Duke Energy®

JAMES R MORRIS
Vice President

Catawba Nuclear Station
4800 Concord Road / CN01VP
York, SC 29745-9635

803 831 4251
803 831 3221 fax

March 13, 2008

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: Duke Power Company LLC d/b/a Duke Energy Carolinas, LLC (Duke)
Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414
Request for Relief Number 06-CN-003
Use of Polyethylene Material in Nuclear Safety Related Piping Applications
(TAC Numbers MD3729 and MD3730)

References:
1. Letters from Duke to NRC, same subject, dated October 26, 2006 and June 21, 2007.
2. Requests for Additional Information (RAIs), provided electronically to Duke on February 4, 2008.

The Reference 1 letters comprising Duke's original request for relief submittal and first RAI response supported a proposed alternative of utilizing polyethylene material in lieu of steel material in piping associated with the emergency diesel generator jacket water coolers and other nuclear safety related piping applications. The NRC provided additional RAIs in conjunction with this submittal via the Reference 2 transmittal.

The attachment to this letter constitutes Duke's response to these additional RAIs. The format of the response is to restate each NRC question, followed by our response.

Duke is requesting NRC review and approval of this request for alternative by March 31, 2008.

There are no regulatory commitments contained in this letter or its attachment.

A047
NRR

If you have any questions concerning this material, please call L.J. Rudy at (803) 831-3084.

Very truly yours,

James R. Morris

LJR/s

Attachment

xc (with attachment):

V.M. McCree, Acting Regional Administrator
U.S. Nuclear Regulatory Commission, Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, GA 30303

A.T. Sabisch, Senior Resident Inspector
U.S. Nuclear Regulatory Commission
Catawba Nuclear Station

J.F. Stang, Jr., Senior Project Manager (addressee only)
U.S. Nuclear Regulatory Commission
Mail Stop 8-G9A
Washington, D.C. 20555-0001

bxc (with attachment):

R.D. Hart
L.J. Rudy
D.L. Ward
E.W. McElroy
M.L. Arey, Jr.
S.S. Lefler, Jr.
M.A. Pyne
M.J. Ferlisi
R.N. McGill
Document Control File 801.01
RGC File
NCMPA-1
NCEMC
PMPA
SREC
ELL-EC050

Attachment

Response to NRC Requests for Additional Information (RAIs)

Request for Additional Information on the NRC Staff Review of Relief from ASME Code Requirements to Install Polyethelyne Piping at Catawba Units 1 and 2 (TAC MD3729 and MD3730)

The NRC staff has had scoping discussions with representatives of Duke Energy to determine a path forward to enable the staff to complete its review of the Catawba Units 1 and 2 relief request to install polyethylene pipe in the essential service water system. The principal staff concern has been the inability to perform effective volumetric examinations of fused joints. A meeting was held on December 7, 2007 at the Catawba plant site for further discussions on the items below.

1. Visual examination of fused joints.

a. The NRC staff is interested in qualification of visual examination procedures and personnel. It is not clear to the staff that adequate guidance is provided in ASME Code Case N-755 in this area. The staff is interested in reviewing a specific proposal by the licensee in this area. The licensee should address use of physical samples of acceptable and unacceptable joints in training, procedure development, and qualification of visual examination personnel.

Duke Response

Physical samples of visually acceptable and unacceptable joints will be utilized for the training of visual examination personnel.

Visual examination procedure qualification will use a performance demonstration and use samples containing at least ten flaws. Five flaws will be used for the visual examination procedure qualification and all ten flaws will be used for the personnel demonstration using the visual examination procedure.

b. The NRC staff believes that it is essential that visual examination of fused joints be performed on both the inside and outside of the joint at the time of fabrication. The licensee should address its plans for performing visual examination of the inside of the joint.

Duke Response

- **Visual examination of the inner joint bead will be performed as an additional quality check and as additional assurance that there were not any equipment or process problems during the joining process. This**

examination will be performed in accordance with a new Duke procedure that will be written to address the inner joint bead. Pictures of the interior beads of samples will be used to be consistent with what the inspector sees using remote examination methods. The visual acceptance criteria for bead appearance will be included in the visual examination procedure. In addition, physical samples of visually acceptable and unacceptable joints will be available to provide the inspector with supplemental visual comparison standards to use during visual examination.

- Following the meeting at Catawba on December 7, 2007, a number of fused joints were made using parameters outside of the procedure limits and also at the procedure limits. These samples were then examined and the results were documented in the December 19, 2007 Materials Engineering and Lab Services Report (Metallurgy File #3895 - Enclosure 1). These samples provide some examples of fused joint beads that would be acceptable and unacceptable.

- In-process inner joint bead inspections shall be performed only on pipe-to-pipe joints that are made in the field. Exempting the inspection of joints in fittings is justified because of the more controlled conditions for fusing and inspecting that exist in a manufacturing facility compared to possible field installation conditions. Fittings also have a greater wall thickness than the pipe and are designed to be stronger than the pipe joints.

- Beads on the fused joints will not be removed for the piping addressed by this relief request.

c. The NRC staff believes that, to the extent feasible, the piping design should include provisions for future access for examination of all joints from the inside surface. The licensee should address its plans for designing the piping for access for future examinations.

Duke Response

The piping design shall include the following provisions for future examination:

- **All joints will be identified and located on the appropriate drawings.**

- **A tee with a blank flange, spool piece, flanged elbow, or other method will be installed at each end of the piping run to allow future access into the pipe.**

2. System leakage testing. The NRC staff believes that since the essential service water piping system is being redesigned, the new design should include provisions to enable the system leakage testing requirements of the ASME Code, Section XI, IWA-5000 via either pressure drop testing or by determining the change in flow between the ends of the piping, i.e., IWA-5244(b)(1). The licensee should address its plans for designing the piping to meet the system leakage requirements of Section XI.

Duke Response

Piping addressed by this relief request will meet the Section XI, IWA-5000 requirements for system pressure tests. The polyethylene piping is being installed in accordance with the Duke Section XI program for repairs and replacements. Polyethylene material is being used to replace existing material in an existing system. Duke plans to meet the pressure testing requirement as it currently exists with the nuclear service water system flow balance.

3. Process controls. The NRC staff recognizes the importance of process controls in ensuring that fused joints provide high assurance of pressure boundary integrity throughout the service life of the piping. The NRC staff plans to witness joint fabrication at the Catawba site during its upcoming meeting and discuss the adequacy of the process controls. In these discussions the NRC staff anticipates reaching agreement on whether additional measures may be necessary beyond those required by Code Case N-755. The licensee should provide a summary of the discussion on process control from the meeting on December 7, 2007.

Duke Response

The NRC Staff witnessed fusing of polyethylene piping during the December 7, 2007 visit to Catawba. Pipe fusing was performed in accordance with the Duke polyethylene pipe joining procedure which was prepared in accordance with Supplement IX requirements of the Catawba relief request. (Requirements presented in the Catawba relief request are

based on Code Case N-755 requirements that were in draft form at the time of the Catawba relief request.)

The Duke joining procedure meets the requirements of paragraph QF-230 b) of the Catawba relief request. The essential variables specified in this paragraph are qualified by testing documented by Plastic Pipe Institute TR-33.

Training of the fusion machine operator will be similar to Appendix A to Supplement IX of the Catawba relief request.

Qualification of the fusion machine operator will be performed in accordance with Supplement IX, Article III of the Catawba relief request.

During the December 7, 2007 meeting, the NRC Staff wanted to assure that data logger results are accepted by QC before the joint is considered acceptable. This issue is addressed by a final QA review that is performed by Duke for any document that is a QC record. Paragraph 5120(c) of the relief request is clarified to read that visual examination by QC Inspection is required before piping with fused joints is permanently covered in the burial trench. Revised Page 27 of the relief request is included with this response (Enclosure 3).

Following the December 7, 2007 meeting, a number of sample joints were fabricated using essential parameters at joining procedure limits and outside the joining procedure limits and were then evaluated. This work is documented in the December 19, 2007 Materials Engineering and Lab Services Report (Metallurgy File #3895 - Enclosure 1).

