CARBON TRUST

Compressed air 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 compressed air 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.

Further information

For more information on compressed air visit **www.carbontrust.co.uk/compressedair** or download the Carbon Trust's Compressed air technology overview (**CTV017**).

Setting the scene

Air compressors are used throughout industry with at least 80%[2] of industrial applications using compressed air in one or more parts of their processes. This ranges from the use of compressed air as a power source for manufacturing aircraft products through to woodworking. Within UK industry, compressed air systems are large consumers of electrical energy. Typically 10% of industrial electrical consumption is used to compress air with compressors consuming around 10TWh of electricity each year[2], resulting in CO_2 emissions of about 4,300ktonnes.

The efficiency of compressed air systems is often compromised. Examples include design through a piecemeal approach, air leaks, mismatched supply and demand, over-pressurisation of the system and inappropriate uses. This can lead to energy wastage, unreliability, reduced productivity and higher operating costs.

Around 15% of compressed air systems have two or more compressors. These systems account for about 1.3% of UK industrial energy consumption and result in CO_2 emissions of around 1,720ktonnes per year[3]. Improving the control of multiple compressor installations by adding energy efficient devices included on the ETL can significantly improve system efficiency by over 15%[4].

Within a compressed air system, energy losses through clean up equipment such as dryers, which are installed in over 80% of all industrial compressor installations[5], can also be improved by replacing low efficiency dryers and adding ETL recommended energy saving devices.

1 Eligibility for ECAs is based on a number of factors. Visit http://etl.decc.gov.uk/etl to find out more.
2 Sources: British Compressed Air Society statistical data & Ragden, Blaustein, Compressed Air Systems in the European Union (2001).
3 Estimates are based on British Compressed Air Society statistical data.
4 Based on information from a cross-section of manufacturers.
5 Condition Monitoring Control Systems and Refrigerated Air Dryers ETL Technical Review 2007.

Benefits of purchasing ETL listed products

Many compressed air systems have been in place for decades. Developments in modern technology mean that efficiencies are now significantly improved when compared to older technologies. An average industrial site using compressed air can potentially achieve energy savings of 10%-20% of the cost of compressed air generation through the purchase of ETL listed compressed air equipment.

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.

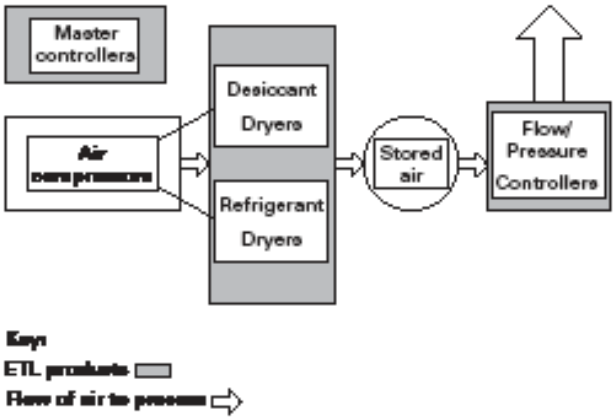
Important

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. Compressed air 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.

Compressed air equipment eligible under the ECA scheme[6]

The following sections describe the compressed air equipment that is covered by the ECA scheme. The diagram below illustrates these ECA eligible components and their relationship to each other.

Figure 1 ECA eligible components



Using the stated baseline scenario below, the potential financial (£), energy (kWh) and carbon savings (tonnes CO_2) have been calculated for replacing component parts of a compressed air system with ETL qualifying equipment.

The following baseline scenario has been used for comparison unless otherwise indicated:

- Nominal installed compressor capacity; 90kW delivering a nominal 14.25m³/min.
- Average 300 watts power required per litre/sec of compressed air.
- 2.2 Bar pressure differential.
- Purge air requirement 15% of compressor capacity.
- Average compressor load 75%.
- Annual utilisation: 8,000 hours.
- Energy price 7.9p/kWh.
- Annual savings do not degrade.

