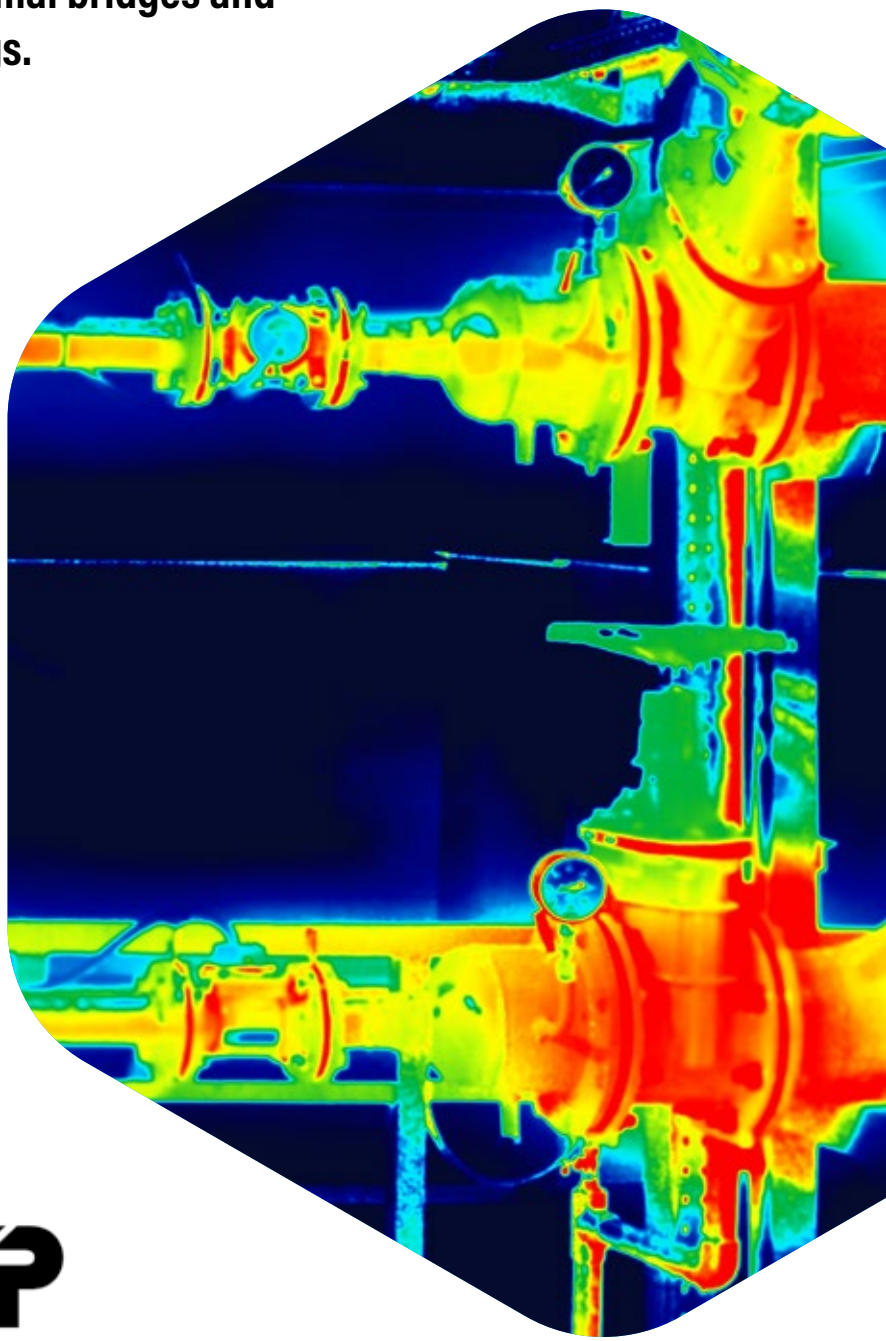
REDUCE THERMAL BRIDGES. IMPROVE ENERGY EFFICIENCY.

Using a flexible, closed-cell insulation system to reduce installation-related thermal bridges and unlock additional energy savings.



