



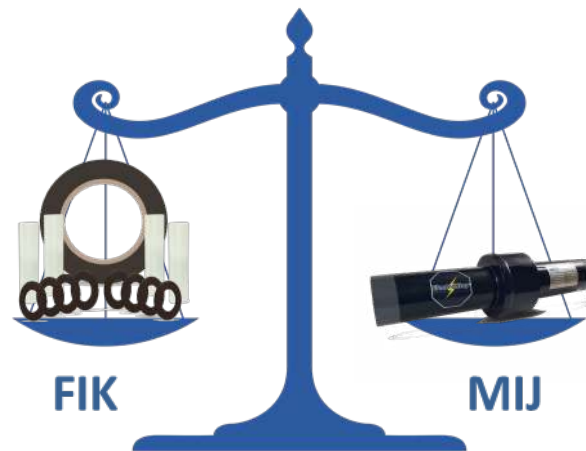
Preventing Pipeline Corrosion: Monolithic Isolation Joints & Flange Isolation Kits

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Areas of Discussion

- Selection Criteria – How do you decide what will work best?
- The benefits of using an FIK vs MIJ and vice-versa
- Current trends in isolation
- Recommended Pre and Post installation practices for MIJ and FIK



Poll

Why do you typically use electrical Isolation products in your pipelines?

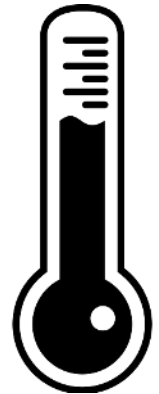
- a. Prevent Galvanic Corrosion
- b. Prevent Crevice Corrosion
- c. Seal mismatched flanges (RTJ – RF)
- d. Reduce Flange Stress
- e. Provide Isolation for cathodic protection
- F. I don't know

Selection Criteria – How do you decide what will work best?



TAMPS

- Temperature
- Application
- Media
- Pressure
- Size



The benefits of using an FIK vs MIJ

FIK Benefits:

- Lower cost – Average 5X-10X less
- Easily accessible – Bolted connection
- Short lead-time – 20X – 40X quicker
- Comfort level – Widely accepted/used
- Wide range of applications- Many variations
- Wide size range – ½" to 144" is common
- Higher temp isolation – 392F/500F/770F are common ratings
- Fire safe

The downside of using an FIK vs MIJ

FIK Limitations:

- Installation issues – Number one problem
- Short path isolation – Increasing in number
- Many parts – 24"/600# has 193 pieces
- Shouldn't be buried – Nuts and bolts corrode
- Many variables – Easy to install wrong product

The benefits of using an MIJ vs FIK



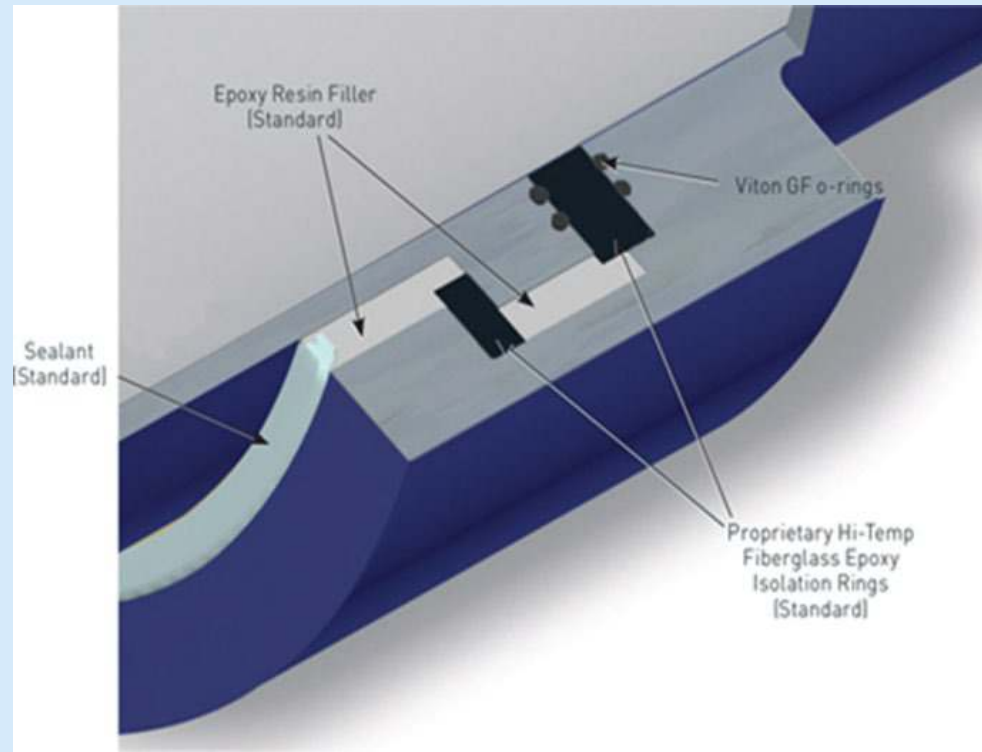
MIJ Benefits:

- Long path isolation – coated IDs seal the internal components (consider high pressure "breach of coating")
- 20-year design life
- Easy installation – welders who weld line pipe are qualified to do this welding, so no special labor is needed
- Ideal for buried apps
- A place to mount other equipment (SSDs, CP test nodes)
- One-piece visible design – instead of hundreds of pieces
- Higher de-electric strength

The downside of using an MIJ vs FIK

MIJ Limitations:

- Higher upfront cost
- Not easily accessible
- Narrow range of applications
- Long lead-time
- Limited size range
- Internal parts are hidden



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Q2 . Within in your pipeline what is the split of MIJ and FIK usage?

