

Reinforced Thermoplastic Pipes

For safe, sustainable and cost effective distribution of high-pressure hydrogen gas

The Connection to a Sustainable Future

Mark Breed, Robert Jan Berg New eMMergy Conference - Emmen, April 2022



o U Force

Twaron Reinforced RTPs



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Applications

- > Oil & Gas
- > Water
- > Hydrogen
- > Carbon Dioxide

Benefits

- > Non-corrosive
- > Low maintenance
- > Ease of installation

Challenges

- > Different concept
- > Variety of non-metal concepts
- > **Pipeline integrity**
- > Industrial standards



Our Customer Benefit Model (LCCA)

supports decision-making











Products Compared







Product:RTP SoluForce H2T M570Sealing:Hydrogen gas tightDiameter:6 InchWeight:5,9 kg/mTransport:Coiled, 400m length

Product:Steel Seamless API 5L X52Coating:FPE pre-coatedDiameter:6 InchWeight:28,3 kg/mTransport:Bundled, 12m length

Be sure.



Bill of materials:

> Steel API 5L X52

Manufacturing

- > Epoxy (coating)
- > HDPE
- > Twaron yarn
- > Aluminum



Manufacturing:

- > Mandrel-Billet process
- > Fusion Bonded coating

Operation

> Extrusion

Installation

> Tape wrapping





End of life





Inspection:

- > Pipeline integrity management
- > Leakage survey
- > Visual inspection
- > Cathodic protection survey

Maintenance:

- > Pipeline Repair
- > Cathodic protection

Operation:

- > Flow-efficiency
- > Fouling













Base Case: 'Left behind'

- > Cleaning
- > Conservation

Alternative: 'Decommissioning'

- > Weight of material to extract
- > Number of pieces to handle
- > Simplified de-installation process

Re-use / Recycling:

- > Re-use !
- > Re-cycling















Key-Findings

- Strong reduction in Carbon Footprint (~70%) and Total Cost of Ownership (~20%) observed from a LCCA perspective.
- **Carbon Footprint:** Contribution mainly in the product materials. Installation phase about 50% less.
- Installation Costs: About 60% less due to significant reduction of on-site equipment, less (specialized) labor activities and less construction time.
- The initial higher price and carbon footprint of Twaron compared to steel has a 'pay-back' already in the CAPEX phase of the project ...
- ... while a Low maintenance, more efficient OPEX phase is to be started with one of the most robust non-metal pipeline concepts on the market.





SoluForce RTP – USP's

- > 20 yrs proven track record world-wide as reputable supplier to major
 O&G companies
- KIWA certified for 100% industrial H2 applications (SoluForce H2T)
 - API industry standards
- Ready to use and readily available

<u>Usage:</u>

- easy transport and fast and easy installation
- Flexible, re-usable and maintenance free
- Fully non-metallic with electrofusion fitting system



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Applications area's

- Industry:
 - Connection to hydrogen backbone
 - Local distribution network infrastructure
 - Local produced H2 off-take distribution network.
- Mobility: Green power to fuel hydrogen tankstation
- Temporary lines to accelerate the energy transition!
- Energy and storage: offshore P2G interconnection
 within windpark

SoluForce



Revolution through evolution

- Proven technologies and knowledge are combined and reinvented
- getting the right partners together and making new combinations
- Using existing certifications into new regulations

We are ready to accelerate the Energy Transition.

Are you too!?

SoluForce® H2T







SoluForce is a PipeLife brand



UForce[®]

Be sure.

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