
Pipework insulation equipment

A guide to equipment eligible for
Enhanced Capital Allowances



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Introduction

ECAs are a straightforward way for a business to improve its cash flow through accelerated tax relief. The scheme encourages businesses to invest in energy saving plant or machinery specified in the Energy Technology List (ETL) to help reduce carbon emissions, which contribute to climate change.

The ETL is a register of technologies and, where appropriate, related products that may be eligible for 100% tax relief under the Enhanced Capital Allowance (ECA) scheme for energy saving technologies¹. The Carbon Trust manages the list and promotes the ECA scheme on behalf of government.

In the case of pipework insulation, the eligibility criteria are defined by performance against a specific standard (BS 5422: 2009) and, therefore, individual products and manufacturers are not listed.

This leaflet gives an overview of how pipework insulation equipment is specified on the ETL and illustrates the reductions in energy bills that can be realised by investing in qualifying ETL energy saving equipment over non-qualifying equipment.

Background

The ETL divides into two sections – one focuses on the criteria which need to be met by products and equipment (the Energy Technology Criteria List or ETCL), the other focuses on the products that meet the criteria (the Energy Technology Product List or ETPL).

However, pipework insulation products are not listed on the ETPL. Instead businesses should seek confirmation from their installer that the installation will comply with the ETCL criteria prior to purchase, and after installation, obtain written confirmation that the specified pipework insulation was installed in accordance with the requirements in the ETCL criteria. This documentation can then be used to support a claim for an ECA.

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¹ Eligibility for ECAs is based on a number of factors. Visit <http://etl.decc.gov.uk/etl> to find out more.

Setting the scene

Carbon savings from the use of pipework insulation can be realised on both heated and cooled pipework. Typically, heated pipework is used for hot water delivery, heating systems and processes. Chilled pipework is mostly associated with air conditioning systems, but is also used in commercial refrigeration (supermarket display cabinets) and numerous other process applications.

Because most materials used for manufacturing pipes are highly conductive, heat losses and gains can be very large when pipes are left un-insulated. This is particularly the case when pipework runs at a temperature very different to its surroundings and is in use for large proportions of the year. These heat losses and gains increase the amount of energy needed to maintain the pipework at the required temperature and can therefore lead to increased energy bills. Indeed, where pipework heat losses occur in spaces which are otherwise subject to air conditioning, one system can be competing with the other, with all of the inefficiencies that this introduces. Conversely, the same is true for chilled pipework in heated spaces. Therefore, careful planning and control are both keys to minimising energy use and costs.

The Thermal Insulation Manufacturers and Suppliers Association (TIMSA) reported that annual emissions saved through the existing use of pipework insulation exceeded 300 million tonnes of CO₂² – see Figure 1. It also reported that the potential existed for at least a further 15-20 million tonnes of savings per annum by tackling the remaining un-insulated pipes and upgrading insulation levels in the process sector beyond the thicknesses required for personnel protection (a health and safety provision) to the levels prescribed in BS 5422: 1990.

Following two revisions of this standard, BS 5422: 2009 is the version currently recognised by the ECA scheme.

It is estimated that a further 6-10 million tonnes of CO₂ per year could be saved, if business adopted this latest standard, which is equivalent to 2-3% of the overall UK baseline emissions in 1990³.

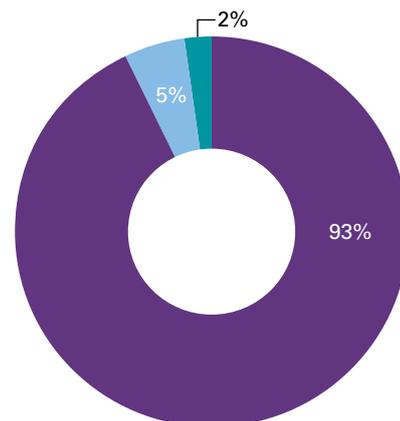
Energy losses from a typical five metre pipe run operating continuously at 75°C

A typical 25mm heating pipe loses heat at a rate of 99Watts/m/hr. This means that if it runs continuously for 24 hours it accounts for 11.88kWh of lost energy per day. This is equivalent to running a three-bar heater (rated at 1.2KW) for nearly ten hours per day at a cost of up to 95 pence per day, or nearly £347 per year.

Insulating the pipework to the standards set out in BS 5422 2009) reduces heat losses by up to 90% and save between £50/year and £300/year in energy costs depending on fuel type for this nominal five metre pipe run.

All this would be achieved for an initial investment cost of around £32. Even when pipework is not operational throughout the year or when some of the heat lost through the pipework heats occupied spaces, the payback periods are typically between one and two years.

