



Tech-Bond Global

Engineering Summary Report

Performance Validation of Tech Patches and Poly Fill on Notched HDPE Pipe
Conducted by Borouge Innovation Center (BIC), Ruwais – November 2023

Test Overview:

This report summarizes the results of ISO 1167 and ISO 13479 testing conducted by Borouge Company in Abu Dhabi to evaluate the performance of Tech-Bond Tech Patches and Poly Fill when applied to notched HDPE pipes.

- Testing Authority: Borouge Innovation Center (BIC), Ruwais
- Test No.: ICTR_10873
- Test Date: November 2023
- Material: Borouge PE100 Pipe, Grade HE3490LS
- Sample Dimensions: OD 110 mm, SDR 11
- Conditioning: 24 hours at 80°C in water bath (ISO 1167-1:2006)
- Objective: Evaluate crack suppression and containment under extreme hydrostatic pressure using Tech Patches and Poly Fill on notched HDPE sections.

Testing Protocols

Standard Purpose

ISO 13479	Notch test to evaluate resistance to crack growth
ISO 1167-1	Hydrostatic pressure test for sustained stress

Test Conditions:

- 20°C at 12.4 MPa (\approx 1,800 psi)
- 80°C at 5.4–5.7 MPa (\approx 800 psi)

Key Results – Primary Test (9 Samples)

Temp (°C)	Pressure (MPa)	Duration (hrs)	Observations
20	12.4	115–157	Pipe burst; coating broke as a result
80	5.4–5.7	10–258	Pipe burst; coating peeled cleanly; no crack propagation

Key Observations

- No adhesive failure: In all cases, failure occurred in the pipe wall, not the patch or Poly Fill layer.
- Crack containment: No visible propagation from the notched area.
- Clean Poly Fill separation: In several tests, the coating delaminated as a single sheet, confirming full coverage and consistent bonding.
- Note: Tech Patches were used in this study. Use of Tech Wraps, which offer superior reinforcement, would likely yield even stronger results.

Significance of Results

1. Unprecedented Durability

Standard SDR11 pipes typically fail below 800 psi at 20°C. Tech-Bond-treated samples withstood 1,800 psi for up to 157 hours, more than double the expected threshold.

2. Failure Mode Validity

When failure occurred, it was due to rupture of the pipe wall. The bonded layer remained intact, with no crack propagation—a rare outcome in notched pressure testing.

3. Advanced Behavior of Poly Fill

Poly Fill's behavior under stress suggests breakthrough applications:

- 3D printable reinforcement layers
- Precision surface repair
- **Custom form-fitting protective sleeves**
- On-site rust prevention or structural overlays

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