CARBON TRUST

Warm air heating equipment

A guide to equipment eligible for Enhanced Capital Allowances

Contents

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 ETL to help reduce carbon emissions, which contribute to climate change.

The Energy Technology List (ETL) is a register of products that may be eligible for 100% tax relief under the Enhanced Capital Allowance (ECA) scheme for energy saving technologies[1]. The Carbon Trust manages the list and promotes the ECA scheme on behalf of government.

This leaflet gives an overview of warm air heating equipment 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 comprises two lists: the Energy Technology Criteria List (ETCL) and the Energy Technology Product List (ETPL). The ETCL defines the performance criteria that equipment must meet to qualify for ECA scheme support; the ETPL is the list of products that have been assessed as being compliant with ETCL criteria.

Setting the scene

Warm air heating can be divided into three main categories: indirect-fired, biomass fired and direct-fired.

Indirect-fired warm air heating has been used to provide heating in retail spaces and factory environments for many years. It can be an efficient heating solution as long as attention is paid to minimising ventilation rates and heat losses through the building fabric, effective controls and, where appropriate, the addition of heat recovery plant and destratification fans. Most stand-alone warm air heating units recirculate air, but indirect heating modules are intended to be incorporated within air handling units for heating fresh air.

Biomass fired warm air heaters are used to provide heating, and are most commonly found in spaces such as shops or warehouses, where a source of biomass fuel is readily available.

Direct-fired warm air heating provides both heating and ventilation through the same unit. It is most often found in factories that need continuously high ventilation rates for fume extraction.

Did you know?

ETL listed indirect-fired warm air heating products can use up to 9% less energy than non ETL listed products based on the minimum efficiency requirement of EN 1020 (84%) compared to the ETL criteria (91%).

Benefits of purchasing ETL listed products

Warm air heating products listed in the ETL must meet minimum efficiency and/or functional criteria that are then verified by independent test laboratories. This means that they are generally more energy efficient than products which are not on the list.

When replacing equipment, businesses are often tempted to opt for that with the lowest capital cost; however, such immediate cost savings can prove to be a false economy. Considering the life cycle cost before investing in equipment can help reduce costs and improve cash flow in 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 over non-qualifying equipment.

Important

Businesses purchasing equipment must check the ETPL at the time of purchase in order to verify that the named product they intend to purchase is designated as energy saving equipment. Warm air heating equipment that meets the ETL eligibility criteria but is not listed on the Energy Technology Product List (ETPL) at the time of purchase is not eligible for an ECA.

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

Warm air heating equipment eligible under the ECA scheme[2]

There are three types of warm air heating equipment that are covered by the ECA scheme:

- Indirect-fired warm air heaters, including:
  - Indirect gas and oil-fired packaged warm air heaters.
  - Indirect gas and oil-fired packaged air heater modules for air handling units.
- Biomass fired warm air heaters.
- Direct gas-fired packaged warm air heaters.

Note: Hot water and portable warm air heating appliances are not eligible under the ECA scheme.

Using the baseline scenario below, the potential financial (£), energy (kWh) and carbon savings (tonnes CO_2) have been calculated for comparison unless otherwise indicated:

- The ETL listed indirect-fired air heater product is 9% more efficient than the standard product but 11% more expensive to purchase.
- The gas price is 3p/kWh with the Climate Change Levy (CCL) at 0.15p/kWh.
- Gas consumption is based on single shift working (10 hours per day during the heating season).
- Improved controllability of the ETL listed direct-fired air heater relative to a basic product provides 10% fuel saving.

Indirect-fired warm air heating

Indirect-fired packaged warm air heaters consist of a gas or oil burner, heat exchanger and hot air fan. Air from the room is recirculated through the heat exchanger and back into the room at high velocity. The hot air may be discharged directly from the unit or ducted into the room. Flue gases are discharged to atmosphere outside the building. Both floor standing and suspended units are available.

Indirect-fired packaged warm air heater modules use a similar set of burners and heat exchangers, but are designed to fit within air handling units to heat the fresh air being introduced to the building. Only the module is eligible for an ECA and not the air handling unit in which it is mounted, or the associated ductwork.

Figure 1 *Suspended indirect-fired warm air heater*

Source: Reznor

Figure 2 *Floor standing indirect-fired cabinet warm air heater*

Source: AmbiRad

[2] The descriptions of the warm air heating 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

In addition to low operating costs and reduced carbon emissions, further advantages of indirect air heating include:

- Low or high-level mounting possible.
- Relatively inexpensive.
- High thermal outputs available.
- More efficient than using a boiler and convector
- Modulating burners and condensing heat exchangers are available.

Installation or replacement of indirect-fired warm air heating should always be considered in conjunction with possible building fabric improvements and minimising uncontrolled air leakage. There may also be benefits from the installation of ventilation heat recovery in some circumstances.

Installing an ETL listed indirect warm air heating system at a total cost of £13,920 rather than a non-specified product at a cost of £13,200, with a respective annual running cost of £13,163 and £11,978 the potential annual savings are:

- £1,185.
- 39,500kWh.
- 7.5 tonnes CO_2.

