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GUIDANCE NOTE	ASBESTOS WORKS - GENERAL	Code: H001	Issue: A
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INTRODUCTION

Due to its unique fire-resistance properties, asbestos has been identified in over 3000 different products, most extensively in buildings. Most buildings built between 1950 and 1980 are likely to contain some asbestos. Asbestos in the form of asbestos cement can also be found in buildings constructed or refurbished between 1980 and 1999.

The main uses of asbestos in buildings were as:

- 1 sprayed insulating coating on steelwork and concrete;
- 2 lagging on pipes and boilers;
- 3 insulation boards on walls, doors and ceilings;
- 4 asbestos cement as structural sheets, pipes and tanks;
- 5 some ceiling tiles;
- 6 some decorative plasters.

HEALTH HAZARDS OF ASBESTOS

All types of asbestos are classified as Category 1 carcinogens. Amphiboles, which include crocidolite (blue asbestos) and amosite (brown asbestos) are considered the most dangerous substances, with the serpentine chrysotile (white asbestos) recognised as being slightly less dangerous due to the nature of the fibres.

Inhaled asbestos fibres can cause a range of asbestos-related diseases:

- 1 diffuse pleural thickening, preventing the lung from expanding and hence causing breathlessness;
- 2 asbestosis, which has a latent period from first exposure of up to 30 years and for which currently there is no effective treatment;
- 3 lung cancer, which has a similar latent period, and also currently has no effective treatment;
- 4 mesothelioma, where the latent period from first exposure can be between 15 and 55 years and which is almost certainly fatal.

THE REGULATIONS

The Control of Asbestos Regulations 2006 came into force on 13 November 2006, replacing the Control of Asbestos Regulations 2002, the Asbestos Licensing Regulations 1983 and the Asbestos Prohibitions Regulations 1992.

The Regulations move away from licensing particular asbestos-containing materials (ACMs), i.e. asbestos insulation, asbestos insulating board and asbestos coatings. Most work with asbestos will still need to be undertaken by a licensed contractor but any decision will now be determined by the risk.

WORK WITH ASBESTOS

For any work with ACMs, the employer is required to:

- 1 prevent the exposure of employees to asbestos as far as is reasonably practicable;
- 2 identify the type of asbestos involved in the work, or assume the type of asbestos is not chrysotile alone;
- 3 make a suitable and sufficient assessment of the risks to health presented by exposure, before carrying out the work;
- 4 identify and implement the procedures needed to control exposure;
- 5 record the significant findings of the assessment;
- 6 prepare a suitable written plan of work detailing how the work is to be carried out without risk to health;
- 7 provide employees who are liable to be exposed to asbestos and those who supervise such employees with information, instruction and training on the risks to health and the precautions to be taken;
- 8 provide washing/changing facilities and facilities for the storage of protective equipment and personal clothing.

MINOR WORKS

Certain works of a minor nature can be carried out by people other than licensed contractors. Such is the case for work carried out during maintenance operations, plumbing and electrical installations. However, a risk assessment must be carried out prior to the work taking place and steps must be taken to protect against exposure to asbestos.

