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Building the future with Polybutene Piping Systems

Selecting the best material for sustainable pressure pipe projects

Webinar – 6 December 2023

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Webinar Agenda

- Introduction to PBPSA
- Objective of this webinar

- PB-1 in pressure pipe applications
- Challenges for designing pressure pipes in large building structures
- Considerations for the installation of pressure pipe systems
- Addressing sustainability
- Cost implications for complex pressure pipe systems

- Wrap up and Conclusions
- Real life examples
- Q & A (15minutes)

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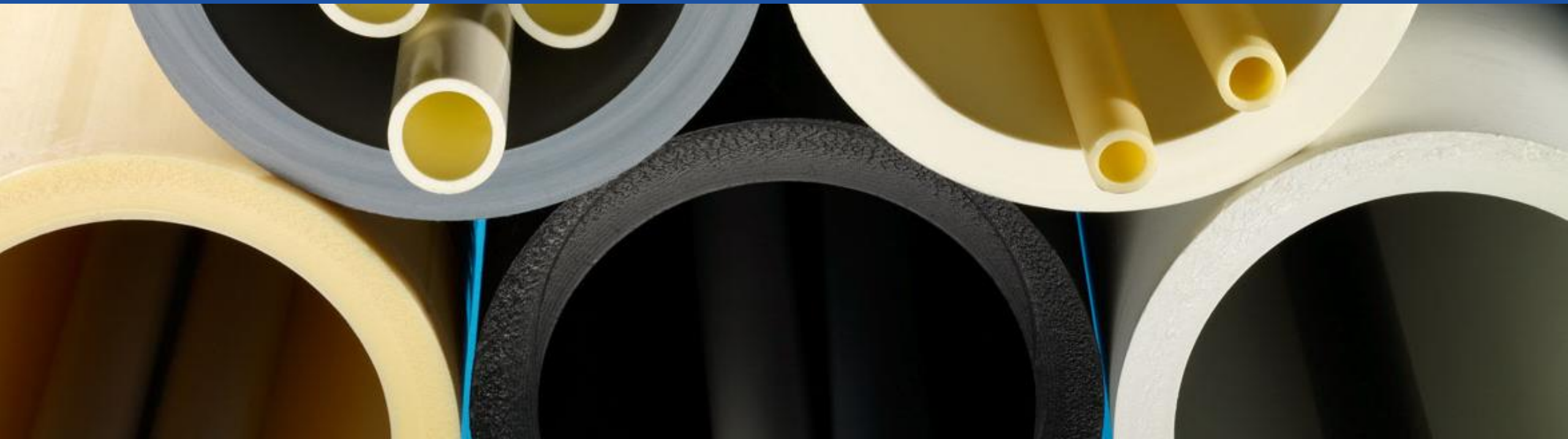
Introduction to PBPSA



PBPSA – Polybutene Piping Systems Association

PBPSA is an international association of market leading companies committed to the use of Polybutene-1 (PB-1) for the manufacture of pressurized piping systems

+GF+ GF Piping Systems

NUEVA TERRAIN S.L.

LYB LyondellBasell

THERMAFLEX ®

RWC

wavin

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Objective of this webinar

What to expect?

Obtain an overview of the key considerations for you as a pipe system designer, installer, property owner or end-user in the different phases of a project

What is our message and what should be your take-away

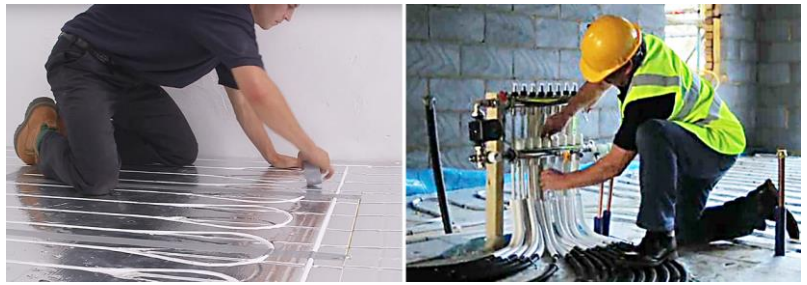
Material selection for a pipe system has tremendous consequences for the entire value-chain ; e.g. the design, installation, maintenance and the well-being of the end-users for one of the most important components in a building

