

Recycling of Used Lamps

Solvaste Environmental Ltd

EXECUTIVE SUMMARY

Increasing demands of Health and Safety and Environmental Legislation seek to reduce the volume of waste that can be landfilled. Development of Environmental Management Systems such as ISO 14001 also require improved management of wastes via the 'Waste Hierarchy' – with disposal as the final route. Re-use or Recycling is the primary means for wastes as part of the UK Waste Strategy. Waste management of used lamps falls within the above regimes, as more organisations have to deal with changing legal requirements and prove compliance with all relevant legislation.

This paper deals with Recycling and Re-use of **ALL** fluorescent and sodium lamps.

Sources of lamps include buildings (**ALL TYPES**), factories, warehouses, street lamps etc.

Europe	:	600 + Million lamps
UK	:	100,000,000 + lamps (all types)
		Equivalent to 12,000 tonnes in total and 4 tonnes of Mercury

HAZARDS

MERCURY, CADMIUM, LEAD, SODIUM

Environmental

MERCURY (Hg) : *There is sufficient Mercury (Hg) in a single fluorescent lamp to contaminate up to 20,000 litres of drinking water above current safe drinking levels (1ppb)*

CADMIUM (Cd) & LEAD (Pb) : *Both of these metals are Highly Toxic and if released into the environment they would cause considerable contamination, especially if water courses are contaminated. These metals are not biodegradable.*

SODIUM (Na) : *Sodium, when exposed into a damp environment will ignite and explode.*

Health

MERCURY, CADMIUM AND LEAD are ALL HIGHLY TOXIC MATERIALS THAT CAUSE SYSTEMIC EFFECTS.

Exposure to these metals can lead to absorption into the body by inhalation or skin contact.

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If exposed to the chemicals contained in these types of lamps, the following are the range of effects that can be detected.

Skin : **Redness or rash**
Ingestion : **Vomiting or diarrhoea**
Respiratory Tract : **Sore throat, nausea and headaches**
Systemic Effects : **Central nervous system, general fatigue and weight loss. For CADMIUM – possible carcinogenicity effects**

Long term there could be damage to possible central nervous system (brain) and other major organs in the body.

Physical : Lamps are manufactured under vacuum and if they break in an uncontrolled manner the glass will shatter and cause exposure of chemicals to those in contact. There is also a high possibility if cuts resulting from such incidents that may require emergency treatment.

Legislation

There are 6 major pieces of legislation covering the handling and disposal of fluorescent and sodium lamps.

Health and Safety at Work Act 1974 (HASAWA 1974)

Mandatory requirement placed upon institutions to carry out Risk Assessment where hazardous materials are being used.

This act specifies the disposal of lamps containing hazardous chemicals to be disposed as a Controlled Waste under the Duty of Care scheme.

Control of Substances Hazardous to Health Regulation

These require sufficient safeguard to protect the user from exposure from the hazardous chemicals. Use of the crushing system prevents exposure to the waste operator.

Environmental Protection Act 1990 (EPA 1990)

To comply with the Duty of Care Regulations (Section 34, EPA 1990) waste from lamps containing mercury, sodium etc must be contained and safe. ***Disposal using skips does not allow for containment and it is not considered safe.*** Companies that deal with waste must be:

❖ **Registered as Waste Carriers**

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- ❖ **If storing waste on their site – must have a Waste Management Licence permitting them to deal with wastes**
- ❖ **Must have suitably qualified personnel to manage their waste management facility – this is a City and Guilds NVQ qualification and regulated by the 'Waste Management Industry Training & Advisory Board'. Level of qualification is dependent upon the type of waste facility. The holder has a 'Certificate of Technical Competence'.**

Pollution Prevention and Control Regulations 2000

These regulations, which form part of the EC Directive of Pollution Prevention, require sufficient control to prevent pollution incidents resulting from controlled substances. Heavy metals such as mercury, cadmium and lead or their compounds are specified within the legislation as controlled substances and should be prevented from contaminating the environment as a whole. Crushing and disposal via treatment prevents such hazardous chemicals from polluting the environment.

