



Arctic Insulation & Manufacturing

The Pre-Insulated Pipe People

Arctic Insulation and Manufacturing offers independent testing for both HDPE Butt Fusion joints and Electro fusion couplings. Our field technicians have been trained, and qualified by McElroy Manufacturing, and Central Plastics Company. Technicians are available for field gathering of samples if required or HDPE butt fusion and or electro fusion samples can be sent directly to our test facility located in Big Lake Alaska.

Field Technician for gathering of fusion samples.	\$1000.00 per day plus all expenses. Technician is on a eight hour day.
Butt Fusion Bend Back Test with test report.	\$25.00 (Per sample)
Butt Fusion Tensile Test with test report.	\$50.00 (Per sample)
Electro Fusion Lab Vise Test with test report.	\$50.00 (Per sample)

McElroy Butt fusing and Central Plastics Electro Fusion Training both in house and or field training.

Field Technician for In Field Training.	\$1000.00 per day plus all expenses. Technician is on a eight hour day.
In House Training. (Anchorage, or Big Lake Alaska.)	
McElroy Butt fusion Training with written test and one year qualification.	\$250.00 per test.
McElroy Side Wall Butt Fusion Training with written test and one year qualification.	\$250.00 per test.
McElroy Data Logger Training, with written test and one year qualification.	\$250.00 per test.
McElroy In Field Tensile Tester with written test and one year qualification.	\$150.00 per test.
Central Plastics Electro Fusion Training with written test and one year qualification.	\$250.00 per test.



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Independent HDPE Butt Fusion Testing Process

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PROCESS FOR TESTING FUSION WELD SAMPLES

1. Receive paper work and samples from AIM training technician.
2. Prepare sample for testing:
 - a. Coupon for tensile test or
 - b. 1" strip for butt fusion bend back weld test.
3. Tensile test coupon to placed in hydraulic pull tester. Tensile sample to be pulled apart and record results.
4. Option b cut a 1"- 1 ½" wide strip from fusion area with a minimum length of 6" or 1.5 times the pipe O.D. from center line of weld on each side, slowly bend strip to were the two ends touch record results.
5. Testing of a electro fusion coupler is done by cutting sample in half placing into a vice were coupling is 1-1/4" above vice jaws squeeze pipe together and check to see if there is any separation in the heat area do other side and record results.
6. Test sample is recorded as a pass (Ductile) if sample separates in pipe wall. Test sample is recorded as a fail (Brittle)if sample separates at the butt weld joint.
7. If a butt fusion weld fails in a brittle manner another sample will be taken 180 degrees from first sample and re-test, if this test fails client will be notified.
8. A complete written report will be issued within (7) working days from the time of the fusion being tuned in.

All reports are keep on file at Arctic Insulation and Manufacturing's QA office, for four years.



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HDPE BUTT FUSION TEST REPORT

DATE: _____
COMPANY: _____
NAME OF FUSION TEC: _____

PIPE INFORMATION

PIPE OR FITTING MANUFACTURER: _____
GRADE OF HDPE PIPE: _____
SDR RATING: _____
PIPE SIZE AND COUPLER OR BRANCH SADDLE: _____

FUSION MACHINE INFORMATION

MACHINE TYPE: _____
IRON HEAT: _____
FUSION PRESSURE: _____
DATA DOWN LOAD EFC BOX: _____

TEST INFORMATION

AIM TEC PERFORMING TEST: _____
TEST SAMPLE NUMBER: _____
TEMP OF SAMPLE: 70 DEG. F. _____
MEASUREMENTS OF BEAD: _____
PRESSURE AT RUPTURE POINT MECHANICAL: _____
TYPE OF DESTRUCTIVE TEST MANUAL: _____

TYPE OF RUPTURE

BRITTLE (NON ACCEPTABLE): _____
DUCTILE (ACCEPTABLE): _____

COMMENTS :

_____.

TESTED BY: _____ DATE: _____

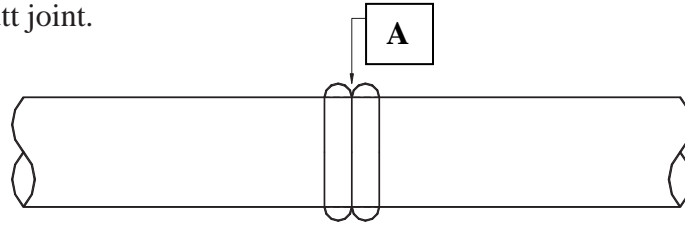
TEST LOG OF BUTT FUSION AND ELECTRO FUSION WELD IN ACCORDANCE WITH ASTM F 2634-07, ASTM F1055, ASTM F2620 AND PPI TR-33

Inspection

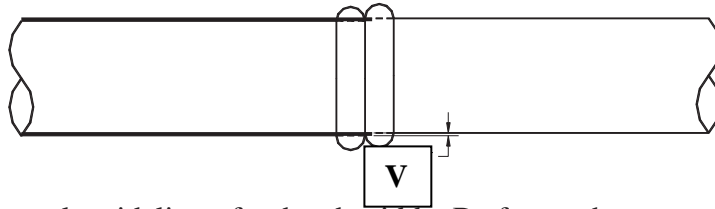
After the cooling cycle is complete. Inspect both sides, the double bead should be rolled over to the surface, and be uniformly rounded and consistent in size all around the joint.