4. In-Process Destructive Examination of Joints. The licensee has proposed developing a program of in-process destructive examination of joints. The NRC staff has encouraged the licensee to develop the plans for such a program. During the upcoming meeting the NRC staff plans to discuss specific licensee proposals in this area, including but not limited to sample selection criteria (blindness and randomness), sample testing frequency, and sample testing methods and acceptance criteria. The licensee should provide a discussion of its proposal to discuss in-process destructive examination of joints.

Duke Response

This is Duke's first installation of polyethylene piping in ASME Section III service and an in-process destructive

examination of joints will be used to provide an additional quality check for field fabricated polyethylene pipe joints.

TESTING FREQUENCY

A minimum of 10% of the field pipe joints fabricated during a production period on each machine shall be tested. A production period shall be a single shift of operation for each fusion machine. In addition, one field fabricated joint shall be selected at random sometime during every four production periods for testing.

TESTING REQUIRMENTS

Testing shall be performed in accordance with ASTM F 2634-07, Standard Test Method for Laboratory Testing of Polyethylene (PE) Butt Fusion Joints using Tensile-Impact Method, with the exception of the number of test specimens tested from each joint. One test specimen will be tested from the first joint of each production period. Four test specimens will be tested from each joint selected at random for testing with the test specimens being taken at each 90 degree segment in the joint.

ACCEPTANCE CRITERIA

Test specimens shall be evaluated by Engineering in accordance with Appendix X1 of ASTM F 2634-07. A valid failure of any test specimen will be evaluated in accordance with the Duke corrective action program.

SELECTION OF JOINTS FOR TESTING

The first joint fabricated on each machine during each production period shall be tested. This first joint may be fabricated using pipe material from the same lot of pipe material as the pipe material that is being installed.

To meet the blindness and randomness selection criteria, the joint that is selected each four production periods from piping that is being installed shall be selected at random.

In-process destructive examination shall be performed only on pipe-to-pipe joints that are fabricated in the field. Exempting the testing of joints in fittings is justified because of the more controlled conditions for fusing that exist in a manufacturing facility compared to possible field installation conditions. Pipe-to-fitting joints are exempted from destructive testing.

BASIS FOR TESTING FREQUENCY
The testing frequency is based on the testing frequency requirements of ASME Section III, Division 2 Code for Concrete Reactor Vessels and Containments. Table CC-5200-1 provides requirements for conducting strength tests for concrete. Testing of a minimum of 10% of the polyethylene pipe joints made during a production period matches Section III, Division 2 Code requirements for testing frequency.

5. The components affected by the request should be stipulated as the 12 nominal diameter piping to the emergency diesel generator jacket water coolers.

Duke Response

This relief request applies to the use of 12-inch nominal diameter supply and return piping to and from the diesel generator jacket water coolers.

6. In the draft response to Question 1 above (provided during the January 17, 2008 meeting) pertaining to performance-based qualifications, the licensee visual examination procedure qualification referenced Section V, Article 14, 2004 Edition, Intermediate Rigor. The staff does not review Section V. However, Section V, Article 14, Intermediate Rigor has multiple performance demonstrations. For the request alternative, Catawba should describe the performance-based process (T-1471 a, b, or c). The staff does not support (d) at this time. As discussed in the public meeting on January 17, 2008, specifying the number of test samples to be used in the performance-based qualification for visual examination would be an acceptable approach for addressing Question 1.

Duke Response

The response to Question 1 has been revised to delete reference to Section V and the performance based process is described. The number of test samples used in the performance based qualification is specified.

7. In the response to Question 1 above pertaining to visual examination of fittings, it may be appropriate to add to the justification that the fitting wall is thicker than the straight pipe wall being attached to it thus the fittings joints are designed to be stronger than the pipe joints. In response to Question 2, we would appreciate a discussion on the visual examination of pipe to fitting joints.

Duke Response

The greater thickness of fittings is now referenced in paragraph 3 of the Duke response to Question 1b. The visual examination of pipe-to-fitting joints will be conducted the same as for pipe-to-pipe joints. The thicker walled fitting will be counter-bored to the same thickness as the matching pipe as illustrated by Figure 4421.2-1 of the Duke relief request.

8. Regarding in-process destructive examination, there is some concern that the one impact tensile specimen from the random test may not be sufficient to detect the range of potential problems the test is intended to uncover; for example the effects from thermal differentials within the pipe wall from the sun shining on black OD surface while the ID may be at night time temperatures.

Duke Response

Four test specimens from each joint tested at random will be tested in accordance with ASTM F 2634-07 with the test specimens being taken at each 90 degree segment in the joint. This will ensure that thermal differential effects from solar heating are addressed by the testing. This requirement has been added to the "Testing Requirements" of the Duke response to Question 4.

9. In the relief request paragraph QF-131.2(a) test specimens of butt fused pipe shall have the bead remaining on, while paragraph 4422.1 (mislabeled as 4421.1) permits the removal of the bead at the owner discretion. Why is there a difference between testing and application?

Duke Response

Duke has decided not to remove the beads for piping addressed by this relief request. Paragraph 4421.1 has been removed from the relief request as shown by revised Page 25 which is included with this response (Enclosure 3).

10. 10 CFR, Part 50, Appendix B, Criterion IX, "Control of Special Processes," require the use of qualified personnel and procedure. In the relief request, paragraph QF-223 provides the testing qualification criteria for the fusion procedure specification (FPS). QF-230 provides generic parameters for by-passing the procedure testing qualifications. According to PPI, TR-33/2006, not all HDPE material is capable of making an

acceptable joint. The justification for QF-230 is not clear in the request, nor is the ability to trace back to the qualification testing data. Information is needed to clearly explain the basis for the qualification of the fusion procedure specification. This information needs to explain how the various elements of the qualification are related and requirements for qualification are satisfied. This information should include aspects such as the material and material supplier, the pipe manufacturer, the joint fabricator, pipe size and wall thickness, the independent tester, the testing data results, and the industry standards and/or code of federal regulation sections (e.g. 49 CFR 192) used to establish qualification requirements and acceptance criteria and audit requirements.

Information is also needed to provide the NRC with assurance that QA program requirements related to the qualification of the FPS are being met.

Duke Response

The joining procedure of the Catawba relief request is based on requirements of TR-33. The TR-33 joining procedure specification was qualified by testing performed under the direction of the Plastic Pipe Institute. In addition, testing is performed by the pipe manufacturer to qualify the joining procedure specification. Performance Pipe letter dated January 24, 2008 from Larry Petroff provides specific qualification information and testing results and this information is included with the response to this relief request (Enclosure 2). Duke has audited Performance Pipe to 10 CFR 50, Appendix B and Performance Pipe (Brownwood, TX) has been added to the Duke Qualified Supplier List for the Product/Service of High Density Polyethylene (HDPE) pipe.

TR-33 2006 Appendix C states that materials that have been pre-qualified to be joined are within the nominal melt index range of 0.05 to 0.25 gm/10 minutes and a nominal density range of 0.936 to 0.955 gm/cc. The Catawba material is qualified by TR-33 with a melt index < 0.15 gm/10 minutes and a density range of 0.947 to 0.955 gm/cc.

Additional confidence in the joining process was established by the laboratory examination of piping test specimens which were joined at procedure limits and outside procedure limits. Reference the December 19, 2007 Materials Engineering and Lab Services Report (Metallurgy File #3895 - Enclosure 1). These test specimens demonstrated that there is a broad range for

the essential joining parameters. The joining procedure requires joining parameters to be within a narrow band in this broad range.

Finally, the destructive testing and random testing addressed in Question 4 provides routine and ongoing assurance of the acceptability of the joining process.

Enclosure 1

December 19, 2007 Materials Engineering and Lab Services Report (Metallurgy File #3895)

Duke Energy®

Nuclear Generation
Materials Engineering & Lab Services

December 19, 2007

Memorandum to: Steve Lefler, Nuclear Generation, Duke Energy Corporation

Subject: **CNS - HDPE Fusion Joint Research**
Metallurgy File #3895

Fusion joints were created in 12"-diameter HDPE pipe under varying process conditions. An approximate 5-inch arc length of fused pipe was provided from each sample. Pipe wall thickness was 1.2 inches.

Each joint was photographed on the ID and OD, and then cross-sectioned to examine the bead structure. The cross-section was prepared to a 600-grit finish and then heated with a heat gun at ~500°F to expose the fused area. Photographs of each sample are attached.