Energy saving controls for desiccant air dryers

Desiccant air dryers are used on approximately 15%[7] of industrial sites using compressed air to remove the moisture present in the compressed air before it is used. This type of air dryer is energy intensive, but it removes significantly more moisture than a refrigerated air dryer and is usually specified for special applications or exposed installations. For example, in circumstances where there is a risk of bacterial growth where compressed air comes into direct contact with food products. Energy saving controls for desiccant air dryers are products that are specifically designed to control the operation of desiccant air dryers in a manner that eliminates unnecessary desiccant regeneration cycles. The amount of energy that can be saved by fitting moisture-sensing control systems varies considerably depending on the application, and drying costs through the use of moisture-sensing control systems can be as high as 80% of total operational costs[8].

The potential annual savings that can be achieved by fitting energy saving controls on desiccant air dryers are calculated as:

- £6,731.
- 85,200kWh.
- 36.6 tonnes CO_2.

[6] The descriptions of the compressed air 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

[7] Based on market feedback and BCAS statistical information.

[8] Condition Monitoring Control Systems ETL Technology Review 2007 – based on information from a cross-section of manufacturers.

Refrigerated air dryers with energy saving controls

Refrigerated air dryers are used on around 65% of industrial sites to remove the moisture present in compressed air before it is used[9]. They work by cooling the air and therefore forcing any moisture to condense so that it can be collected and drained out of the compressed air system. A refrigerated air dryer typically increases the energy used in compressed air generation by between 2% and 5% depending on the type of product selected and how it is controlled[10].

Refrigerated air dryers with energy saving controls can modulate their energy use as the load on the compressed air system varies. They typically use 30% less energy than non-modulating products[11].

The potential annual savings that can be achieved through the use of refrigerated air dryers with energy saving controls are calculated as:

- £597.
- 7,560kWh.
- 3.2 tonnes CO_2.

Master controllers

Master controllers are products that are specifically designed to improve the control of compressed air systems with two or more compressors. They realise energy savings by reducing the pressure fluctuations that are normally present in compressed air systems where simple cascade or sequence controls are used to maintain system pressure. On average, master controllers deliver energy savings of approximately 15% on a typical industrial site[12].

The potential annual savings that can be achieved through the use of a master controller to operate multiple compressor installations are calculated as:

- £2,986.
- 37,800kWh.
- 16 tonnes CO_2.

Flow controllers/pressure controllers

Flow controllers/pressure controllers are products that are specifically designed to reduce the pressure fluctuations that normally occur in compressed air distribution systems when machines turn on and off, or when air demand is variable. They operate in conjunction with an air-storage vessel to match air supply with air demand. By reducing pressure fluctuations they enable sites with one or more compressors to run their compressed air generation systems at pressures that are closer to the minimum required for reliable operation.

Flow controllers/pressure controllers typically realise average energy savings of 15%, on sites with multiple compressors where only basic compressor control systems are being used, or 5%-10% where a master controller has been installed or conventional flow/pressure regulators have been fitted. They can also realise average energy savings of 5%-10% on sites with a single compressor[13].

The potential annual savings that can be achieved through the installation of a flow controller/pressure controller are calculated as:

- £2,986.
- 37,800kWh.
- 16 tonnes CO_2.

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

9 BCAS statistical data.
10 Refrigerated Air Dryers ETL Technical Review 2007.
11 Based on information collected from a cross-section of manufacturers.
12 Based on information from a cross-section of manufacturers.
13 Based on information from a cross-section of manufacturers.

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**

Action Plans

Create action plans to implement carbon and energy saving measures. **www.carbontrust.co.uk/apt**

Case Studies

Our case studies show that it's often easier and less expensive than you might think to bring about real change.
www.carbontrust.co.uk/casestudies

Events and Workshops

The Carbon Trust offers a variety of events and workshops ranging from introductions to our services, to technical energy efficiency training, most of which are free. **www.carbontrust.co.uk/events**

Publications

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.

www.carbontrust.co.uk

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