Introduction : PB-1 in pressure pipe applications

PB-1 has been in continuous service for pressurized hot and cold-water piping systems for >50 years

Interior pipe

- Plumbing for hot and cold drinking water
- Surface heating and cooling
- Radiator connections



Source: John Guest Ltd.

Exterior pipe

- District heating and cooling
- Geothermal pipelines

Source: Thermaflex Isolatie BV.

Ship building

- Plumbing for hot and cold drinking water

Source: Shutterstock.com

Source: Georg Fischer Piping Systems Ltd.

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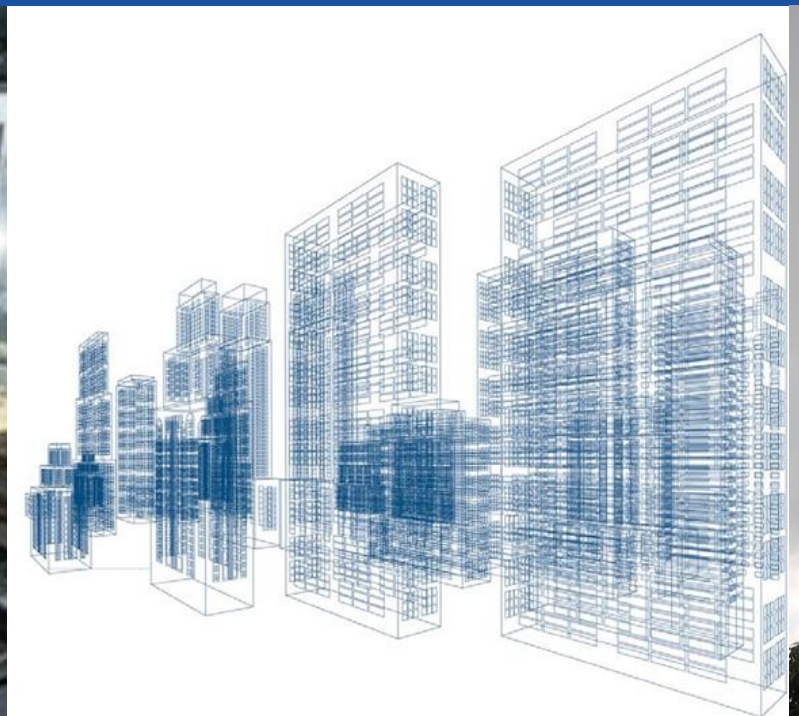
Challenges for designing pressure pipes in large building structures



Challenges for designing pressure pipes in large building structures

In the design-phase many decisions need to be taken …
But exactly in this phase lies the key to success !!

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Challenges for designing pressure pipes in large building structures

Three questions before we start….

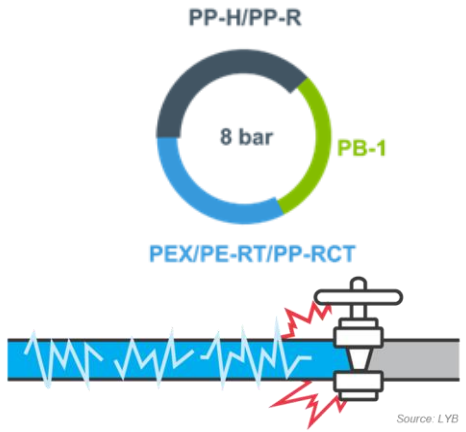
1. What's the most important part in a building?
   …foundation and the building structure…
2. What would be the 'second' most important part of a building?
   … the Hot & Cold-water plumbing …
   … they are the "veins of the building"…
3. What is the typical material cost share of a pipe system, in relation to the total building project cost?
   … ~0,3% ...