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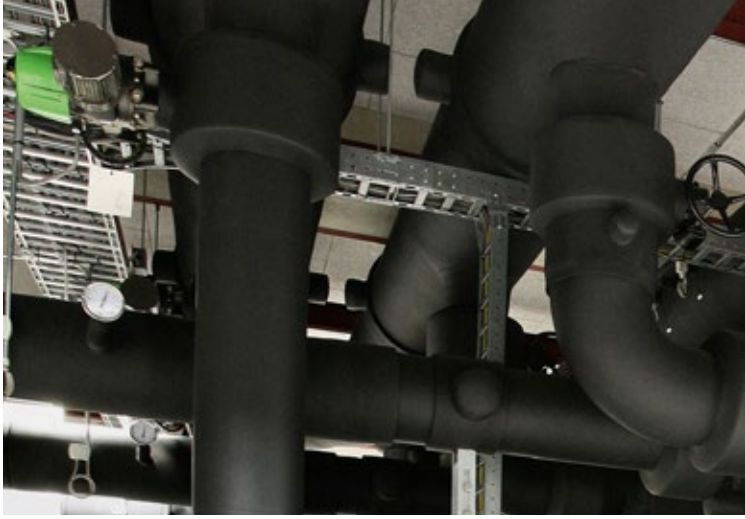


HEATING AND COOLING CONSUME ALMOST HALF OF THE ENERGY USED WITHIN EUROPE.

Space heating and cooling accounting for the majority of this consumption – 45% in the residential sector and 36% in the industrial sector.

This highlights the growing need to reduce primary energy use without compromising occupants' well-being. Reducing energy loss from the mechanical services that provide space heating and cooling is essential, and pipe insulation is one of the most effective and proven energy-saving technologies. Nevertheless, consultants often underestimate the importance of pipe insulation and often fail to recognise that easily correctable installation practices are responsible for a high proportion of avoidable energy loss.

FEF and PEF insulation materials are easy to install and may represent the best option available for insulating every component of mechanical service pipework throughout its entire length.

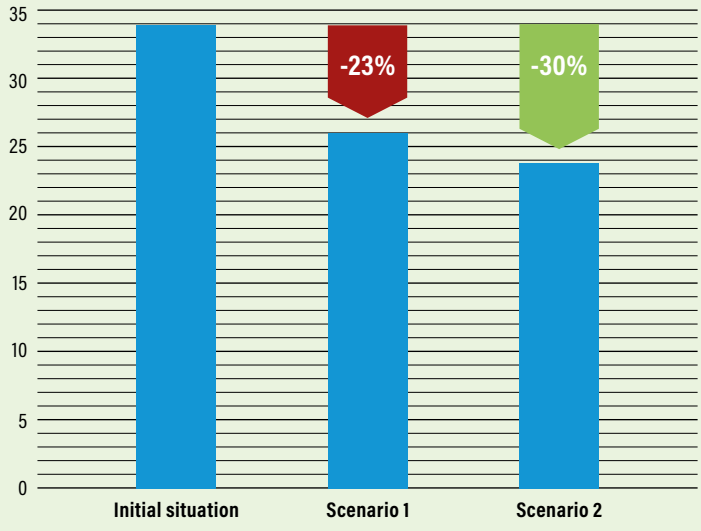
UNLOCK ADDITIONAL SAVING POTENTIAL

The insulation of pipes and ducts is often an afterthought, and little consideration is given to material selection or installation details. As a result, complex or irregularly shaped components of pipe insulation systems — such as flanges, valves, pipe supports, and bends or elbows—are frequently left uninsulated. In some cases, these components are simply covered with PVC or duct tape to give the appearance of being part of an insulated system, without delivering any energy-saving benefits.

A study conducted by the FfE (Forschungsgesellschaft für Energie-wirtschaft) in Munich assessed the impact of insufficient or incomplete thermal insulation on pipes and ducts. The institute examined existing pipe insulation in six companies from different industry segments. The study found that retrofitting all uninsulated components of the pipe systems could reduce energy losses by more than 20%.

Although the study is not representative of all building and application types, the results clearly demonstrate that applying thermal insulation to an entire pipe system can have a significant impact on reducing the energy consumption and CO_2 emissions of occupied buildings.

