



Flow Assurance Importance:

Ensuring the successful and economical flow of a hydrocarbon stream from reservoir to the point of sale, otherwise known as ‘flow assurance,’ is a critical task during deepwater energy production. High pressures, low temperatures ($\sim 4^{\circ}\text{C}$) and the potential for solid deposits to cause catastrophic blockages, increase the possibility of flow assurance failure. The financial loss from such production interruption can be astronomical.

Traditionally, modern subsea insulation systems require the oil to be cooled prior to meeting with flow lines. At certain depths, flow challenges can occur due to the high temperature of the oil being recovered. There exists the potential for the quickly-cooled oil to crystallize and form hydrates, which may plug the pipeline and slow the speed of the hydrocarbon flow.

As a result, operators have been searching for an insulation product that can endure up to 400°F (204°C) of high velocity fluid and has the ability to mitigate the formation of hydrates in a highly unstable production environment.

MTE: Combining Strength to Deliver Innovation

Mark Tool and Rubber Co., Inc., are experts in the development and application of insulation for splash zone protection of platform structural members, risers, J-tubes and conductors. The Mark Tool team partnered with Elite Elastomers, an applicative compounder specializing in elastomeric high-performance material solutions.

This partnership yielded MTE Engineered Materials. MTE is a joint venture focused on the research, development and end-use application for complete elastomeric subsea high-temperature thermal insulation systems. The mission of MTE is to cost-effectively create products that will guarantee the success of production in deepwater applications.



SUBSEA THERMAL INSULATION: A NEW, COMPLETE, ELASTOMERIC SOLUTION

MTE has designed, developed and deployed two insulation systems, known as ThermoTron 350 and ThermoTron XT. These systems are mechanically robust, flexible, high-temperature elastomeric compounds, which are applied to pipe exterior, jumpers and other complex components, using a proprietary extrusion process. These systems are uniquely designed to extend the lifespan of subsea installations.

ThermoTron 350 and ThermoTron XT insulation systems consist of three layers:

- Corrosion resistant layer
- Bonding agent layer
- High-temperature, high density elastomeric layer

ThermoTron XT is unique to the market, as it is the only elastomeric insulating material capable of operating at continuous temperatures exceeding 350°F and also capable of being deployed using the J-Lay, S-Lay and Reel-Lay methods.

The Systems: ThermoTron 350 and ThermoTron XT

THERMOTRON 350

High-temperature wet insulation system intended for use in splash zone protection of risers, hull piping and subsea jumpers, with an internal operating temperature of up to 350°F.

THERMOTRON XT

High-temperature wet insulation system intended for subsea flow lines and tiebacks, with an internal operating temperature exceeding 350°F.

Designed to perform in extremely harsh environments, the ThermoTron line has initially been developed for a major oil and gas company operating in the Gulf of Mexico, with projected application expansion into the North Sea and West Africa.

