. JOINT TYPE – Mechanical Couplings; Stab and/or Lycofit (separate certifications)

1. Cut 2 pieces of 3/4" High Density Polyethylene SDR11 pipe approximately 12-inches long each.
2. Utilizing coupling manufacturer's procedures, install the coupling to be tested to connect the two pieces of 3/4" HDPE Pipe. Note any deviation from manufacturer's procedures during fitting installation is a failure of the annual fusion certification test for that joint type and requires additional training and a repeat of the test for that joint.
3. Utilizing companies' Mechanical Coupling Tensile Testing apparatus, insert barbed fittings in each open end of the 3/4" PE Pipe/Coupling Assembly to be tested. 2 inches of insertion on each end is considered the minimum necessary to firmly hold the pipe assembly for testing. Note that the outside end of each barbed fitting has a hole to mount a clevis to for applying tensile force to the test sample.



Mechanical Coupling Testing Apparatus with 3/4" PE and Lycofit to be tested

Annual Joining and Fusion Qualification Procedure



Barbed Insert with Clevis hole to be inserted in pipe end

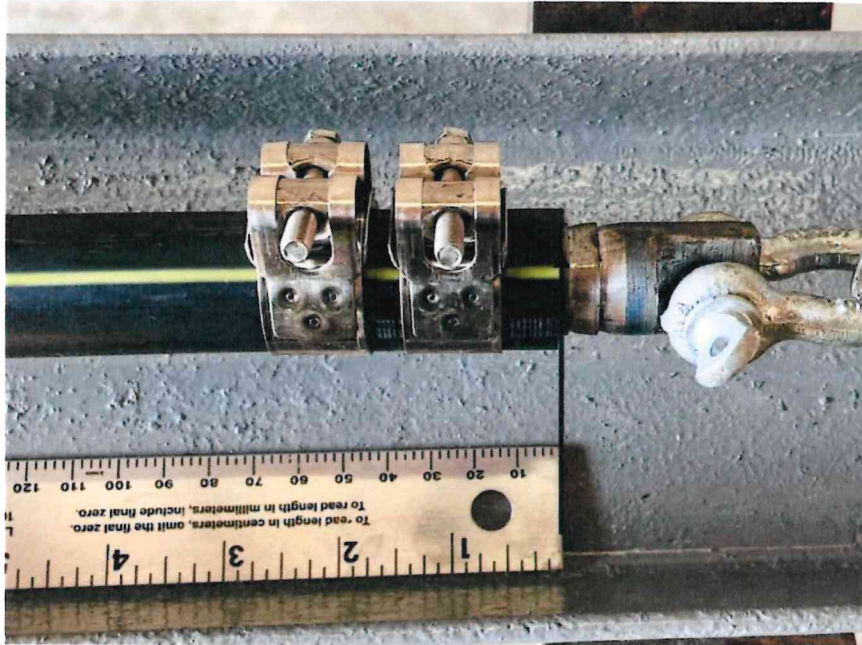
4. Install 2 clamps on each pipe end to squeeze the pipe wall against the barbed fitting. Tighten with screwdriver, nut driver, or wrench. These must be snug or pipe will slip during testing.
5. Using the handle affixed to the acme thread on the fixture, run the acme threaded rod all the way in to put the tester in "Start" position.

Annual Joining and Fusion Qualification Procedure

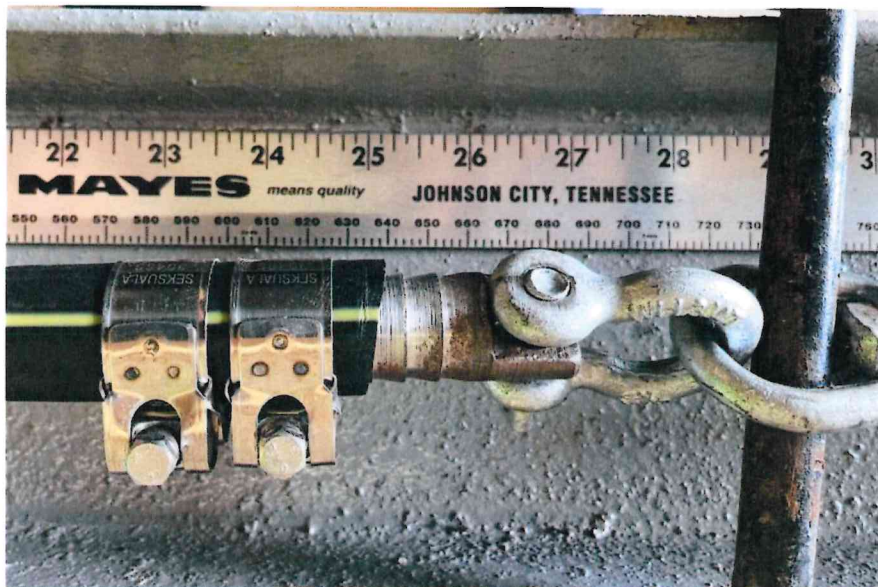


6. Connect the barb hole end of one clevis to the tester using a cross bolt. Repeat for the other end of the assembly to be tested.
7. Adjust the short end of the fixture so one end of the pipe is at "0" Inches on the indicating ruler. Then take the slack out of the assembly by turning the handle. Remove all slack but do not begin stretching at this time.

