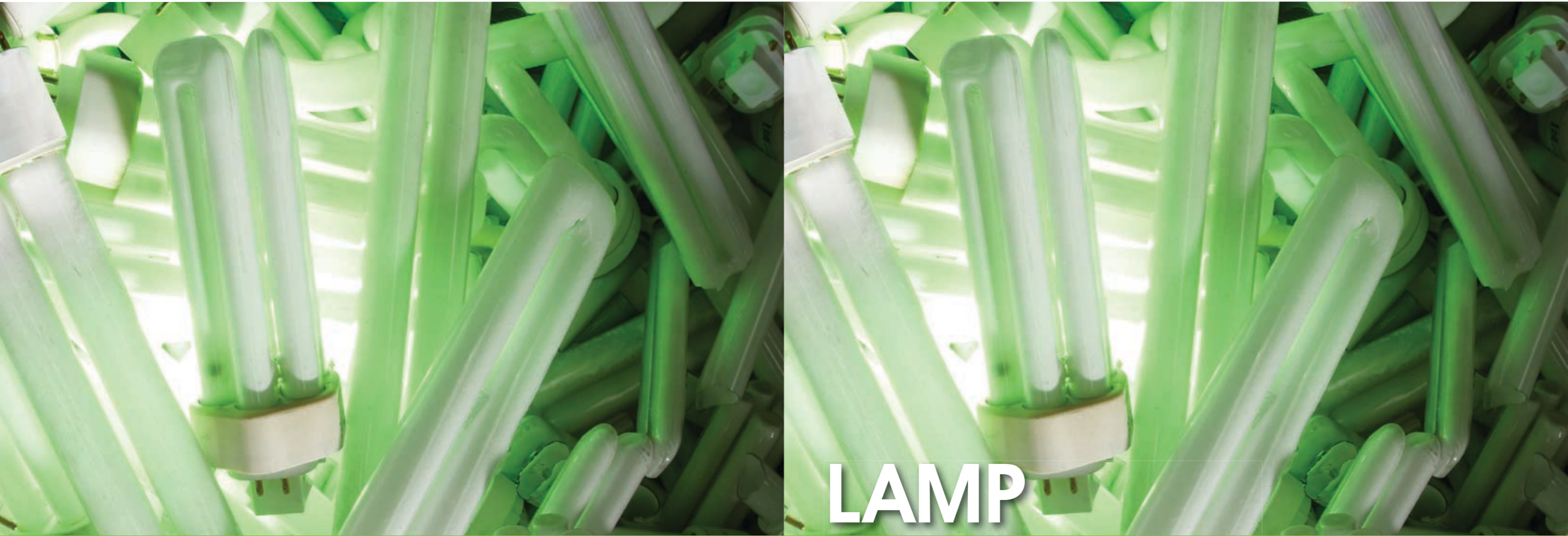


# RecOlight

Making lamp recycling happen



# LAMP RECYCLING GUIDE

**RecOlight**  
Making lamp recycling happen

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## FOREWORD

**G**lobal climate change, the Kyoto targets, rising energy prices, fuel shortages and the necessary reduction of CO<sub>2</sub> emissions are some of the key issues facing us in the modern world. The consequences of global warming are already clearly visible today, and the main reason for this is the increasing level of CO<sub>2</sub> emissions throughout the world.

In the UK, lighting accounts for 15-20% of electrical energy consumed, so efficient lighting technologies play a decisive role in saving energy and reducing CO<sub>2</sub>. By selecting the lighting option with the greatest energy efficiency it is possible to lower the overall costs for lighting and help protect the environment. For example, Gas Discharge Lamps (energy saving lamps) can consume up to 80% less energy than traditional incandescent lamps (which are being phased out of use progressively over the next few years).

Equally important in the effort to reduce our impact on the environment is the reduction of waste going to landfill. Local authorities are constantly striving to meet government targets to reduce the amount of landfill waste, and increasing recycling rates is of equal concern to businesses and consumers alike.

This brochure is intended to provide further information and guidance regarding the safe disposal of Gas Discharge Lamps.



