

**FRIALEN XL
CONICAL RING COUPLER KM XL:
REROUTING OF AN HDPE d 1200
MINE WATER PIPE**

Project report no. 1/2017

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FIRST INSTALLATION OF FRIALEN XL CONICAL RING COUPLER KM XL d 1200

ELECTROFUSION REINVENTED

An extraordinary technical challenge has been mastered: PE 100 / SDR17 d 1200 pipes of an open pit lignite mine were connected six and a half metres under the Spree in the northeast of Germany.

The project:

Open pit lignite mining is a key economic factor in the region of Upper Lusatia. Extracting the coal requires the permanent lowering of groundwater levels. This mine water is pumped to the "Schwarze Pumpe" clarification plant.

Earlier, the Spree was crossed by two ancient pipes of GFRP (glass fibre reinforced plastic). These pipes failed repeatedly in the past. Reliable operations could be safeguarded only when the two lines, Nochtener Wasser 1 and 2, were replaced with PE 100 pipes.

In March 2016, the specialised companies TRAPP Infra GmbH and Visser & Smit Hanab started HDD or horizontal direct drilling work on the culvert. Customer was the Lausitz Energie Bergbau AG (LEAG), at the time of construction Vattenfall Europe Mining (VEM).

This culvert was connected to the new piping network on both sides of the river.

The challenges facing the planners were clear: A reliable, and above all fast connection had to be safeguarded for minimised groundwater retention and downtimes. With respect to connection reliability, the project plan offered zero leeway to the deadlines.

The solution

The quality of the electrofusion join (EF) between the couplers hinges on the fit between the couplers' internal and the pipes' external measurements. The gap sizes must be as small as possible. Working against this requirement is the obligatory removal of the oxide layer on the pipe, a scraping process that may take place several times before a tightly toleranced coupler can be fitted. This is strenuous and above all time consuming work for the fitters on site.

The unusual design of the FRIALEN conical ring coupler KM XL means that a large installation gap between the pipe and coupler can first be closed with mechanical means.

The ideal fits are therefore presented for the subsequent fusion.

The fitters were clearly surprised at the ease of installation and at the short time needed to process the conical ring couplers, only two hours. Above all compared with the experience gained in parallel from conventional cylindrical EF couplers from another provider. The crew found the processing work highly strenuous, needing 1.5 working days for each connection.

FRIALEN KM XL: Operating principle of the conical ring coupler ...

The conical rings on both pipe connectors are pressed into the coupler housing. This features a conical interior contour that contacts the conical ring over its whole area. At the same time, the conical ring's cylindrical internal surface lies on the pipe surface without any gaps. The conical ring is activated by a clamping system of tie bars and threaded rods. These are spread evenly over the circumference and push the conical ring uniformly into the coupler housing.



Scraper tool FWGS XL in use



Conical ring coupler KM XL can be pushed on with ease.



Conical ring activated with a cordless screwdriver

... and its effects

The conical ring coupler KM XL exhibits a varying internal diameter for simple installation and positioning. Fitted to the pipes, the coupler features a large clearance, and so can be aligned manually. Now, the pipe surface need be scraped once only to remove the oxide layer and adjust it to the connecting pipe diameter. The restoring forces from the activated conical ring overcome ovalities as high as 6% – and that without additional tools. This cuts both fusion times and power requirements in the following joining process.

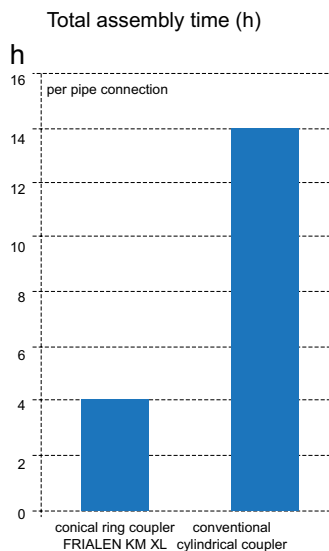
In practice, this means that connecting pipes now require only a fraction of the time needed e.g. for a conventional cylindrical EF coupler and other joining technologies.

Building site times are direct costs!

Large pipe connections require more than one fitter, not to mention the additional site vehicles and auxiliary equipment, e.g. bulldozers. And of course, quality often falls victim to complex installation work, like scraping the pipe diameter to the right size. The potential result is failure as early as the pressure test.

Conical ring coupler technology cuts installation and fusion times. The connection is made in less than an hour, can be moved just thirty minutes later, and can be pressurised only 1.5 hours after fusion. The defined and easy processing serves to increase the reliability of the contractor's planning, and hence pricing, as early as the tendering phase.

Later, in the building phase, everything must run as smoothly as silk, especially for the integration, when the costs of personnel and equipment are particularly high. At the end of the day, the contractor must benefit from the added value. The operator gives top priority to quality and long life. The guarantee for both is the conical ring coupler KM XL!



Project's installation times for the conical ring coupler compared with a conventional EF coupler



Video: Horizontal directional drilling Spreedüker Spreewitz 2016, construction: Visser & Smit Hanab

The fusion can be optimised through the use of two FRIAMAT XL fusion units.



Measure:	Crossing of the Spree at Spreewitz
Building site:	Spreewitz, Oberlausitz, Brandenburg
Developer:	Lausitz Energie Bergbau AG
General contractor:	TrappInfra Rohrbau Welzow GmbH (Volker Wessels Group)
Subcontractor:	Visser en Smit Hanab B.V. (Volker Wessels Group)
Planner:	infraprojekt Ingenieur GmbH
FRIALEN XL:	Conical ring coupler KM XL d 1200
FRIATOOLS:	Fusion unit FRIAMAT XL, Scraper tool FWGS XL
Construction time:	March–August 2016

FRIATEC Aktiengesellschaft
Technical Plastics Division
Steinzeugstraße 50 - 68229 Mannheim, Germany
Phone: +49 621 486 0 - info-frialen@friatec.de
www.frialen-xl.de

an *OAliaxis* company



More details on:
Conical ring coupler
KM XL