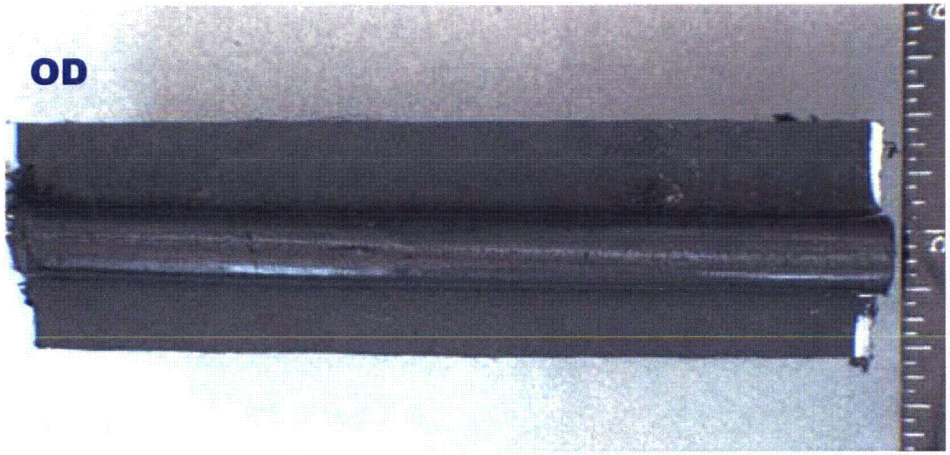
In general, there was more variation across the samples in the visual appearance of the bead than there was in the size of the fusion zone. Fusion Joint #1, created at low temperature and low pressure, had an obviously wider fusion zone than the other samples, but the external bead size was small as well.

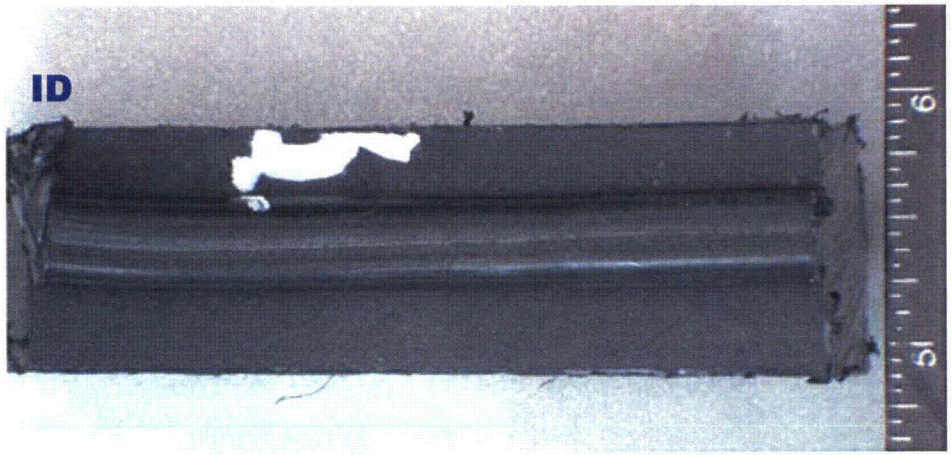
If the Metallurgy Lab can be of further assistance, please call us at (704) 875-5326.

Susan Anderson, P.E.
Senior Engineer
Duke Energy Corporation

13339 Hagers Ferry Road MG03A6
Huntersville, NC 28078

Fusion joint sections as received.

