Internal Pipe Bending – An innovative technology for thermal insulated pipelines

IPLOCA – Novel Construction Initiative

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Thermal Insulated Pipes

Medium pipe made of steel

Thermal insulation made of PUR-foam

Casing made of Polyethylene (PE)

Alarm wires
General Problems of Bending

- Bending from the outside means high forces on the insulation
- The insulation can’t transfer the forces to the medium pipe
- Foam gets damaged
- Steel pipe gets wrinkles
- Roundness can’t be controlled
Bending of Small Diameters from Outside

- Only small diameters could be bended from the outside on low steel grades
- Only small bending angles
- Execution very slowly requiring great care
Production of Large Diameter Bends

- Bendig of bare medium pipe from outside
- Cutting the PE-casing in segments
- Welding the segments
- Filling the hollow space with PUR-foam
- Long lasting progress in the factory
The isobend idea

Innovative solution:

- Initiate forces from the inside to reduce the stress on the insulation
- Insulation follows the steel pipe
- Internal machine replaces the mandrel

Internal Pipe Bending (IPB)
Internal Pipe Bending

- World’s first internal pipe bending machines
- Installed in 20” cargo containers
- Easy transportation
- Designed and manufactured using latest technology
Bending Process

- Computer-assisted cold bending process inside of service pipe
- Machine frame navigates into the pipe
- Bending is monitored and executed step-by-step
- Sensors supply relevant data at any time
Bending Process Animation
Technology

- Electrohydraulic system
- Stand-alone solution using a power generator
- High pressure hydraulics up to 700 bar
- CNC (Computerized-numerical-control) system
Our Capabilities

- Bending without damaging the insulation
- Out of roundness ~ 1%
- Production tolerance of +/- 0.2°
- Higher efficiency than conventional technologies (up to 2000%)
Customer Benefits

- More flexibility
- Better planning capabilities
- Higher quality
- Reduction of total costs
isobend has implemented a comprehensive quality assurance system:

- Preorder calculations by use of the Finite-Elements-Method
- Real-time monitoring of bending process
Quality Assurance

- Checking the roundness of pipe by means of a gauge plate (2.5%)
- Final visual inspection
-Extensive order related analyses
- Destructive testing – if required
Currently, customers from district heating sector only

- Solutions for thicker pipes/higher steel grades available

- Pipe dimensions: 6m-18m; 18”-32”

- More sizes for industrial applications like oil, gas and other can be realized
About isobend

- Founded: 2012
- Location: Hannover, Germany
- 50/50 Joint-Venture
- Mission: Development of an economic technology for bending thermal insulated pipes
- Services: Bending, FEM simulations, quality assurance …

More informations:
www.isobend.de
Many thanks for your attention!

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