Quality deserves highest priority over cost

Challenges for designing pressure pipes in large building structures

Lifetime is key!

- High pressure resistance (tall buildings)
- Water hammer resistance
- Continuous exposure to high water temperature (70ºC - 24/7) - Hygiene
- Sensitivity to scaling or corrosion



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Challenges for designing pressure pipes in large building structures

One single material for the entire project

PBPSA members have the expertise and can assist in designing the most optimal pressure pipe network or grid :

- make maximum use of the outstanding PB-1 material characteristics
- use the members' best practices to secure the pipe system integrity with maximum building comfort

Probably the biggest challenge is to convince and convert the entire (conservative) value chain towards 'plastic pipe thinking'

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Considerations for the installation of pressure pipe systems

Considerations for installation of pressure pipe systems

Bamboo is flexible and lightweight, but stronger than most other woods

High flexibility allows for

- longer coils

- easy installation in confined or irregular shaped spaces or landscapes requiring fewer joints
  → fewer costly fittings
  → shorter installation time

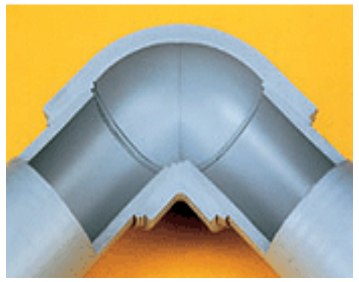
- in-house made pre-assemblies

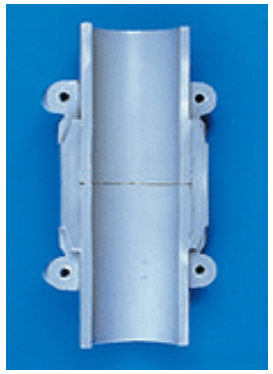
Thinner walls / Less weight offers easier handling (especially compared to metals)

Considerations for installation of pressure pipe systems

The versatility of PB-1 jointing techniques facilitates easy installation

No bending tools, no naked flame and no fluxes or chemicals are needed





	Push-fit	Butt fusion	Socket fusion	Electro-fusion	Clamping
PB-1	√	√	√	√	√
PEX	√	X	X	X	√
PE-RT	√	√	√	√	√
PP-R	√	√	√	√	√

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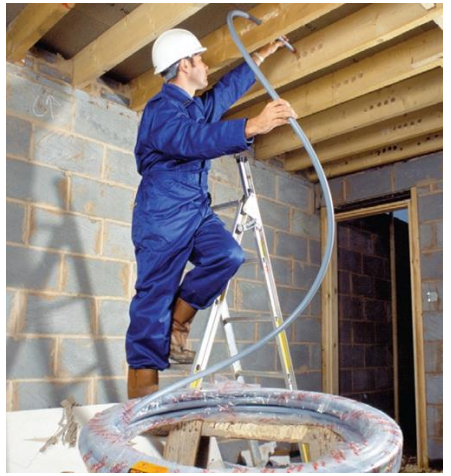
Considerations for installation of pressure pipe systems

For all pipe systems in any material, **proper installation is key** !

- to secure a long lifetime
- to avoid premature leakages
- to keep maintenance cost low

