



don't crack under pressure

# Setting higher standards to promote the use of the PE 100

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# Introduction

- PE is a well-established pipe material in gas and water transport
- Today, PE 100 is the standard material for highly demanding applications
- The plastics industry in PE and PE 100 could largely benefit from a common marketing platform and quality objectives.

# Objectives of the PE100+ Association

Created on the 24<sup>th</sup> of February, 1999

- “The objective of the Association is to establish a quality label for PE100+ products and to promote the use and the safety of PE 100 products generally and of PE100+ products in particular.
- In addition, the Association will engage in appropriate public relations activities, to promote the performance of PE100+ products on a world-wide scale.

## How is the Association organised?

- Association members, i.e. raw material producers, meet once a year in a member meeting and elect a board, responsible for day-to-day work in the Association
- A technical committee supports the Association where testing is concerned
- Feedback is sought from the market through the Advisory Committee

## Ahead of standardisation

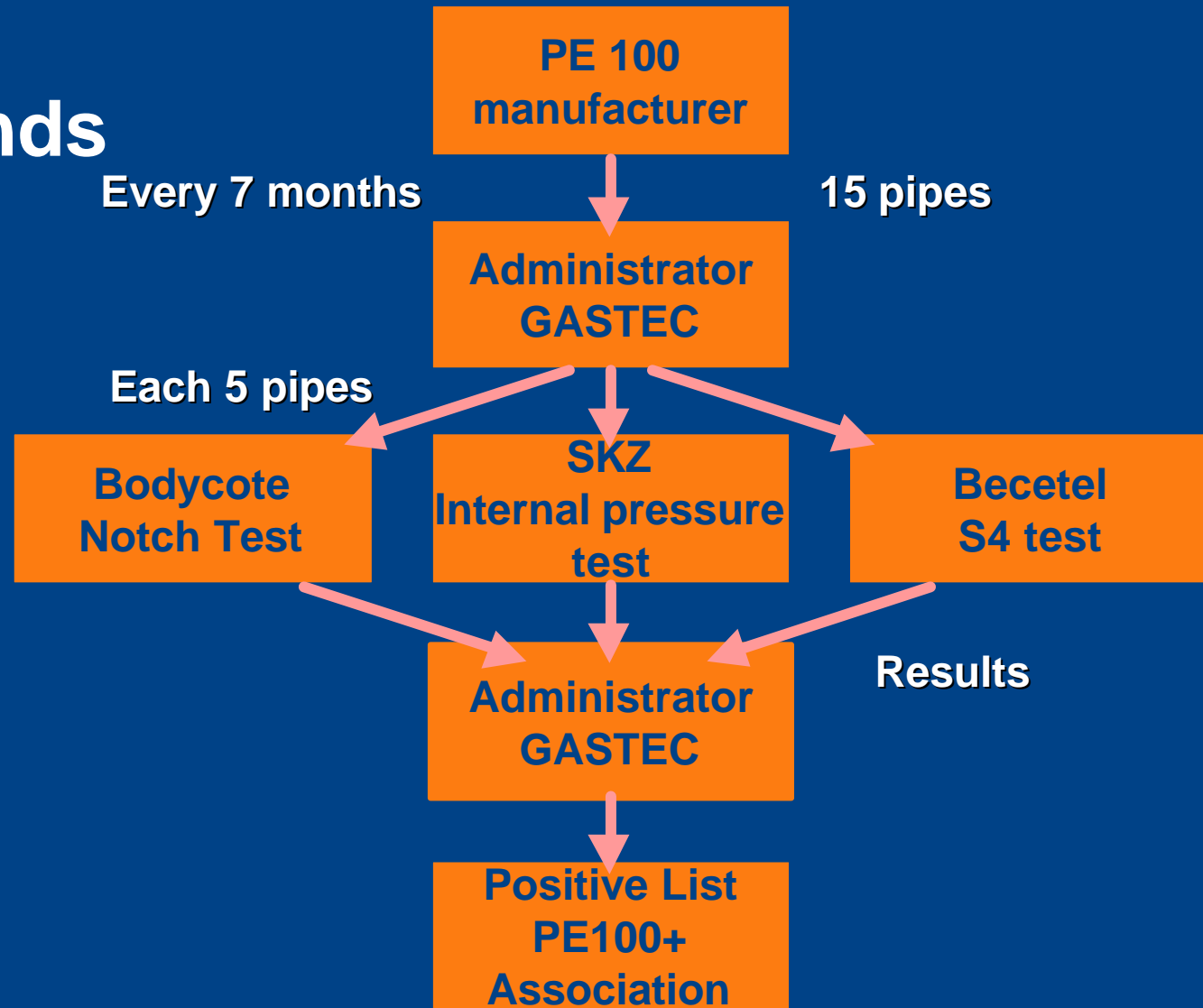
- On a technical level, the Association has the objective to be at the forefront
- On ISO level, norms exist for water and gas pipes in PE  
On CEN level, they hopefully exist in near future
- The Association therefore wants
  - to set requirements for good PE 100 materials
  - to install a neutral quality control scheme

