



Metamic HT Issues

June 27, 2008

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Materials Selection for ITS Components

- 1) Determine Design & Service Conditions
 - temperature, stress, environment, time, etc.
- 2) Determine Fabrication Processes, Special Processes, and Procedures
 - Cold/hot work, heat treatment, welding, inspection, etc.
- 3) Select material meeting all fabrication & service requirements
 - candidate materials **fully characterized** before selection
 - code, tests, etc.
- 4) Documentation for all above supports design review

Materials *Fully Characterized* by:

Production specification/standard (e.g. ASTM)

- Product form
- Production methods & processes
- Property criteria
- +others

Critical processes & characteristics for QA/QC

- Specified or implicit in specification
- Sub-tier documents/specs

Materials *Fully Characterized* by: (continued)

Available (open) literature/references

- Corrosion characteristics
- Welding characteristics
- Microstructural characteristics
- + many others

Application-specific testing, e.g.,:

- Salt-spray test
- Immersion test

Metamic HT Characterization Issues

Characterization deficient in multiple areas:

- **Proprietary material**
 - No standards available
- **No similar materials**
- **No useful open literature**
- **Unique combination alloying/property enhancement strategies**
 - Unknown effects/response
 - E.g. microstructural behavior-production/service

Metamic HT Characterization Issues (continued)

- **Conventional metallurgical knowledge not applicable**
- **Many properties/characteristics not explored**
 - Isotropic?
 - Welding?
- **Some available data apparently contradictory**
 - Impact versus tensile elong. w/increasing temp.
- **Conventional Metamic should not be used as a model for Metamic HT**

Metamic HT Characterization Issues (continued)

Conclusions:

- **Cannot make any findings about properties/characteristics or adequacy for application**
- **Comprehensive development program needed**