**Recolight**  
Making lamp recycling happen

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*For further information regarding the WEEE Regulations and your responsibilities please contact the relevant enforcement agency for your region:*

*For England and Wales:*  
The Environment Agency  
[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

*For Scotland: SEPA*  
[www.sepa.org.uk](http://www.sepa.org.uk)

*For Northern Ireland:*  
Northern Ireland Environment Agency  
[www.ni-environment.gov.uk](http://www.ni-environment.gov.uk)

## WEEE REGULATIONS

(Waste Electrical Electronic Equipment)

### WEEE Facts and Figures

Where electricity is produced from coal, each fluorescent light bulb used prevents 1,300 pounds (nearly 600 kilograms) of CO<sub>2</sub> emissions and 20 pounds of sulfur dioxide from being pumped into the atmosphere (Worldwatch Institute, 2007)

In less than 2 hours, the UK produces enough waste to fill the Albert Hall (Waste Watch)

9 out of 10 people would recycle more if it were made easier (www.recycling-at-home.com)

Glass is 100% recyclable and can be used again (www.recycling-guide.org.uk)

Up to 60% of the rubbish that ends up in the dustbin could be recycled (www.recycling-guide.org.uk)

On average, every person in the UK throws away their own body weight in rubbish every 7 weeks (www.wasteonline.org.uk)

Using just one energy saving light bulb could save you £5 a year, and if every household installed one, we could power the lighting currently used in 2 million homes for a year (DEFRA)

In one year there will be enough waste to fill dustbins stretching from the Earth to the Moon (LGB Publications)

*“Incandescent bulbs are highly inefficient, converting only 2% of the energy they use into light”*

(www.news.bbc.com)

The WEEE Regulations were introduced into UK law in June 2007 to help encourage the reuse and recycling of waste electrical and electronic equipment (WEEE) and reduce the amount of WEEE that goes to landfill. The regulations cover 13 categories of electrical equipment and, of those, Gas Discharge Lamps are the most numerous.

WEEE is now the fastest growing waste stream in the UK, around 1.8 million tonnes is generated every year – increasing by over 5% annually. (www.netregs.gov.uk)

It has been estimated that just over half of this comes from domestic users, with large household appliances such as fridges and washing machines accounting for around 80% of this figure. The balance comes from offices, shops, businesses and other non-household sources.

Until recently over 75% of waste electrical goods ended up in landfill, where lead and other toxins contained in the equipment potentially has a harmful impact on the environment, wildlife and also human health by contaminating soil and water.



Recycling fluorescent tube lamps

Many of the electrical items that we currently throw away can be repaired or recycled. It is estimated that of the six million electrical appliances thrown away every year in the UK, over half of them are still working or could easily be repaired.

For those items that reach their end-of-life, such as lamps, recycling is the only practical option. Recycling items helps to save natural finite resources and also reduces the environmental risks associated with sending waste electrical goods to landfill.

*“If every household replaced its most often-used incandescent light bulbs with CFLs, electricity use for lighting could be cut in half.”*

(Worldwatch Institute 2007)

## LAMPS IN SCOPE OF WEEE REGULATIONS

The lamps that are within the scope of the WEEE Regulations are commonly known as Gas Discharge Lamps (GDLs) and include for example fluorescent tubes, compact fluorescent lamps (CFLs), mercury, metal halide and sodium SON and SOX lamps. Most of these lamp types are used in both household and non-household applications.

These lamps contain a small amount of mercury which means that they are classified as hazardous waste. They therefore need to be dealt with in accordance with strict safety guidelines as they could cause a risk to human health and the environment if sent to landfill sites or otherwise not disposed of properly.

Lamps not included in the scope of the WEEE Regulations include filament lamps such as standard light bulbs (known as GLS lamps) or halogen lamps, which are not hazardous to the environment if thrown away with everyday waste going to landfill.



WEEE Recyclable Materials Icon

The lamps included in the scope of the WEEE Regulations for recycling are labelled with this symbol.

*“The UK has now exceeded the EU’s e-waste collection target of 4kg per capita for all types of WEEE and currently has a collection rate of 6-7kg per capita, per year”*

(www.businessgreen.com)

### LAMPS IN SCOPE OF WEEE REGULATIONS

| PRODUCT CATEGORIES             | DESCRIPTION   | PRODUCTS |
|--------------------------------|---|----------|
| FLUORESCENT TUBES              | STRAIGHT  |          |
| NON-LINEAR FLUORESCENT         | DIFFERENT SHAPES  |          |
| CFL NON-INTEGRATED             | COMPACT   |          |
| CFL INTEGRATED (ENERGY SAVERS) | COMPACT + ELECTRONICS   |          |
| HIGH INTENSITY DISCHARGE       | HIGH PRESSURE (>1 BAR) NOBLE GAS, MERCURY, SODIUM AND SALTS CONTAINING ATOMIC DISCHARGE LAMPS |          |
|                                | LOW PRESSURE (SOME MBAR) NOBLE GAS AND SODIUM CONTAINING ATOMIC DISCHARGE LAMPS               |          |

