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Minimize the waste of energy, maximize the use of renewables

Societies across the globe are in need of sustainable solutions for energy and water. Together with our stakeholders, we help build systems for future generations. In everything we do, we are inspired by nature. As it is always systemic, smart and efficient in its solutions.

1919 Wilhelmus Baars learns to harness the virtues of wood in a carpentry shop

1951 Wilhelmus innovates with cork, nature’s finest insulating technology

1976 Thermaflex founded by Leendert Baars, based on polyolefine technology

1976 International expansion under the 3rd generation, Gerrit-Jan Baars

1983 Direct extrusion of polyolefines developed

1983 First process for pre-insulating pipes developed

1990 As the first company worldwide, Thermaflex switches completely to (H)CFC-free production

1999 Launch of Flexalen 600, the world’s first circular pre-insulated piping system

2003 Start of polybutene pipe production

2004 New world record set in DHC networks, connecting an entire street in just 1 day

2014 Proven sustainability with Cradle-to-Cradle certification and Environmental Product Declarations for various ranges

2015 Became partner of the United Nations District Energy in Cities program (UNEP DES)

2016 Proven sustainability with Cradle-to-Cradle certification and Environmental Product Declarations for various ranges
01. WE, THERMAFLEX

ISO 9001:2008
6 regions in the Thermaflex group have achieved ISO 9001 quality management certification for continuous quality improvements in its customer focus, management, and processes.

ISO 14001:2004
On top of that, both Thermaflex production locations in Europe have also achieved ISO 14001 certification through effective environmental management systems.
Our Philosophy

Taking care of energy and the environment

Energy and water are a necessity in the built environment. They are a basic right for everyone.

We have the knowledge and experience to provide systems to distribute these vital elements efficiently, and smartly. In a manner that is convincingly different and will serve society far into the future.

Today Thermaflex is a source of energy to many people. From the team that is running its every day operations to the business partners and customers with whom we share values and create smart energy saving solutions.

Our Inspiration

We are inspired by nature in the way that it provides protection without a depletion of resources. Always in full symbiotic harmony with its surroundings, creating a circular state of existence.

Our designs and systems contribute to the circular economy; they are recyclable and serve the transition to renewable energy. Responsible processes demand a minimum of resources for maximum benefit.

At Thermaflex we like to think in solutions rather than in products. Our research and development aims at the specific needs of our customers and end-users. We build close relationships with our stakeholders, creating optimal solutions in cooperation and co-creation with each other.
Our major aim is to reduce CO2 emissions by maximizing the use of renewables and minimize the waste of energy. Renewable resources are often locally available, reducing dependency on external suppliers. We facilitate the use of renewables in our operations wherever possible.

We are continuously improving the energy performance of our systems and solutions. In our own organization, in-house programs result in higher energy efficiency and operational excellence.

Let’s join forces to take care of...

**Our ecosystems**
Taking care of our ecosystems, spanning generations, drives us to work together in symbiotic harmony. We aim for maximum benefit for all our stakeholders.

We develop maintenance-free and easy-to-install systems to connect demand for cooling & heating with supply, while lowering energy costs and contributing to green communities.

We can only be successful in our mission by working together with like-minded partners throughout the complete value chain.

**Our climate**
Our major aim is to reduce CO2 emissions by maximizing the use of renewables and minimize the waste of energy.

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**Our resources**
The growing scarcity of resources is one of the major challenges in the world today. We believe a solution can be found in the circular economy.

Our long term ambition is to reclaim all materials and close the loop. This requires a constant drive for improving efficiency, longevity and waste reduction for our systems as well as in our processes.

Our contribution to water scarcity and quality lies in delivering leakage-free systems for drinking water and/or sanitation purposes, and reducing and reusing water in our production facilities.

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From the agricultural to the residential, Thermaflex serves numerous markets...
03. MARKETS & APPLICATIONS

Residential

- Building (for) the future: smart and sustainable homes
  - Single Family Houses
    Strike home with efficient convenience
  - Apartment Blocks
    Sustainable building: a better future for all
  - Rural Communities
    Think local, heat local
  - Attached Houses
    Bringing homes and heat together

Commercial

Future-proofing your business: a sweet deal

- Data Centers
  Cool data = Safe data
- Supermarkets
  Keep it fresh
- Office Buildings
  A comfortable workplace works better
- Shopping malls
  Healthy shopping: wallet-friendly, and eco-friendly solutions

... for varied applications

- Cooling
  Keep a cool head
- Space Heating
  For your comfort
- Potable Water
  Water. The basis of life
- Heatpumps
  Prime your pump
Renovation
Closing the gap... and beyond

Everything has an expiry date, that also goes for the systems we put in the ground. Leakages, energy losses, undersized/oversized systems, downtime ... some common ingredients for stinging headaches. So the challenge is to effectively renew that system, as quickly and efficiently as possible, and to make it last. The faster and smoother that process is, the more profitable for all parties involved. That's what drives us!

Expansion
Sustaining comfort for an expanding world

Expansion is a major challenge for emerging cities around the globe. More than half of the world’s population lives in urban areas, and that number is only going to grow. So does our energy consumption, which is expected to rise by more than 55% until 2040. This urges municipalities to evaluate existing heating, cooling and potable water networks as well as to develop new living and working space, and accommodate growing energy needs. It is thus crucial to upgrade and expand infrastructure in an early stage to secure the comfort and security of our future.

New construction
Breaking valuable new ground

CO₂ neutral energy is now an important goal for both individual buildings and entire cities. Like you, Thermaflex knows that concentrated use of waste heat and renewable energy will help preserve resources and the environment for future generations. One step toward CO₂ neutral energy is the efficient and sustainable distribution of potable water, cooling and heating. This distribution must also be seamlessly provided to assure the comfort and supply security of end-users.

Street in a day
Future-proof district energy networks

District Energy plays a vital role in moving towards a sustainable future, and clear the way for smart cities with efficient, sustainable and affordable energy systems. The implementation or renovation of such solutions, however, are often considered a major stumbling blocks because of the time, cost, disturbance and operational risk often associated with their installation. But what if we can bury that block? What if we can secure affordable, and future-proof comfort for the residents of an entire street in just a single day?
Above and beyond industry standards

Choosing Thermaflex solutions ensures that you will comply in every respect with industry standards...

**3rd party control**
Our quality assurance is continuously monitored according to international standards. This transparency assures measurable network quality for every step of the way.

**REACH and VOC compliant**
We fully commit ourselves to the protection of human health and environment. All Thermaflex components are risk-free and safe to use under any conditions in conformity with the Registration, Evaluation, Authorisation and Restriction of Chemicals by EU regulation (REACH), the Volatile Organic Compounds list (VOC).

**Potable water & public health certified**
Flexalen network has approval from the Water Regulations Advisory Scheme (WRAS) and KIWA-ATA, as suitable for drinking water,

**Environmentally friendly production**
Of its own accord, Thermaflex decided to obtain certification of its factory in the Netherlands ISO 14001. Thus, the entire production of pre-insulated Flexalen pipes takes place in a certified workshop. Through these standards, Thermaflex ensures that it protects the environment.

... and even going above and beyond them, giving you a competitive advantage and a means to differentiate

**Cradle to Cradle Certified™ solutions**
Our commitment to healthy environments and making scarce resources meet future demands has led us to achieve a 25% Cradle to Cradle Certified™ assortment. For Flexalen, we achieved Cradle to Cradle Certified™ Silver, the world’s only in technical pre-insulated pipe systems.