# Technical requirements

Property	Test Method	EN/ISO Standard requirement	PE 100+ requirement
Creep Rupture Strength	Internal pressure test at 20°C and 12.4 MPa ISO 1167	> 100 h	> 200 h
Stress Crack Resistance	Pipe notch test at 80°C and 9.2 bar ISO 13479	> 165 h	> 500 h
Resistance to Rapid Crack Propagation	S4 test at 0°C ISO 13477	$P_c > MOP/2,4 - 13/18$ P <sub>c</sub> : critical pressure MOP: max. operat. pressure	> 10 bar

All tests are performed on 110 mm SDR 11 pipes

# Test rounds



# Positive List of Materials

Product	Manufacturer
Finathene® XS10 H (blue)	ATOFINA
Finathene® XS10 B (black)	ATOFINA
Hostalen® CRP 100 black	Basell Polyolefine GmbH
Hostalen® CRP 100 blue	Basell Polyolefine GmbH
Hostalen® CRP 100 orange/yellow	Basell Polyolefine GmbH
Borstar® HE3490-LS (black)	Borealis AB
Vestolen® A 6060 R (black)	DSM Polyolefine GmbH
Eltex® TUB 121 (black)	BP Solvay Polyethylene
Eltex® TUB 125 N2025 (orange)	BP Solvay Polyethylene
Eltex® TUB 124 N2025 (blue)	BP Solvay Polyethylene

As a result of the testing rounds, this positive list is regularly updated



## Not only organising tests

- The objective of the Association goes far beyond quality insurance and testing
- Marketing activities through
  - PE100 website
  - Seminar rounds
- The Advisory Committee provides feedback from the market

# www.pe100plus.net

The internet site is one tool to reposition the PE100+ Association as the marketing platform for PE piping in general by:

- Regular News
- Comprehensive download centre
- Q&A section
- Industry link centre



## Seminar rounds

- Targeting to show the outstanding performance of the piping material Polyethylene 100 (PE 100)
- Ensuring all the participants about the safety transport possibilities of drinking water, natural gas and industrial fluids using pipelines made of PE

## Seminar rounds/1

- Speakers from the industry provide background information by using case stories to demonstrate the successful use of PE 100 piping materials
- These seminar rounds are performed locally, by adopting the country requirements and using the local language

