High Technology for Pipe Coating and Insulation
State-of-the-Art Technology in Coated Pipes
Tradition and Quality in Onshore and Offshore Applications

Aware of the great potential of the Brazilian energy market, Socotherm Brasil initiated operations in the country in 1999 under the name Socotherm do Brasil, a joint venture between TenarisConfab and Socotherm S.P.A.

With its steel pipe coating technologies, the company is committed to constantly fulfilling the needs of the growing and increasingly diversified Brazil and South American energy markets.

Fully prepared to participate in onshore and offshore projects and meet the demands generated by the expansion of natural gas distribution networks, oil pipelines and related projects, Socotherm Brazil supplies internal and external anti-corrosive, thermal insulation, and concrete coatings, in addition to gas and water flow coatings, using state-of-the-art technologies and processes.

With its plants strategically located close to the main steel pipe manufacturers worldwide and near important petrochemical complexes, Socotherm also ensures the best logistics solutions for its customers.
Internal Coating

Internal coating systems for steel pipes using epoxy-based liquid paints, including Novolac, accompanying market trends.

The principal uses of these coatings are:
1. To improve the flow of liquids by reducing the roughness of the pipes’ inner surfaces, in the case of Flow Coating.
2. To provide anticorrosive protection, in cases in which bicomponent epoxy coatings, 100% solid epoxys and Novolac coatings are applied.
The internal surface of the pipe is cleaned previously. After cleaning, the epoxy paint is applied to the pipe’s inner surface through an airless guns system, forming a uniform layer that cures in the open air.

The typical thickness for the internal coating system varies between 60 and 100µm for gas transportation pipelines and between 200 and 500µm for pipes designed to conduct water or other liquids.

The internal coating unit is equipped to coat pipes with a nominal diameter ranging from 4” to 48” and lengths ranging from 8m to 13m.
Three Layers External Coating

Coating system applied to the surface of steel pipes using thermoplastic polyolefins.

The main purpose of the system is to provide anticorrosive and mechanical protection for the pipes.
The pipes are first cleaned and heated. Then the powder epoxy is applied, forming the first layer of the system. This is followed by the application of a copolymeric adhesive via lateral extrusion to provide the adherence necessary between the primer and the third system layer. Finally, a polyolefin (Polyethylene or Polypropylene) is applied, also via lateral extrusion, completing the three layer system.

This system is suitable for underground gas and oil pipelines and underwater installations.

The Three Layer Polyethylene (3LPE) system is applied to pipelines operating at temperatures ranging from -40 to +80°C.

The Three Layer Polypropylene (3LPP) system is applied to pipelines operating at temperatures ranging from -20 to +110°C.

Typically the two systems have a thickness ranging from 1.5 to 3mm.

The 3LPE and 3LPP external coating plant is equipped to coat pipes with a nominal diameter ranging from 2” to 48”, and lengths ranging from 8m to 18m.
Fusion Bonded Epoxy Powder
External Coating

External coating system for pipes using fusion bonded epoxy (FBE) powder.

The main purpose of this coating is to ensure anticorrosion protection for steel pipes.
The pipes are first cleaned and heated. Then the powder epoxy is applied to the pipe surface by electrostatic guns, forming a uniform layer which cures shortly after application.

The typical thickness for this system ranges from 350 to 450µm; it may be used for pipelines with an operating temperature of up to 90°C.

For more severe temperature conditions and where greater mechanical resistance is needed, other systems known as "dual coatings" should be applied. The thickness and the type of "dual coating" system should be selected in accordance with project requirements.

The FBE external coating plant is equipped to coat pipes with a nominal diameter ranging from 2" to 48", and lengths ranging from 8m to 18m.
Expanded Polyurethane Thermal Insulation Coating

Coating system applied to the pipe surface using Polyurethane Foam.

The main purpose of this system is to provide thermal insulation for steel pipes used for the transportation of heated liquids and also for subzero temperature liquids.
This system consists of a steel pipe inserted inside a jacket pipe normally made of polyethylene. Two chemical components, which upon contact form the polyurethane foam, are injected between the steel pipe and the jacket pipe, expanding to fill the annular space. Normally an anticorrosive system is applied to the steel pipe before the foam is injected in accordance with customer specifications.