**Economical buildings and ecodistricts**
Flexalen systems have frequently been installed for networks supplying ecodistricts and Low Energy Buildings. They comply with the European standards for low energy buildings such as LEED and BREAM. In the case of the renovation of a network in Lacapelle-Marival (46) France, Thermaflex was instrumental in creating savings of up to 30% of energy for the connected district!

**KIWA-ATA International conformity**
All our pre-insulated pipe components are KIWA-ATA certified according to EN 15632 for heat-loss and BRL 5609, BRL-K536 for PB pipes.

**Earthquake resistant**
Flexalen has been certified as earthquake-proof by the Russian Building Seismic Stability Research Centre for seismic activity up to 7-9 magnitude.

For an overview of our certifications check out our knowledge center: [www.thermaflex.com/knowledge-center](http://www.thermaflex.com/knowledge-center)
Quality of raw materials
Our pre-insulated piping consists of:

- A polybutene medium pipe, a highly flexible polyolefine that assures reliable assembly homogeneous welding, quick and easy on-site handling and the best in class for energy efficiency
- Extruded polyolefine insulation enclosing the pipe that, thanks to its hydrophobic and closed cell structure, keeps the water absorption coefficient to a minimum
- A protective HDPE outer casing with UV treatment that ensures efficient mechanical protection throughout the networks’ entire lifetime.

Quality of manufacture
Flexalens systems are manufactured with maximum quality assurance along every step of the way:

- ISO 9001-certified quality management systems for continuous monitoring and improving the quality of our components
- Workshop tests on piping and pre-insulated parts for optimal performance

Complex networks mastered by weldability
Minimizing risk for maximum performance:

- Risks of leaks minimized by homogeneity of welded materials
- Safe, fully homogenous and easily welded connections ensure lifetime efficiency
- Zero risk of sedimentation with PB and its natural Anti Oxygen Barrier
- Segmentation of the network not necessary, limiting the number of connections needed on site

Prefabrication
Prefabrication on a 100% clean and controlled factory floor, readily tested for performance:

- Minimizes installation risks
- Reduces the amount of on-site welded connections to just 30% of traditional designs
- Allows control of time schedules, handling, installation and overhead costs
High service pressure reserves to absorb demand fluctuations

Elevated service pressure resistance means that changes in load, through-put or temperature over the network’s lifespan can be safely allowed.
Guiding every step of the way...

Expert design:
- Expert advice on acceptable flow speed and pressures
- Optimization of diameters (Figure 01)
- Structural optimization: hydraulic balancing for optimal pressure drop distribution with the aim to reduce components and costs (Figure 02)
- Collaboration with project designers
- Use of FLEXTOOLS and Autocad software
- Static energy loss calculation for complex networks

Advanced calculation:
Our engineers calculate with Flextools software:
- Suitable diameters for optimal flow speed
- Static energy losses
- Flow and return pressure losses and temperature drop

Comprehensive training and installation support:
To ensure a smooth installation process, we extend our assistance through:
- Trained and certified Flexalen system partners for
  - Installation training
  - On-site installation support
  - Welding training for complex projects
  - Installation manuals available for download
09. PRODUCTS

- **Flexanet**
  Securing tomorrow with ready-made district networks

- **Pre-insulated Pipes**
  Sustainable thermal networks for decades of service

- **Flexalink**
  Revolutionizing connection technology

- **Customized Connections**
  Smooth the way

- **Protectube**
  Flexible durability

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**Our Impact**

In 2016 Thermaflex connected 19,150 buildings.
Pre-insulated Pipes

Sustainable thermal networks for decades of service

You may need thermal energy in multiple locations. Or you realize your current network is not as durable as the building it serves. In either case, it pays to build your thermal network around Thermaflex pre-insulated pipes. We can simplify connection and use of thermal energy in both buildings and district energy. Our solutions are designed to bring you a durable and efficient system adaptable to local circumstances, future needs and changes.

Thermaflex drove innovation further with tailor made solutions integrating:

- Innovative network design
- Speed and quality of installation
- Minimal disturbance to the environment
- Energy efficiency
- Highest standards of safety
- Sustainability to the service of people and the environment
- State of the art logistics

A sustainable thermal network – environmental capital for years to come

Today’s thermal networks are seen as a valuable part of the communities they serve with renewable energy. That’s why our smart solutions for thermal energy distribution have become the standard for this important application. We develop and produce state-of-the-art, flexible, pre-insulated pipe systems and pre-fabricated branches to meet both current and future stakeholder needs.
Flexalen 600

The flexible solution for timeless efficiency

As the first fully Cradle to Cradle certified™ flexible pre-insulated pipe system worldwide, Flexalen 600 is ideal for group, community and district networks. The efficiency and endurance of its components ensure long-term performance to serve needs of today, and tomorrow.

All-in-one

Flexalen 600 has been developed to offer one solution for heating, cooling and potable water applications, and is ideal for thermal distribution networks. Its high and stable performance in combination with the ease and speed of installation, even in the most difficult conditions, is the reason why... Thanks to the unique properties polybutylene pipes, and the closed cellular structure from the enclosing polyethylene foam, Flexalen 600 is highly pressure, temperature and moisture-resistant. The safe, fully homogenous and easily welded connections further minimize heat losses to ensure a lifetime efficiency of the network.

For a world to come

We strive to ensure performance on all levels. That also goes for our environment and the generations to come. By minimizing energy losses, we can minimize our waste of energy and subsequently our carbon footprint. With its Cradle-2-Cradle certification, Flexalen 600 is not only a highly efficient, but also the most sustainable choice for thermal energy distribution. On top of that, all its components are environmentally friendly and fully recyclable.
F600 Single pipe system
A flexible choice

Flexalen 600 single line is our most practical solution for heating, cooling and potable water applications. When dealing with space and time restrictions, this flexible, pre-insulated pipe system with a single carrier pipe is the ideal choice for large scale networks, but can also be used for small scale ones.

- Pipe diameters medium pipe OD16 – OD125
- Pipes in coils of up to 300m (depending on diameter)

Availabilities

F600 Double pipe system
The economical choice

Flexalen 600 double lines have been developed as the most energy-efficient solution for smaller scale thermal water transport. This range is highly suitable for compact networks with low energy demand.

- Pipe diameters medium pipe OD16 – OD63
- Pipes in coils of up to 300m (depending on diameter)

Availabilities

F600 Plug & Play sets
The all-in-one solution

The Flexalen 600 turnkey box is our carefree all-in-one package, ideal for small installations. It has all you need to connect as quickly and easily as possible from A to B, while securing a reliable distribution system.

- Available as a complete set (incl. 4 fittings)
- Individual lengths available (up to 20 meters)
- Easy transport allowed by light weight and compact coil diameters (1.45m sq. boxes)

Specifications

Wide range of applications:
- Air/water heat pumps
- Outdoor
- Swimming pools

Availabilities

Flexalen Compact
The take-away package

Flexalen 600 Compact has been developed as a take away solution for heating, cooling and potable water applications. This extension of our Flexalen range offers an assortment of smaller diameters, but with the same distinguished features.