Figure 1 Potential annual savings from installed UK pipe insulation (330 million tons CO₂-equivalent)



- Estimated pre-2000 annual savings
- Increasing compliance to pre-existing BS 5422: 1900 standard
- Upgrading of BS 5422 in 2001 to make additional savings

² Current environmental benefits arising from BS 5422 and the identification of areas for further gains (Caleb Management Services Ltd. for TIMSA – 1999).

³ As determined by the UK Government's reporting to the United Nations Framework Convention on Climate Change (UNFCCC) for the reference year of 1990.

Benefits of installing products that meet the ETL criteria

Although the potential energy and cost savings are substantial for most pipework insulation installations, in some instances, arguments emerge to suggest that the heat lost by a pipe within a building envelope serves to provide 'useful heat' to a building. Although this is theoretically valid at certain times of the year, it is rarely the case in practice. In commercial buildings, 'zoning' is often practised, and the key element in this approach is control over sources of heating and cooling. For example, it is unfavourable to have air conditioning units working against heat losses from un-insulated hot water pipes.

The following example outlines the benefits of specifying pipework insulation equipment eligible under the ECA scheme on an actual insulation project involving a small pharmaceutical laboratory building. Table 1 provides information on the pipework involved and indicates that compliance with BS 5422: 2009 created an overall energy saving of 33% based on a utilisation value of 3,360 hours/year when compared to BS 5422: 1990.

When replacing pipework insulation, businesses are often tempted to opt for the option with the lowest capital cost. However, such immediate cost savings can prove to be a false economy because the saving over the lifetime of the measure are not taken into account. Considering the life cycle cost before investing in new pipework insulation can help reduce costs and improve cash flow over the longer term.

The ECA scheme provides businesses with 100% first year tax relief on their qualifying capital expenditure. This means that businesses can write off the whole cost of the equipment against taxable profits in the year of purchase. This can provide a cash flow boost and an incentive to invest in energy saving equipment which normally carries a price premium when compared to less efficient alternatives.

This leaflet also illustrates the reductions in energy consumption, carbon emissions and energy bills that can be realised by investing in qualifying ETL energy saving equipment as an alternative to non-qualifying equipment.

Table 1 Benefits of specifying ETL qualifying products

Pipe diameter (mm)	Pipe length (m)	Heat loss (W/m)		Boiler energy consumption (kWh)		
		BS 5422 (1990)	BS 5422 (2009)	BS 5422 (1990)	BS 5422 (2009)	
20	76	13.93	10.06	4,743	3,425	
25	209	16.04	11.07	15,019	10,365	
32	110	18.4	12.3	9,068	6,061	
40	6	20.14	12.94	541	348	
50	99	23.58	14.45	10,458	6,409	
65	342	25.04	16.35	38,365	25,051	
75	138	28.19	17.91	17,428	11,073	
100	120	34.19	20.77	18,381	11,166	
Energy usage					-33.17%	

Pipework insulation equipment eligible under the ECA scheme⁴

BS 5422: 2009 covers four applications: frost protection, condensation control, personnel protection, and energy saving. Although all four applications rely on the thermal insulating value of the material, only pipework insulation for energy saving is covered within the scope of the ETL.

The standard contains specific tables targeted at energy saving, where the insulation thicknesses defined within these tables are those used to establish the relevant criteria (see Table 2).

Table 2 Tables pertinent to energy saving in BS 5422: 2009

BS 5422: 2009 Reference	Energy saving
Refrigeration (Clause 6)	Annex F
Chilled water (Clause 7)	Tables 10 & 11
Non-domestic heating/hot water (Clause 8)	Tables 15 to 18
Domestic heating/hot water (Clause 9)	Tables 19 & 20
Process pipework (Clause 10)	Table 21
Additional guidance	Annex A & F

As specific products are not included in the ETL, suppliers of pipework insulation are asked to provide evidence to their purchasers which show the following:

1. Thermal conductivity data at mean temperatures as determined by the relevant tables.
2. Confirmation that their staff are suitably trained to provide confirmation of compliance to BS 5422: 2009 when pipework insulation scenarios are presented to them.

Space limitations often impact on the thickness of insulation that can be used, meaning that the choice of available materials can be limited. The result is that to comply with ECA criteria, more efficient insulation types may be required.



Information for purchasers

For further information about the ECA scheme, the Energy Technology List (ETL) and other Technology Information Leaflets in the series please visit <http://etl.decc.gov.uk/etl> or contact the Carbon Trust on +44 (0)207 170 7000 or email info@carbontrust.com.

⁴ The descriptions of the pipework insulation equipment given in this leaflet are examples only. The formal criteria and details governing the ECA scheme can be found at <http://etl.decc.gov.uk/etl>

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