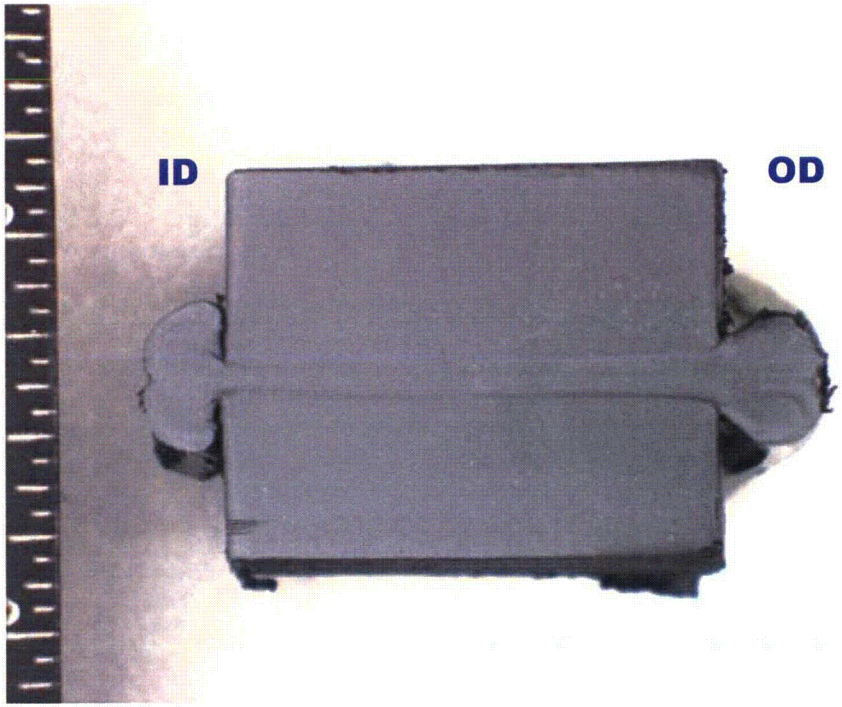


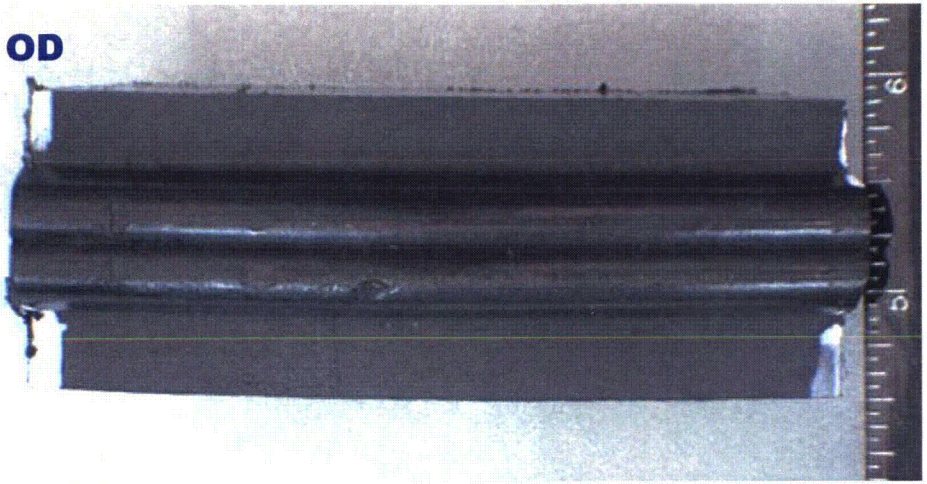


FUSION JOINT #1

TEMPERATURE: 280°F

PRESSURE: 150 psig

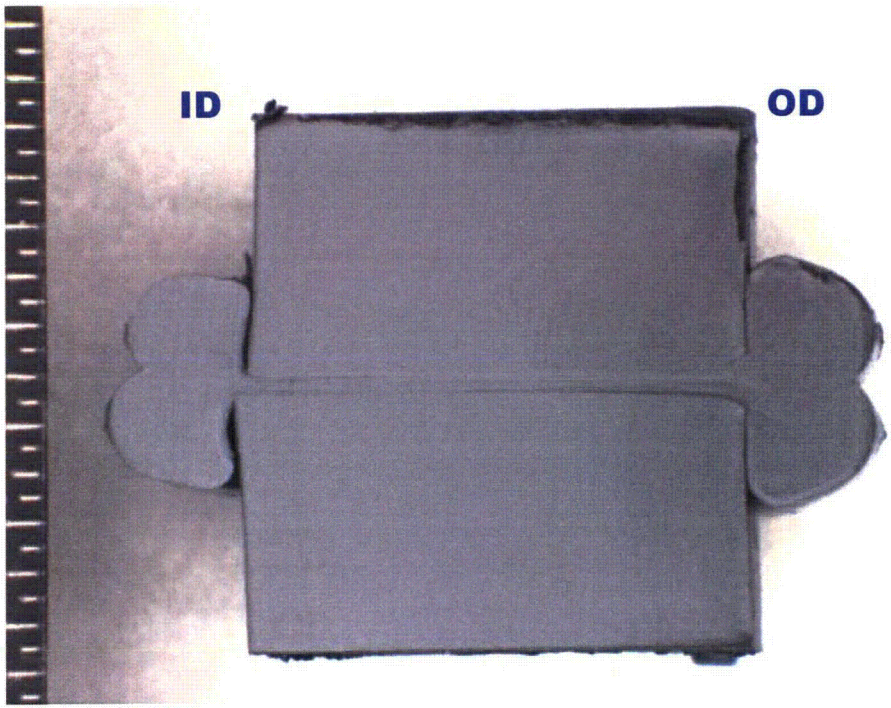


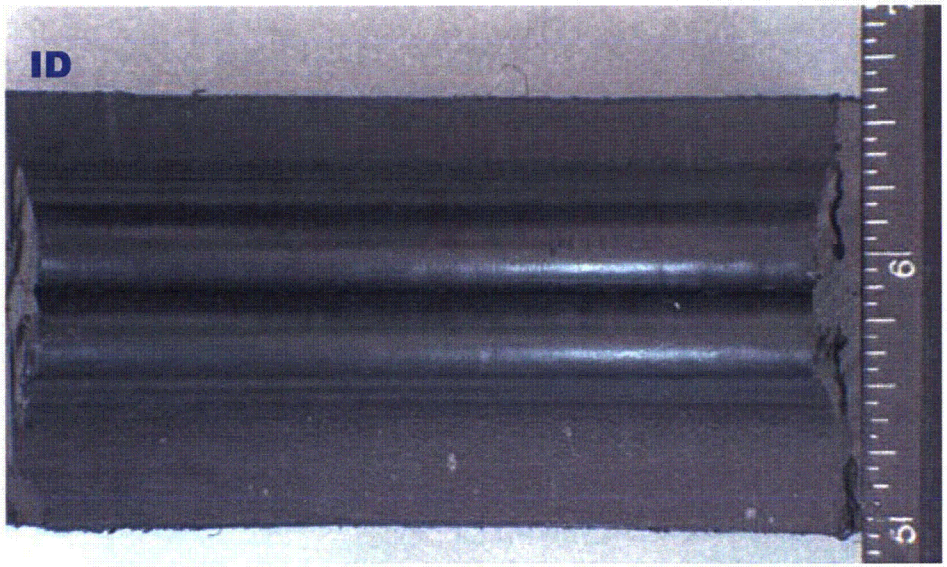


FUSION JOINT #2

TEMPERATURE: 345°F

PRESSURE: 450 psig

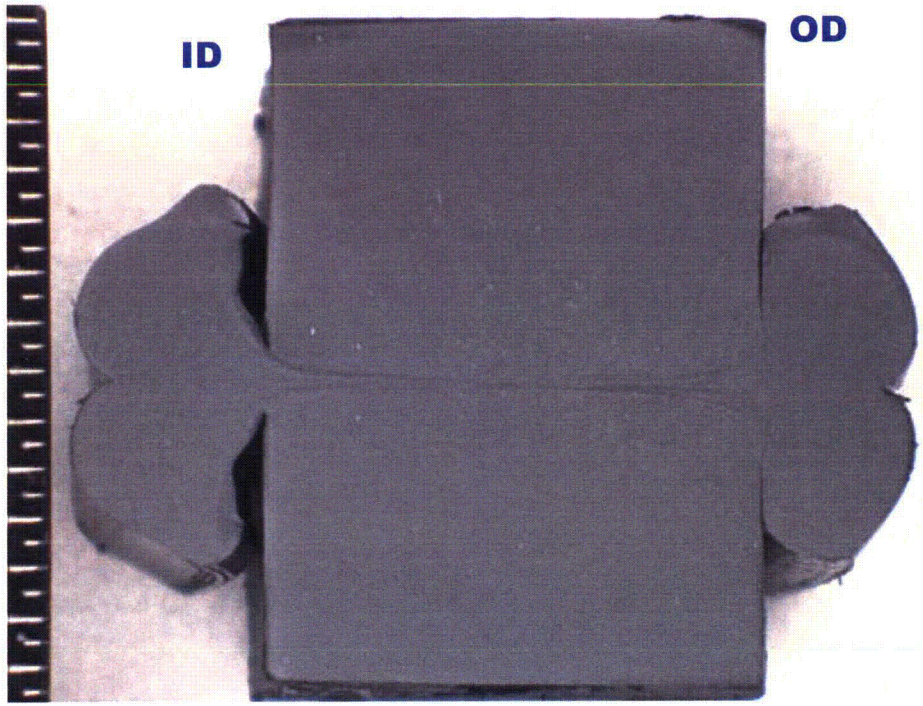


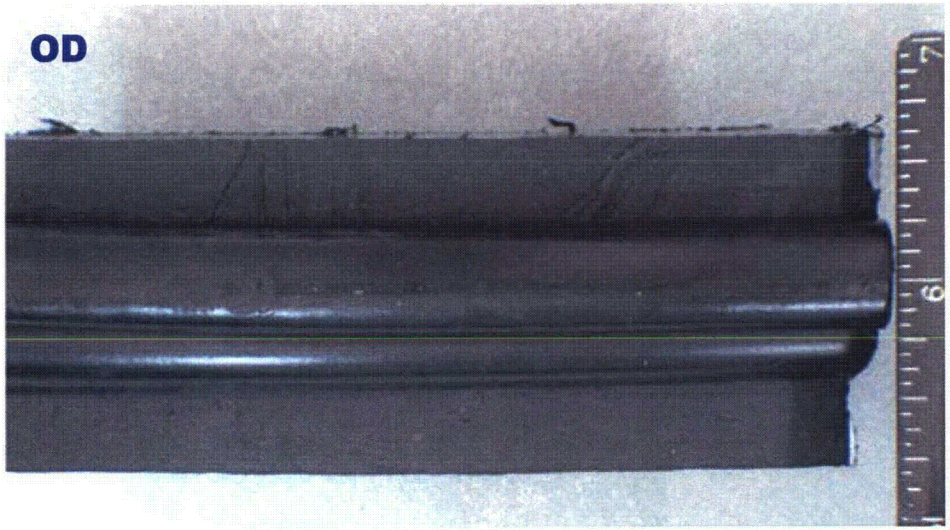