- Available as a complete set (incl. 4 fittings)
- Individual lengths available
- Easy transport allowed by light weight and compact coil diameters

Specifications

Wide range of applications:
- Air/water heat pumps
- Indoor & Outdoor
- Swimming pools & Garden showers

Availabilities

- Pipe diameters OD20 – OD40
- Pipes in fixed coils of 8, 12, 16 and 20m (other length up to 20 meters on request)

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- Individual lengths available
- Easy transport allowed by light weight and compact coil diameters

Specifications

Wide range of applications:
- Air/water heat pumps
- Indoor & Outdoor
- Swimming pools & Garden showers

Availabilities

- Pipe diameters medium pipe OD16 – OD40
- Pipes in fixed coils of 12.5 and 25m (other length on request)
### Flexalen 600 Single Pipe System

**For open system**

<table>
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<tr>
<th>DN [mm]</th>
<th>Inch</th>
<th>Casing pipe O.D. [mm]</th>
<th>Carrier pipe O.D. [mm]</th>
<th>I.D. [mm]</th>
<th>Wall thickness [mm]</th>
<th>Minimum bending radius [m]</th>
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* May differ in various regions

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Flexalen SL
Reduce risk, straighten it out

Our innovative range of pre-insulated pipes secures all-embracing solutions for heating, cooling and potable water applications. In addition to our flexible pipes in coils, Flexalen Straight Lengths is designed to meet large-scale energy needs, and offers a considerable installation and operational advantage.

A sustainable choice

Flexalen SL with Polybutylene medium pipes is a highly suitable choice for large-scale thermal energy distribution. Fewer connections reduce leakage risks, ensuring security over time. That, in combination with the energy efficiency and durability of the material, make Flexalen SL an ideal solution. The strength and safety of the welded connections ensure a reliable and care-free system for generations to come.

Easy does it

Flexalen SL can be combined with all other Flexalen products. And even though it has a straight form, it is semi-flexible and allows for a quick and easy installation in otherwise difficult conditions such as crawlspace, river crosses or overhead systems. Electro and butt fusion welding techniques offer quick and simple, yet fully homogeneous connections as strong and sustainable as the PB pipes themselves.

Flexalen SL

- Flexible
- Flexible
- Semi-Flexible

Specifications

- Easy quick and safe to weld
- Can be welded outside the trench and pulled into concrete ducts (renovation)

Service Temperature

- Wide temperature range
- Minimum -15°C
- Maximum 95°C

Pressure rating

- up to OD110 20°C/16bar
- up to OD110 70°C/10bar
- up to OD110 95°C/8bar

- ≥ OD125 20°C/10bar
- ≥ OD125 70°C/8bar
- ≥ OD125 95°C/5bar

Availabilities

- Semi flexible
- Usable for both heating and cooling applications
- Full range of accessories
- Safe and secure operation
- Long lifetime expectancy

- Available with single carrier pipe
- Pipes in straight length of 6/12m
- Pipe diameters medium pipe OD63 – OD125 (flexible)
- Pipe diameters medium pipe OD160 – OD225 (semi flexible)
### Straight Lenghts - Flexible

<table>
<thead>
<tr>
<th>Product code</th>
<th>Product code [NEW]</th>
<th>Product code</th>
<th>DN</th>
<th>Inch</th>
<th>Casing pipe O.D. [mm]</th>
<th>Carrier pipe</th>
<th>Wall thickness [mm]</th>
<th>Minimum bending radius [m]</th>
<th>max. length [m]</th>
<th>Weight [kg/m]</th>
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### Straight Lenghts - Semi Flexible

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<th>Inch</th>
<th>Casing pipe O.D. [mm]</th>
<th>Carrier pipe</th>
<th>Wall thickness [mm]</th>
<th>Minimum bending radius [m]</th>
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<td>160</td>
<td>130.8</td>
<td>14.6</td>
<td>20</td>
<td>11.80</td>
</tr>
</tbody>
</table>
Flexanet
Connections just got more reliable
Imagine the most challenging parts of the network installations - branches and connections - can be taken out of the field - with all related unpredictable external influences. The joints are made to order on our 100% clean and controlled factory floor. Leakages, poor post insulation, corrosion,... this vocabulary all belongs to the past.

Prefabricated Connections
Smooth the way
Our range of standard prefabricated connections includes all your standard Tees, Bends and Elbows as well as custom components that may be needed to deal with specific connections. We can provide these components in any size to suit all specific wishes, circumstances and challenges.

Flexalink
Revolutionizing connection technology
Imagine the most challenging part of network installations – branches and connections – would actually become a cakewalk. Imagine they could be taken out of the field (with all its unpredictable external strains), carefully prepared on a 100% clean and controlled factory floor, readily tested for performance, and reduce the amount of welded connections needed on-site by 75%. Flexalink makes it happen.

Flexanet
Ready-made district networks on coil
FlexaNet is our strikingly efficient, high-speed solution for district heating and cooling networks. A fully pre-fabricated Flexalen network can realize all-round, ready-made solutions that can be swiftly rolled out to secure the energy needs of today, and of future generations. Its proven track-record to connect an entire street in just a single day, makes it a world record leader in district energy networks.
Prefabricated Connections

... the best preparation

1.0

Availabilities
- Standard diameters: Ø16 to Ø225
- Available with oxygen barrier: ≤ Ø25 to Ø90

Prefabricated components:
- Standard: Bends, Elbows, Corners (45° or 90° degrees)
- Custom components (e.g. headers, Y-pieces, ...)

2.0

Availabilities
- Main pipe diameter: Ø25 to Ø110
- House connection Ø25 to Ø40 (Double lines on request)
- Customization is standard

3.0

Availabilities
- PB pipe diameter main line: Ø25 to Ø75
- Outer casing diameter house connection: Ø90 (PB25 to PB40)
- Customization is standard

Rating:
- Ease & Speed
- Reliability
- Total cost of ownership savings
Imagine the most challenging part of network installations – the branches and connections – could be taken out of the field, carefully prepared on a 100% clean and controlled factory floor, readily tested for performance, and immensely reduce the amount of welded connections needed on-site. Imagine.

Implementing or replacing district energy networks can put quite some strain on communities, considering the endless road blocks, parking problems, and disturbing excavation works that come with it. On top of that, installation can be risky; leakages, deteriorating insulation, downtime, … usually a direct cause of faulty connections. This leads to underperforming networks, higher energy bills, and escalating operating costs. But what if we could change the game, and overcome those barriers?

Changing the game
Implementing or replacing district energy networks can put quite some strain on communities, considering the endless road blocks, parking problems, and disturbing excavation works that come with it. On top of that, installation can be risky; leakages, deteriorating insulation, downtime, … usually a direct cause of faulty connections. This leads to underperforming networks, higher energy bills, and escalating operating costs. But what if we could change the game, and overcome those barriers?

Breaking the barriers
Co-created in 2010 with several DH companies, Flexalink has proved to be this game-changer. Ideal for both heating, cooling and tap water grids, our fully prefabricated house connections reduce on-site connections to just 30% of traditional designs. Instead of months, the installation of district energy networks become a matter of days, allowing effective control of costly labor and time schedules, preventing any contract variations.
### Flexalink - Single pipe system

<table>
<thead>
<tr>
<th>Main pipe O.D. [mm]</th>
<th>20</th>
<th>25</th>
<th>32</th>
<th>40</th>
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<td>o</td>
<td>o</td>
<td>-</td>
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<td>5</td>
</tr>
<tr>
<td>32</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>-</td>
<td>1</td>
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<td>63</td>
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<td>x</td>
<td>1</td>
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<td>5</td>
</tr>
</tbody>
</table>

- o = option
- x = standard
- - = at time of publication not available

Customization (other lengths) on request

Double lines on request

nederland@thermaflex.com
Carrier Pipes

Expect 100 years of reliable service

Stakeholders such as utility companies, municipalities and building owners tell us they need a reliable, durable and maintenance-free system up to 100 year life expectancy and excellent flow properties. On top of that want it to be sustainable, too. Our carrier pipes are designed and built to meet those expectations.

