

## Mini-Inside Diameter Temper Bead

### Remote Machining and Welding for Nozzle Repairs

Framatome's Mini-Inside Diameter Temper Bead welding techniques decreases weld volumes while reducing risk and schedule costs.

#### Challenge

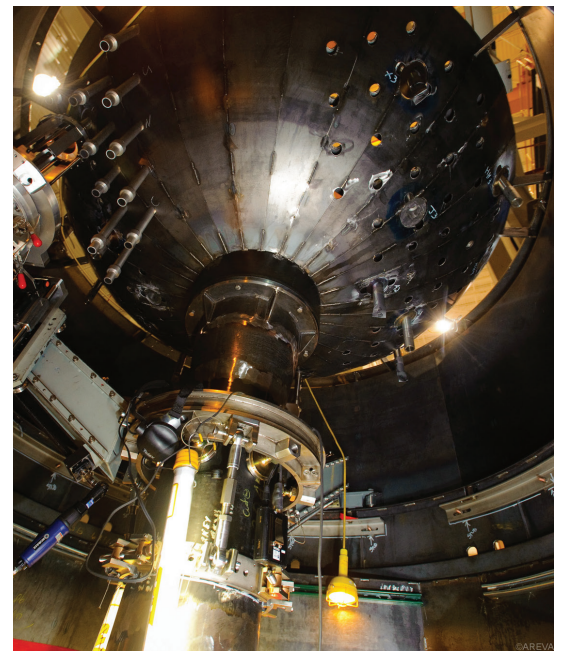
Many plants have the potential for Primary Water Stress Corrosion Cracking (PWSCC). As the nuclear fleet ages, the likelihood of PWSCC occurring in a Dissimilar Metal (DM) weld increases substantially.

#### Solution

Framatome's Mini-ID Temper Bead (IDTB) welding techniques can eliminate all Alloy 600 from service and implement a permanent solution for continued component integrity. The mini-IDTB process was originally developed for Bottom Mounted Nozzles (BMNs); however, it was used to successfully repair 119 pressurizer heater nozzle locations in 2012. We can perform mini-IDTB weld mitigation of your BMNs with the reactor vessel (RV) in the flooded condition, reducing radiation exposure and impact to your outage schedule. This is an adaptation of our IDTB control rod drive mechanism (CRDM) repair tooling — successfully proven with extensive experience.

As a result of extensive research and development, mini-IDTB allows for as much as an 80 percent decrease in weld volumes, thus reducing risk and schedule.

- New lower heater sleeve or replacement nozzle is inserted and mini-IDTB weld installed
- Weld process joins new heater sleeve or nozzle to the bore ID by the remote GTAW process (ambient temperature temper bead welding)
- Weld is disassociated from the original heater sleeve attachment weld



**Your performance**  
is **our** everyday **commitment**

#### Customer benefits

##### Reduced weld volume

- Mini-IDTB install:  
approximately 4 hours
- Standard ½ nozzle technique  
and pad weld:  
approximately 18 hours

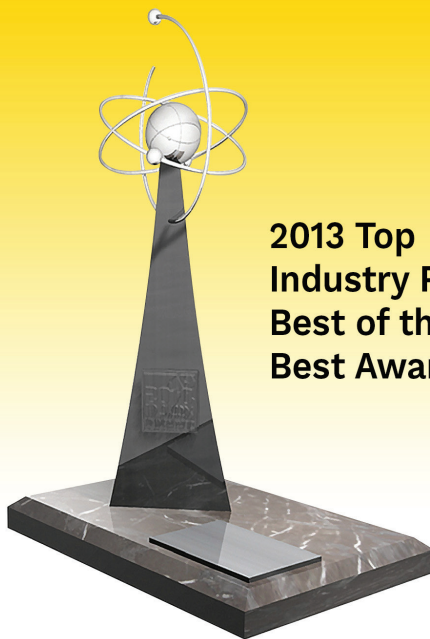
##### Schedule savings

- 117 heater penetrations out of  
120 total heaters repaired
- Schedule savings of 33 days  
compared to standard weld  
techniques

##### Radiation exposure reduction

## Design Specifications

- Water-cooled, 300-amp capacity
- Dual axis wire manipulator
- Single weld vision with renewable optical cover
- Integral light guide
- Remote iris
- Actuated weld filter
- Conventional gas lens



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