## Advisory Committee

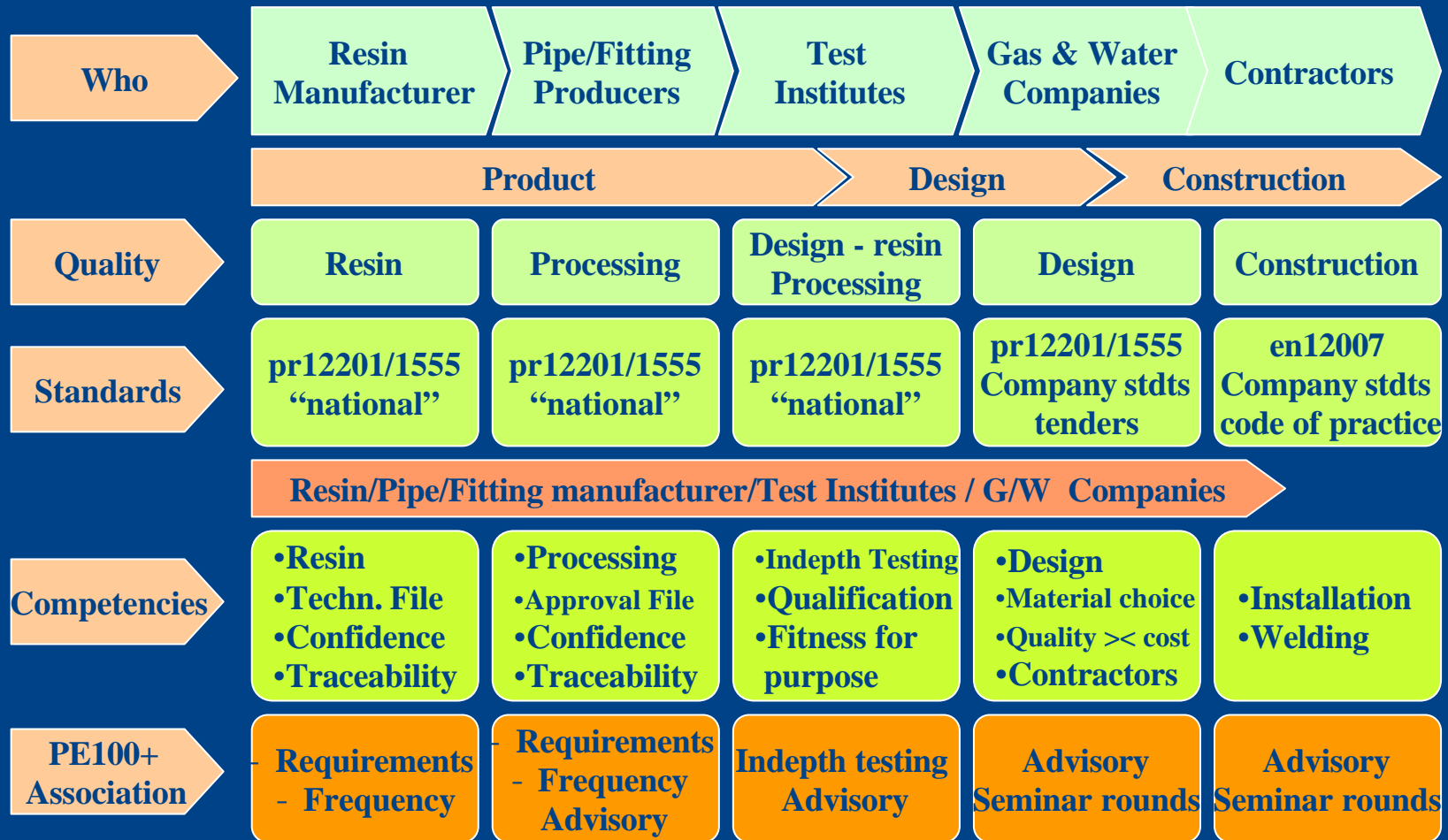
- The Advisory Committee consists of individuals not affiliated with any member who are experts in the field of pressure pipes and fittings for use in gas and water supply systems, sewage disposal and industrial and mining applications.
- The Advisory Committee shall provide advice to the Association on matters relating to the market needs of PE100+ products.