PB-1: The best solution for the best carrier pipes

We have worked closely with several leading energy companies to find the best possible material for the carrier pipes in our thermal network solutions. Their choice, and ours, is Polybutene-1 (PB-1). Polybutene-1 piping systems deliver long-life performance in severe industrial, large-scale and domestic applications. PB-1 can withstand up to 100 years of temperatures below 70°C and allows multiple connection techniques that include homogeneous welded joints and provides excellent recyclability. PB-1 also has broad acceptance among engineers, architects, planners, building contractors, installers and homeowners. Its easy and reliable assembly, pipe flexibility, on-site handling and best in class energy efficiency all make it the right material for the job. When you specify Thermaflex PB-1 carrier pipe you can expect long-term, durable performance.

Sustainability

- Fully sustainable

Installation

- Ease and speed of installation
- Pipe flexibility – low bending forces
- Energy savings in use
- No scale build up or corrosion
- Quiet systems
- Low possibility of cold weather burst
- Safe and secure operation
- Long lifetime expectancy
- Low thermal expansion + forces

Specifications

Service Temperature

- Wide temperature range
- Minimum -15°C
- Maximum 95°C

Pressure rating

- up to OD110 20°C/16bar ≥ OD125 20°C/10bar
- up to OD110 70°C/10bar ≥ OD125 70°C/8bar
- up to OD110 95°C/8bar ≥ OD125 95°C/5bar

Flexibility

- Excellent flexibility
- Reduces the need of fittings
- Bending radius: 8x pipe diameter
PB-1 without oxygen barrier
For open and closed circular systems

Polybutene has an unrivalled balance of properties to satisfy the demands of hot, cold and potable water distribution. Its flexibility and superior resistance to stress, corrosion, frost and aggressive water, in combination with its performance and environmental success make it the ideal choice.

PB-1 with oxygen barrier
For closed circular systems

For closed systems with advanced requirements, we offer PB-1 pipes with an EVOH oxygen barriers. In closed loop systems that are not continually supplied with fresh water containing oxygen, minimization of oxygen ingress through the pipe wall will significantly reduce corrosion risk of metallic components. For this reason the PB-1 barrier pipe has been developed. Dimensions >OD90 have a reduction of a permeation meeting international standards due to the higher wall thickness and the low permeation coefficient of PB-1.

**Availabilities**

**Flexalen PB-1 pipes without oxygen barrier**

<table>
<thead>
<tr>
<th>Product code</th>
<th>max. m</th>
<th>DN</th>
<th>Inch</th>
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<tbody>
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<td>102</td>
<td>20</td>
<td>¾</td>
</tr>
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<td>PB-32A/102M</td>
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<td>1</td>
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<td>¹½</td>
</tr>
<tr>
<td>PB-63A/102M</td>
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<td>2</td>
</tr>
<tr>
<td>PB-75A/102M</td>
<td>102</td>
<td>65</td>
<td>2½</td>
</tr>
</tbody>
</table>

**Availabilities**

**Flexalen PB-1 pipes with oxygen barrier**

<table>
<thead>
<tr>
<th>Product code</th>
<th>max. m</th>
<th>DN</th>
<th>Inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>PB-25H/102M</td>
<td>102</td>
<td>20</td>
<td>¾</td>
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<tr>
<td>PB-32H/102M</td>
<td>102</td>
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<td>PB-40H/102M</td>
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<tr>
<td>PB-75H/102M</td>
<td>102</td>
<td>65</td>
<td>2½</td>
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</table>
Protectube

Universal ducting

We’ve developed this range as a protective solution for channeling ingenuity. This universal robust, yet flexible insulation duct provides future-proof flexibility for any combination of pipes, tubes and cables.

Harnessing creativity

Protectube acts as a thermal, sound, and mechanical barrier for a wide scope of applications, both indoor and outdoor. It can furnish great creativity of use in an efficient, and sustainable solution. Because of its light weight and flexibility, Protectube can be quickly and easily installed under river crossings, railways or buildings, used as feed lines for heat pumps or split air conditioning, ... the possibilities are endless. And they remain endless, even for future replacement or up-scaling.

Cover all bases

Just like our other insulated components, Protectube is made from extruded polyolefin foam to a robust HDPE outer casing, offering excellent thermal performance as well as protection against moisture, humidity, frost and mechanical loads. It is equally safe and environmentally friendly in terms of sustainability and recyclability.

### Sustainability
- Fully recyclable

### Health
- Produced without (H)CFC
- Complies to REACH
- Complies to VOC (Volatile Organic Components)

### Installation
- Light weight and flexibility allows easy insertion of pipes and cables.
- Possibility to replace inner pipes and cables at any time.

### Service Temperature
- Wide temperature range
- Minimum -15°C
- Maximum 95°C

### Specifications
- Robust and flexible at the same time.
- Ideal protection for thermal and mechanically sensitive pipes and cables.
- Extruded polyolefine foam with a robust inner / outer casing.
- Especially developed by Thermaflex and fully bonded to the PE outer casing.
- HDPE outer casing, offers superior protection against moisture and mechanical loads.

### Flexibility
- Excellent flexibility
- Bending radius: 12x casing diameter

### Availabilities
- Diameter range:
  - Inner (DI): 18 mm to 115 mm (free space)
  - Outer (DA): 40mm to 200mm
  - Available in coils to max. 500m (depends on diameter)
### Protectube

<table>
<thead>
<tr>
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<td>110/115</td>
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<td>2.40</td>
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*) Longer on request
Flexalen 1000+  
**Timeless multifunctionality**

Flexalen 1000+ is our multi-purpose solution for energy distribution and offers a range opportunities for micro-networks. The possible combinations offer flexible freedom today, as well as for future adaptations or additions.

**Flexible freedom**

If your ambition is to combine heat and domestic hot water coming from a heat pump, wood chip boiler or solar installation as well as your frost protection and other cables in a single casing, Flexalen 1000+ is the ideal choice. It can combine various applications in a single, homogeneous distribution network to serve the energy supply, and demand of your close by community.

**Clear and simple**

This range of our wide Flexalen product family is highly suitable for micro-networks. A variety of connection lines can be combined in a single solution, making it highly over-seeable. The flexibility and homogeneity of the components allow for a quick and easy installation with minimal disturbance to the existing environment.

---

**Sustainability**

- Fully recyclable
- Satisfies the requirements for sustainable construction

**Health**

- Produced without (H)CFC
- Complies to REACH
- Complies to VOC (Volatile Organic Components)

**Installation**

- Easy to install
- Safe welding connections due to Polybutene pipes
- Assembly on customer specification
- Full compatibility with Flexalen 600

**Pressure rating**

- up to OD110 20°C/16bar ≥ OD125 20°C/10bar
- up to OD110 70°C/10bar ≥ OD125 70°C/8bar
- up to OD110 95°C/8bar ≥ OD125 95°C/5bar

**Specifications**

- Free moving carrier pipes
- Multi-line capability
- Homogenous connection between outer casing and insulation

**Flexibility**

- Excellent flexibility
- Bending radius (depending on inner pipe selection)

**Availabilities**

4 standard medium pipe combinations:
- OD32/OD25, OD40/OD25, OD 50/OD25, OD63/OD32

Various combinations of OD16 till OD63 mm pipes possible e.g:
- H2/32A25A20...2 times OD32 heating, OD25 potable, OD20 circulation

Various insulation thicknesses possible depending on ID
- Up to 50 m length in coils available (depends on diameter)
- End caps for water tight sealing between outer casing and medium pipes
Let's roll out a sustainable future together
The Flexalen® system

The process

Our polybutene pipes (Pb-1) and Thermoplastic Elastomeric (TPE) foam are produced in a low-energy extrusion process (for 95% powered by renewables), compressing the melted plastic. Both the pipe and foam are inherently fit for purpose without modification or secondary processing, with the additional advantage that any off-specification production is recycled within the process.

