

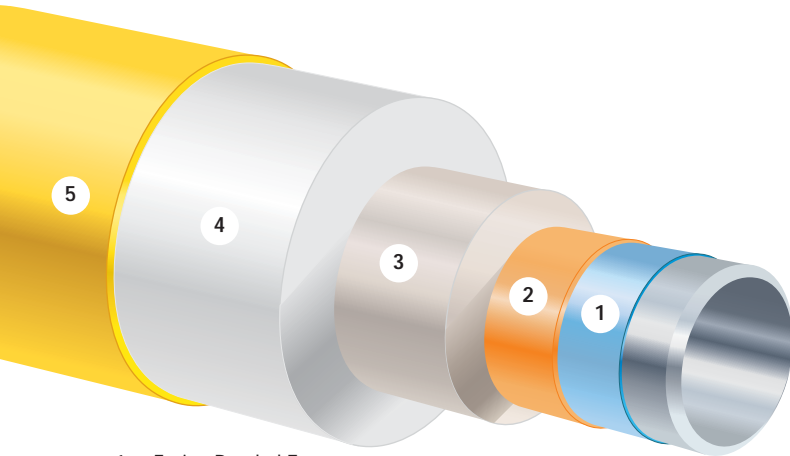
Thermotite®

Polypropylene Insulation Systems



FLOW
ASSURANCE

PRODUCT DATA SHEET



1. Fusion Bonded Epoxy
2. Adhesive
3. Solid PP
4. Foam PP
5. Outer Shield

Product Description

Thermotite® is a technologically advanced multi-layer polypropylene insulation coating system designed for offshore flow assurance. **Thermotite® can be designed and manufactured in a wide range of thicknesses and layers to meet specific performance and subsea installation requirements for both shallow and deep water applications.**

Applications



Oil & Gas
Pipelines



Subsea
Pipelines



Small Diameter
Pipelines



Superior Insulation Properties

- Provides superior insulation properties in subsea pipelines for flow assurance.
- Has been used in harsh environments with operating temperatures up to 155°C (319°F) and depths of up to 3000 m (9842').

Flexible Installation

- Can be installed using all subsea laying methods including reeling, S-lay and J-lay.
- The product is a highly mechanically resilient product and is constructed from impact resistant ductile materials.
- Has been tested extensively for tensioner clamp loads, axial shear loads and fatigue, giving excellent performance.

Engineered Solutions

- The multi-layer geometry allows for the use of materials with specific thermal and mechanical properties at different locations within the product, enabling optimisation of the coating for steady or transient state operation.
- All materials have been tested extensively with a view to thermal and physical properties in order to ensure predictable performance throughout the life of the field.

Advanced Field Joint Technology

- Combining the Thermotite® multi-layer system with injection moulded polypropylene field joint technology provides an integral system well-suited to reeling applications.
- The interface between the parent coating and the field joint infill is fused during the manufacturing process, such that the polypropylene material becomes continuous and is not susceptible to cracking or delamination during deployment and operation.
- With over 50,000 joints successfully laid by reel lay on a range of vessels, this system has proved to be a reliable high quality product.

Features & Benefits

Thermotite®

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Typical Plant Capabilities and Product Properties

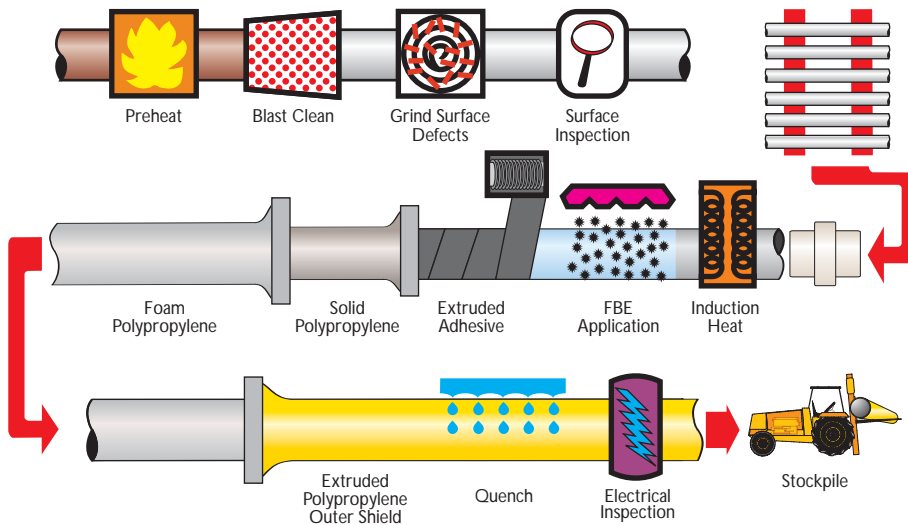
Capability/Property	Shallow Water Thermotite® (S)	Deep Water Thermotite® (D)
Minimum Pipe Diameter	50 mm (2")	50 mm (2")
Maximum Pipe Diameter	600 mm (24")	600 mm (24")
Minimum Operating Temperature	-35°C (-30°F)	-35°C (-30°F)
Maximum Operating Temperature.....	155°C (310°F)	155°C (310°F)
Minimum Pipe Length	9 m (30')	9 m (30')
Maximum Pipe Length.....	26 m (85')	26 m (85')
OHTC ("U" Value).....	> 2.0 W/m ² .K (0.352 BTU/hr.ft ² .F)	> 2.5 W/m ² .K (0.44 BTU/hr.ft ² .F)
Maximum Water Depth.....	700 m (2297')	3000 m (9842')
K-Value.....	0.125 - 0.185 W/m.K (0.072 - 0.107 BTU/hr.ft.F)	0.165 - 0.185 W/m.K (0.095 - 0.107 BTU/hr.ft.F)

Values shown are typical and may vary from plant to plant. Consult Bredero Shaw for special requirements. As density and composition are design variables with Thermotite® the figures above are given as general guidelines. Where there is a range specified, the interval is related also to the density range for the particular component.



Thermotite®_rev020

Product Application Process



Plants

North America

Pearland, Texas (planned)

Latin America

Veracruz, Mexico
Belo Horizonte, Brazil

EMAR

Leith, Scotland
Orkanger, Norway

Asia Pacific

Kuantan, Malaysia

About Bredero Shaw

Bredero Shaw is the global leader in pipe coating solutions. With more than 80 years of experience, the largest team of dedicated pipe coating professionals, the most extensive network of strategically located plants worldwide and with proven innovative coating technologies, the company has protected more pipelines in virtually every environment and operating condition than anyone in the industry.

Bredero Shaw offers technologically advanced solutions for anti-corrosion coatings, protective and weight coatings, thermal flow assurance coatings, internal coatings, custom coatings and field joints for both onshore and offshore applications. This broad range of products and services provides Bredero Shaw with the unique capability to service the full spectrum of pipeline protection and flow assurance requirements. Consult your Bredero Shaw representative for your unique project requirements.

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The information contained herein is indicative of the types of coatings provided by Bredero Shaw, and is not intended to be a guarantee that a particular coating will be suitable for a given application. Since many unique environmental, operating, and design conditions must be considered, the user shall determine the suitability of the coating for the intended use and assume all the risks and liabilities in connection therewith. Bredero Shaw's liability is stated in our standard conditions of sale.