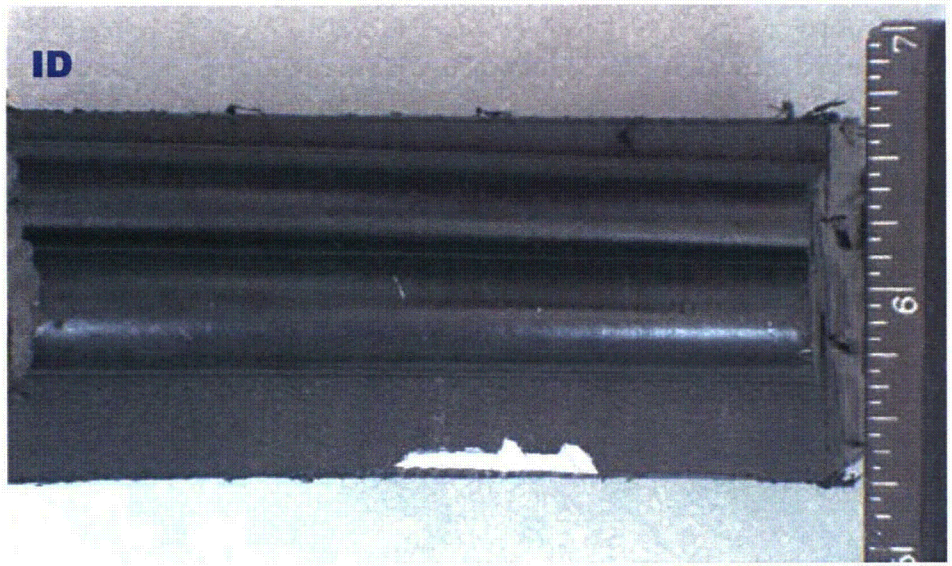
FUSION JOINT #3

TEMPERATURE: 575°F

PRESSURE: 492 psig





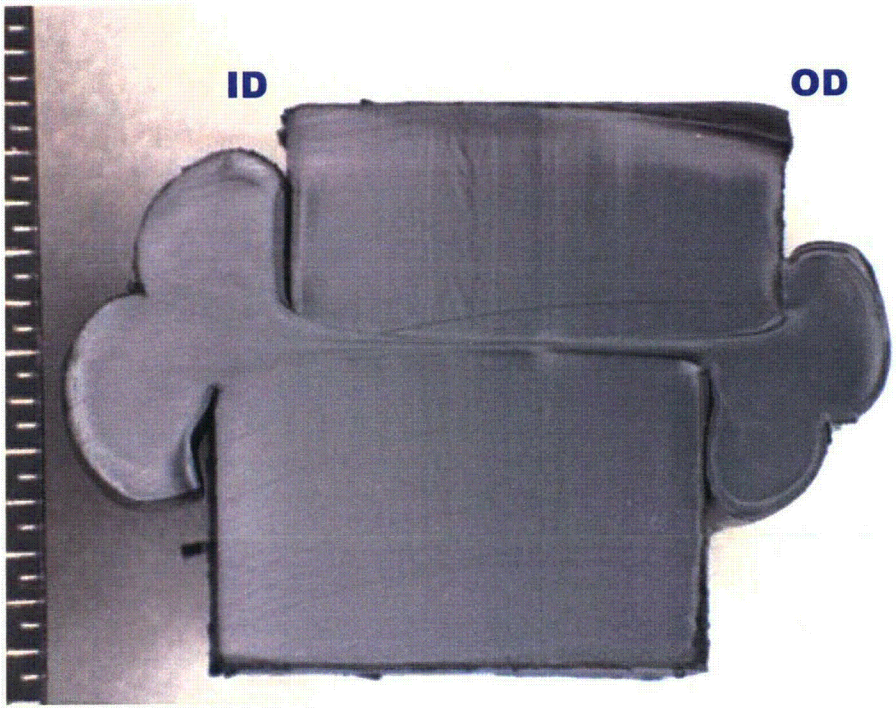


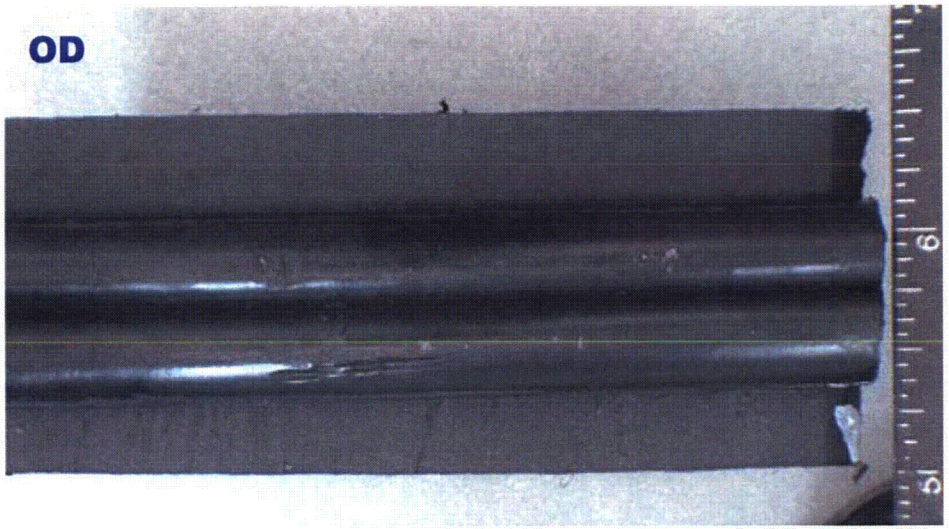
FUSION JOINT #21

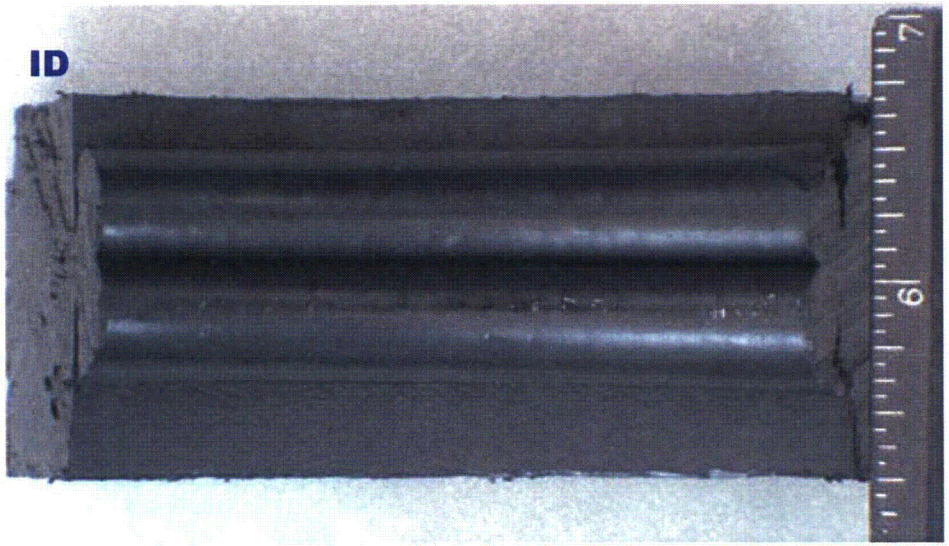
TEMPERATURE: Not reported

PRESSURE: Not reported

Deliberately misaligned and allowed to stay apart too long after heat plate was removed