(European Lamp Company Federation)

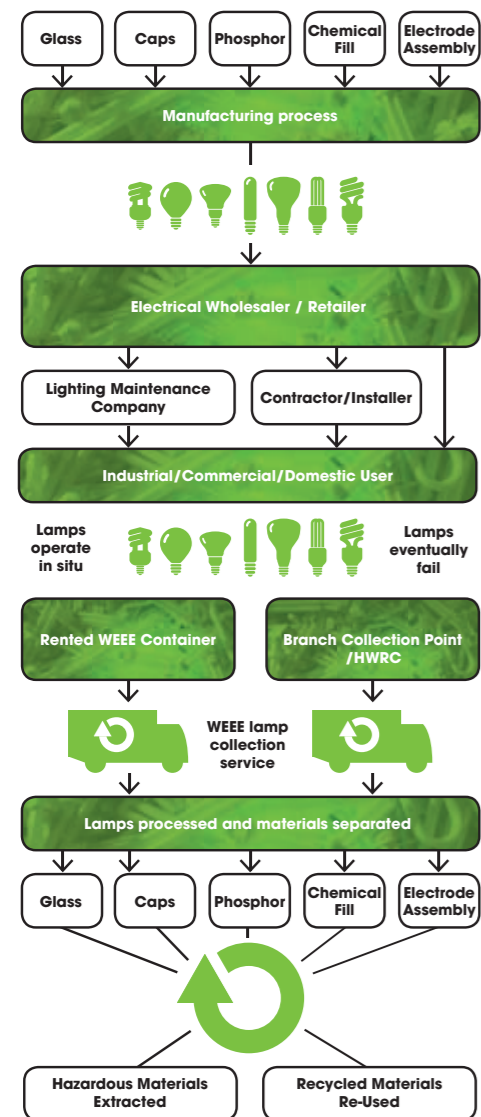


## LAMPS AND THE ENVIRONMENT

Gas Discharge Lamps are extremely economical, lasting up to 10 times longer than conventional incandescent lamps and using up to 80% less energy. In order to produce light so efficiently these lamps contain a small amount of mercury. It is only a small amount and over the last few years manufacturers have, through product innovation, been systematically reducing the quantity required whilst maintaining levels of efficiency.

Although the amount of mercury contained in a single lamp is minimal and unlikely to cause any risk to human health, if large quantities of these lamps are sent to landfill the mercury content could possibly contaminate soil and water and have a detrimental effect on wildlife, the environment and human health. From an ecological point of view it is essential to ensure that products containing hazardous substances are disposed of correctly at the end of their life.

With the implementation of the WEEE Regulations, producers, distributors and end users now have to consider the complete life cycle of their lamps. If everyone in the supply chain complies with the regulations and actively takes responsibility for recycling, the life cycle of a lamp should look like this:



Model life cycle of a lamp



Recycling fluorescent tube lamps



Separation of the raw materials to be reused in industry

## RECOLIGHT'S ROLE

Producers of EEE are responsible for funding the collection and recycling of their products at end-of-life. They meet their obligations by registering with a compliance scheme which takes on the producer responsibilities on their behalf.

Recolight is one such scheme which specialises in the collection and recycling of end-of-life lamps. Recolight collects end-of-life lamps through its collection network RecoNet, and also through subcontractor arrangements with other schemes for the collection of household waste from local authority sites. Recolight has over 1000 commercial collection points of which roughly one third are open sites. It also provides one-off, on-demand collections, e.g. for quantities of 1000 or more lamps.

