**Thermotite ULTRA**

**Superior Subsea Insulation**

Thermotite® ULTRA is a styrenic alloy-based subsea insulation system designed for flow assurance.

**System Description:**
- Layer 1, 2, 3: 3-layer anti-corrosion system - Fusion Bonded Epoxy, ULTRABond and ULTRA Solid
- Layer 4: Thermal insulation - ULTRA foam/solid
- Layer 5: Mechanical and UV protective layer - ULTRAShield

**Superior Insulation Properties And Unmatched Mechanical Performance**
- Lower thermal conductivity of both solid and foamed systems result in lower achievable U values
- Extended cool-down time
- No glass microspheres:
  - Zero risk of compromised thermal performance due to glass breakage or degradation during service
  - Superior insulation performance without glass enables unlimited depth installation
- Incompressibility of solid system allows unlimited water depth installation
- Higher insulation density coupled with reduced thickness improves seabed stability of flowlines and assists in optimizing hydrodynamic response of risers
- Thinner insulation and reduced pipe profile results in lower lay strains and improved hydrodynamic response

**Installation**
- Can be installed using all subsea laying methods including reeling, S-lay and J-lay
- Superior low temperature ductility enables lower temperature reeling and increased flexibility in installation schedule
- Lower thermal conductivity translates to reduced insulation
- Thickness and potential savings in transportation and installation costs

**FJ Compatibility**
- Thermotite® ULTRA
- Nemo 1.1
- Nemo 2.1

**Value Added Services**
- Compatibility with direct electrical heating systems (DEH)
- Streamlined delivery schedules, product standardization and quality assurance practices due to simplified processing operations
- Universally and readily available project management and logistics support from multiple existing plant locations

<table>
<thead>
<tr>
<th>CAPABILITY/PROPERTY</th>
<th>SHALLOW WATER THERMOTITE®(R)</th>
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<tbody>
<tr>
<td>Minimum pipe diameter</td>
<td>100 mm [4&quot;]</td>
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<tr>
<td>Maximum pipe diameter</td>
<td>914 mm [36&quot;]</td>
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<tr>
<td>Maximum operating temperature</td>
<td>120°C [248°F]</td>
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<tr>
<td>Thermal conductivity (K value)</td>
<td>0.11-0.16 W/m·k</td>
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<tr>
<td>Overall heat transfer coeff. (U value)</td>
<td>&gt; 2 W/m²K [Specific to thermal design]</td>
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<tr>
<td>Water depth</td>
<td>Unlimited</td>
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