Due to the flexibility of the material, Flexalen can be easily coiled, allowing a swift roll-out from the coil directly into the trench. The connection lines can then be easily bent to the house connection points and linked to the heating or cooling system.

The houses can then be hooked up to the main network using homogeneous welding techniques or with a plug-and-play solution using Flexalink ready-made connections. That means risk, maintenance and overhead costs are also kept to a minimum.

After final pressure testing, the Flexalen network can enter full operation and secure affordable, and future-proof comfort for its end-users.

Flexalen pre-insulation happens on a 100% clean and controlled factory environment, ensuring optimal and sustainable insulation performance of the finished product which is then cooled, and coiled or cut.

Optimization and smart designs offer important added value to a network. We focus on minimizing total cost of ownership and maximizing the speed of implementation.

A support program for innovative network design, available to all professional designers/engineers, offers the right solution/tool in combination with Flexalen network concepts.

Our prefabricated house connections reduce the amount of on-site connections by at least 70% compared to traditional systems. This minimizes the number of joints and the risk of leakages so that network lifetime is maximized. The entire network is then tested in-house, to ensure guaranteed network performance.
The structure of a long-distance heating pipe is determined by the designer on the basis of the instructions supplied by the pipe manufacturer, the valid standards and the individual circumstances in the building.

A sand bed of at least 100 mm in any direction must surround the pipeline after the sand has been compressed. The size of the grains of sand should not be bigger than 3 mm. There must be no coarse grains. After the back filling, the sand is compressed. Thus some small air holes remain in the sand which are only connected by narrow channels (high flow resistance - no air convection in the sand).

Further back filling is normally undertaken using spoil from the trench. Coarse-grain gravel or road metal with or without a small soil portion are not suitable for the filling as they produce air channels with relatively big cross-sections and thus encourage the convection of the encircled air or the water which has invaded the trench. The filling must have a portion of fine-grained material, which prevents the development of continuous air channels. After the filling has been poured in, it must be compressed to produce a compact packing of the material.

The covering depends on the location of the ditch. In roads it is formed by the building profile of the road, in meadows and fields it is formed by a “humus layer”. In no case may the filling reach the surface. A clear layering of the materials represents an additional barrier for the heat transportation in transitional areas between the different layers.

The ditch must be prepared in accordance with the pictures on the left. For those areas that must bear transport loads, the law provides a minimum cover of 0.8 m (load class SLW 60); in areas without transport the regulations demand a minimum cover of 0.5m. Please consider the corresponding standards and regulations regarding the pipeline course of long-distance heating pipes. During construction, the trench must be kept dry. For very damp soil, drainage of the trench is recommended to improve the heat insulation effect of the distribution network.
Electrofusion welding

Automize to optimize

The quality level of joints is critical to the performance and lifespan of the network. So they should be as accurate and reliable as possible. Electrofusion welding is the automated technology developed to meet exactly these expectations, and making welded connections child’s play.

User-friendly, system-friendly

Electrofusion is a highly efficient welding technology that combines special fittings with built-in electric heating elements to ensure complete homogeneity of the system. The welding machine connects to the fitting, and automatically determines the welding time, before left to cool. This process is highly suitable for joints made on site or in tight areas.

Durable simplicity

This automated welding process makes pipe joining much easier, faster and it minimizes ‘human’ errors. As the weld is made on the outside of the tube, the inside remains smooth, contributing to the flow quality of the entire network, and preventing scale and incrustation that normally causes serious problems at joints.
Electrofusion connections

**Coupler**
- d: 16 - 110

**Coupler (BIG)**
- d: 125 - 225

**T-Piece 90° Equal**
- D1: 16 - 110

**T-Piece 90° Branch Off Pipe Reduction**
- D1: 20 - 63
- D2: 16 - 40
- D3: 20 - 63

**T-Piece 90° Connection Pipe Reduction**
- D1: 20 - 32
- D2: 16 - 25
- D3: 16 - 25

**Elbow 90°**
- D1: 16 - 110

**Elbow 90° Socket Spigot**
- D: 16 - 63

**Elbow 45°**
- D1: 16 - 110

**Elbow 45° Socket Spigot**
- D1: 16 - 63

**Special Reducer With Adaptor**
- D1: 75 - 110
- D2: 16 - 50

**Endcap**
- D1: 16 - 63

**Valve**
- D1: 20 - 63
- D: 70 - 90

**Valve With Spigot For Drain**
- D1: 20 - 63
- D: 70 - 90

**Reduction**
- D1: 20 - 110
- D2: 16 - 90
Polyfusion welding

The basic solution

Polyfusion welding technology offers a simple and cost-effective solution for homogenizing your distribution system, ideal for indoor connections.

Steady performance

Homogenous connections are a fundamental aspect of implementing energy-efficient distribution solutions. The hot-melt possibility of polybutene offers easy connections with high cohesive strength to ensure an optimal performance of the system. That homogeneity can only be achieved with the right tools and the right techniques.
Polyfusion connections

**Coupler**
d: 16 - 110  
D2: 22 - 133

**T-Piece 90° Equal**
d: 16 - 110  
D2: 22 - 133

**T-Piece 90° Branch Off Pipe Reduction**
d: 20 - 63  
d2: 16 - 25  
d3: 20 - 63

**T-Piece 90° Connection Pipe Reduction**
d1: 20 - 25  
d2: 16 - 25  
d3: 16 - 20

**Elbow 90°**
d: 16 - 110  
D2: 22 - 132

**Elbow 45°**
d: 16 - 110  
D2: 22 - 134

**T-Piece 90° Branch Off**
**Pipe Reduction**
d: 20 - 63  
d2: 16 - 25  
d3: 20 - 63

**Elbow 90° Socket Spigot**
d: 16 - 63  
D2: 22 - 81

**Elbow 45° Socket Spigot**
d: 16 - 63  
D2: 22 - 81

**Reduction**
D1: 20 - 110  
d: 16 - 90

**Endcap**
D1: 16 - 63

**Valve**
d: 20 - 63  
D2: 70 - 90

**Valve With Spigot For Drain**
d: 20 - 63  
D2: 70 - 90
Buttfusion welding

When the size counts

Butt-fusion welding offers a safe and proven solution for homogeneous connection of larger diameters. We recommend Butt-fusion for diameters starting with OD 110.

Standard equipment can be used

Most Butt-fusion machines, used for PE or PP pressure pipes can be used with Flexalen PB pipes as well. The welding parameters have to be adjusted to the needs of PB. Our experts and instructions will support you with applying this technology most effectively.

Buttfusion connections

<table>
<thead>
<tr>
<th>T-Piece 90° Equal</th>
<th>Elbow 90°</th>
<th>Reducer</th>
<th>Elbow 45°</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>d2: 110 - 160</td>
<td></td>
</tr>
</tbody>
</table>
Tools & Accessories

Solidifying your solution

Our custom selection of tools and accessories is dedicated to secure all-rounded, and optimally sustainable solutions. With the right equipment, a fully integrated Flexalen system can be installed swiftly, and soundly. An integral solution is impossible without the right means to implement it. That’s why we’ve attuned our equipment perfectly to our pre-insulated piping solutions – both in terms of quality and handling.

Maximum performance, minimum hassle

That consistency starts with a completely homogeneous system. Our complete range of PB-1 fittings and modern welding technologies can ensure that homogeneity and water-tight sealing of all indoor and outdoor installations. That way, the performance of the system can be maximised at full speed, and no hassle.