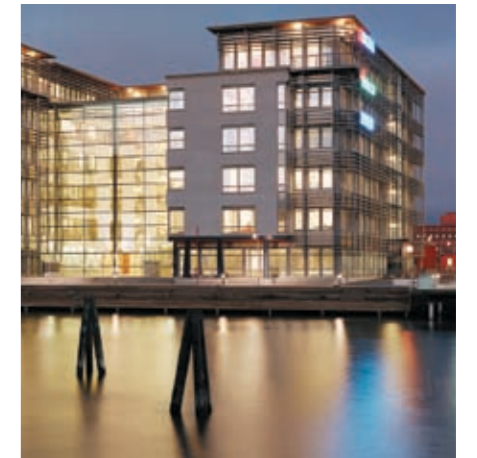
## RECYCLING

Various methods have been established for the recycling of Gas Discharge Lamps and in some cases it is possible to take recycling machinery direct to the collection site. All approved methods are able to safely remove the mercury content and separate the other materials, including glass, plastic and metal, for reuse within the manufacturing industry. Fluorescent lamp glass, for example, can be used as a raw material for the manufacture of new lamps.

## INFORMATION FOR BUSINESSES

As a business, it is important to take responsibility under your environmental management system, for the electronic equipment you use when it reaches end-of-life. By demonstrating your commitment to recycling waste lamps you can improve your environmental credentials and make a significant contribution to reducing the impact of harmful waste on the environment.

To recycle your end-of-life lamps check if the lamp producer is a Recolight member, and if so you can recycle your lamps free of charge through Recolight's compliance scheme. Log on to the Recolight website and use our online mapping tool to find your nearest open collection point. Alternatively, if you have a large quantity of lamps and would like to arrange for a one-off collection call the team on the RecoLine 0845 601 7749 and we will find the best solution for you.



Reduce your impact on the environment

## INFORMATION FOR HOUSEHOLDERS

All local councils have an obligation to make arrangements for the disposal of CFLs and similar lamps at their household waste recycling centres (HWRC). You can find where they are on the Recolight website by using the 'Open Collections Search tool'.

Some retailers also provide in-store take back. However, most retailers have funded Designated Collection Facilities, in the main at HWRCs, and it is recommended that householders use these sites for CFL disposal. From this point onwards, producers fund the transport, treatment and recycling, where the materials – including mercury – are recovered, and this is managed by Recolight on their behalf.

For further information or if you are unsure how to recycle your lamps, call RecoLine 0845 601 7749.



Lamps can be recycled at your local civic amenity site

## BROKEN LAMPS

Although the accidental breakage of a lamp is very unlikely to cause any health problems, it's a good practice to minimise any unnecessary exposure to mercury, as well as risk of cuts from glass fragments.

- Ventilate the room and fetch cleaning materials as soon as possible.
- Do not use a vacuum cleaner. Wear rubber gloves to protect yourself from cuts and sweep up the mess. Aim to avoid creating and inhaling airborne dust.
- Sweep up all particles and glass fragments and place in a plastic bag. Wipe the area with a damp cloth, then add that to the bag, seal it, and clearly mark it.
- Mercury is hazardous and the bag should not be put in the bin. All councils have an obligation to make arrangements for the disposal of hazardous waste at a civic amenity site or HWRC.





## INTRODUCTION

Various industrial methods have become established for the recycling of Gas Discharge Lamps. Several of the methods commonly in use are represented pictorially below.

These include the most common End Cut and Shredder methods and also a description of other more complex, automated systems used to treat large volumes of certain lamp types.

The mix of lamps to be processed in a load picked up from a collection point will often consist of a large number of fluorescent tubes, but may also include Compact Fluorescent Lamps (with a plastic housing containing an electronics board) and elliptical bulb HID types. The recycling process used will be adapted both to the type and quantity of lamps to be treated.

**Recolight's contracted recycling suppliers are required to operate to the highest standards in order to ensure that:**

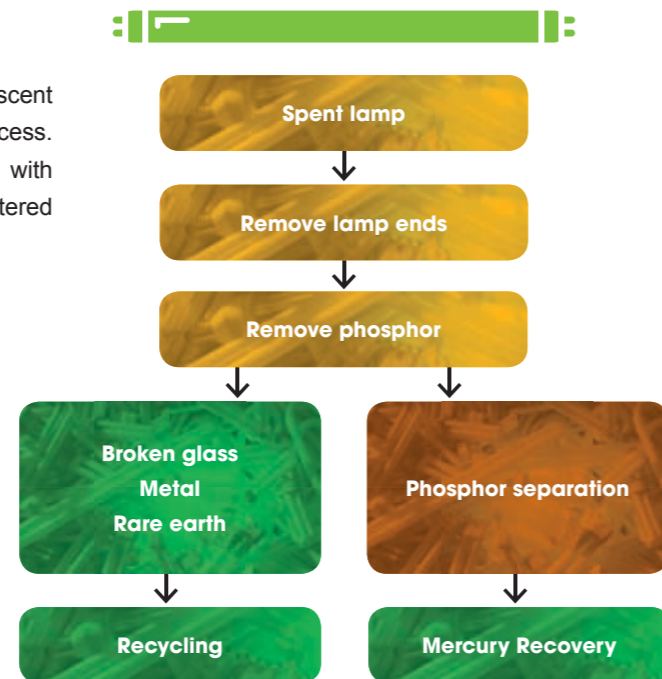
- The material recovery rate is as high as possible, especially for mercury.
- Materials recovered are as clean and mercury free as possible.
- That the processes, irrespective of methodology, meet all the regulatory requirements for Health and Safety and Pollution Control.