Work with qualified PB-1 pipe and fitting manufacturers

Installation by well-trained and certified installers



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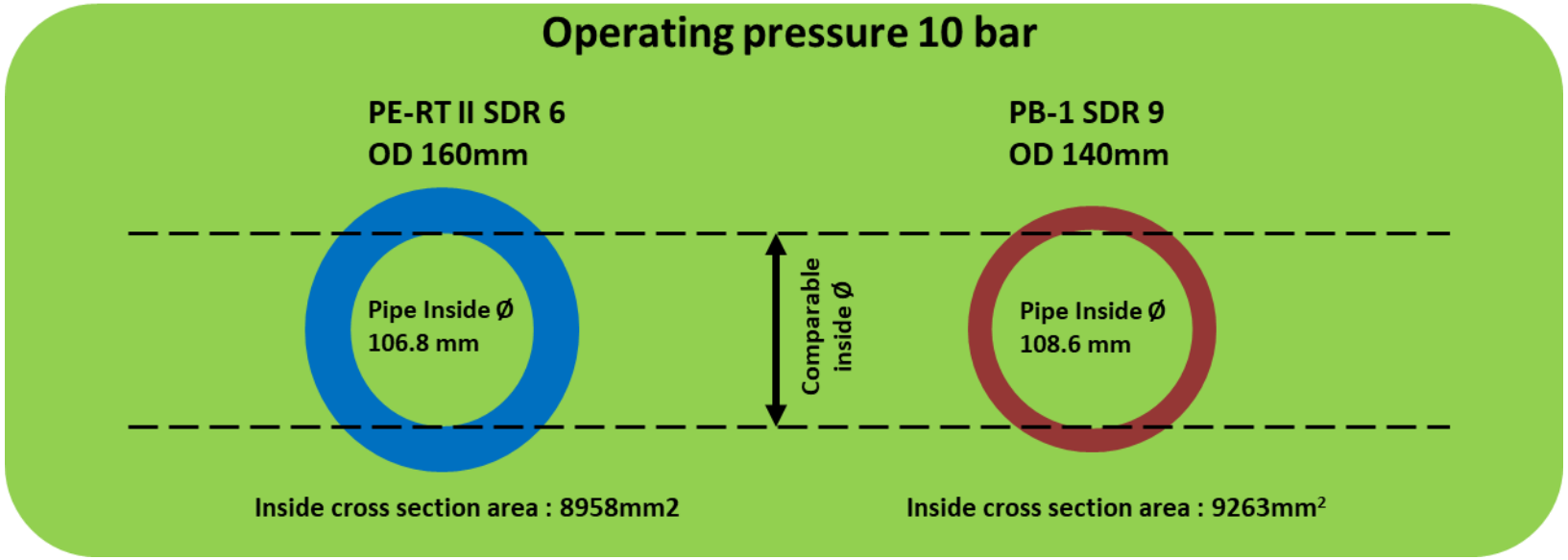
Addressing sustainability

Addressing sustainability

Green building Management

- PB-1 is the best-in-class material with the lowest material content per meter pipe, yet maintaining highest pressure Classification



Weight of 1 meter PE-RT pipe : 10.56kg

Weight of 1 meter PB-1 pipe : 5.67kg

The weight of 1 meter PE-RT pipe is 86% higher than the PB-1 pipe with comparable inside ø

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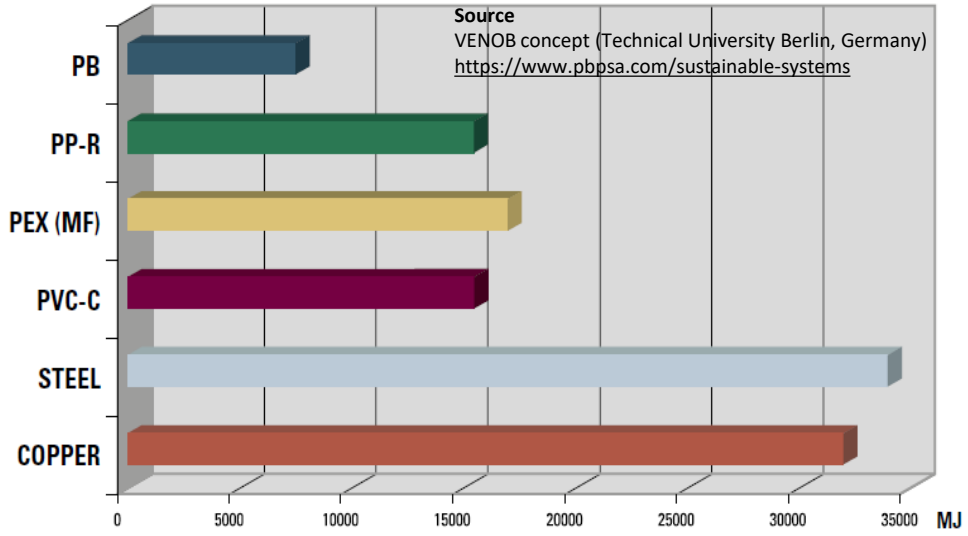
Addressing sustainability

