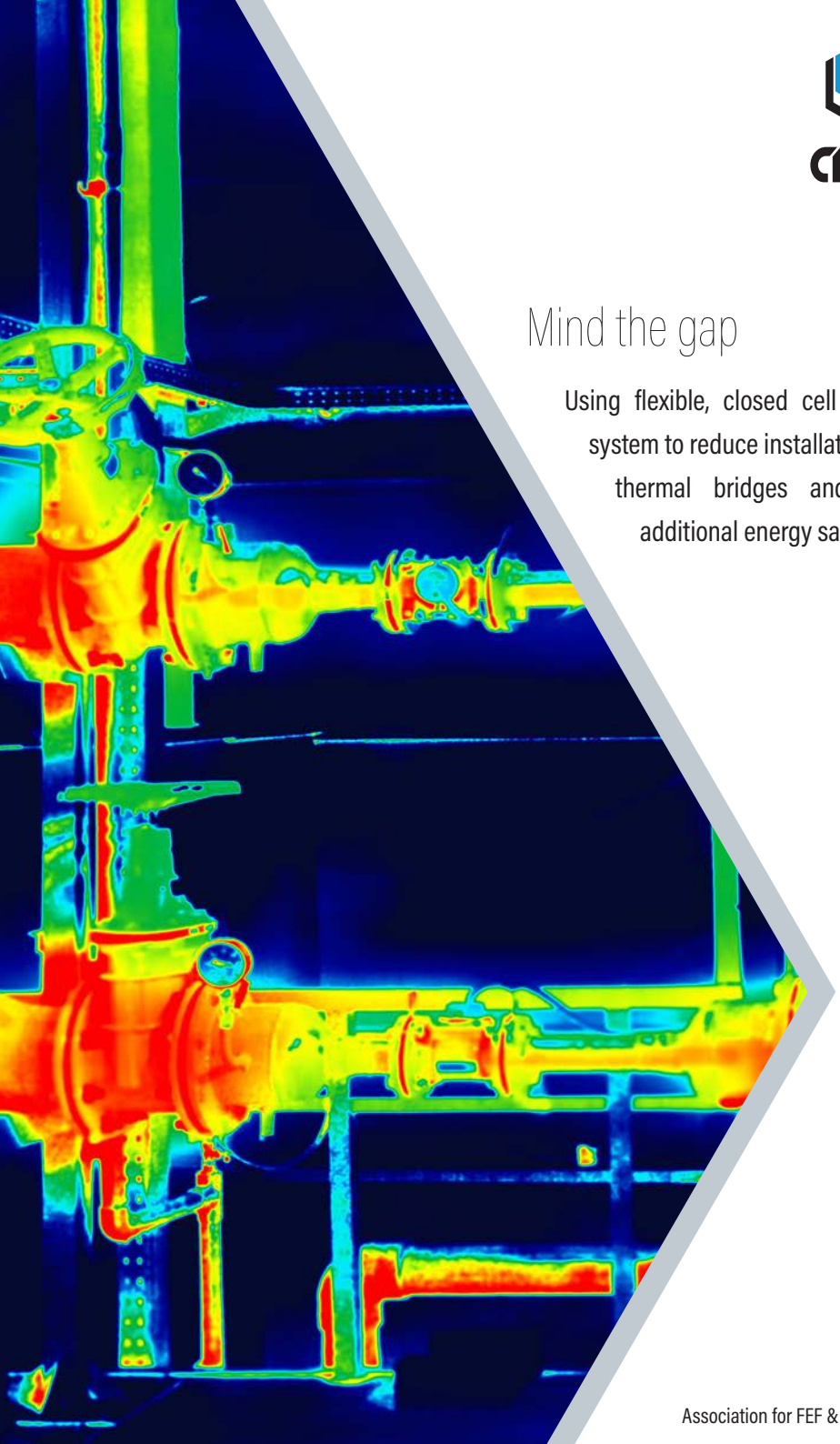


CEFEP

Mind the gap

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

Association for FEF & PEF insulation

Heating and cooling consume almost half [1] of the energy used within Europe. With space heating and cooling accounting for the majority of it - 45% in the residential sector and 36% in the industrial sector [2] – an ever bigger need to reduce the use or primary energy becomes important without compromising on the well-being of occupants.

Reducing energy loss from the mechanical services that supply space heating and cooling is essential and pipe insulation is one of the most effective, proven, energy saving technologies. Nevertheless, consultants often do not appreciate the importance of pipe insulation and that some easily corrected installation practices are responsible for a high proportion of avoidable energy loss.

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

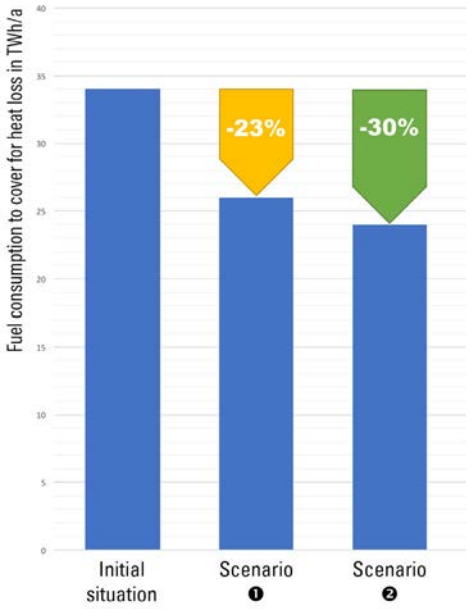
Unleash additional saving potential

Insulation of pipes and ducts is often an afterthought and often little consideration is given to the details of which materials or how they should be installed. This often leads to difficult or irregularly shaped parts of a pipe insulation system like flanges, valves, pipe supports and complicated bends or elbows being left un-insulated. In some cases these pipe fixtures are simply covered with PVC or duct tape to make them 'look' part of an insulated system without providing any of the energy saving benefits.