If you think the joint is bad for any reason cut it out.

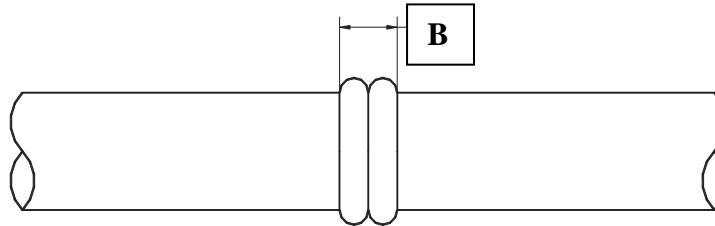
1. The gap (A) between the two single beads must not be below the fusion surface throughout the entire circumference of the butt joint.



2. The displacement (V) between the fused ends must not exceed 10% of the pipe/fitting minimum wall thickness.



3. Refer to Table II for general guidelines for bead width, B, for each respective wall thickness.



Bead Widths per Wall Thickness

Minimum Wall Thickness, in.	Approximate Bead Width (B), in.		Minimum Wall Thickness, in.	Approximate Bead Width (B), in.	
	Minimum	Maximum		Minimum	Maximum
.118	5/32	1/4	1.06	19/32	25/32
.157	5/32	9/32	1.18	5/8	13/16
.197	3/16	5/16	1.34	21/32	7/8
.246	1/4	11/32	1.57	11/16	29/32
.315	9/32	3/8	1.77	25/32	1
.354	5/16	7/16	1.97	7/8	1-1/16
.433	11/32	1/2	2.16	15/16	1-3/16
.512	3/8	9/16	2.36	1	1-1/4
.630	7/16	19/32	2.56	1-1/8	1-7/16
.710	1/2	5/8	2.76	1-3/16	1-1/2
.750	1/2	11/16	2.95	1-1/4	1-9/16
.870	1/2	11/16	3.15	1-5/16	1-11/16
.940	9/16	3/4	3.35	1-3/8	1-3/4
			3.54	1-1/2	1-13/16

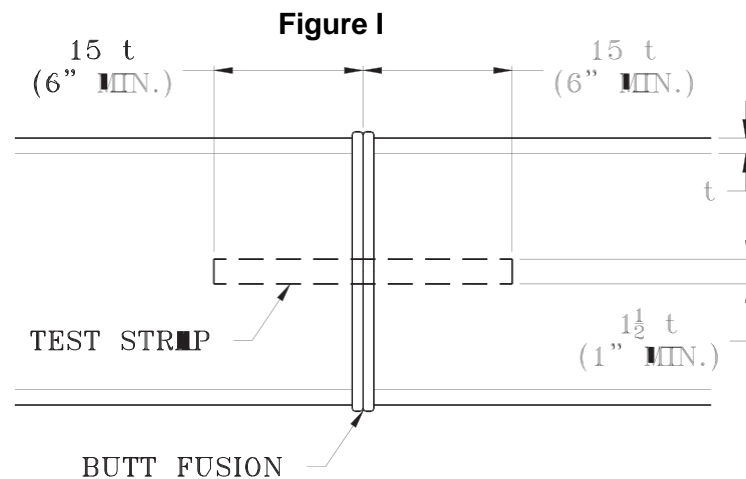
Instructions:

Determine the wall thickness of the pipe/fitting. Find the wall thickness above. If the exact wall thickness is not shown, use the next lowest wall thickness for determination of bead width.

Butt Fusion Bent Strap Test Specimen (Reference ASTM D2657)

1. Prepare a sample joint. Sample lengths should be at least 6" or 15 times the minimum wall thickness (see Figure I).
2. Visually inspect the sample joint for quality. Joint to have cool completely (minimum of one hour).
3. Prepare the sample as shown in Figure I. The sample should be cut lengthwise into at least three longitudinal straps with a minimum of 1" or 1.5 times the wall thickness in width.
4. Visually inspect the cut joint for any indications of voids, gaps, misalignment or surfaces that have not been properly bonded.
5. Slowly bend each sample at the weld with the inside of the pipe facing out until the ends touch. The inside bend radius should be less than the minimum wall thickness of the pipe. In order to successfully complete the bend back, a vise may be needed. For thick wall pipe, a hydraulic assist may be required.

