

Fluorescent Tube Recycling

Introduction

As fluorescent lighting requires only a fraction of the energy of traditional bulbs whilst lasting several times longer, it has become widely used in a variety of premises such as offices, factories, restaurants and even homes.

Lighting Performance Parameters:

Type of Bulb	Wattage	Efficiency (lm/watt)	Average Life (hrs)
Incandescent	15 - 150	6 - 16	750 - 1500
Low voltage halogen	5 - 250	12 - 23	2000 - 4000
High voltage halogen	75 - 2000	13 - 24	2000
Double ended fluorescent	5 - 70	65 - 100	10,000 - 20,000
Compact fluorescent (CFL)	5 - 38	42 - 82	10,000 - 12,000

Source: AEA Technology Environment, Revising the Ecolabel Criteria for Lamps (1999)

However one of the main issues with fluorescent lighting is the threat of the toxic materials they contain, such as mercury, cadmium (a known carcinogen) and lead entering the atmosphere or sensitive watercourses. It has been estimated that a single fluorescent tube contains enough mercury to pollute 30,000 litres of water.

Mercury poisoning is particularly dangerous as it can cause a variety of ailments ranging from tunnel vision to inducing a coma, while cadmium and lead have the potential to damage vital organs such as the liver and brain etc.

The Lighting Industry Federation states that only 0.3% of mercury entering the environment comes directly from fluorescent tubes and bulbs.

Disposal

It is estimated that the UK currently discards approximately 100 million fluorescent tubes every year (source: Mercury Recycling). This results in approximately 20,000 tonnes of glass and 3 tonnes of mercury being disposed of in UK landfill sites per annum.

At present fluorescent tubes are not classified as special (hazardous) waste under the Special Waste Regulations 1996. However mercury is classified as toxic under the Chemicals (Hazard Information for Supply) Regulations 1996.

DEFRA currently advises that there should be a distinction between volumes of tubes disposed. Large quantities should be treated as hazardous (but non-special) waste, whilst small quantities can be disposed of as non-hazardous household or commercial waste. It is currently the responsibility of individual Local Authorities to determine what qualifies as a large quantity; however it has been suggested this may be anything in excess of 20 to 30 tubes.

Legislation / Regulation

In February 2001 the European Commission published a revised European Waste Catalogue and hazardous waste list, which added approximately 250 waste types to the list. This means that a whole range of end-of-life products, including fluorescent tubes will be classified as hazardous waste items. This is likely to be adopted by the UK next year with the replacement of the Special Waste Regulations by the new regulations for hazardous waste.

The inclusion of fluorescent tubes as hazardous waste will require the disposal of these tubes to landfill sites registered specifically to accept hazardous waste, and will inevitably increase

disposal as well as landfill costs, making recycling an increasingly viable option.

The regulations will likely require anyone other than an individual householder who requires to dispose of fluorescent tubes, to register as a hazardous waste producer.

In the UK, some waste management companies are already refusing to accept fluorescent tubes at their landfill sites as a precaution against future liability.

Recycling

There are many benefits to recycling fluorescent tubes, such as:

- Minimise health and safety risks
- Reduced reliance on quarrying / mining
- Improved site management
- Reduce waste to landfill
- Demonstrate best environmental practice
- Fully meet Duty of Care responsibility under the 1990 Environmental Protection Act 1990, which states that users of tubes and lamps have a duty of care to take all responsible steps to look after this waste and prevent illegal disposal

One of the most advanced techniques for re-processing fluorescent tubes works by breaking the tube into waste fractions and then extracting the mercury. The process is done in two stages:

- The fluorescent tubes are crushed, sieved and separated. Which produces fluorescent powder, glass and metal
- The fluorescent powder is heated under vacuum while simultaneously supplying oxygen to the afterburner. The vacuum pressure is varied to enable the mercury to be extracted from the powder and collected in condensers. It is possible to recover 99% of the mercury with a purity of 99.98%

There is also a variety of size reduction equipment now available. These work by crushing the tubes, while a filter traps the mercury vapour. The fractions can then be either disposed of or sent for recycling.