The lower weight per meter pipe contributes to a much better Life Cycle Assessment (LCA) and a lower Carbon Footprint

Comparison of equivalent energy consumed to complete the manufacture and installation of a pipe system in a 16-apartment building



PB-1 is recyclable and is also available from bio-based feedstock (mass-balance certified)

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Cost implications for complex pressure pipe systems




Cost implications for complex pressure pipe systems

"***Installation is by far the largest component in the cost of an installed pipe network.***
Systems that will facilitate and speed up installation will gain ground"
(Quote by AMI ''Plastic Hot and Cold pipe systems in Europe'' 2018)

The unmatched flexibility of PB-1 opens up to :

- fewer (costly) joints for installation
- longer coils (easier handling / transportation)
- pre-fabs or pre-assemblies to minimise on-site installation effort and cost
- less downtime in case of renovations or new builds

Cost implications for complex pressure pipe systems

Operational cost considerations over the lifetime of a pipe system :

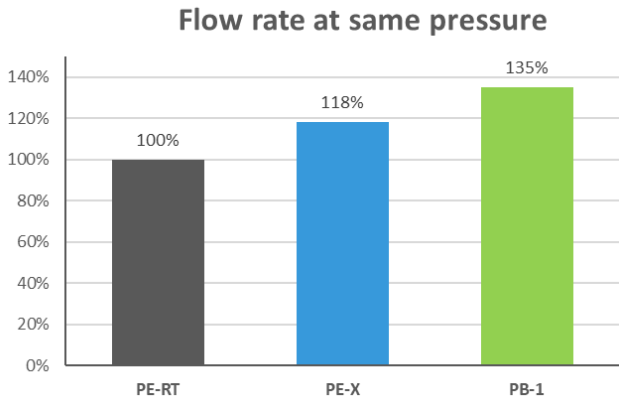
- The larger inside pipe cross section area for PB-1 (at a given outside diameter) allows for higher throughput at same pressure

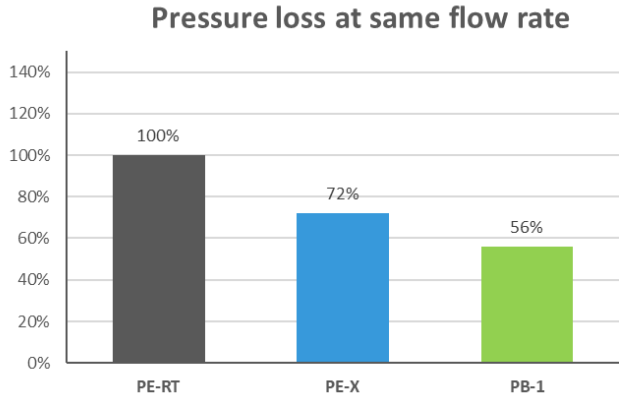
or

- For the same flow rate a lower pump capacity is needed as the pressure loss is less

- Insusceptibility to corrosion / scaling preserves the throughput capacity that the system was designed for

Example - pipe ø50mm





Think long term (cost) and think sustainable

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Wrap up and Conclusions

Wrap up and Conclusions

Design :

- Material selection greatly impacts lifetime expectation
- Make use of the PBPSA members with a decade's long designing expertise

Installation :

- High flexibility allows easy handling and fewer joints/fittings
- Work with qualified producers and installers

Sustainability :

- Lowest material consumption per meter pipe reducing carbon footprint
- Recyclable material and available from renewable feedstock

