



## Application Story



## Technically perfect and at the same time cost-effective coating solutions

### MÜLHEIM PIPECOATINGS GmbH:

MÜLHEIM PIPECOATINGS GmbH is part of the Europipe Group, who as a world leader produces longitudinal and spiral seam-welded large-diameter pipes in almost all desired dimensions. Together with two other coating plants they are responsible for the coatings required for all EUROPIPE pipes.

With a capacity of more than 4.5 million square meters of inside and outside coating, they operate the largest coating plant in the large-diameter pipe industry. Moreover, within the group of companies they are the technical competence center for the coating process. The development of manufacturing processes and equipment, as well as the continuous optimization of coating materials are centrally controlled by them.



MÜLHEIM PIPECOATINGS offers a wide range of technically optimized and at the same time cost-effective coating solutions. The standard solutions for external coating are three-layer polyolefin coatings (PE/PP) and Fusion Bonded Epoxy coatings (FBE). The first outside process was developed by Mannesmannröhren-Werke, one of the predecessor companies of EUROPIPE. The standard solution for the inside coating of pipes is liquid epoxy coating.

The coatings can be designed to deal with service temperatures of up to 120 °C (248 °F). Moreover, they can produce a whole range of mechanical properties which can withstand stress, shear or compression forces as required

Pipes for offshore installation are given a non-slip coating regardless of whether or not they are subsequently coated with concrete. This is done by applying polyolefin and FBE coatings with textured surfaces, or by including fine particles in the coating to achieve the so-called sandpaper effect. In addition to the coating of oil and gas pipes, EUROPIPE offers solutions for the long-distance transport of drinking water and wastewater. The inside coating used here is made of epoxy resin. The outside coatings are identical to those that are used for oil and gas pipes.

Coating is precision work. Not only does the coating have to be tailored to the climatic conditions in the field and the properties of the product to be conveyed, it also has to protect the pipe during transport, storage and subsequent installation.

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## APPLICATION:

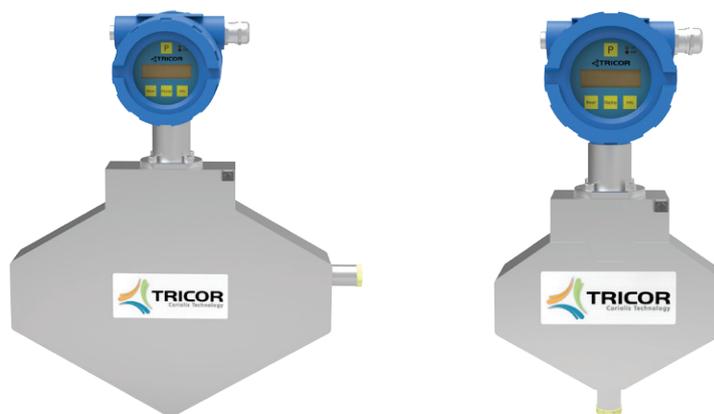
At MÜLHEIM PIPECOATINGS GmbH in Mülheim, Germany, various longitudinal and spiral seam-welded large-diameter pipes are coated in almost all desired dimensions in the largest coating plant in the industry.

In the 2K coating process the lacquer paint and its related hardener are mixed directly on the nozzles in highly accurate mixing ratios.

To meet the very high quality requirements of the respective customers and their application conditions, the highly accurate mixing ratio and its continuous monitoring for quality assurance and the consistent material application is absolutely essential.

## TECHNICAL DATA:

	<b>Base lacquer:</b> <b>TCM 1550-FA-SBSS-AZZS-EX</b> <b>TCE 8001-L-SBSN-EX</b>	<b>Hardener:</b> <b>TCM 0650-FA-SBSS-AZZS-EX</b> <b>TCE 8001-L-SBSN-EX</b>
Flow range	15...1,500 kg/h	6...650 Kg/h
Work point:	3...15 l/min	0.5...3 l/min
Medium	Base lacquer	Hardener
Viscosity	20.5...1,000 mPas	20.5...1,000 mPas
Density:	1,530...1,600 kg/m <sup>3</sup>	1,040...1,090 kg/m <sup>3</sup>
Medium temperature	+10 °C to +35 °C	+10 °C to +35 °C
Operating pressure at TCM	270 bar	270 bar
Display	LCD panel mount display of switch-board housing	LCD display of switchboard housing
Interface	2 x analog outputs RS 485 (Modbus RTU)	2 x analog outputs RS 485 (Modbus RTU)
ATEX+IECEX Zone 1	II 2G Ex d [ia] IIC T4 Gb	II 2G Ex d [ia] IIC T4 Gb





## CHALLENGE:

Depending on the type and later purpose of the application, the pipes are coated with different materials in variable mix ratios. This means there is a high variance in the media properties and the material discharge of the coating nozzle that have to be taken into account.

The main focus of this process is the consistently high demands on the coating quality. When selecting the equipment, the abrasive media being used played a very important role from the beginning. From the initial concept discussion there was a focus on utilizing flow meter technology with no moving parts to avoid variances in coating quality over time.

Furthermore, the mixing ratio between base lacquer and hardener must be applied accurately. For continuous monitoring during the coating process, the actual flow of the respective materials must also be controlled and documented for quality management.

A direct warning must be given via the host control system in a freely programmable deviation of the mixing ratio between the A and the B components. A PLC is used to control the process to high accuracy standards. The system must not be affected by medium properties and provide fast response time.

## SOLUTION:

The design of the TRICOR Coriolis Mass Flow Meters from KEM Küppers Electromechanical GmbH is based on the measuring principle of no moving parts in the medium flow. Compared to other flow meters, instruments using the Coriolis principle are significantly more accurate, faster and are almost completely independent from the medium properties.

The measurement system allows MÜLHEIM PIPECOATINGS GmbH to cover the full range of coating materials in the coating plant with this solution, to optimally use the sensors for the variable media and flow conditions and to measure the wide range of their abrasive and highly viscous media with high precision.

Devices are connected to the customer's WinCC SCADA system that monitors the master-slave measurement, controls process-related alarms, enables online visualization of all process-relevant data and archives the data.

## CUSTOMER ADVANTAGE:

In addition to the main requirement for the continuous monitoring of the actual flow rates and mixing ratios, the process flow can now also be viewed and evaluated by the master control system in high-resolution timeframes. Interesting conclusions about the process and plant situation with PLC potential optimization and maintenance aspects can also be drawn by comparing the pressure and flow curves.

Using analog output signals and modbus RTU interfaces the customer can now see mass flow, volume flow, temperature and medium density all at the same time from the TRICOR Mass Flow Meter.

In the final analysis, it was decided TRICOR is the optimal solution for MÜLHEIM PIPECOATINGS GmbH to meet their demanding requirements..

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