

## Butt Fusion Repair Sleeve for PE Pipe

**Description:** Butt Fusion Repair Sleeve (BFRS) - an electrofusion fitting designed to reinforce defective PE pipe joints.

**Status:** BFRS is manufactured by NUPI-Americas/GECO Systems. Fittings are commercially available in 4" pipe size.

### BENEFITS

NYSEARCH acquired the services of GECO Systems to design and manufacture a repair fitting for defective PE butt fusion joints. Although maintenance or repair of butt fusion joints is infrequent, they can be costly because such operations require customer disruptions. In most cases, when an in-service butt fusion joint fails, the surrounding joints also become suspect and may require replacement. This means shutting the pipeline down and replacing the joints in question. However, the BFRS fitting provides utilities with a repair option that can be applied while maintaining live service to surrounding customers.

The special fitting design, with its internal channel, will accommodate a suspect or poor fusion bead during the repair process. This added safety feature eliminates the need to prepare and/or disturb the pipe joint. The BFRS eliminates the need for customer interruptions, reduces repair costs and improves overall safety to the public and the utility.

### BACKGROUND

Currently, Pipeline and Gas Journal statistics indicate that two-inch through six-inch diameter PE pipes are widely used by gas utilities and account for more than 95% of all new main installations. In 2006, over 28,000 miles of main were installed, which

means that millions of joints are being fused annually. These connections are joined by either the electrofusion process or the butt fusion process.

Presently, if a pipeline is encountered that has butt fusion joints and does not pass a visual examination and/or does not meet a company's standards, the joints need to be cut-out and replaced. Currently there is no non-destructive means to examine these joints in the field to determine their integrity.

### TECHNICAL APPROACH

NYSEARCH is funding the project through GECO System SPA of Italy – a

BRFS After Electrofusion



BFRS with void for fusion bead



subsidiary of NUPI Americas.

The objective is to develop an Butt Fusion Repair Sleeve for PE systems.

The first fitting being developed is a split-sleeve for 4" PE pipe only. The fitting is specially designed to fully encapsulate the fusion bead and carrier pipe. This fitting requires the ends to be retained with clamps/anchors during the installation process, typical of any electrofusion couplings. The bead does not need to be disturbed or removed to apply the fitting. This is an important safety feature for gas utilities.

The BRFS is molded using PE 100 materials and is initially bolted on to the pipe after the cleaning process. A specially designed cavity in the middle of the fitting is placed over the bead area. After installation, the BRFS is fused to the pipe using a universal electrofusion box and standard bar code application.

The BRFS can be applied to repair butt fusion joints on both medium and high density pipes. The repair systems is rated

for systems operating up to 124 psig and have undergone extensive testing at various companies and meet all applicable ASTM standards. The repair system can be applied to pipe damage that are 2" in length or less and exceeds 10% of the wall thickness which is the maximum allowed by the gas industry. The maximum 10% is qualitative guideline that has been adopted by Plastic Pipe Institute and PE pipe manufacturers.

This electrofusion repair system is not recommended for situations where the butt fusion joint has failed and gas is blowing.

#### PROJECT STATUS

GECO Systems and NYSEARCH have completed the project and all testing requirements for the fitting. The BRFS fitting is commercially available in 4" sizes only and is distributed by NUPI Americas. Additional fitting sizes being considered for future projects are 2" and 6". These sizes are considered to be typical for natural gas distribution systems.

#### Highlights

- Repair/reinforce HD and MD butt fusion joints
- Acceptable for systems up to 124 psig
- Initial repair sleeves for 4" PE pipe; future sizes for 2" and 6" pipe are planned
- Avoid excessive repair costs due to pipe replacement and system shutdowns
- Repair small isolated damages less than 2"
- Not recommended for joint failures with blowing gas

#### FOR ADDITIONAL INFORMATION

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BFRS Electrofusion Setup