The mercury can be sold back into industry for use in products such as barometers, thermometers etc. The glass can be returned to the glass manufacturing industry to make other glass products such as containers. The end pieces of the tubes are a variety of metals and are sold on to scrap metal merchants to be reprocessed.

The glass can potentially be used in a variety of applications, such as:

- Construction aggregate
- Surface cleaning / preparation
- Sand replacement
- Foam glass
- Composite materials

Ideally the glass could be recycled back into making lamps, offering a closed-loop recycling option, however contamination from tiny end caps still remains a problem

and restricts this option.

At present the cost of disposal / recycling can range from £0.30 to £1.50 per tube depending on the quantities involved.

Research & Development

The Waste and Resources Action Programme (WRAP) is funding an R & D project on the recycling potential of lamp glass. The project involving British Glass, SLI Glass and Mercury Recycling seeks to overcome technical and practical barriers to using glass from recycled fluorescent tubes.

In London a pilot reuse and recycling scheme for fluorescent tubes called 'Green Light Project' has been set-up by Ealing Community Transport Recycling (ECT). They collect discarded but useable fluorescent tubes from businesses and distribute them to schools and non-profit organisations in exchange for spent lamps. The project demonstrates that schools can benefit from lower cost lighting while extending the life of fluorescent tubes, reducing the impact on the environment. Spent tubes are recycled.

SustainaLite was launched by the Lighting Industry Federation and Environmental Services Association in response to the proposed EU WEEE Directive, which requires that mercury from gas discharge lamps such as fluorescent tubes is removed and 80% by weight of collected lamps to be reused or recycled. The scheme encourages companies to register to gain accreditation to the scheme by demonstrating they comply with conditions drawn up by the British Standards Institution (BSI) for the collection and recycling of discharge lamps.

Fluorescent Tube Recycling Companies:

Lampcare (UK) Recycling Ltd

400 Denmark Street
Glasgow, G22 6DB
Tel: 0141 347 0077
Contact: Duncan Tate
E-mail: duncan@lampcare.com
Web: www.lampcare.com

Mercury Recycling Ltd

Unit G, Canalside North
John Gilbert Way, Trafford Park
Manchester, M17 1DP
Tel: 0161 877 0977
Contact: Graham Mitchel
E-mail: info@mercuryrecycling.co.uk
Web: www.mercuryrecycling.co.uk

Holden Environmental

Shore Road
Perth, PH2 8BH
Tel: 01738 634 747
Contact: Robert Holden

E-mail: bobholden@holdenenvironmental.com

Web: www.holden-enviro.com

Dron & Dickson Group

Whitehouse Road, Springkerse Industrial Estate

Stirling, FK7 7SS

Tel: 01786 449 444

E-mail: info@dronnickson.com

Web: www.dronnickson.com

The Lamp Recycling Company Ltd

18A Government Road Industrial Park, Aldershot

Hampshire, GU11 2DX

Tel: 0700 254 4487

Contact: Norman Kemp

E-mail: lamp.recycling@virgin.net

Web: www.recycle-today.co.uk/lamprecycling.htm

Recyclite Ltd

38 Maurice Gaymer Road,

Gaymers Industrial Estate, Attleborough

Norfolk, NR17 2QZ

Tel: 01953 451 111

E-mail: info@recyclite.com

Web: www.recyclite.com

Balcan Engineering Ltd

Woodhall Spa

Lincolnshire, LN10 6RW

Tel: 01526 353 075

E-mail: info@balcan.co.uk

Web: www.balcan.co.uk

Useful Links

www.sustainalite.co.uk

www.wastewatch.org.uk

www.defra.gov.uk

www.lightingassociation.com

www.est.org.uk