Energy-saving potential by insulating all pipework components



Initial situation -
State of the mechanical insulation at the start of the study

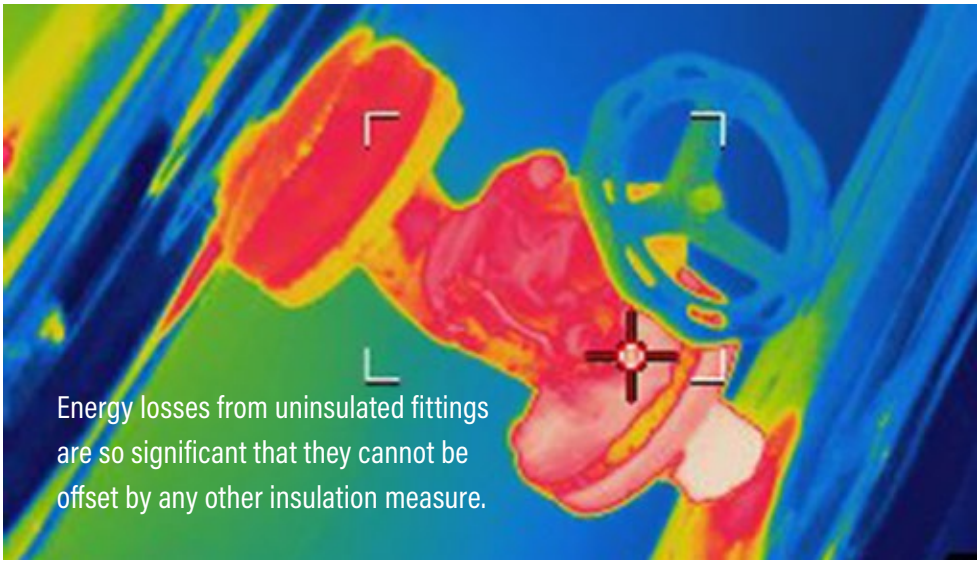
Scenario 1:
Retrofitting all uninsulated components of the pipe systems

Scenario 2:
Entire insulation system upgraded to economically optimal thicknesses

Graph: CEFEP | Data Source: FfE Study – Energy Saving Potential by Mechanical Insulation, Final Report, November 2012 (available only in German)

RETRO-FITTING ALL UNINSULATED COMPONENTS OF THE PIPE SYSTEMS COULD REDUCE ENERGY LOSSES BY MORE THAN 20%

ENERGY LOSS FROM UNINSULATED FITTINGS



Energy losses from uninsulated fittings are so significant that they cannot be offset by any other insulation measure.

Several EN and ISO standards provide detailed guidance on assessing additional energy losses when flanges and other fittings are left uninsulated. Figures provided by EN ISO 12241:2008 suggest that, for a DN 50 pipe operating at 100°C, even an insulated flange can be responsible for as much energy loss as 1 m of insulated pipe.

The same standard suggests that, depending on the exact location, a single uninsulated flange can result in heat loss equivalent to 3–5 m of insulated straight pipe. This represents an increase in energy loss of at least 300% and potentially as much as 500%.

These energy losses are so significant that they cannot be offset by any other insulation measure. Increasing the insulation thickness on straight pipe runs or selecting insulation materials with lower thermal conductivity values will save only marginal amounts of energy compared with the savings that can be achieved by insulating all flanges, valves, and pipe supports.

Energy loss of uninsulated flanges for pressure stages

Flanges for pressure stages PN 25–PN 100	Equivalent length Δl in m (for 100°C)			
	Uninsulated		Insulated	
	In buildings at 20°C	In the open air at 0°C	In buildings at 20°C	In the open air at 0°C
DN 50	3–5	7–11	0.7–1.0	0.7–1.0
DN 100	4–7	9–14	0.7–1.0	0.7–1.0
DN 150	4–9	11–18	0.8–1.1	0.8–1.1
DN 200	5–11	13–24	0.8–1.3	0.8–1.3
DN 300	6–16	16–32	0.8–1.4	0.8–1.4
DN 400	9–16	22–31	1.0–1.4	1.0–1.4
DN 500	10–16	25–32	1.1–1.3	1.1–1.3

Source: EN ISO 12241:2008 – Table A.1

BRIDGING THERMAL GAPS WITH FLEXIBLE INSULATION

An insulation system is only as effective as its weakest points, which makes insulating fittings such as flanges, pipe supports, and bends essential. These pipework elements often have complex geometries, which is why flexible insulation materials that can be easily cut and shaped to fit should be the preferred choice for consultants and contractors.

FEF and PEF insulation materials are highly flexible. This makes it possible to insulate even the most complex pipework elements, but they also offer several additional advantages. These insulation materials can be easily cut to size on site without the need for specialist equipment – nothing more than a sharp knife is required.
Since the materials are completely free from dust and fibres, they are particularly easy and clean to work with, without introducing contaminants into the working environment.

Insulating all parts of a pipe and duct system is easy to achieve with FEF and PEF insulation products. Thanks to their flexible, closed-cell structure, they can be easily cut to fit every component of the system. Only when all parts of a pipe and duct system are properly insulated can mechanical building services operate at maximum efficiency. This saves energy, improves system efficiency, and helps minimise the risk of corrosion.

CEFEP
European Association of
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The European Association of
Flexible Elastomeric Foam (FEF) and Polyethylene Foam (PEF) insulation manufacturers
brings together leading producers of technical insulation materials across Europe.

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References
1. EU Strategy on Heating and Cooling, COM (2016) 51 final
2. Heating & Cooling Sector, © European Union 2016
3. FfE: Energy Saving Potential by Mechanical Insulation, Final Report, November 2012 (available only in German)
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