Cost :

- Installation is highest cost component of a pipe system
- Longest predicted lifetime of the pipe system
- Opportunity for reduced cost of installation, maintenance and operations

Installation of a PB-1 hot water pipe system in the 60's of the previous century (still in operation today)

PB-1 is the most technically advanced material for pressure piping systems

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Real life examples







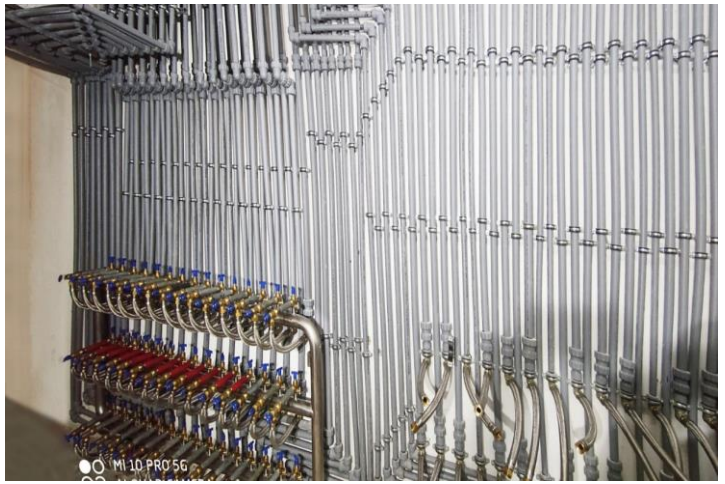


PB-1 pipe application Case 1 – The Infinity Tower Lisbon - Portugal

Pressure pipe installation in new built high-rise building

- The building has 26 floors and 195 residential flats, with each apartment having a separate supply pipe and water meter
- Lifetime assurance and a reliability were the main drivers for selecting PB-1 for the plumbing installation

One of the 3 water meter rooms



Source: Nueva Terrain S.L.

More information on www.pbpsa.com

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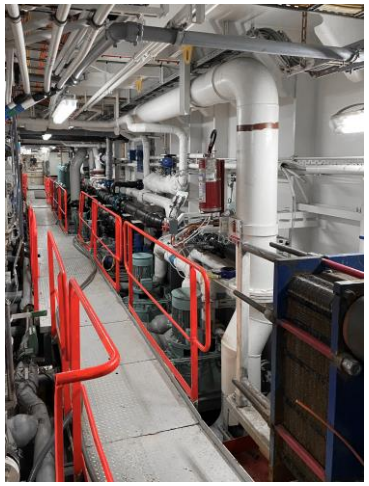
PB-1 pipe application Case 2 – Cruise Liner Costa Luminosa

Replacement of corroded metal manifolds in a cruise liner

- Customized products and easy jointing technologies for trouble-free installation during ongoing ship operations
- Making use of prefabricated piping systems
- Corrosion- and maintenance-free materials for a long-lasting service life and weight savings

Source: stock.adobe

Source: MecShip/CCL



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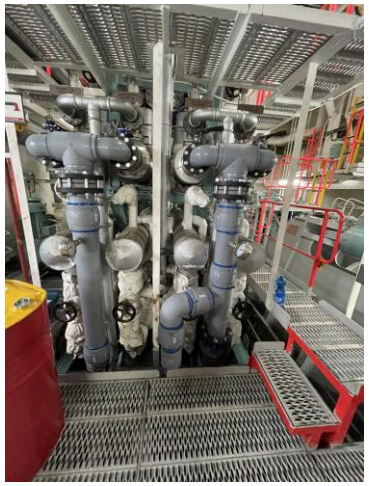

Source: MecShip/CCL

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PB-1 pipe application Case 3 – District Heating network Otopeni - Romania

Replacement degraded gas pipe network for individual heating boilers

40 % total investment cost savings :