- A. FIK only
- B. MIJ only
- C. 50 / 50
- D. 60% or greater FIK
- E. We don't use Isolation

Current Trends in Isolation

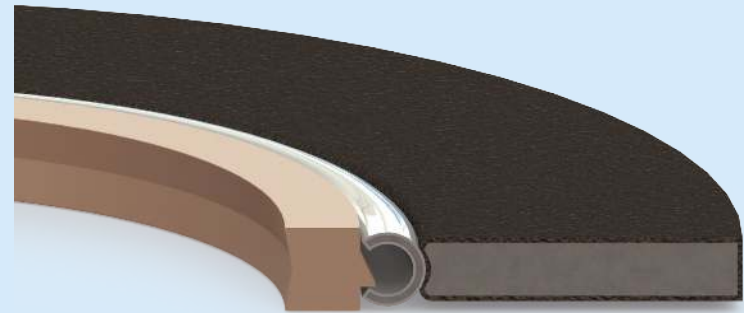
- Migration to coated isolation washers
- Migration to coated isolation gaskets
- Training on how to install isolation kits
- Training on how to test isolation kits
- Movement towards universal seal material
- Better thermal control
- Better Inside Diameter coating management

Coated Washers



- Higher compressive strength
- Simpler installation (can't reverse)
- Higher dielectric
- Longer life

Coated Gasket



- Fire safe (at lower cost)
- More chemically resistant
- No exotic metallurgy required
- Much better sealability
- Easier to install
- Higher pressure capability
- Cryogenic capable

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What formal training have you or your team received on installing isolation products?

A. None

B. Internal training

C. Third party training

Typical GPT Flange Isolation Training Outline

- Class size – 12-30 per session
- Duration- 4hr class Including hands-on training
- Certification – workers are certified for specified period of time (1 year)
- Attendees – field personnel, supervisors, integrity engineers, reliability engineers
- Currently seeking Personnel Certification
- Teaches proper installation as well as proper testing methods

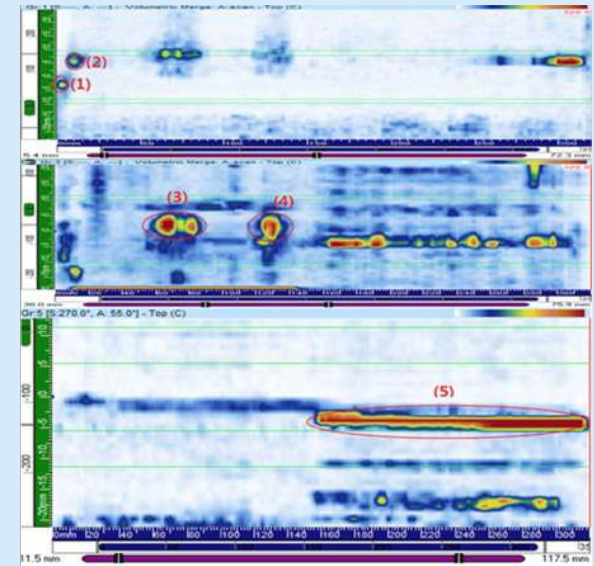
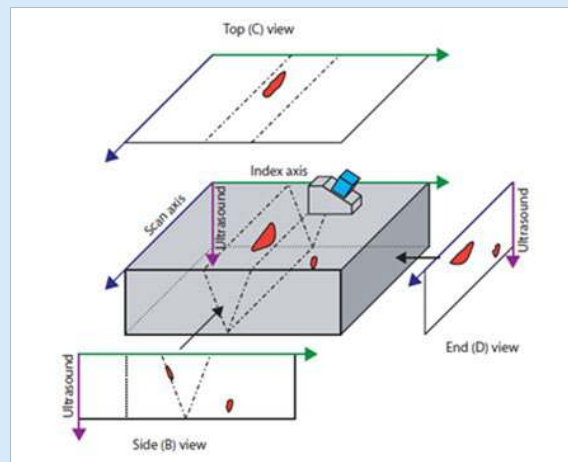
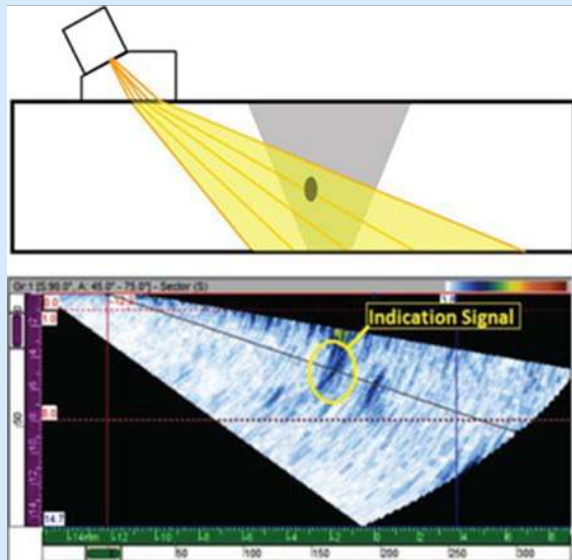