The sample must be free of cracks and separations within the weld location. If failure does occur at the weld in any of the samples, then the fusion procedure should be reviewed and corrected. After correction, another sample weld should be made per the new procedure and re- tested.

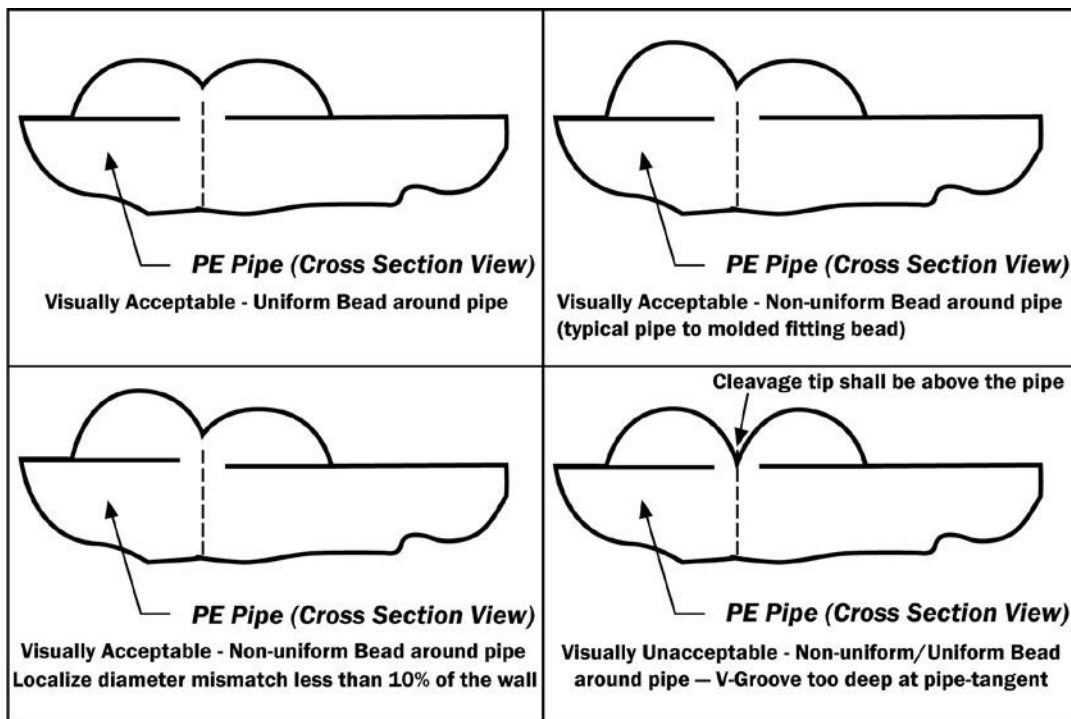


Bend back testing. No gaps or voids.

Butt Fusion
ACCEPTABLE FUSIONS



Butt Fusion Bead Acceptance Guideline



- When fusing PE 4710, a slight gap may be present between the pipe OD and the bottom of the bead after cooling. When fusing PE 4710 to PE 3608/3408, the bead on the PE 3608/3408 pipe may roll all the way over the pipe wall, but the bead on the PE 4710 may not roll out completely.

UNACCEPTABLE FUSIONS



Melt bead too small due to insufficient heat time.



Melt bead too large due to excessive heating and/or over-pressurizing of joint.



Misalignment.



Incomplete facing.

Recommended Equipment

McELROY Data Logger®

The McElroy **Data Logger** is used to record and document key parameters of the fusion process. This cost-effective device can be used to verify that proper fusion procedures have been followed prior to installation.

The Data Logger unit consists of a rugged handheld computer that serves as the recording device connected to a data collection device that records the heater temperature and fusion pressure profile over time. All data is recorded and transmitted to the handheld computer where the joint report can be stored, viewed, printed or transferred to a desktop computer for archiving.



Recommended Equipment

McELROY In Field™ Tensile Tester

McElroy's In Field Tensile Tester provides a quick and easy way to qualitatively test fusion joints in the field. The dual reduced section coupon allows for a quick comparison of the integrity of the joint versus the parent pipe. A hand-pump system tests coupons from 2" IPS and larger pipes (up to 5" thick wall). To create the coupon, a template is attached to the pipe's outer wall, where a drill and reciprocating saw produce the coupon in minutes. The coupon is then inserted into the hand-pump tensile test unit for destructive testing.

