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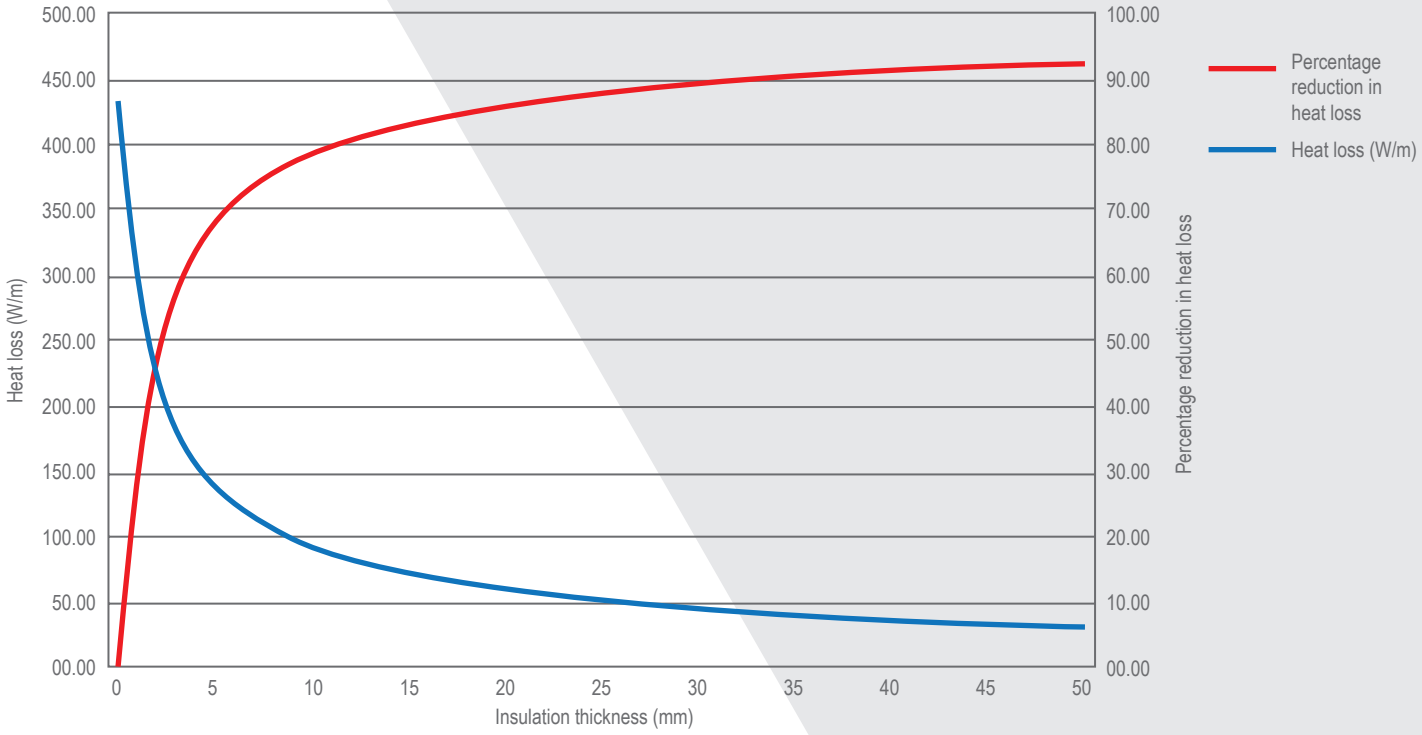
The effect of insulation coverage on energy savings T-FIT®

T-FIT®
Unique Insulation Technology

It seems obvious that increasing the thickness of an insulation material will reduce the heat loss from the pipe that it is insulating. But what happens if pipework is too densely packed, and using a thick insulation actually prevents certain parts of the pipe being insulated?

When it comes to reduction in heat flow, the initial increase in thickness of insulation, compared to no insulation at all, has the largest effect. As the thickness is further increased, heat loss continues to be reduced but at a diminishing rate. This effect can be seen in the below graph, based on theoretical calculation of a 2" NB pipe running at 150°C in a 23°C environment, covered with varying thicknesses of T-FIT Clean insulation material. Within the first 6 mm of insulation, the heat loss has been reduced approximately 70% compared to its original value, though in order to obtain 90% reduction in heat loss, over 30 mm of insulation is required; a huge increase in thickness for a relatively small increase in efficiency



This would suggest that it is more important to ensure maximum coverage of pipework with insulation than it is to insulate easy-to-reach portions of piping with very thick insulation, leaving some pipework bare.

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The following heat losses were calculated using a theoretical model for a 2" NB pipe running at 150°C in a 20°C environment. The heat losses in Watt/metre were then converted to total heat losses over a 100 metre install where different proportions of pipework are able to be insulated, based on the type of insulation. For the thinner T-FIT insulation 95% of the pipe work is insulated, whereas with thicker fibre based Insulation only 75% can be insulated.

	Uninsulated pipe	T-FIT Clean	Fibre Product
Insulation wall thickness (mm)	0	6.35	25
Heat loss (Watt/m)	435	126	51
Percentage reduction in heat loss for 100% insulated pipe (%)	0	71	88
Heat loss over a 100 m install (kW) [95% insulation coverage of install for T-FIT Clean / 75% coverage of install for fibre based Insulation]	435.0	14.1	14.7
Percentage energy saving (%)	0	68	66

Even though the heat loss for a segment of pipe covered with 6.35 mm T-FIT Clean is greater than that when the pipe is covered with 25 mm of fibre based Insulation, using the thinner insulation can still lead to an overall energy saving if a larger proportion of the pipework can be insulated.

It has been found in the most common type of applications for T-FIT Clean that 6.35 mm T-FIT insulation can cover 95% of process piping whereas traditional, thicker insulation materials are only able to cover 75%. It can be seen in the table above that in this 95 vs. 75% situation, 6.35 mm T-FIT Clean can actually provide similar or greater energy and cost savings overall compared to 25 mm of other insulation materials.

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