## END CUT METHOD

The end cut method has been developed for treating fluorescent tubes efficiently with the lowest cost in mind, in an automated process. Economic phosphor recycling and re-use becomes possible with this technology, which is done in a machine fitted with a filtered sub-atmospheric pressure extraction and collection system.

**There are four steps in this method, which include:**

- Cutting off the lamp caps and electrode assembly.
- Removal of the phosphor from the glass tube into dust-tight containers.
- Crushing and collection of the remaining glass tube and metallic components.
- Recovery of elemental mercury.



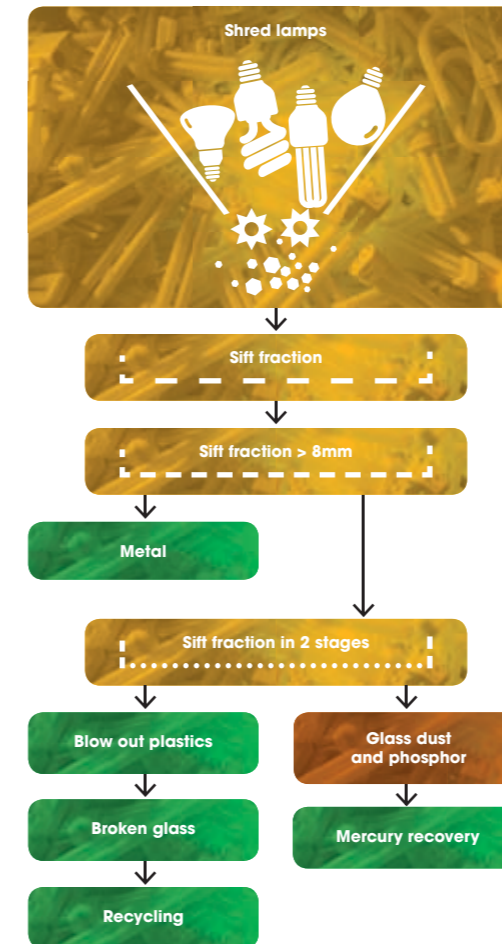
End Cut method

## SHREDDER METHOD

This is regarded as the most flexible method since it allows for the processing of different shapes and sizes of waste lamps in varying batch sizes.

**Lamps are processed in four main steps:**

- Crushing the lamps, which is done with equipment which is fitted with a sub-atmospheric pressure extraction system.
- Sorting the crushed material into glass, metal caps and plastics.
- The removal and collection of the phosphor powder from the crushed glass and plastic.
- The capture of free mercury in a distillation process.