Annual Joining and Fusion Qualification Procedure



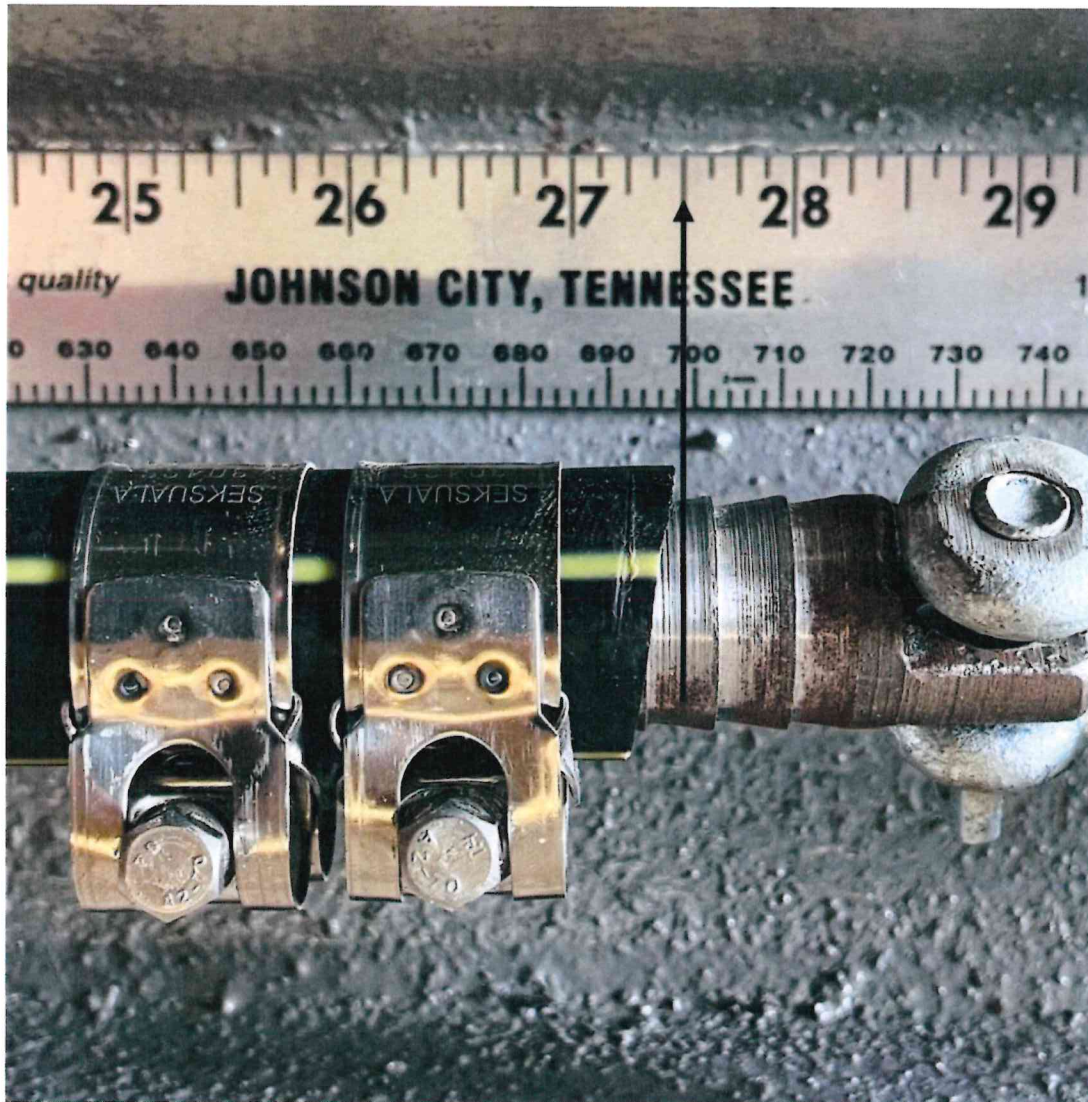
8. Take a digital picture of the test assembly and testing apparatus in this position, verify that the ruler can be read in the picture and the start position of the end of the test assembly can be verified. Typically this will be about at the 25 inch point on the indicating ruler. Note the actual position.