Biomass fired warm air heaters

Using a biomass fired warm air heat can reduce the heating costs of your business and, because biomass fuels are considered carbon neutral, it can also reduce your carbon footprint. Biomass fired warm air heaters are suitable for heating workshops, warehouses, and similar spaces where a source of biomass fuel is readily available. Using air heaters fired by this material will deliver additional financial and environmental benefits by replacing purchased fuels and reducing disposal costs.

Products of varying thermal efficiency are available. Those listed on the ETL use automatically controlled combustion and a good quality heat exchanger to ensure high efficiency, and can be up to 20-30% more efficient than non-listed products.

Businesses considering installing any solid fuel fired appliance should be aware that these are covered by the Clean Air Act. This requires that the local authority is notified of the installation and, depending on location, other requirements may need to be met.

Using the baseline scenario below, the potential financial (£), energy (kWh), and carbon savings (tonnes CO_2) have been calculated for comparison:

- The ETL listed biomass fired air heater product is 25% more efficient than a non listed unit but 29% more expensive to purchase.
- A Comparison gas fired unit operates at 84% efficiency.
- The gas price is 3p/kWh with the Climate Change Levy (CCL) at 0.15p/kWh.
- The improved efficiency of the ETL listed direct-fired air heater relative to a basic product provides a 22% wood fuel saving.

Installing a specified ETL listed unit at a cost of £35,000 will generate 350,000 kWh per year of heat energy. If waste wood at zero cost is used as a fuel the potential annual savings are:

- £12,500.
- 154,651kWh.
- 66.5 tonnes CO_2.

***Figure 3** Direct-fired warm air heater*

Source: AmbiRad

Direct-fired warm air heating

Direct-fired warm air heating discharges the products of combustion into the surrounding space, resulting in a thermal efficiency of 100% (net calorific value). They can only be used in situations where there is good ventilation. For example, the classic application of direct-fired warm air heating is in factory buildings with high ventilation rates for fume control. The technology is also commonly used as part of the heating system for warehouses, large retail sheds and sports arenas.

ETL listed direct-fired warm air heaters include variable speed fans and high turndown ratio burners to provide a flexible and efficient heating solution that can result in significant fuel savings compared to a basic heater. The variable speed fans in direct-fired warm air heaters can also provide efficient summer ventilation.

In addition to low capital costs and reduced carbon emissions, further advantages of direct-fired warm air heating include:

- Ventilation and heating in winter and ventilation in summer.
- Low discharge temperature eliminates the risk of stratification.
- Fast provision of heat from start up.
- A single unit can serve a large area.
- Low maintenance requirements.

Installing a specified energy saving ETL direct-fired air heating at a cost of £14,000 rather than a non specified product with a cost of £13,100, with a respective annual running cost of £9,256 and £10,284 the potential annual savings are:

- £1,028.
- 34,280kWh.
- 6.5 tonnes CO_2.

Figure 4 *Warehouse application*

Source: Nordair Niche

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 www.carbontrust.co.uk/eca, contact the Carbon Trust on 0800 085 2005 or email customercentre@carbontrust.co.uk

Go online to get more

The Carbon Trust provides a range of tools, services and information to help you implement energy and carbon saving measures, no matter what your level of experience.

Carbon Footprint Calculator

Our online calculator will help you calculate your organisation's carbon emissions.
www.carbontrust.co.uk/carboncalculator

Energy Efficiency Financing

Offers leases, loans and other financing options to all types of organisations seeking to reduce their energy use. For more information see: **www.energyefficiencyfinancing.co.uk**

Carbon Surveys

We provide surveys to organisations in Scotland, Northern Ireland and Wales with annual energy bills of more than £50,000*. Our carbon experts will visit your premises to identify energy saving opportunities and offer practical advice on how to achieve them. **www.carbontrust.co.uk/surveys**

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Our case studies show that it's often easier and less expensive than you might think to bring about real change.
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We have a library of free publications detailing energy saving techniques for a range of sectors and technologies
www.carbontrust.co.uk/publications

Need further help?

Call our Customer Centre on 0800 085 2005
Our Customer Centre provides free advice on what your organisation can do to save energy and save money. Our team handles questions ranging from straightforward requests for information, to in-depth technical queries about particular technologies.

* Subject to terms and conditions.

The Carbon Trust is a not-for-profit company with the mission to accelerate the move to a low carbon economy. We provide specialist support to business and the public sector to help cut carbon emissions, save energy and commercialise low carbon technologies. By stimulating low carbon action we contribute to key UK goals of lower carbon emissions, the development of low carbon businesses, increased energy security and associated jobs.

We help to cut carbon emissions now by:

- providing specialist advice and finance to help organisations cut carbon
- setting standards for carbon reduction.

We reduce potential future carbon emissions by:

- opening markets for low carbon technologies
- leading industry collaborations to commercialise technologies
- investing in early-stage low carbon companies.

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