

# WehoCoat ready to take off





## WEHOCOAT FIELD JOINT COATING MACHINE

### Size range

- » 150–1 500 mm

### Capacity

- » Typical coating time of Ø 500 mm pipe: appr. 4,5 minutes including powder epoxy application

### Technical Specification

- » Chain-supported frame assembly including
- » Raw material feeding device
- » Flat die extrusion head
- » Induction heating assembly
- » Pressure roller assembly
- » Electronics & Instrumentation
- » Extruder and feed hose

**The WehoCoat development has reached a phase where it is ready to take off and conquer the field joint coating market by storm. The recent testing and fine tuning of the concept in real field conditions has brought the whole oil and gas pipe line industry closer to a safer future.**

In the beginning of 2006, KWH Pipe Technology, supplier of plastic pipe manufacturing technology and related machines, and Borealis AG, the world's leading supplier of raw materials for steel pipe coating, joined their efforts in developing a system to coat oil and gas pipeline field joints with new and innovative plastic materials developed by Borealis. The challenge was to design a machine which could apply a melt plastic layer on a field joint welding area in a controlled manner repeatedly without compromising the future pipe line integrity.

A development team was put in place where Borealis was bringing in the coating and plastic raw material know-how, and KWH Pipe brought long-term experience in designing and constructing machinery and equipment for the plastics industry.

The construction of the machine started late 2006. In the beginning of 2007, the machine was given the name "WehoCoat". The first testing and machinery demonstrations were done in early spring 2007. The WehoCoat machine performed as planned, and several test sessions were executed, including customer demonstrations at Borealis' Russian pipe coating seminar.

A sub-development program was set-up to find a solution for the heating of the steel pipe. At an early stage, it became clear that the solution should be an electrical-induction-based heating system. For the steel pipe surface to reach a temperature of 200° C in 15 to 20 seconds, conventional heating methods had to be abandoned. This was also in line with the chosen "high tech" philosophy – let's go even higher. During the winter 2007/2008, a suitable compact solution was found and custom-developed to suit the WehoCoat machine and the coating process.

This development was the final breakthrough in the project and the development team was ready to enter into the next phase of the journey towards an ultimate field joint coating solution. ▶

## Recent development and testing

The next real challenge for the WehoCoat development team was testing and demonstrations in real field conditions where it would be exposed to the elements. The Finnish natural gas pipeline operator, Gasum, agreed to cooperate in the testing process, and it was agreed to do several field joints in a real on-shore gas pipeline construction project.

At the time, Gasum had several pipe works under construction in Finland. The DN 500 mm 43 km pipe at a construction site called Kutinen-Kulju, in southern Finland, was selected for the testing process.

So far, the development team had worked in workshop and laboratory conditions, but now they were able to do field tests and the equipment used, including extruders, heaters and control cubicles, was loaded onto a truck and taken to the site.

Prior to the field session, several laboratory tests were conducted by the site team comprising of Borealis and KWH Pipe personnel. Before the field test, qualification tests were applied to demonstrate the quality of the coating. In the field test phase, several joints were coated; some of them were also peel tested on actual pipeline in the excavation. Testing results were dominantly excellent; showing pull strength values between 5 to 10 times better compared to conventional shrink sleeve methods.

During the field testing session, several demonstrations for customers were held as well. For example, a high-level delegation from Russia followed the tests on location.

## Borealis Innovation Award for the WehoCoat Team

With more than 40 years of experience in polyolefins and 30 years in the global pipeline industry, Borealis is moving ahead into the future as a leading innovator and trendsetter in the industry.

The WehoCoat team, comprising of employees from both KWH Pipe and Borealis, was awarded a highly prestigious Customer Solution Award at the annual Borealis Innovation Awards ceremony.

At the ceremony, awards in several categories, such as Innovator of the Year, Customer Solution Award and Co-operation Award, were presented and the nominees were analyzed according to strict criteria by the Award Committee.

“The awarded solution is a truly novel innovation on the market. The benefits of this

method will be far reaching and will help the pipeline owners sleep better at night” says the head of development, Leif Leiden at Borealis R&D centre.

## Future opportunities and next steps

During the development project, the prototype machine has experienced several modifications and redesigns to improve the coating process. In addition, the raw material has experienced further innovations. Today it can be said that the new field joint coating method, the machine, raw material and the coating process have reached a point where a first level commercial approach can be started.

A second generation WehoCoat design is already under way. All the learning and experience gained from the prototype and field testing have been analyzed. It will be implemented in the new version of the machine, and a market launch can soon begin.

thousands of kilometres of pipelines under construction at any moment. It is estimated that in the coming 5 years, there will be approximately 200,000 km of newly laid oil and gas transportation pipelines in the world.

When looking into the life span of a pipeline, it is the joint area which is always the weakest point. Today the joints are treated in the field and the methods for joint coatings are many. None of the joint field treatments and methods for joint coatings are even close to the quality of a typical factory coated three-layer steel pipe.

This is the niche where the WehoCoat machine, together with Borealis innovative plastic material, comes into the picture. WehoCoat is designed to produce a PE layer on the joint area with equivalent physical properties as the actual factory plastic coating of the pipe itself.

By using the WehoCoat solution for field joints in three-layer pipe systems, both on-

**A SECOND GENERATION WEHOCOAT DESIGN IS ALREADY UNDER WAY. ALL THE LEARNING AND EXPERIENCE GAINED FROM THE PROTOTYPE AND FIELD TESTING HAVE BEEN ANALYZED. IT WILL BE IMPLEMENTED IN THE NEW VERSION OF THE MACHINE, AND A MARKET LAUNCH CAN SOON BEGIN.**

At the same time, persistent work is already being done in introducing the new coating principle amongst the oil and gas pipeline industry, especially for the pipeline owners and operators who are paying the final price for the premature failures of oil and gas transportation pipelines.

The road map is crystal clear towards an ultimate field joint coating experience. The WehoCoat machine and the team are ready for the challenge to meet the conservative industry and to change the way of thinking on a large scale.

## Market drivers for development

While oil and gas reserves are becoming increasingly scarce, the exploration is heading further out to more difficult corners of the globe. Once the oil rig is set-up, the oil and gas pipelines will follow. No matter if it is on-shore, off-shore, in the Siberian sub-zero permafrost or the hottest deserts: there are

shore and especially off-shore installations, it is lifting the pipeline integrity to a new level. This would save vast amounts of money for pipeline operators and owners, not to mention reduce the number of oil- and gas-related environmental disasters and danger situations due to leakages and failures in the high-pressure pipelines.

## WehoCoat Machine

The WehoCoat coating concept brings in technology to tackle the weakest link on the pipelines: the “field joint”.

Together with Borealis, KWH Pipe Technology has developed a unique coating device for demand of field joint markets.

Taking all weather conditions into account, the WehoCoat device is definitely operational in the field and is the ideal equipment for extruding the field joint with molten polymers to achieve a joint at site as good as the factory coating. ■



Coating crew in action on the Gasum gas pipeline in Lempäälä, Finland, operating the coating machine are Jouni Purmonen, Borealis and Christian Glasberg, KWH Pipe.