All-in solutions

We also accommodate transition to other materials such as mechanical fittings by compression, flanges or weld-to-weld solutions. All Thermaflex components are carefully selected and tested to fulfil technical specifications as well as sustainability standards to the highest degree.
Tools

- Pipe Cutter
- Timer
- Tangit KS Cleaning Tissue
- Scraper Set
  - D1: 16 - 25
  - D2: 25 - 90
- Chamfering Tool
- Gloves
- KS Tangit Cleaner
- Scraper
- D1: 16 - 25
- D2: 25 - 90
- Hand Scraper
- Cable Cutters
- Tissues
- Manual pipe peeling and Chamfering Tool
  - D1: 20 - 110
- Temperature Stick
- Align Clamp
  - D1: 25 - 40
  - D2: 63 - 110
- Roller Support
- Thermometer
Electrofusion Machine
D1: 125
D2: 160
D3: 225

Polyfusion Welding Handmachine SET
D1: 16
D2: 63 - 110

Buttfusion Machine CNC

Electrofusion Machine

Polyfusion Welding Handmachine Complete SET
D1: 16
D2: 63

Buttfusion Machine ECO

Polyfusion Welding Machine
D1: 20
D2: 125

Heatbushes For Polyfusion Welding (Hand) Machines
D1: 16 - 110

Reduction Clamp
D1: 110 - 225

Rotation Scraper
D1: 125 - 225

Clamp for Buttfusion Machine

Outer Clamp

For spare parts and further support
nederland@thermaflex.com
Transitions

<table>
<thead>
<tr>
<th>Article</th>
<th>BCA Compression fitting</th>
<th>PB-Steel Transition</th>
<th>PB-Copper Transition</th>
<th>Adaptor Union Socket</th>
<th>Spigot Adaptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article Code</td>
<td>BCA-PB</td>
<td>RND-TF-PB</td>
<td>RND-TF-PB</td>
<td>PB-HV / GF-HV</td>
<td>GF-TFP</td>
</tr>
<tr>
<td>Transitions</td>
<td>male thread</td>
<td>Steel spigot</td>
<td>Steel spigot</td>
<td>male and/or female thread</td>
<td>male thread</td>
</tr>
<tr>
<td>Underground laying</td>
<td>no*</td>
<td>yes</td>
<td>yes</td>
<td>no*</td>
<td>no*</td>
</tr>
<tr>
<td>Assembly</td>
<td>Easy fitting without any special tools</td>
<td>Polyfusion- or Electrofusion welding</td>
<td>Polyfusion- or Electrofusion welding</td>
<td>Polyfusion- or Electrofusion welding</td>
<td>Polyfusion- or Electrofusion welding</td>
</tr>
</tbody>
</table>

*) not primarily recommended
Flanges

**Electrofusion Flange Adaptor Flat**
- **D1**: 34 - 150
- **D2**: 27 - 131
- **DN**: 15 - 100

**Electrofusion Flange Adaptor With Groove**
- **D1**: 34 - 150
- **d**: 20 - 110
- **DN**: 15 - 100

**Backing Flange**
- **D**: 106 - 226
- **D1**: 65 - 180
- **D3**: 14 - 18

**Polyfusion Flange Adaptor Flat**
- **D1**: 34 - 150
- **d**: 20 - 110
- **DN**: 10 - 100

**Polyfusion Flange Adaptor With Groove**
- **D1**: 29 - 150
- **d**: 16 - 110
- **DN**: 15 - 100

**Flange Gasket For Flange Adaptor**
- **D**: 51 - 162
- **DN**: 15 - 100
- **D1**: 20 - 110

**Buttfusion Flange Adaptor Flat**
- **D1**: 132 - 235
- **d**: 125 - 225
- **DN**: 150 - 200

**Buttfusion Backing Flange**
- **D**: 226 - 350
- **D3**: 18 - 22
- **DN**: 100 - 200
- **D2**: 125 - 225

**Flange Gasket For Buttfusion Flange Adaptor**
- **D**: 162 - 273
- **DN**: 100 - 200
- **D1**: 125 - 225

---

### Measurements of flange connections

<table>
<thead>
<tr>
<th>Pipe diameter d (mm)</th>
<th>20</th>
<th>25</th>
<th>32</th>
<th>40</th>
<th>50</th>
<th>63</th>
<th>75</th>
<th>90</th>
<th>110</th>
<th>125</th>
<th>160</th>
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<tbody>
<tr>
<td>Numbers of drilling</td>
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<td>4</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
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<tr>
<td>Bolts (not included)</td>
<td>M12x70</td>
<td>M12x75</td>
<td>M12x75</td>
<td>M12x80</td>
<td>M12x85</td>
<td>M16x85</td>
<td>M16x90</td>
<td>M16x95</td>
<td>M16x130</td>
<td>M20x140</td>
<td>M20x160</td>
<td></td>
</tr>
<tr>
<td>D (mm)</td>
<td>106</td>
<td>118</td>
<td>122</td>
<td>142</td>
<td>156</td>
<td>171</td>
<td>191</td>
<td>206</td>
<td>226</td>
<td>226</td>
<td>296</td>
<td>350</td>
</tr>
<tr>
<td>D1 (mm)</td>
<td>65</td>
<td>75</td>
<td>85</td>
<td>100</td>
<td>110</td>
<td>125</td>
<td>145</td>
<td>160</td>
<td>180</td>
<td>180</td>
<td>240</td>
<td>295</td>
</tr>
<tr>
<td>D2 (mm)</td>
<td>28</td>
<td>34</td>
<td>42</td>
<td>51</td>
<td>62</td>
<td>78</td>
<td>92</td>
<td>110</td>
<td>133</td>
<td>135</td>
<td>178</td>
<td>238</td>
</tr>
<tr>
<td>D3 (mm)</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>H (mm)</td>
<td>18</td>
<td>18</td>
<td>17</td>
<td>17</td>
<td>19</td>
<td>20</td>
<td>21</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>28</td>
<td>31</td>
</tr>
<tr>
<td>Torque (mm)</td>
<td>10</td>
<td>15</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>35</td>
<td>40</td>
<td>40</td>
<td>50</td>
<td>50</td>
<td>60</td>
<td>75</td>
</tr>
</tbody>
</table>
## End Caps

### End caps for single pipe system

<table>
<thead>
<tr>
<th>Product code</th>
<th>Product code [NEW]</th>
<th>Carrier pipe O.D. [mm]</th>
<th>Carrier pipe O.D. [mm]</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS-MAN40A20-A16</td>
<td>1741-040020-016</td>
<td>40</td>
<td>16, 20</td>
<td>0.025</td>
</tr>
<tr>
<td>VS-MAN50A25-A20</td>
<td>1741-040025-020</td>
<td>50</td>
<td>20, 25</td>
<td>0.029</td>
</tr>
<tr>
<td>VS-MAN63A32-A16</td>
<td>1741-040032-016</td>
<td>63</td>
<td>16, 20, 25, 32</td>
<td>0.043</td>
</tr>
<tr>
<td>VS-MAN75A40-A16</td>
<td>1741-040040-016</td>
<td>75</td>
<td>16, 20, 25, 32, 40</td>
<td>0.075</td>
</tr>
<tr>
<td>VS-MAN90A50-A20</td>
<td>1741-040050-020</td>
<td>90</td>
<td>20, 25, 32, 40, 50</td>
<td>0.095</td>
</tr>
<tr>
<td>VS-MAN125A75-A32</td>
<td>1741-040075-032</td>
<td>125</td>
<td>32, 40, 50, 63, 75</td>
<td>0.180</td>
</tr>
<tr>
<td>VS-MAN160A90-A50</td>
<td>1741-160090-050</td>
<td>160</td>
<td>50, 63, 75, 90</td>
<td>0.220</td>
</tr>
<tr>
<td>VS-MAN200A125-A110</td>
<td>1741-200125-110</td>
<td>200</td>
<td>110, 125</td>
<td>0.225</td>
</tr>
</tbody>
</table>

