

CONTROL CONDENSATION

Flexible, closed-cell insulation prevents condensation from forming on cold, refrigeration and air-conditioning pipes.



CEFEP

European Association of
FEF and PEF Insulation Manufacturers

CONDENSATION ON PIPEWORK SHOULD ALWAYS BE PREVENTED WHEREVER POSSIBLE.

Moisture can damage building structures, promote mould growth, and accelerate corrosion.

Depending on the conditions, condensation-related corrosion can significantly reduce the service life of mechanical systems. Maintaining surface temperatures above the dew point is essential to prevent condensation. While this can be achieved by different insulation materials, flexible closed-cell solutions offer a unique combination of properties that make them particularly effective in condensation-prone environments.

Warm air can hold significant amounts of water vapour, but this capacity decreases as the air cools. As temperatures drop, excess moisture is released, resulting in condensation.

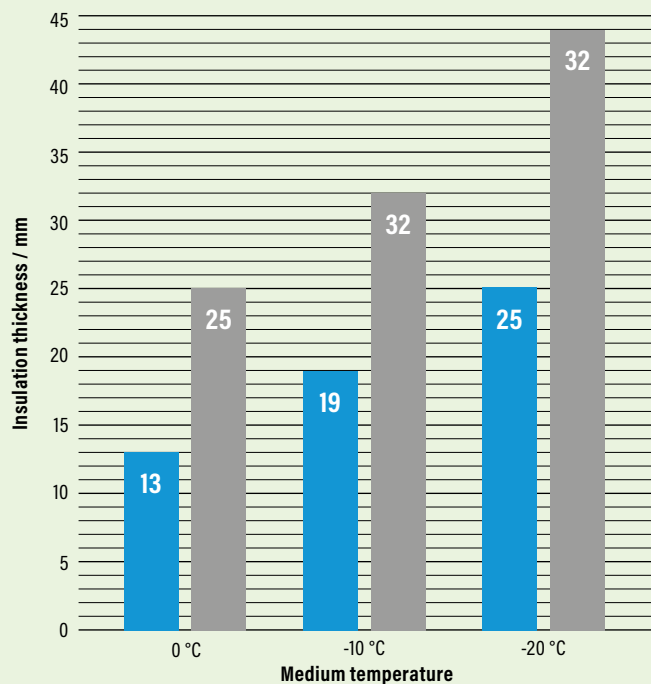


SURFACE TEMPERATURE CONTROL WITH HIGH-EMISSIVITY INSULATION

Surfaces colder than the surrounding air are always at risk of condensation, especially in refrigeration and air-conditioning systems. Proper insulation not only reduces energy loss but also prevents warm, moisture-laden air from contacting cold pipe surfaces.

When insulating refrigeration and air-conditioning pipework, it is essential to keep the surface temperature above the dew point so that condensation cannot form. Besides the thermal conductivity of an insulation material, surface emissivity is also critical. Surface emissivity describes the potential of a

material to give off energy in the form of thermal radiation. With a non-reflective, high-emissivity finish, black surfaces are well suited to controlling the surface temperature. In this way, relatively low insulation thicknesses can be used for reliable condensation control.



Example:

Pipe diameter: 22 mm

Thermal conductivity at 0°C: 0.034 W/(m·K)

Relative humidity: 75%

Ambient temperature: 25°C

■ High emissivity insulation (black - FEF) ■ Low emissivity insulation (aluminium-foiled insulation)

REDUCE INSULATION THICKNESS WITH HIGH-EMISSIVITY INSULATION

PREVENTING MOISTURE INGRESS

Differences in partial water vapour pressure drive moisture towards colder surfaces, where it can cause interstitial condensation within the insulation. If water vapour penetrates the insulation layer, interstitial condensation can occur, significantly reducing performance and increasing the risk of corrosion.

Unlike many conventional materials that rely on fragile external vapour barriers, closed-cell FEF and PEF insulation provides inherent resistance to water vapour diffusion. This built-in protection remains effective even if the surface is slightly damaged. Closed-cell FEF and PEF materials are, however, so inherently effective at preventing the passage of water vapour that they can be considered to possess an in-built water vapour barrier and do not require an external foil.



OPTIMISED PERFORMANCE WITH MINIMAL THICKNESS

Because closed-cell insulation does not require low-emissivity outer layers, it enables thinner, more efficient insulation solutions. Its flexibility allows precise fitting around complex components such as valves, flanges, supports, and bends, ensuring continuous protection across the entire system.

Thanks to the flexibility of the foam and the inherent vapour resistance of its closed-cell structure, FEF materials can be cut to size, without relying on externally applied vapour barriers for effective moisture protection. They are particularly practical when it comes to insulating complex pipework elements like valves and flanges.

By combining thermal efficiency, vapour resistance, and installation flexibility, FEF and PEF insulation delivers reliable condensation control, reduces energy consumption, and extends the lifetime of mechanical systems.





The European Association of
Flexible Elastomeric Foam (FEF) and Polyethylene Foam (PEF) insulation manufacturers
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