9. Begin to turn the handle to stretch the pipe/coupling assembly. Continue until the assembly is stretched to 110% of its original length (approximately 2.5 inches) or slightly more. Do not

Annual Joining and Fusion Qualification Procedure

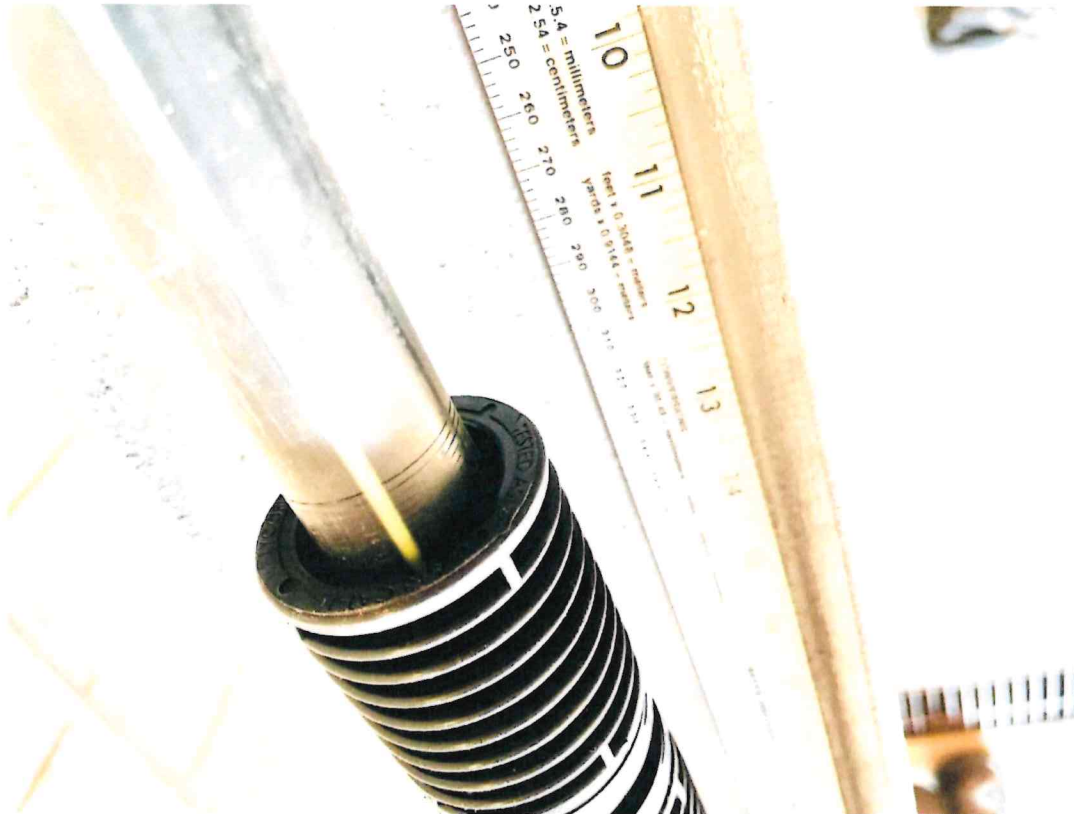
attempt to stretch the pipe assembly more than 120% of its original length (NOTE: mechanical couplings are limited by their design to 125% stretching as the pipe wall will become too thin for the coupling to interface with.)



10. **PASSING CONDITION:** If the person performing joining followed the manufacturer's instructions correctly AND the completed pipe-coupling-pipe assembly is stretched to 110% of its original length (roughly 25-inches original + 2.5-inches stretch = 27.5-inches final), with no pull out from the coupling, then the joint is considered passing and annual certification for that type of fitting (stab/Perfection or Lycofit) is granted. Have them sign or initial the test assembly. The passing test sample should be documented with a photograph showing the

Annual Joining and Fusion Qualification Procedure

assembly and the indicating ruler and retained as part of documentation for a period of at least 7-years. Normally this will be done within the companies' cloud based "Annual Joining and Fusion" Certification form and retained as part of each employee's records.



Lycofit Coupling shows no pullout after 10% pipe elongation. Test Passes.

11. **FAILING CONDITION:** If the pipe has any visible pullout from the coupling, pulls completely out of the coupling or any deviation is noted between the manufacturer's installation instructions and how the employee actually assembled the joint, the joint fails. If the joint fails, a second test, and attempt to pass is allowed. If the second test fails, inform the supervisor and they will determine if additional training, OQ revocation, or other remedial action is appropriate.
12. Once documentation is complete the pipe and coupling should be removed from the testing apparatus. It may be necessary to slit the pipe ends to remove the hose barbs. Be careful not to damage the clamps or barbs. Report any issue with the testing apparatus to supervision immediately. Once photographed the stretched piping assembly may be disposed of.

Q&As

