Novolastic Subsea Thermal Insulation

Subsea technologies for unparalleled recovery and production
It starts with Subsea Thermal Management Solutions

FMC Technologies is focused on developing subsea fields more efficiently and economically. By providing subsea thermal management solutions that shorten and stabilize application times, such as Novolastic, FMC Technologies is lowering risk to project deadlines. In addition to the ease of application, Novolastic was designed to provide superior performance and has a field track record to prove it.

Proven Solution

To help delay the onset of hydrate formation and prevent wax deposition, Novolastic was developed by leveraging FMC Technologies’ subsea experience and technology.

This proprietary glass-syntactic, silicone-based material is cast-in-place and can be readily applied to subsea trees, manifolds, FLET’s, PLEM’s, jumpers, and similar components at any site worldwide.
Global Field Track Record

Novolastic is recognized by the subsea industry as the highest performance insulation product with no failures of material on over 5.5 million kilograms applied to subsea equipment over the last 15 years.
Novolastic has been rigorously qualified over the years and meets the standards of nearly every operator. Through extensive qualification testing, Novolastic complies with the ISO 12736 standard (general and specific properties, aging, full-scale testing, application process and quality control).

In addition, Novolastic was included in the SWIS JIP in 2013 at 150 ºC (302 ºF) and maintained its physical integrity and thermal performance throughout a year-long Simulated Service Test (SST). Novolastic is also included in the second ongoing SWIS JIP at 180 ºC (356 ºF) with similar results expected in 2016.

Novolastic insulated subsea equipment can interface with other thermal insulation materials using mechanical or chemical interfaces. For field joints, it is common for Novolastic to interface with other insulation materials such as 5LPP, IMPP, PU, and GSPU. These interfaces can be found on subsea equipment such as connectors, jumpers, flowlines and pipelines.

**Insulation Application Duration (from start to final inspection)**

<table>
<thead>
<tr>
<th>Project</th>
<th>Novolastic</th>
<th>Other Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsea Tree System</td>
<td>3 – 6 Days</td>
<td>10 – 15 Days</td>
</tr>
<tr>
<td>Manifold (8 Slots)</td>
<td>5 – 7 Days</td>
<td>26 Days</td>
</tr>
<tr>
<td>PLET</td>
<td>2 – 3 Days</td>
<td>9 Days</td>
</tr>
<tr>
<td>Jumper</td>
<td>2 – 3 Days</td>
<td>8 Days</td>
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</tbody>
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**Material Properties**
- Extended cool-down time through a high heat capacity of 1.45 J/(g-K) and low thermal conductivity of 0.167 W/(m-K)
- Rated for temperatures up to 177 ºC (350 ºF)
- Rated for water depths up to 10,000 feet (3,048 meters)
- Neutrally buoyant due to near-seawater density
- Superior tensile elongation properties (224 %) allow expansion and movement of substrate without cracking or breaking
- Low water absorption of 0.66 weight percent

**Performance**
- Stable thermal performance over time
- Proven field track record
- Minimal heat transfer, resulting in very low thermal expansion
- Optimal thermal insulation solution for subsea equipment

**Application**
- Able to cure at ambient room temperatures
- Does not require preheating of substrate or molds and does not provide any risk of exothermic cracking
- Simple and easy application. Cast-in-place with molds to accommodate complex geometries
- Increase machinability and application ease due to the patented suspension of glass microspheres in silicone resin
- Easily applied at worksites (shop, fabrication yard, etc.)