The FfE (Forschungsgesellschaft für Energiewirtschaft) in Munich conducted a study in 2012 to understand the impact of insufficient and incomplete (thermal) insulation on pipes and ducts. The institute examined the existing pipe insulation of six firms from different segments.

Their findings are revealing: retro-fitting all uninsulated components of the pipe systems could reduce energy losses by more than 20%[3].

Energy saving potential by insulating all pipework components



Retro-fitting all uninsulated components of the pipe systems could reduce energy losses by more than 20%[3]

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

Scenario ❶ - Retro-fitting all uninsulated components of the pipe systems

Scenario ❷ - Entire insulation system was upgraded to economic thicknesses

Graph: CEFEP | Data Source FfE Study - Energy saving potential by mechanical insulation, Final Report, November 2012 (only available in German)

Although the study is not representative of all building and application types, the results clearly demonstrate that applying thermal insulation to a pipe system in its entirety can have a significant impact when it comes to reducing the energy consumption and CO2-emssions of occupied buildings.

Energy loss from uninsulated fittings

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

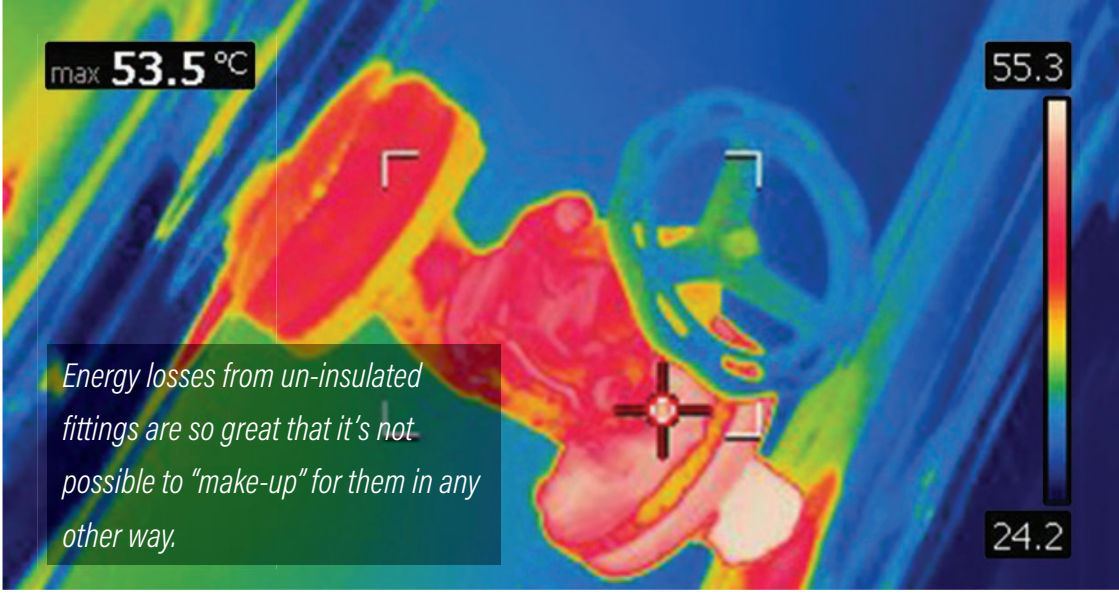
The same standard suggests that, depending on the exact location, a single uninsulated flange can yield heat loss equivalent to between 3 and 5 m of insulated straight pipe. That's an increase in energy loss of at least 300% and potentially as much as 500%.

These energy losses are so great that it's not possible to "make-up" for them in any other way. Increasing the thickness of insulation applied to straight pipes or selecting insulation with lower thermal conductivity values will save only marginal amounts of energy when compared to the energy savings that can be realised by insulating all flanges, valves and pipe supports using FEF and PEF insulation.

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 the gap(s) made easy with flexible insulation

An insulation system only can be as efficient as its weakest points, which makes insulating fixtures like flanges, pipe supports and bends essential. These pipework elements often feature difficult geometry which is why flexible insulation materials that can be easily fabricated 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 offer further, crucial, advantages too. These insulation materials can be easily cut to size on site without the need for specialist equipment – nothing else is needed other than a sharp knife. Since the materials are completely free from dust and fibres they are particularly easy and clean to work with, introducing no contaminants into the working environment.

The insulation of all parts of a pipe and duct system is easy to achieve with insulation products made of FEF and PEF. Due to their flexible, closed cell structure they can easily be cut to fit every part of the pipe system. Only if all parts of a pipe and duct system are insulated properly the mechanical building services can perform most efficiently. This is saving energy and reduces the risk of corrosion every day.

CEFEP, the industry association for FEF and PEF insulation, provides a representative body for European manufacturers of elastomeric and polyethylene foam insulation materials.

Its objective is to develop and promote common standards and design solutions for FEF and PEF insulation to realise additional energy savings by insulating pipework, ductwork and associated parts of mechanical systems.

For more information about CEFEP, its vision and members please visit www.cefep.net.

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(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 (only available in German)