The jacket-pipe, the density of the foam and the thermal insulation capacity of the coating system may be selected in accordance with project requirements.

The low thermal conductivity in conjunction with the physical properties of the polyurethane foam, enable the system to operate at temperatures ranging from -40°C to 120°C.

The PUF external coating plant is equipped to coat pipes with a nominal diameter ranging from 4” to 26”, and lengths ranging from 8m to 13m.
Multilayers Thermal Insulation Coating

Socotherm patented Thermal Insulation System for shallow, deep and ultra-deep water environments.

The insulation system is achieved by the highest technological standards in existence, which allows different compounds of polypropylene to be combined, thus satisfying the most rigid technical demands.
The pipes are first cleaned and heated. Then a powder epoxy is applied, forming the first layer of the system. This is followed by the application of a copolymeric adhesive via lateral extrusion and the polyolefin, completing the three layer anti-corrosive system. Finally, the multilayers system is applied.

The system consists in the application of several layers with different mechanical and thermal performances by means of a high-technology side extrusion process. There is no limit to the number of layers that can be applied nowadays by using the system so, it is possible to obtain thickness previously unattainable for this type of coatings, without voids, air inclusions, or any other kind of anomalies, with a homogeneous structure, concentricity, and unique properties as compared to any other methods or products developed so far, achieving at the end a cost-efficient solution in terms of Thermal Insulation Coating.

Multilayers Systems:
- Solid Polypropylene (5LPPS)
- Polypropylene Foam (5LPPF)
- Syntactic Polypropylene (5LSyntPP)

Five Layer Insulation System Description:
- Layer 1: FBE Primer
- Layer 2: PP Co-Polymer Adhesive
- Layer 3: Solid PP
- Layer 4: Insulation based material
- Layer 5: Solid PP outer layer

The syntactic PP layer (layer 4) consists in different proprietary Polypropylene compounds which are developed in-house by Socotherm’s State-of-The-Art process. Insulation based materials:
- Solid PP resin compound
- Polypropylene compound
- Syntactic Polypropylene compound

The possibility of formulating in-house compounds enhances the overall performance of the system over the other systems, since it is nowadays possible to provide flexibility to the formulation of PP based materials, bring them as close as possible to the desired thermal and mechanical performance in order to comply with Project demanding requirements. This feature is not only a clear advantage for the In-Service performance, but also for the coated pipes critical conditions during the subsea installation phase.

The system meet the most diverse underwater pipe launch requirements (S-Lay; J-Lay; Reel-Lay). It also provides high levels of resistance to hydrostatic pressure and waterproof characteristics. They may be applied in depths of up to 3,000 meters at operating temperatures of up to 140°C.

The type of coating and thickness to be used varies according to the thermal insulation requirements of the specific project. The thermic coating plant is equipped to coat pipes with a nominal diameter ranging from 6” to 24”, and lengths ranging from 9m to 24m.
Concrete Weighting Coating

Concrete coating system applied to the surface of steel pipes.

The main purpose of the concrete coating system is to ensure negative buoyancy and provide greater mechanical protection for pipes.
The system consists of a mixture of components (sand, plus gravel or iron ore, cement and water) in the correct proportions, applied directly to the pipe surface. Before the concrete is applied, the pipe normally receives an anti-corrosive coating in accordance with customer requirements.

The mix of components is compressed against the pipe surface to the required thickness through lateral extrusion; simultaneously, wire mesh is added to provide reinforcement. A film of polyethylene is also applied to ensure suitable curing.

The system may be used in wet environments, river crossings and, mainly, in sub sea installations.

Concrete density may range from 2,240 to 3,040 kg/m³ with thickness from 1.0” to 4.0”.

The concrete coating plant is equipped to coat pipes with a nominal diameter of 6” to 48”, and lengths ranging from 8m to 13m.
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