Current Trends in Isolation Techniques and Solutions

- NDT (PAUT)
- Internal sealing elements such as low temp Viton(R)
- Special coatings (new coatings are almost too strong)
- More MIJs in Water applications
- Sour service requirements
- Transition MIJs (SS to CS)
- Welding
- Documentation integrity and urgency
- MIJ's supplied with SSD, Surge Diverter and/or CP test station connection brackets/lugs

Current Trends in Isolation Techniques and Solutions

PAUT Can detect all defect types and characterize them in accordance with acceptable criteria code. This allows for more accurate quality control



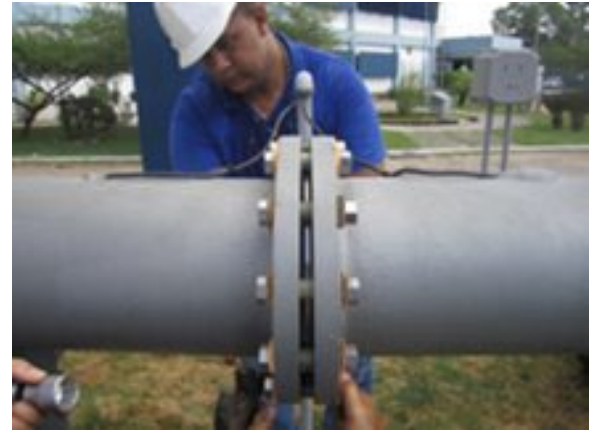
Current Trends in Isolation Techniques and Solutions

	CRACKs		LOFs		LOPs		SLAGE		CAVITY-s		POROSITY-s	
	RT	PAUT	RT	PAUT	RT	PAUT	RT	PAUT	RT	PAUT	RT	PAUT
Depth of flaw	RT	PAUT	RT	PAUT	RT	PAUT	RT	PAUT	RT	PAUT	RT	PAUT
10-19mm	50%	100%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20-39mm	30%	100%	70%	100%	90%	100%	90%	90%	60%	90%	90%	90%
40 and Over	25%	100%	28%	100%	20%	100%	17%	90%	50%	92%	50%	80%

Pre and Post installation practices for MIJ and FIK

FIK Pre Installation:

- **ALIGN FLANGES**
- **Use non-metallic lubricant**
- **Verify isolation kit is correct size/class/schedule**
- **Clean flange faces**
- **Inspect studs/nuts/flanges**



Pre and Post installation practices for MIJ and FIK



Inspector Checklist:

- Are the gaskets the correct type, size and class?
- Are the sleeves the correct type, diameter and length?
- Are the washers the correct diameter?
- Flange face was cleaned? Yes / No
- Flange aligned prior to gasket installation? Yes / No
- Bolts are the proper length? (at least two threads exposed after torquing) Yes / No
- Flange gap is consistent around the flange and of appropriate distance? ((raised face height x 2) + gasket thickness) Yes / No
- Nuts are installed with printing facing out? Yes / No
- Non-metallic lubricant was used on bolts/nuts? Yes / No
- Isolation washers are installed properly? Yes / No
- Sleeves are all proper length? Yes / No
- Nuts were torqued in proper star pattern? Yes / No
- Nuts were torqued to proper torque value and in proper increments? Yes / No

Pre and Post installation practices for MIJ and FIK

FIK Post Installation:

- Measure flange gap in four quadrants making sure gap is as expected
- Electrically test bolts (all) to flange, flange to flange and flange to core (if exposed metal cored gasket) – Note: don't wait until fully torqued to test
- Complete all required reporting

Pre and Post installation practices for MIJ and FIK

MIJ Pre Installation:

- Clean bevel and two inches past bevel to API 5L white metal specs
- Prepare to lift MIJ in a supported manner
- Inspect bore for foreign particles and clean if necessary.
- Horizontal = bi-directional flow
- Vertical = bi-directional flow, position the RTV area down
- Ensure weld ground is on the same side of the MIJ as the welding is being performed

Pre and Post installation practices for MIJ and FIK

MIJ Post Installation:

- Ensure welds are properly inspected
- Tape RTV area with tape prior to any sandblasting
- Coat exposed steel around MIJ and Line Pipe connection
- Using an RFID meter, confirm Electrical Isolation

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QUESTIONS

Thank you for your time and attention

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