## Meeting of the advisory committee

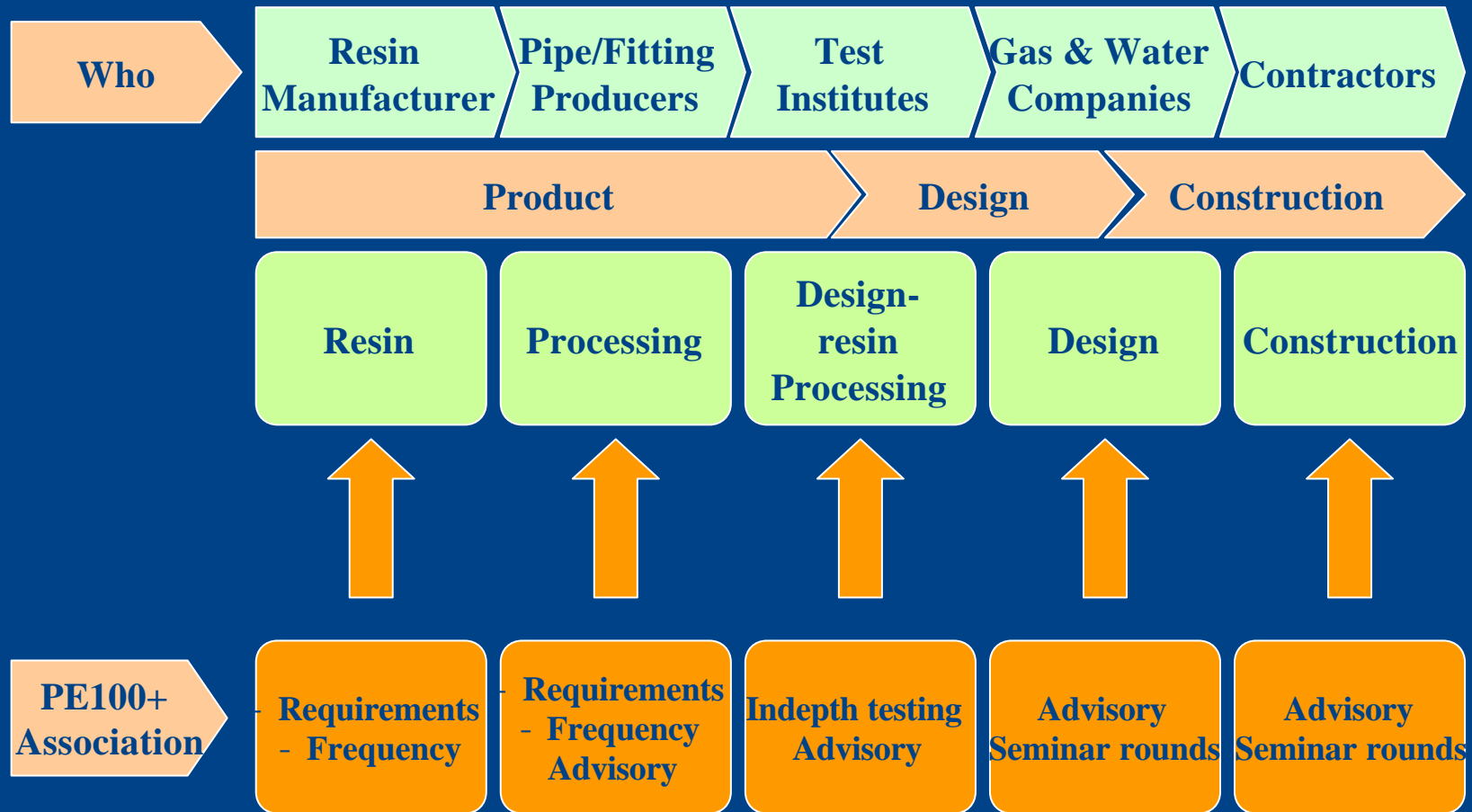
- Several members of the Advisory Committee made presentations how to guarantee the value throughout the chain.
- A model was developed to illustrate the quality chain