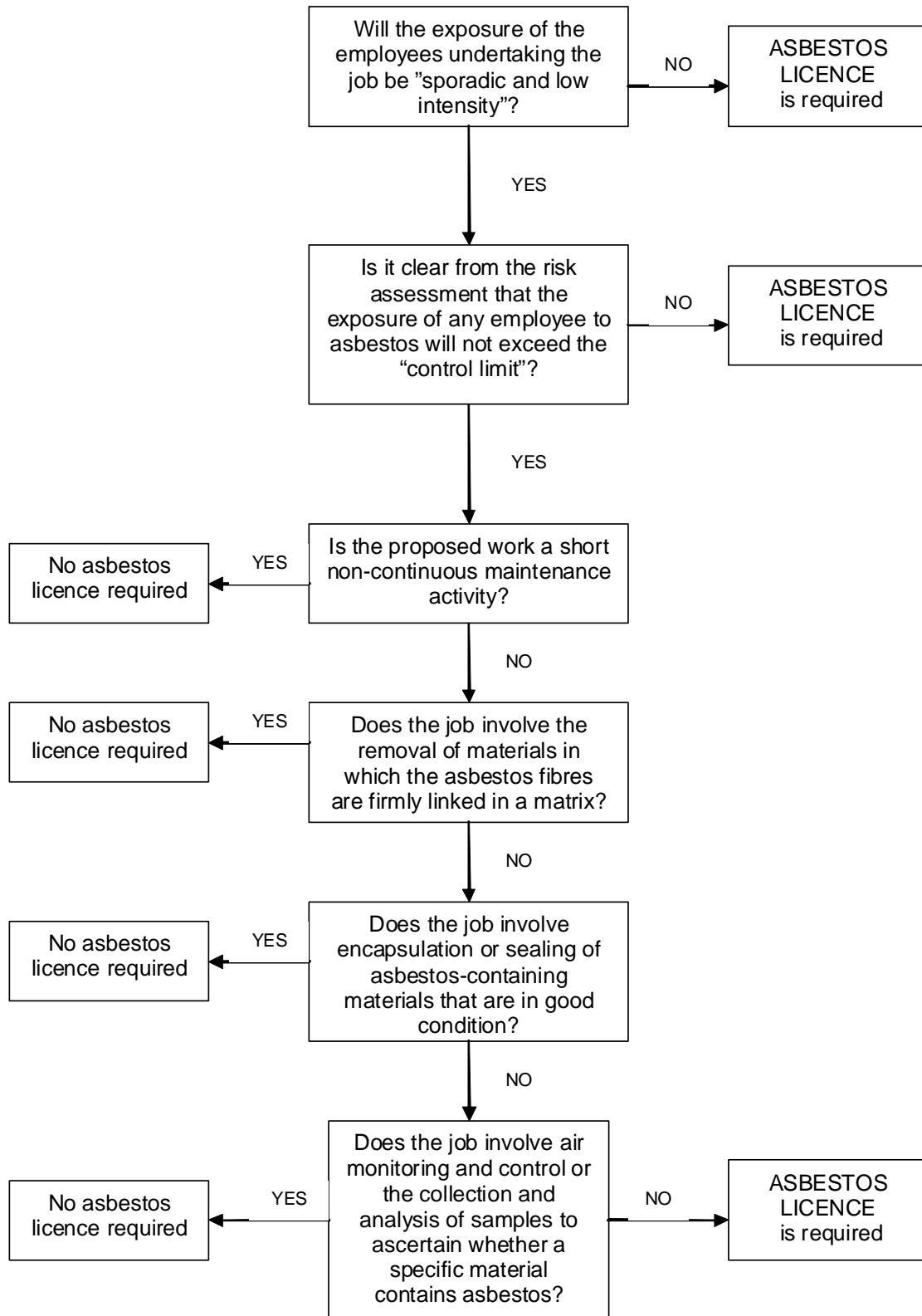
HSE guidance note HS(G)210 - "Asbestos Essentials Task Manual" offers practical guidance on the way minor works should be carried out. Tasks covered by the manual include drilling holes in asbestos insulating board, removal of a single asbestos insulating board ceiling tile, drilling holes in asbestos cement and other bonded materials.

LICENSING

Work with ACMs must not be undertaken unless the employer holds a licence, unless:

- 1 the exposure of employees to asbestos is "sporadic and of low intensity";
- 2 it is clear from the risk assessment that the exposure of any employee to asbestos will not exceed "the control limit";
- 3 the work involves:
 - a) short, non-continuous maintenance activities;
 - b) removal of materials in which the asbestos fibres are firmly linked in a matrix, such as asbestos cement and asbestos-containing decorative coatings;
 - c) encapsulation or sealing of asbestos-containing materials which are in good condition; or,
 - d) air monitoring and control, and the collection and analysis of samples to ascertain whether a specific material contains asbestos.

DETERMINING WHETHER AN ASBESTOS LICENCE IS REQUIRED TO WORK WITH ASBESTOS UNDER THE CONTROL OF ASBESTOS REGULATIONS 2006



“**Sporadic and Low Intensity**” relates to the exposure risk and not the frequency of the asbestos work. Work which is likely to result in exposure at or above the short term exposure limit of 0.6 fibres per cubic centimetre (f/cm^3) of air measured over a 10 minute period, cannot be considered sporadic and low intensity exposure.

“**The Control Limit**” for all types of asbestos is 0.1 fibres per cubic centimetre (f/cm^3) which is equivalent to fibres per millilitre (f/ml). This is the maximum concentration of asbestos fibres in the air (averaged over any continuous 4 hour period) that must not be exceeded.

a) Short non-continuous maintenance activities

Activities involving asbestos insulation and asbestos insulating board can be considered short non-continuous maintenance activities if any one person carries out work with these materials for less than 1 hour in a seven day period. The total time spent by all workers on the work should not exceed a total of 2 hours.

When calculating the time the work takes, you should include anything ancillary to the work which is liable to disturb the asbestos, including setting up enclosures and clearing any potentially affected area.