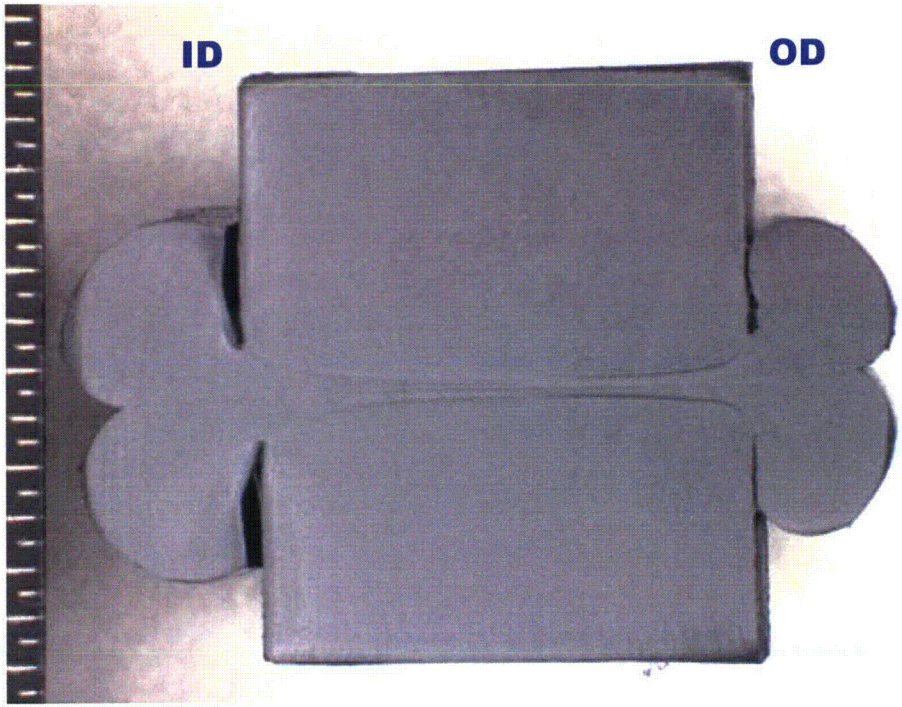


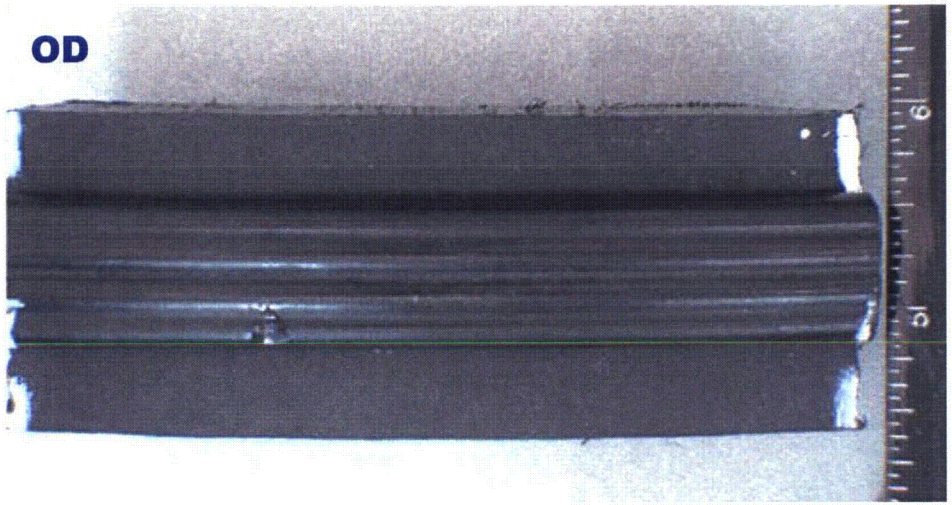


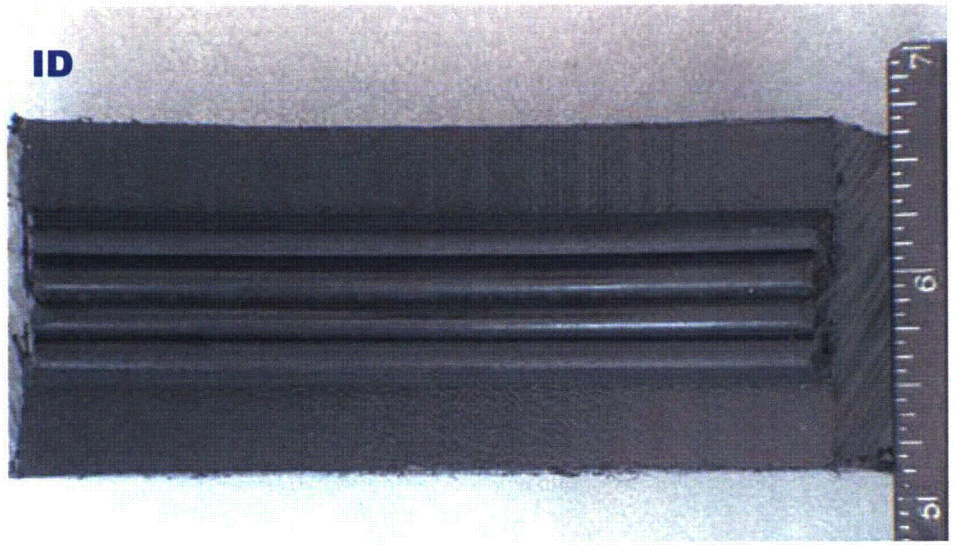
FUSION JOINT #33

TEMPERATURE: 591°F

PRESSURE: 200 psig



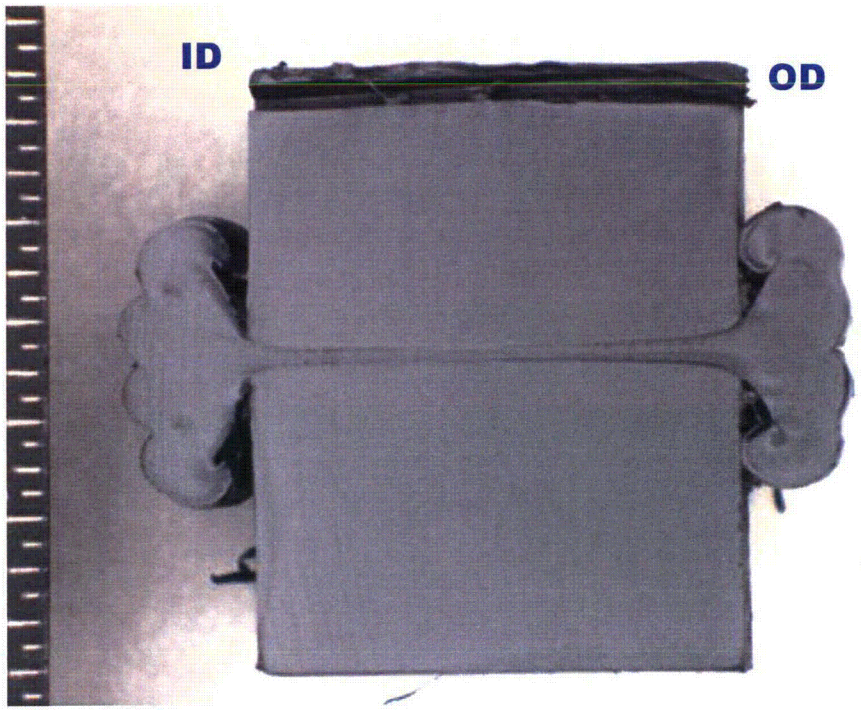


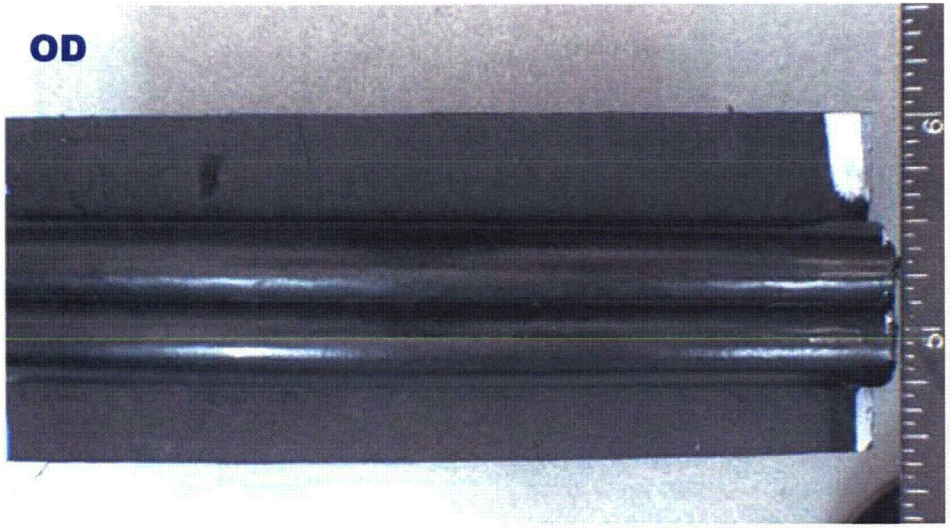


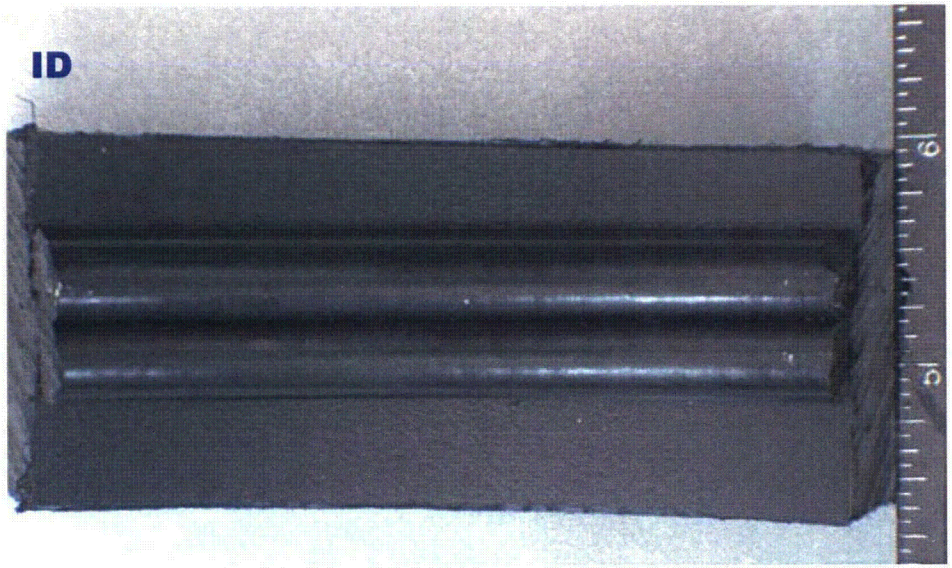
DEMO 8 JOINT #7

TEMPERATURE: 300°F

PRESSURE: 500 psig



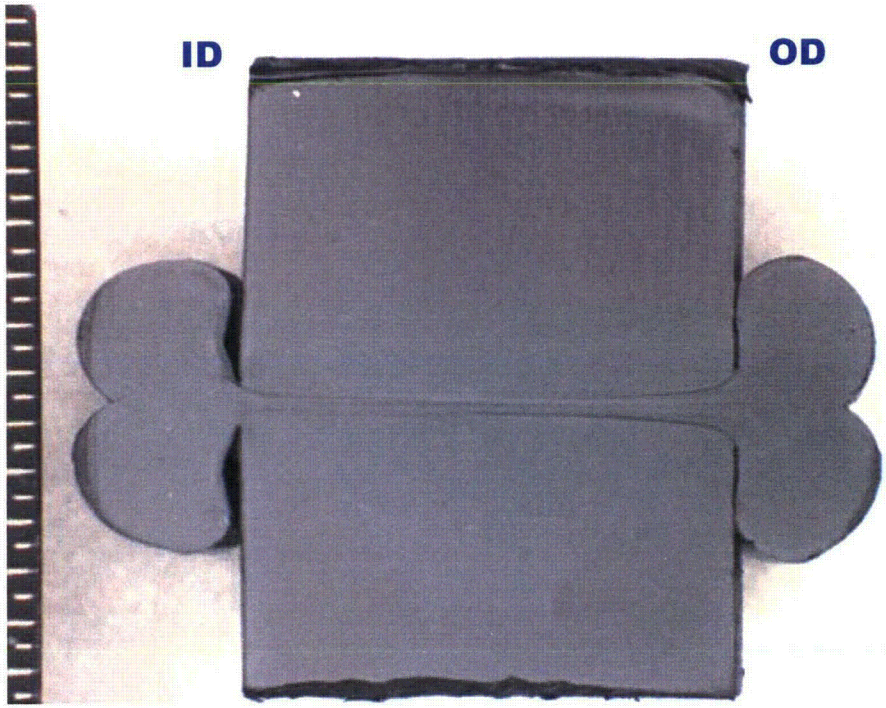




DEMO 9 JOINT #8

TEMPERATURE: 400°F

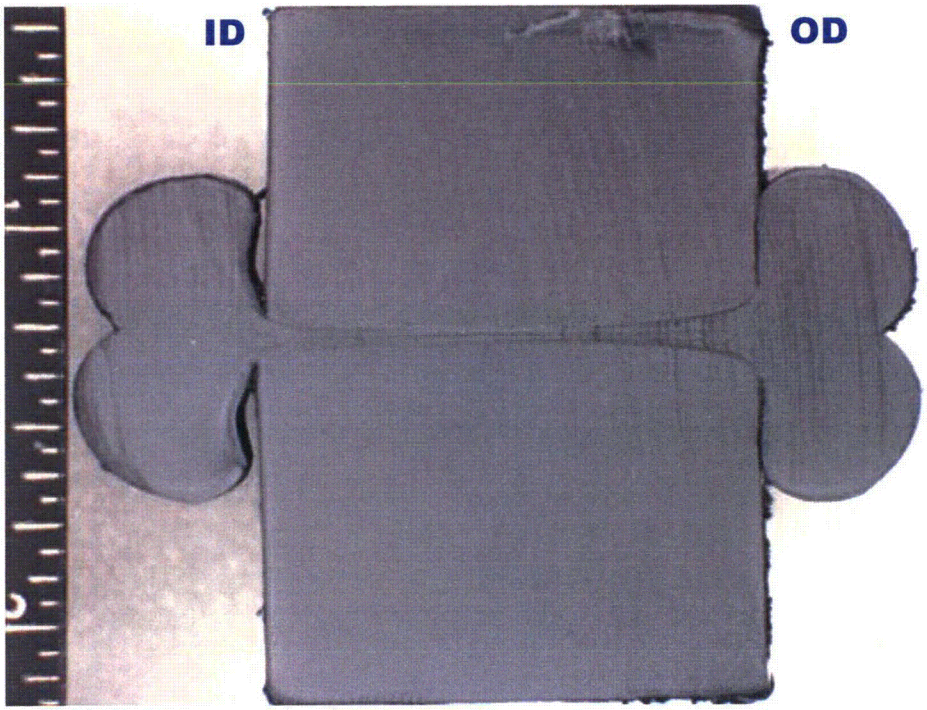
PRESSURE: 300 psig

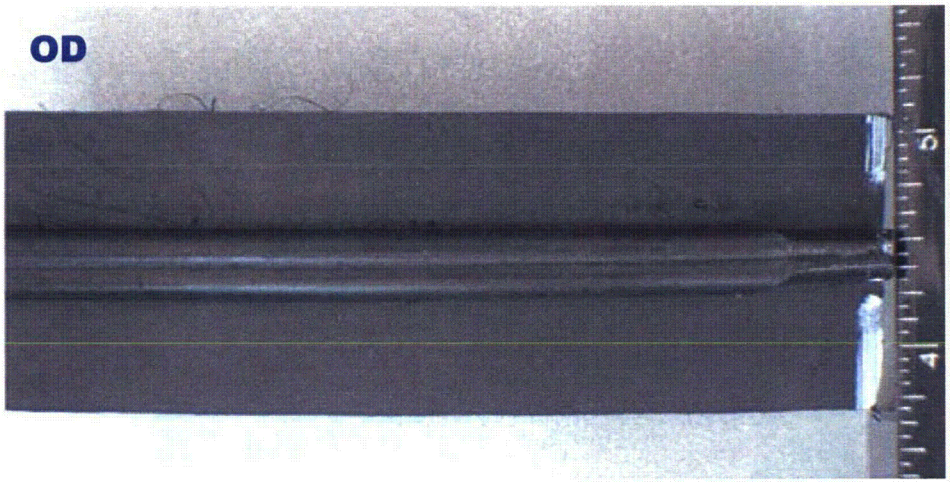


DEMO 10 JOINT #9

TEMPERATURE: 450°F

PRESSURE: 300 psig

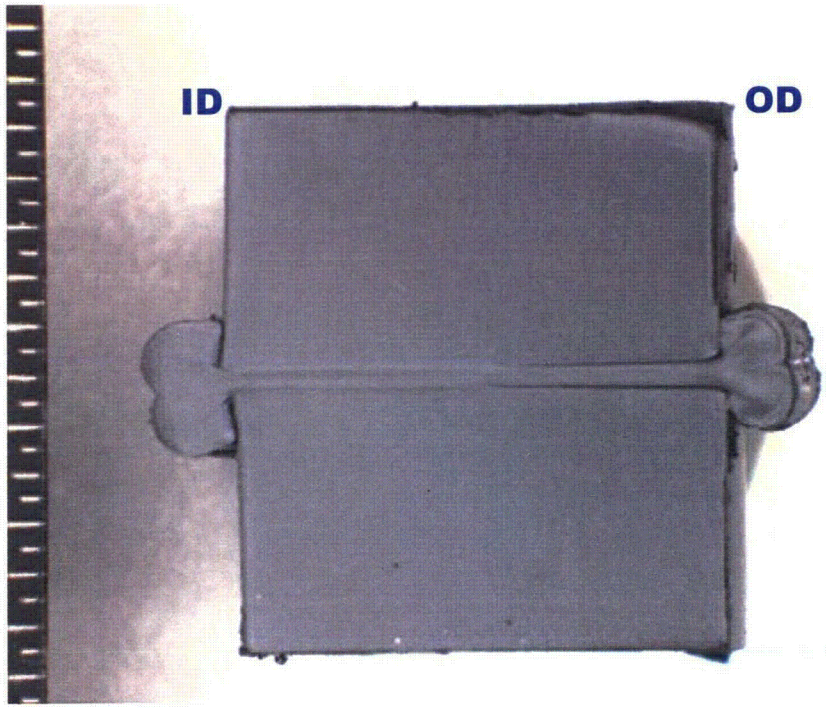




DEMO 11 JOINT #10

TEMPERATURE: 275°F

PRESSURE: 550 psig



Enclosure 2

Performance Pipe Letter Dated January 24, 2008 from Larry Petroff

PERFORMANCE PIPE
A Division of Chevron Phillips Chemical Company LP

Larry J. Petroff
Technical Service Specialist

139 Imperial Way
Bogart, GA 30622

Telephone: 706-208-1031

petrolj@cpchem.com

www.DriscoPlex.com

January 24, 2008

Fusion Qualification Report for XT10 Resin to Itself:

Purpose

The purpose of this set of testing was to qualify the following fusion procedures on pipe made at Performance Pipe using Total XT10 resin:

- Generic PE Pipe Heat Fusion Procedure
- Plexco HDPE Pipe Heat Fusion Procedure
- Driscopipe HDPE Heat Fusion Procedure
- Driscopipe 8000/8100 Heat Fusion Procedure

This testing satisfies the DOT fusion qualification requirements for PE pipe to be used in gas distribution systems as detailed in DOT 192.283.