# PE100+ role in the quality chain



# PE100+ role in the quality chain





### 1.400 mm PE 100 pipe installed in Shetland Islands

- Protection pipe for oil exploration at Shetland Islands
- Pipe production at Pipelife Norge AS
- 163 m one piece pipe
- Transport over 1,000 km by towing on the water only in 3 days



#### PE 100 was chosen thanks to

- Large diameter → Excellent extrusion properties
- Easy transport on water → Lower transport cost
- PE 100: Borstar® HE3490-LS

#### 163 m one piece PE 100 pipe

- PE 100 1,400 mm pipeline
- Wall thickness 100 mm
- 430 kg/m pipe weight
- Extrusion output rate 1 m/h

### 710 mm wastewater pressure pipe made of PE 100

- Portugal's Foz do Arelho submarine-outfall pipeline
- Environmental protection against waste water contamination
- Installation of a 2.2 km submarine-outfall made of PE 100
- Basic bid was in concrete and PVC



#### PE 100 was chosen thanks to

- Quick and unproblematic installation  
→ Lower installation cost
- Operational safety → excellent lifetime
- Easy handling → improved safety
- PE 100: Vestolen® A 6060 R black

#### 2.2 km submarine-outfall pipeline

- PE 100 710 mm pipeline
- 27.2 mm wall thickness
- Operation pressure 6.3 bar
- 31 Mio. litre/day of max. hydraulic capacity

### Alpine village Grindelwald - PE 100 water distribution

- Switzerland's Grindelwald started 100 years ago to install public water transportation due to a major fire accident
- Present installation amounts to 42 km
- Earlier used PE 80 and cast iron pipes needed to be replaced



#### PE 100 was chosen thanks to

- **Easy jointing → Lower cost by butt-and flange jointing**
- **Easy laying and high flexibility → No heavy building machines**
- **Lowest maintenance - Decrease maintenance cost**
- **PE 100: Hostalen® CRP 100**

#### Over 1 km fall pipeline in two parts

- **PE 100 125 - 180 mm pipeline**
- **Operation pressures up to 16 bar (SDR 11) and up to 25 bar (SDR 7.4)**
- **Mainly butt-welded**

### First gas high pressure PE 100 pipeline for 12 bar, Vladimir, Russia

- Vladimir Oblast in Western Russia
- Russia is one of the major natural gas producers in the world
- Natural gas represents 53% of the entire Russian energy market
- The use of PE for gas distribution
- started beginning of the 1960s



#### PE 100 was chosen thanks to

- High corrosion durability  
→ Low cost of maintenance
- Better flowing qualities  
→ Lower friction losses
- PE 100: Finathene<sup>®</sup> XS10B

#### 1 km connection pipe

- PE 100 160 mm pipeline
- Operation pressures up to 12 bar (SDR 7.4)
- Stick length of 12 m
- Butt-welded



### The biggest underwater PE 100 pipe disposal of treated municipal effluent in Greece

- Greece's Patras municipality decided in 1996 for a biological cleaning site
- Large diameter PE 100 pipe to transport cleaned municipal effluent
- Jacketing concrete blocks to prevent system floating
- Highly appreciation by the end-user



#### PE 100 was chosen thanks to

- Blue coloured pipes  
→ Immediately identification
- Wall-thickness reduction  
→ Cost improvement
- Reduced project cost  
→ Roughly 14% less than PE 80
- PE 100: ELTEX® TUB124

#### 1.44 km transportation pipe

- PE 100 1,200 mm pipeline
- SDR 26
- Operation pressure 6.3 bar
- Stick lengths of 14 m
- Jacketing concrete blocks

## Conclusions

- In the past, the PE100+ Association focused on testing and quality control
- Marketing issues are at least as important
- Together with the Advisory committee, the PE100+ Association will construct a model showing both performance and advantages of PE pipe systems all over the chain