Landfill Directive 2001

Aim is to prevent landfilling of toxic materials and restrict a whole range of other hazardous products. The number of landfill sites that can accept mercury will be reduced to 10-15 and these will not be allowed to take more than they are allowed.

Waste Electrical and Electronic Equipment Directive (EC Directive, Adopted, UK Law 2004/5)

Aim of this legislation is to prevent the landfilling of lamps as they contain hazardous components as described.

In order to prevent landfilling recycling is the REAL alternative. This system enables the components to be separated and re-used, adding to a more sustainable environment. The greater the recycling the more cost effective the process.

The landfilling of waste will become an increasing problem as the amount of available land decreases markedly over the years.

Lamp Re-cycling Process

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Current method of disposal in the UK is mainly landfilling – this basis must alter due to compliance issue of current and future legislation.

The method we adopt is to separate the various lamps into types e.g. linear fluorescent lamps, sodium lamps etc. **ALL** varieties and sizes can be handled and methods developed to prevent handling exposure to the hazardous components. A schematic diagram of the recycling process is attached

Complete lamps are fed into a process, then crushed and separated into their individual components that are then re-used. The crushed materials can be 100% re-used.

The recycling of used lamps will satisfy all requirements for the ISO 14001 Environmental Management System – through proof of recycling and hence no additional environmental burden.

Composition of Lamps

Glass	:	95%
Phosphor Powder	:	2.5%
Aluminium/Brass/Other Metals	:	2%
Lead compounds	:	0.5%
Mercury & other toxic metals	:	0.01%

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Is a registered waste carrier: ESW/244807/CB

Licensed by the Environment Agency for Keeping and Treating Wastes : WML/251/M1

Certificate of Technical Competence Nos: 2213 and 2214
(NVQ Level 4 – TSS4)

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We supply a range of containers suitable for storage and transport of used lamps, some of which are shown here:

LB 1750 - Plastic Folding Box Pallets For Mixed Lamps 1000 x 1200mm x 975 o/h, 850mm i/h (Note takes lamps up to 1 Metre)



Fully Collapsible Heavy Duty Distribution and Storage Containers C/W Lid for storage of lamps. Half drop gate access. Capacity for mixed length lamps will be approximately 1450 lamps per container. Obviously for smaller lamps and tubes the quantities will be greater and for larger lamps it will be less. Purchase Cost £POA each + Del. Rental £POA Per Month + Del.

Delivery/Collection £POA first pallets + £POA per pallet thereafter (per site).

Steel Pallets for Fluorescent Lamps and Tubes

LB2000 - Steel Storage Containers for Mixed Length Fluorescent Tubes 600 x 600 x 2500mm (Note Takes Lamps up to 8ft)



Approximate capacity for 4ft, 1 inch fluorescent tubes will be 1100 lamps per container. Full containers will be replaced with empty containers at time of collection. Purchase Cost £POA each + Del. Rental £POA Per Month + Del.

Delivery/Collection £POA first pallet + £POA per pallet thereafter (per site).

LB3000 Steel Pallets 2500mm (L) x 1220mm (W) x 1220mm (H)



Approximate capacity for mixed length 1 inch fluorescent tubes will be 2000 lamps per container. Obviously for smaller lamps and tubes the quantities will be greater and for larger lamps it will be less. Full containers will be replaced at time of collection. Purchase Cost £POA each + Del. Rental £POA Per Month + Del.

Delivery/Collection £POA per pallet + £POA per pallet thereafter (per site).

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LB 400) Steel Pallets 2500mm (L) x 1220mm (W) x 2139mm (H)



Approximate capacity for mixed length fluorescent 1 inch fluorescent tubes will be 4000 lamps per container. Obviously for smaller lamps and tubes the quantities will be greater and for larger lamps it will be less. Full containers, if required, will be replaced at time of collection. Purchase Cost £POA each + Del. Rental £POA Per Month + Del.

Delivery/Collection £POA per pallet+ £POA per pallet thereafter (per site).