Requirements

Tensile elongation per ASTM D638 of 25% or greater. Minimum hydrostatic burst pressure per ASTM D1599 of 580 psi (corresponds to 2900 psi stress).

Testing

Pipe made at Performance Pipe using XT10 resin was fused to itself. Various fusion parameters were used to fuse the pipe to cover all fusion procedures being qualified (as listed above). The pipe was then subjected to quick burst testing and tensile elongation testing. See attached table.

Findings

As detailed in the following test results, all samples from all testing passed their respective tests.

(Excerpted from a Fusion Qualification report by Barrett Jesseph dated July 10, 2006.)

Larry Petroff

Larry J. Petroff

Like Material Butt Fusion: XT10 Resin fused to XT10 Resin

Fusion Conditions		Pipe Size	Test Method	Reference	Result
Heater Temperature	Interfacial Pressure				
430 F	75 psi	4" DR 11	Tensile 5 samples tested	DOT 192.283(a)(3) ASTM D 638	PASS: Elongation of greater than 300% on all samples
			Quick Burst 5 samples tested	DOT 192.283(a)(1)(i) ASTM D 2513 ASTM D 1599	PASS: Burst Pressures (psi) of 684, 678, 702, 711, 706 All samples were ductile in appearance and all breaks occurred in pipe section with no separations at the fusion joints
430 F	75 psi	6" DR 11	Tensile 5 samples tested	DOT 192.283(a)(3) ASTM D 638	PASS: Elongation of greater than 400% on all samples
			Quick Burst 5 samples tested	DOT 192.283(a)(1)(i) ASTM D 2513 ASTM D 1599	PASS: Burst Pressures (psi) of 694, 739, 741, 742, 742 All samples were ductile in appearance and all breaks occurred in pipe section with no separations at the fusion joints
500 F	150 psi	6" DR 11	Tensile 5 samples tested	DOT 192.283(a)(3) ASTM D 638	PASS: Elongation of greater than 400% on all samples
			Quick Burst 5 samples tested	DOT 192.283(a)(1)(i) ASTM D 2513 ASTM D 1599	PASS: Burst Pressures (psi) of 687, 742, 695, 696, 700 All samples were ductile in appearance and all breaks occurred in pipe section with no separations at the fusion joints
500 F	75 psi	4" DR 11	Tensile 5 samples tested	DOT 192.283(a)(3) ASTM D 638	PASS: Elongation of greater than 300% on all samples
			Quick Burst 5 samples tested	DOT 192.283(a)(1)(i) ASTM D 2513 ASTM D 1599	PASS: Burst Pressures (psi) of 687, 743, 692, 728, 740 All samples were ductile in appearance and all breaks occurred in pipe section with no separations at the fusion joints

Performance Pipe Test Requests:

Tests using Performance Pipe Fusion Parameters (430F / 75 psi interfacial pressure)

TR 1430: 4" DR11, XT10 fused to 4" DR11, XT10 (Butt Fusion)
- Quick Burst
- Tensile Elongation

TR 1432: 6" DR11, XT10 fused to 6" DR11, XT10 (Butt Fusion)
- Quick Burst
- Tensile Elongation

Tests using Driscopipe 8000 Fusion Parameters (500F / 150 psi interfacial pressure)

TR 1445: 6" DR11, XT10 fused to 6" DR11, XT10 (Butt Fusion)
- Quick Burst
- Tensile Elongation

Tests using Driscopipe HDPE Fusion Parameters (500F / 75 psi interfacial pressure)

TR 1465: 4" DR11, XT10 fused to 4" DR11, XT10 (Butt Fusion)
- Quick Burst
- Tensile Elongation

Enclosure 3

Revised Relief Request Pages

-4422 Identification of Joints by Fusing Operator
Each fusing operator shall apply the identification mark assigned to him by Duke Power Company LLC adjacent to all permanent fused joints or series of joints on which he fuses. The marking shall be 1 ft (.3 m) or less from the fusion bead and shall be done with permanent metallic paint marker or stenciling marker.

Paragraph 4421.1 should have been paragraph 4422.1 but is now deleted.

-4423 Repairs

Repairs of a fused joint is not allowed. All unacceptable joints shall be cut out and replaced.

-4430 Fusing Data Acquisition Recorder

The fusion machine will have an automatic acquisition data recorder attached to it. The recorder shall record essential variables of the fusion process.

a) Failure to run the recorder during the fusion process shall be cause to fail the fusion joint being made.

b) The butt fusion joint record should be compared to the Fusion Procedure Specification (FPS) to ensure that the proper butt fusion parameters and procedures were followed. Any parameter out of the approved range will be cut out and re-fused using the correct FPS.

-4500 ASSEMBLY AND ERECTION

-4510 General

Distortion resulting in a pipe bending radius $\geq$ 30 times the pipe outside diameter is acceptable for piping with a DR of 9 and 11.

-4520 Flanged Joints using PE material

a) Flanged connections are only permitted for the joining of polyethylene pipe to metallic pipe or piping components. The polyethylene flange connection shall be constructed using a polyethylene flange adapter having a DR ratio equal to the attached PE pipe and shall be fusion joined to the attached polyethylene piping.

b) The polyethylene flange adapter shall be connected to the metal flange using a metallic backing ring and as a minimum having the same pressure rating as the mating metallic flange.

c) Before bolting up, flange faces shall be aligned to the design plane within 1/16 in/ft measured across any diameter; flange bolt holes shall be aligned within 1/8 in. maximum offset. Any damage to the gasket seating surface on the PE flange which would prevent gasket seating shall be evaluated.

-5000 EXAMINATION

-5100 GENERAL REQUIREMENTS

-5110 Procedures

-5111 Examination of manufactured PE piping subassemblies, fittings and installed PE piping systems shall be in accordance with the requirements of this section of this Relief Request.

-5112 Examination Procedures. All examinations performed under this Relief Request shall be executed in accordance with detailed written procedures which have been proven by actual demonstration, to the satisfaction of the ANII. Written procedures, records of demonstration of procedure capability, and personnel qualification shall be made available by the Manufacturer or Duke Power Company LLC to the ANII on request.

-5120 Visual Examination of Fused Joints

a) A VT-1 visual examination shall be performed on all fused joints

b) The VT-1 visual examination shall be conducted:

1) Upon the completion of cooling period and
2) after the fused joint data obtained in –4430 has been reviewed.

c) The visual examination by QC Inspection is required before piping with fused joints is permanently covered in the burial trench.

-5300 ACCEPTANCE STANDARDS

-5310 General Requirements

Unacceptable joints shall be removed. Repair of unacceptable joints is not permitted.

-5320 Visual Acceptance Criteria

-5321 Thermal fusion butt joints shall meet the following:

a) shall not have an improper fusion bead configuration,

b) shall not show evidence of cracking or incomplete fusion,

c) shall not be visually angled or offset. The ovality offset shall be less than 10% of the minimum wall thickness of the fused components,

d) the cleavage between fusion beads shall not extend to or below the outside diameter pipe surface see (Figure –5321-1),