



# **“Challenges Obtaining and Implementing Welding Alloys for High Temperature Stainless and Super Nickel Steel Weldments”**

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**William F. Newell, Jr., PE, PEng, IWE**

**EUROWELD**, Ltd.  
255 Rolling Hill Road  
Mooresville, NC 28117

## **Disclaimer...**

**The opinions expressed in this presentation are the opinions of the author, not the official opinion of the responsible API, ASME, AWS or ISO Committees.**



# Special Welding Alloy Inventories

- Inventories small vs. low carbon & 3XX stainless steels
- Low commercial demand
- Expensive to manufacture
- Many discontinued due to mergers, sagging sales, loss of inventory funding
- Long lead times: up to 24 weeks

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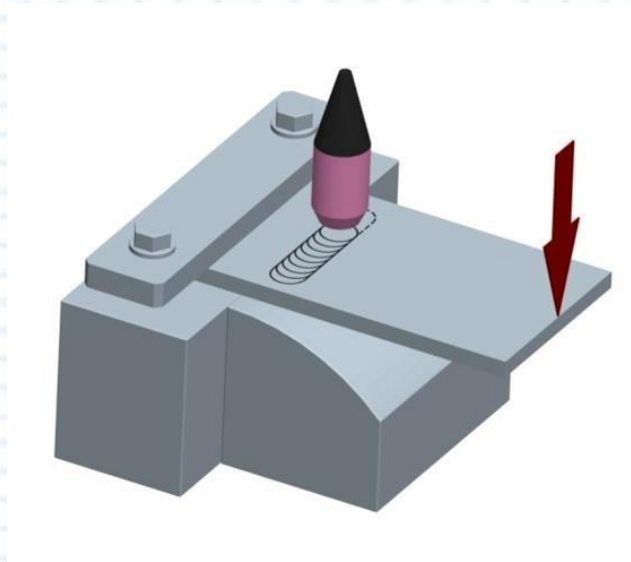
# **Welding Technique Issues**

- Alloy vs. Technique Issue
- High Carbon SS vs. Nickel & Nickel Super Alloys : similar issues
- Dilution
- Groove Geometry
- Weld Bead/Layer Geometry
- All must be considered and controlled to avoid cracking and microfissuring
- Assure melting weld metal, NOT remelting (EPRI's Power Ratio)
- Dissimilar Weldments Introduce Additional Challenges

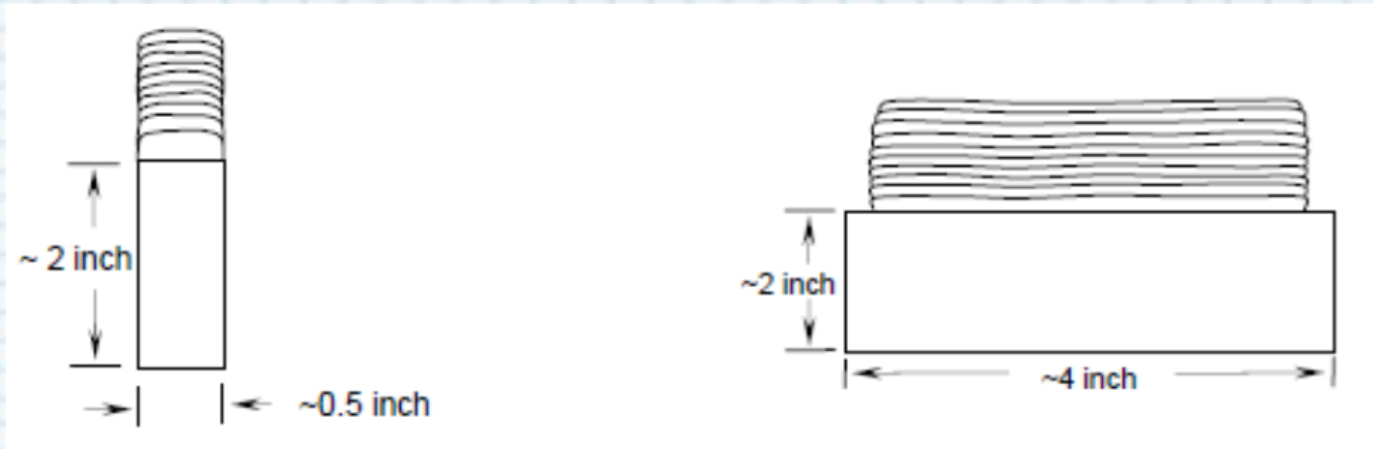


# Weld Metal Evaluation & Testing

- Traditional Test Coupons & Specimens May be Inadequate
- Creative Test Assemblies
  - Induce Fabrication/Installation/Repair Stresses
  - Create Residual Stresses
  - Evaluate Cracking and Microfissures



# EPRI P87 Test Specimen





# QUESTIONS ?

- [bill@euroweld.com](mailto:bill@euroweld.com)
- 704-662-3993
- [\*\*www.euroweld.com\*\*](http://www.euroweld.com)

**Thank You!**