### End caps for double pipe system

<table>
<thead>
<tr>
<th>Product code</th>
<th>Product code [NEW]</th>
<th>Carrier pipe O.D. [mm]</th>
<th>Outlet 1</th>
<th>Outlet 2</th>
<th>Outlet 3</th>
<th>Outlet 4</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS-MAN63A2/20-A2/16</td>
<td>1742-063020-016</td>
<td>63</td>
<td>16, 20</td>
<td></td>
<td></td>
<td></td>
<td>0.045</td>
</tr>
<tr>
<td>VS-MAN75A2/20-A2/16</td>
<td>1742-075020-016</td>
<td>75</td>
<td>16, 20</td>
<td></td>
<td></td>
<td></td>
<td>0.055</td>
</tr>
<tr>
<td>VS-MAN90A2/25-A2/16</td>
<td>1742-090025-016</td>
<td>90</td>
<td>16, 20, 25</td>
<td></td>
<td></td>
<td></td>
<td>0.080</td>
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<tr>
<td>VS-MAN125A2/32-A2/20</td>
<td>1742-125032-020</td>
<td>125</td>
<td>20, 25, 32</td>
<td></td>
<td></td>
<td></td>
<td>0.185</td>
</tr>
<tr>
<td>VS-MAN160A2/50-A2/32</td>
<td>1742-160050-032</td>
<td>160</td>
<td>32, 40, 50</td>
<td></td>
<td></td>
<td></td>
<td>0.205</td>
</tr>
<tr>
<td>VS-MAN200A2/63</td>
<td>1742-200063-063</td>
<td>200</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
<td>0.225</td>
</tr>
</tbody>
</table>

### End caps for multi pipe systems

<table>
<thead>
<tr>
<th>Product code</th>
<th>Product code [NEW]</th>
<th>Carrier pipe O.D. [mm]</th>
<th>Outlet 1</th>
<th>Outlet 2</th>
<th>Outlet 3</th>
<th>Outlet 4</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>FV+MAN160ML</td>
<td>1744-160000-000</td>
<td>160</td>
<td>25, 32, 40</td>
<td>20, 25</td>
<td>20, 25</td>
<td>20, 25</td>
<td>0.22</td>
</tr>
<tr>
<td>FV+MAN200ML</td>
<td>1744-200000-000</td>
<td>200</td>
<td>32, 40, 50, 63</td>
<td>25, 32, 40</td>
<td>20, 25</td>
<td>20, 25</td>
<td>0.40</td>
</tr>
</tbody>
</table>

### End caps Flexalen SL Straight Lenghts

<table>
<thead>
<tr>
<th>Product code</th>
<th>Product code [NEW]</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FV-MAN160FL</td>
<td>1745-160160-000</td>
<td>End caps to make the sealing between medium pipes and smooth casing pipe.</td>
</tr>
<tr>
<td>FV-MAN225FL</td>
<td>1745-225225-000</td>
<td></td>
</tr>
</tbody>
</table>
## Insulation Kits

### Shrink Sleeves
- **D1**: 63 - 315
- **D2**: 40 - 315

### Flexalen Foam Insulation Couplers
- **D1**: 40 - 200
- **D2**: 40 - 200

### Flexalen Foam Insulation Couplers
- **D1**: 225 - 315

### Flexalen Pur Insulation Couplers
- **D1**: 125 - 200
- **D2**: 90 - 160

### Insulation End Cap Set
- **D1**: 90 - 315

### Shrink Sleeves
**D1**: 63 - 315

### Flexalen Foam Insulation Reduction Couplers
- **D1**: 125 - 200
- **D2**: 90 - 160

---

<table>
<thead>
<tr>
<th>Product code</th>
<th>Product code [NEW]</th>
<th>Casing pipe O.D. [mm]</th>
<th>Sliding muff</th>
<th>Insulation</th>
<th>Weight [kg/m]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>O.D. [mm]</td>
<td>Wall thickness [mm]</td>
<td>Shrinkable</td>
</tr>
<tr>
<td>FV-UM40PO</td>
<td>1746-040040-000</td>
<td>40</td>
<td>~69</td>
<td>3</td>
<td>no</td>
</tr>
<tr>
<td>FV-UM63-50PO</td>
<td>1746-063050-000</td>
<td>50, 63</td>
<td>~84</td>
<td>3</td>
<td>no</td>
</tr>
<tr>
<td>FV-UM90-75PO</td>
<td>1746-090075-000</td>
<td>75, 90</td>
<td>~103</td>
<td>3</td>
<td>yes</td>
</tr>
<tr>
<td>FV-UM125PO</td>
<td>1746-125125-000</td>
<td>125</td>
<td>~140</td>
<td>3</td>
<td>yes</td>
</tr>
<tr>
<td>FV-UM160PO</td>
<td>1746-160160-000</td>
<td>160</td>
<td>~177</td>
<td>3</td>
<td>yes</td>
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<tr>
<td>FV-UM200PO</td>
<td>1746-200200-000</td>
<td>200</td>
<td>~218</td>
<td>3,5</td>
<td>yes</td>
</tr>
<tr>
<td>FV-UM225PO</td>
<td>1746-200225-000</td>
<td>225</td>
<td>~245</td>
<td>4</td>
<td>Yes</td>
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<tr>
<td>FV-UM250PO</td>
<td>1746-200250-000</td>
<td>250</td>
<td>~296</td>
<td>4,5</td>
<td>Yes</td>
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<tr>
<td>FV-UM315PO</td>
<td>1746-200315-000</td>
<td>315</td>
<td>~345</td>
<td>5</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Restraining Clamps
Lock-in for stable welding

We offer restraining clamps that feature a double clamp with anchor plates, as well as threaded pipes and elbows to restrain the pipes where necessary. The elasticity of the material allows the total pipe system to self-compensate, eliminating the need for expansion loops or bellows. Restraining clamps are only necessary at the end of the pipeline at the building entry, effectively avoiding excess stress on the transition fittings.

Restraining Clamps for single pipe system
O.D.16 - O.D.50,
O.D. 160 - O.D.225

Restraining Clamps for pipe systems
O.D.16 - O.D. 63

External pipelines, internal pipelines – horizontal
For above ground horizontal lines, we recommend that all coiled Flexalen pipelines are supported by angled bar support systems or cable trays with strong clips/ties placed every metre along the entire length. The Flexalen anchoring system must be used with transition ends. (see sketch)

Restraining Clamps for pipe systems

External pipelines, internal pipelines – vertical
For vertical lines, we recommend that the pipeline is secured to the wall or cable tray to the casing pipe at every metre. The PB pipe in the Flexalen pipe system should be anchored every 4 to 5 metres (in most cases on each floor). Suitable restraining clamps should be used on both sides of the clamp.

Non insulated Polybutene pipelines
Precautions must be taken for expansion and contraction as well as for pipe support when using an un-insulated PB. Bare PB pipes require complete and permanent protection from ultraviolet (UV) radiation. The layout of in-house pipeworks significantly depends on the area (visible or non-visible) where the PB pipe system is to be installed, also depending on local standardization.