Shredder method

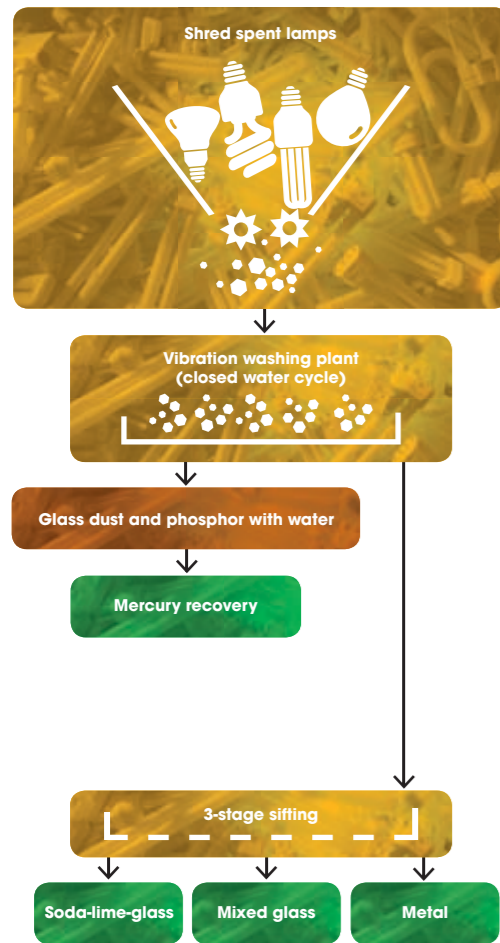


## RECYCLING METHODS (continued)

### BROKEN GLASS WASHING METHOD

This method is a variation of the SHREDDER METHOD and is intended to deal with very large volumes of fluorescent tubes without preliminary sorting by length or type. After crushing, materials are subjected to a bulk washing process which removes the phosphor material. The materials are then separated in a sifting process similar to that used in the dry shredder process.

The phosphor suspension is allowed to settle and the resultant sludge is distilled to recover the mercury content.



Broken glass washing method



### USING THE RECYCLATE

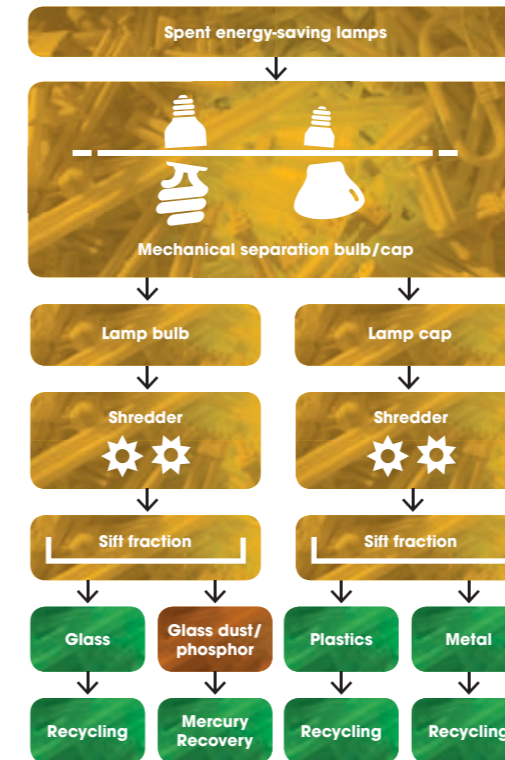
The materials recovered from the various processes described above can be used in a variety of different ways. It is feasible to recover the lamp phosphor powders, particularly the triphosphor type, and re-use them to make new lamps. The mercury collected, when purified to the right level, may also be used to make new lamps or it may be used in other industrial processes. The crushed glass may also be returned to be mixed with a new glass melt for a variety of applications, from furnace linings to making new lamps, though in this latter case the purity level of the recovered glass becomes very important.



Mercury distillation

### METHODS FOR DEALING WITH HID AND CFL LAMPS

These lamp types need some form of pre-treatment to recover the lamp arc tubes before they are introduced into the materials recovery process and are a hybrid combination of some of methods previously described.



Product-specific stripping



## CONTACT US

Recolight has been founded by the lighting industry to ensure the environmentally friendly collection and recycling of Gas Discharge Lamps. If you have any queries regarding recycling end-of-life lamps or would like to join Recolight's collection network please contact the operations team:

**Recolight Operations Team**  
 Suite 265 Airport House  
 Purley Way  
 Croydon  
 CR0 0XZ  
 Tel: 0845 601 7749  
 Email: [info@recolight.co.uk](mailto:info@recolight.co.uk)  
[www.recolight.co.uk](http://www.recolight.co.uk)

For further information regarding the WEEE Regulations and your responsibilities please contact the relevant enforcement agency for your region:

For England and Wales:  
 The Environment Agency  
[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)  
 For Scotland: SEPA  
[www.sepa.org.uk](http://www.sepa.org.uk)  
 For Northern Ireland:  
 Northern Ireland Environment Agency  
[www.ni-environment.gov.uk](http://www.ni-environment.gov.uk)

Recolight is responsible for waste lamps. For waste luminaires (a complete lighting unit consisting of a lamp or lamps and also the parts which help to position, protect or connect the lamps) there is another specialist compliance scheme, Lumicom. For more information please visit: [www.lumicom.co.uk](http://www.lumicom.co.uk)

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