LOGSTOR
Advance Hot Water Piping

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LOGSTOR’s concept for DHC

- We invented the buried pre-insulated pipe technology

Traditional

Axial Conti & flexible

Spiral Conti / Opti-pipes

All sizes

\[ \lambda = 0.027 \text{ W/mK} \]

Max \( \varnothing 315 \text{ mm casing} \)

\[ \lambda = 0.023 \text{ W/mK} \]

\[ \lambda = 0.025 \text{ W/mK} \]
Standardized and complete pipesystem with all elements included

With: Preinsulated straight pipe
Preinsulated bends
Preinsulated branches
Preinsulated valves
Connected with joins
Low CAPEX

- Standardized industrial products, development based on +50 years of experience
- Established and proven EN standards, products, design & install, EN253, EN13941
- Simplification and optimization of design and installation
- Integrated fittings & joint solutions, savings by pipe & joint philosophy
- Robust and durable solutions
- Reduced installation costs
- Shallow trenching
- Quick & easy pipe installation
Design of Bonded Pipe Systems

- European Standards

**CEN-Standard**

**EN 13941**
Design and installation of preinsulated bonded pipe systems

**EN 253**
Bonded Pipes

**EN 448**
Fittings

**EN 488**
Valves

**EN 15698-1**
Twin Steel

**EN 489**
Joints

**EN 14419**
Surveillance systems

B-Standard (Product standard)
EN 253 Piping in NA

Why choose EN over traditional steel systems?

- The thin wall steel results in reduced overall stress versus conventional schedule 40 steel—allowing numerous laying methods often saving in number of expansion loops and welds. Thin walled steel is also more flexible allowing for fewer fittings.

- Design. EN systems are shallow bury (min cover 2 ft) saving in excavation and civil costs.

- Quality and 30 year service life. The EN 253 system is a fully welded system (no flanges). It comes complete a with five year warranty (NA systems have one year warranty)

- Leak detection. Simple and effective central surveillance that constantly monitors the pipe network for faults (and precise location). Even minor irregularities can be detected providing basis for preventative maintenance.
Our Innovative design: more flexibility
INTRODUCING A NEW GENERATION OF PRE-INSULATED FLEXIBLE PEX PIPING – REINFORCED WITH KEVLAR – SHIPPED IN COILS.

- Larger sizes and higher temperatures: up to 160 mm (6 in) at 115°C (240°F) @ 16bar (230psi). Custom temperature/pressure configurations available.

- Ideal for FAST installations in remote locations or busy urban cores - industrial or hydronic applications.

- Due to reduced carrier pipe wall thickness, these pipes have smaller ODs compared to conventional flexible plastic solutions – making them easier to handle and install.

- Full range of supporting press fittings and joints.
Civil work represents 60% of the total project cost.

The Trench

<table>
<thead>
<tr>
<th>Casing ø mm</th>
<th>Distance A mm</th>
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<tbody>
<tr>
<td>90-180</td>
<td>150</td>
</tr>
<tr>
<td>200-560</td>
<td>250</td>
</tr>
<tr>
<td>630-900</td>
<td>300</td>
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3 Methods to Reduce Axial Stresses

Stress reduction with bends

.. by prestressing

.. with E-Comp
Energy Efficiency / Heat Loss

• Lower operating costs
• Less environmental impact

Our diffusion barrier
• Prevents ageing of insulation
• Reduces energy losses
• Implemented in pipes & joints

Cyclopentane, $\lambda = 0.012$ W/mK
$CO_2$, $\lambda = 0.017$ W/mK

$\lambda_{air} = 0.0<27$ W/mK

Lambda ($\lambda$) expresses the insulation property of a material. The lower the lambda value, the better the insulation.
Example:
Heat loss
- 1000 m
DN 80 –
average
30 years

OPEX optimization, type of pipe system

- TW Konti S3: 66%
- TW Konti S2: 61%
- TW Konti S1: 53%
- TW trad S3: 59%
- TW trad S2: 53%
- TW trad S1: 42%
- Konti S3: 42%
- Konti S2: 33%
- Konti S1: 23%
- Trad S3: 27%
- Trad S2: 15%
- Trad S1: 15%

What can we to day?

OPEX: optimization; type of pipe system.
Total Cost of Ownership / Lifetime costs

1. **Investment costs**
   2. Purchase costs, components
      - Installation costs
      - Costs of planning and commissioning

3. **Operating costs** (annual costs)
   - Costs of energy & heat loss
   - Costs of maintenance
   - Costs of repairs
   - Costs of poor quality

4. **Total costs of the solution**
Hot water vs. steam distribution

- Lower capital costs
- Low distribution losses
- Reduced maintenance costs
- Enables access to a wider range of renewable and waste heat thermal resources
- Storable, thus facilitating technically or economically intermittent resources
System longevity secret: alarm system - quality joint - water treatment
LOGSTOR Value Proposition to campuses, references

- **Stanford University**
  - Part of Stanford Energy System Innovations program
  - Meet growing energy needs while cutting costs and emissions
  - New CHP energy center, production of power, heat and cooling
  - Steam to hot water conversion
  - 24 miles of preinsulated pipes in dn50-dn600
  - Installed in 2013-14

- **University of British Columbia**
  - Establish a sustainable and energy efficient energy system
  - Steam to hot water conversion project
  - Combination with CHP based on renewable energy sources
  - 20 km of preinsulated pipes in dn32-dn400
  - Installation during 2014-2016