<table>
<thead>
<tr>
<th>Carrier pipe O.D. [mm]</th>
<th>X *) [mm]</th>
<th>max. elongation force per pipe **) [kN]</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>~ 180</td>
<td>0.35</td>
</tr>
<tr>
<td>32</td>
<td>~ 180</td>
<td>0.60</td>
</tr>
<tr>
<td>40</td>
<td>~ 180</td>
<td>0.90</td>
</tr>
<tr>
<td>50</td>
<td>~ 180</td>
<td>1.40</td>
</tr>
<tr>
<td>63</td>
<td>~ 180</td>
<td>2.20</td>
</tr>
<tr>
<td>75</td>
<td>~ 180</td>
<td>3.00</td>
</tr>
<tr>
<td>90</td>
<td>~ 180</td>
<td>4.30</td>
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<tr>
<td>110</td>
<td>~ 180</td>
<td>6.50</td>
</tr>
<tr>
<td>125</td>
<td>~ 180</td>
<td>8.30</td>
</tr>
</tbody>
</table>

*) depending on mounting situation
**) temperature difference \(dT = 70K\)
### Restraining Clamp for single pipe systems

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>F-RCLAMP16</td>
<td>1791-016016-001</td>
<td>16</td>
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<tr>
<td>F-RCLAMP20-25</td>
<td>1791-025020-001</td>
<td>20, 25</td>
<td>1.36</td>
<td>~175</td>
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<tr>
<td>F-RCLAMP32</td>
<td>1791-032032-001</td>
<td>32</td>
<td>1.36</td>
<td>~175</td>
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<tr>
<td>F-RCLAMP40</td>
<td>1791-040040-001</td>
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<td>1.40</td>
<td>~175</td>
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<td>F-RCLAMP63</td>
<td>1791-063063-001</td>
<td>63</td>
<td>1.10</td>
<td>~175</td>
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<tr>
<td>F-RCLAMP75</td>
<td>1791-075075-001</td>
<td>75</td>
<td>1.50</td>
<td>~175</td>
</tr>
<tr>
<td>F-RCLAMP90</td>
<td>1791-090090-001</td>
<td>90</td>
<td>1.50</td>
<td>~175</td>
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<tr>
<td>F-RCLAMP110</td>
<td>1791-110110-001</td>
<td>110</td>
<td>1.50</td>
<td>~175</td>
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<tr>
<td>F-RCLAMP125</td>
<td>1791-125125-001</td>
<td>125</td>
<td>1.50</td>
<td>~175</td>
</tr>
<tr>
<td>F-RCLAMP160</td>
<td>1791-160160-001</td>
<td>160</td>
<td>2.26</td>
<td>~175</td>
</tr>
<tr>
<td>F-RCLAMP225</td>
<td>1791-225225-001</td>
<td>225</td>
<td>2.36</td>
<td>~175</td>
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### Restraining Clamp for double pipe systems

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</tr>
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Wall entry for corrugated casing pipes
Optimized flow with sealed wall penetrations

Suitable for ground water pressure up to 0.5 bar for corrugated outer casings and 3 bar for smooth outer casings / no contamination

- Pressure-tight annular sealing between all Flexalen pipe systems and core drilled holes / scabbard tubes for wall openings
- Suitable for high ground water tables
- Oil, fuel and solvent-resistant, temperature and fire-resistant designs available
- Protected location in masonry
- Stainless steel bolts
- Absorption of impact, noise and vibration loads
- Cathodic pipe

Annular space sealant for demanding situations

- Robust rubber parts guarantee long lifetime
- Suitable for high ground water tables (only for F-SL with smooth outer casing)
- Oil, fuel and solvent-resistant, temperature and fire-resistant designs available
- Protected location in masonry
- Also perfectly suited for retrofitting
- Easy and rapid installation with prefabricated connections
- Galvanized or stainless steel bolts upon request
- Absorption of impact, noise and vibration loads
- Cathodic pipe
- Suitable for ground water without pressure

The corrugated construction of Flexalen 600 pipe casing in combination with quicksetting sealing cement offers a water-tight seal between the entry hole and the Flexalen casing. This means that there is no need for extra rubber-based wall entry seals when using Flexalen 600 coiled pipes.
### Annular Space Sealing Not Watertight

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<th>Product code</th>
<th>Product code [NEW]</th>
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**Westin Playa Bonita in Panama**

- 620 rooms on 23 floors including 6 auditoriums and 4 restaurants supplied with sustainable cooling and heating, chilled and hot potable water
- 0 incidents recorded since project completion

**Wörgl in Austria**

- 20 low-energy row houses
- 78% installation cost reduction
- 176 man hours saved
- 100% secure heating & sanitary water supply
- 4,500 tons of CO2 saved per year which is the equivalent absorbed by 225,000 trees

**Purmerend, Netherlands**

- 4,000 homes reconnected
- 50,000 tons of CO2 saved
- 84% cut in unplanned maintenance
- 50% cut in water supply
- 10% cut in heat loss
- 33 steady jobs created

**Edine, Turkey**

- 4,000 homes reconnected
- 50,000 tons of CO2 saved
- 84% cut in unplanned maintenance
- 50% cut in water supply
- 10% cut in heat loss
- 33 steady jobs created
Purmerend’s network resurrection

Purmerend, Netherlands

District Heating 2.0

The district-heating network in Purmerend is situated in an area with a high ground water level, so the old steel pipes of the district heating network suffered heavily from the corrosion that resulted from this, and its damage to the insulation. This emphasized the need to switch to plastic pipes. Purmerend also wanted to make the district heating network sustainable, yet economical. They wanted to be prepared for the future, when they would like to use biomass and geothermal energy for heating purposes. Their major problem: connections located in difficult crawling spaces underneath the houses where Dutch legislation does not even allow for steel welding.

Goals

A fast renovation was needed to keep the downtime of the heating/hot water supply short. Speed and space conditions were crucial to keep the disturbances to a minimum for the local government and the residents of Purmerend. The existing district heating network in Purmerend failed to meet the performance demands, so the focus was laid on improving heat loss and securing a full-proof and hassle-free district heating network.

Main advantages for SVP:

• Joint development of a renovation concept avoiding open flame connections in the crawl spaces
• Development of a high-speed installation concept
• Tailor-made Flexalink for quick, easy, and secure house connections
• Installation trainings and on-site supervision for HAK (pipe installers)
• Project preparation (material lists, network design, logistics)
• Pre-fabricated and customized supply of materials

Results

An exceptionally fast connection of about 4,000 houses meant there was very little disturbance for the local residents. Initially, they had been particularly sceptical due to the earlier issues with the network, but ultimately they were positive and grateful of the renovation project once the results became clear.

Precise pre-fabrication per section made it particularly easy for the installer to plan the implementation and reduce time and space requirements. Complaints quickly dropped and the maintenance scheme of the network drastically changed, as maintenance was minimized.

For a detailed overview of all our case studies, go to www.thermaflex.com
Our process

A customized approach
No two projects are the same. But after seeing thousands of them around the world, we know what makes them a sustainable success. Your specific projects goals come first and act as the ‘yardstick’ throughout the project. Our very best engineers design the best possible solution and calculate optimal routing and dimensioning; fast implementation and lifecycle performance are always on the top of their minds. Once full alignment on all aspects of the project is reached, it’s time for implementation.

Our tools, training and on-site support ensure a smooth implementation of the project. We are only happy when you are. All that’s left for users and owners is to enjoy affordable and headache-free comfort for generations to come. After that, safe and efficient reclaim secures the renewed purpose of our carefully selected materials.

Your very own thermal energy expert
Team up today with our highly dynamic, and professional team of experts and engineers. Our solutions have proven successful in any climate, situation or working conditions. Locally, our teams of professionals across the globe are ready to cater for your needs, from Panama to Siberia.

What goals do you want to achieve?
- Cost control
- Operational efficiency
- Installation ease and speed
- Energy saving
- Environmental capital
- Life expectancy

CALL US