- Up to 4 times quicker installation compared to classical steel pre-insulated pipe systems :
  - No need to dig trenches / breaking up roads, etc
  - Elimination of weldings and where necessary, head-to-head welding or electro-fusion methods were applied
- Reduction of fuel usage for heavy machinery

Source: Thermaflex

Operational savings :

- 2,083 tons CO_2 emission saved yearly
- up to 12,000m^3 yearly water economies

Source: Thermaflex

Source: Thermaflex

More information on www.pbpsa.com

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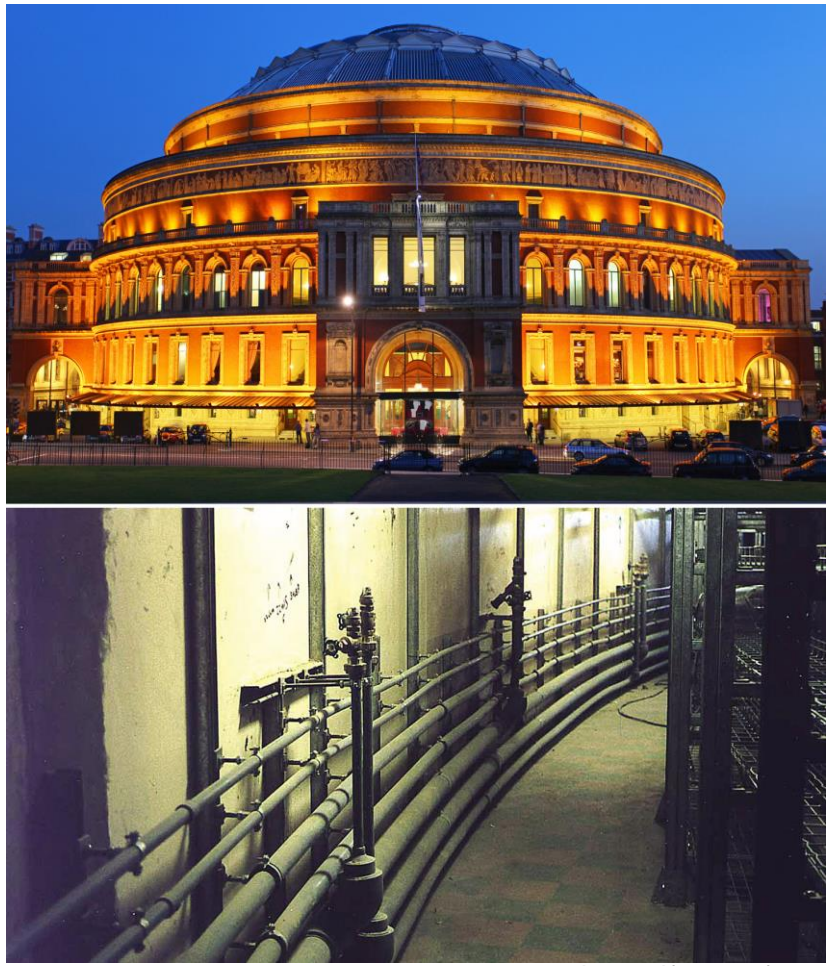
PB-1 pipe application Case 4 – Perfect acoustics for the Royal Albert Hall, London - UK

Replacement of the corroded galvanized steel plumbing system

- The low thermal expansion and inherent flexibility of PB-1 allowed the unique shape of the building to be followed, thereby reducing installation time
- Heat loss was reduced by 40%
- Pipe-borne noises in the auditorium were reduced by 90%



Source: Shutterstock.com
Source: Georg Fischer Piping Systems Ltd.

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The Polybutene Piping Systems Association (PBPSA) is an international association of market leading companies committed to the use of the thermoplastic material, Polybutene-1 (PB-1) for the manufacture of piping systems. Also known as polybutylene, PB-1 is used worldwide in applications including piping systems for large-scale building projects, district energy networks, heating and cooling, and plumbing installations.

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Thank you for your attention

We’d like to connect with you; please reach out to us