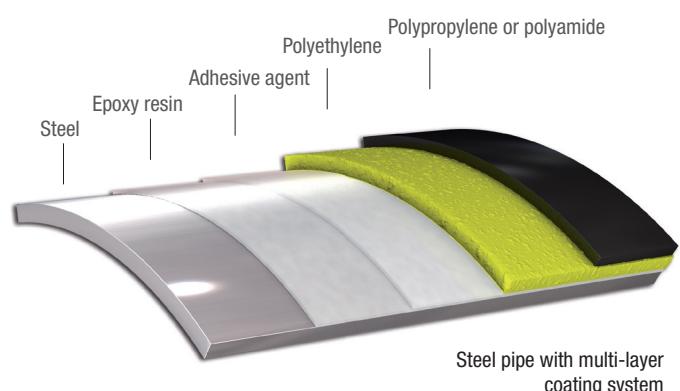


Separate functionalities of corrosion protection and mechanical protection

Product description

Multi-layer systems consist of a combination of a three-layer polyethylene coating (PE) and a mechanical protection layer of polypropylene (PP) or polyamide (PA 12). Coarse PE granules, which are sprayed and fused onto the freshly extruded polyethylene coating while the pipe string is still hot, give the coating a rough surface. The "rough coat" produced in this way provides for frictional resistance, which prevents separation of the subsequently applied top coat of PP or PA 12 during pipe string pulling in trenchless pipe-laying projects.



What is PA 12?

The PA 12 used here is marketed under the tradename Vestamid® and is a modified polyamide. The best known synthetic polyamides are Nylon (PA 6.6) and Perlon (PA 6), which are used in the textile sector.

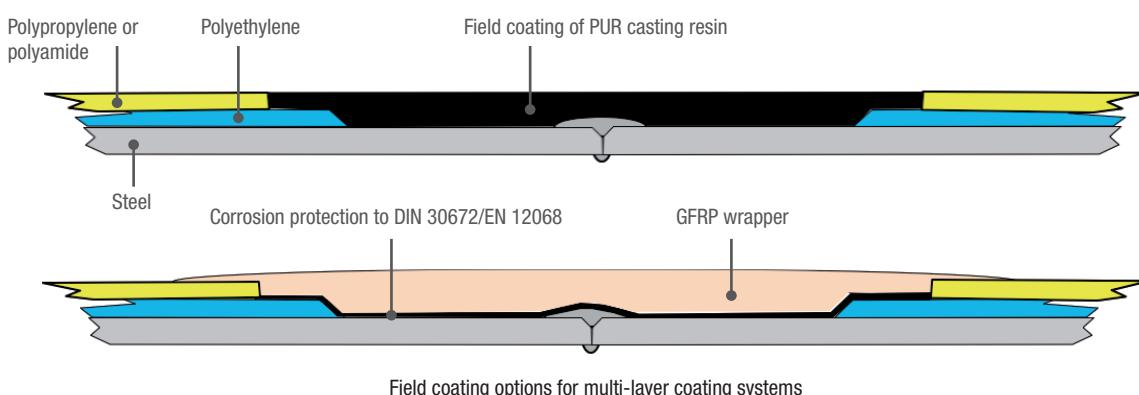
Application

As a rule, multi-layer coating systems are used for non-conventional pipe-laying techniques; they replace PE- or PP-based thick-layer systems. Field coating materials for pipe with multi-layer coating systems include polyurethane (PUR) casting resin and GFRP-based coating systems. The pipe ends are appropriately prepared at the pipe mill, i.e. the polyamide layer is cut back on the polyethylene coating over a length of at least 50 mm. This is long enough to ensure that the overlap of the mill-applied corrosion protection and the field coating meets standard specifications.

If short pipes are required, a circumferential cut should be made into the polyamide layer using a specially prepared cutting tool, whose blade only protrudes far enough to penetrate the outer coating to a maximum depth of 2 mm. For a precise circumferential cut, a clamp can be provisionally fitted around the pipe as a guide for the cutter. For trenchless projects where the pipe string is pulled through the drilled bore, a weld-on collar is available for protection of the pipe end coating.

Product properties

Multi-layer coating systems possess excellent shearing resistance. The combination of PE and PA 12 or of PE and PP provides for a functional separation of corrosion protection and mechanical protection. Initial cracks in the outer mechanical protection layer are stopped at the interface between the corrosion protection and mechanical protection. This is a property that cannot be achieved in PE- or PP-based thick-layer systems.



**Separate functionalities of corrosion protection
and mechanical protection**

Typical product properties and data

Pipe	Top coat ¹⁾	Polypropylene PP	Polyamide PA12
Size range	Shore hardness D (RT)	60	65
Wall thickness	Impact resistance (J/mm layer thickness)	10 (0 °C)	20 (-40 °C)
Yield strength (steel)	Penetration depth (RT mm)	0.1	0.075
Fracture resistance (steel)	Shear resistance (N/cm ²)	100	100
Elongation after fracture	Temperature resistance	max. 85 °C (depending on PE type used)	
Modulus of elasticity			

¹⁾ Independent of the top coat, a polyethylene base layer is provided.

Application examples



Installation of a gas pipeline with multi-layer coating system using the flush-drilling technique

Stadtwerke Düsseldorf



Installation of a high-pressure gas pipeline using the plowing technique

Stadtwerke Mönchengladbach

Note

Multi-layer coating systems for trenchless pipe-laying projects are included in the current draft version of DIN 30675-1. Tests and requirements are specified in Mill Standard T10.00.002 of Mannesmann Line Pipe GmbH.

Title: "Multi-layer coating system for circular steel hollow sections, comprising a three-layer polyethylene coating and a polyamide-based top coat – Requirements and tests"

The works standard can be downloaded as a PDF file from the link "Mill standards" on our website:

www.mannesmann-linepipe.com



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