Please note that if short non-continuous maintenance activities are carried out by licensed contractors under this exemption then it does not preclude the operatives concerned from carrying out other work with asbestos during the seven day period, it only precludes them from carrying out work under the short, non-continuous maintenance activities exemption within the seven day period.

b) Removal of materials in which the asbestos fibres are firmly linked in a matrix

This exemption is the one that effectively removes decorative textured coatings from the asbestos licensing requirements. The materials to which it applies include:

- 1 asbestos cement (e.g. corrugated roof sheets, flue pipes, guttering);
- 2 textured decorative coatings and paints which contain asbestos (e.g. artex);
- 3 any article of bitumen, plastic resin or rubber which contains asbestos where its thermal or acoustic properties are incidental to its main purpose (e.g. vinyl floor tiles, electric cables, roofing felt).

There may be other materials in which the asbestos fibres can be firmly linked in a matrix such as paper linings, cardboards, felt, textiles, gaskets, washers or rope where the products have no insulation purposes. If this is the case then the exemption from licensing may apply.

c) Encapsulation or sealing of ACMs which are in good condition

This exemption applies to all encapsulation or sealing of ACMs which are in good condition, i.e. undamaged. This is as long as the exposure to employees to asbestos during the work is sporadic and low intensity and it is clear from the risk assessment that the exposure of any employee to asbestos will not exceed the control limit.

d) Air monitoring and control, and the collection and analysis of samples to ascertain whether a specific material contains asbestos.

Again this work is need not be carried out by a licensed contractor as long as the exposure to employees to asbestos during the work is sporadic and low intensity and it is clear from the risk assessment that the exposure of any employee to asbestos will not exceed the control limit.

Additionally, you will not require a licence to work with asbestos if you are:

- 1 the client who has engaged a licensed contractor to do the licensable work;
- 2 the principal or main contractor on a construction or demolition site if the licensable work is being done by a subcontractor holding an asbestos licence;
- 3 an analyst checking that the area is clear of asbestos at the end of the job;
- 4 carrying out quality control work such as atmospheric monitoring (air monitoring) outside enclosures while asbestos removal work is in progress or checking outside enclosures that work has been carried out to a standard which meets the terms of the contract;
- 5 a consultant or other reviewing tender submissions on behalf of the client.

Note: The exemption from licensing for those that use their own employees on their own premises has also been removed. This now means that companies carrying out maintenance on contaminated plant such as negative pressure units and class H vacuum cleaners will require a licence.

ASSESSMENT AND PLAN OF WORK

The Control of Asbestos Regulations require that a suitable and sufficient risk assessment is carried out for any work which is liable to expose employees to asbestos, so as to establish the potential risks and whether or not the work is licensable.

From this assessment, a plan of work with details of the work methods and controls to be used should be provided for both licensable and non-licensable work. The plan of work should always be job-specific; however, information from previous similar jobs can be used provided there are no additional risks and it is appropriate for the site conditions.

For licensable work, the plan of work must be site specific, readily available on site and cover in sufficient detail the following information:

- 1 The scope of the work as identified by the risk assessment;
- 2 Details of hygiene facilities, transit route and decontamination arrangements, vacuum cleaners, protective clothing and RPE;
- 3 Details of the use of barriers an signs, location of enclosures and airlocks, location of skips, negative pressure units, air monitoring, cleaning and clearance certification, emergency procedures.

ADDITIONAL DUTIES FOR LICENSABLE WORK

If the work is licensable there are a number of additional duties. You need to:

- 1 notify the enforcing authority (HSE or local authority) 14 days prior to work commencing (see Regulation 9);
- 2 designate the work area (see Regulation 18);
- 3 prepare specific asbestos emergency procedures (see Regulation 15), and;
- 4 pay for your employees to undergo medical surveillance (see Regulation 22).

CLEANLINESS OF PREMISES AND PLANT

Once removal of the asbestos has been completed, the premises must be thoroughly cleaned before being handed over for reoccupation. All visible traces of asbestos dust and debris should be removed and a thorough visual inspection carried out.

Where the work is licensable then a certificate of reoccupation should be issued following the 4-stage clearance procedure:

1. a preliminary check on site conditions and job completeness;
2. a full visual inspection inside the enclosure/work area;
3. clearance air monitoring (see note below);
4. final assessment after enclosure/work area dismantling.

Air measurements shall only be taken by those able to demonstrate they can carry out such work to the specified requirements in ISO 17020. Competence should be evidenced through accreditation with a recognised accreditation body such as the United Kingdom Accreditation Service (UKAS).

Analysis of the concentration of asbestos in the air shall be measured using the 1997 WHO recommended method.

From 6 April 2007, any person who issues a site clearance certificate for reoccupation must be accredited by an appropriate body (i.e. UKAS) as competent to perform work in compliance with ISO 17020 and ISO 17025.

WASTE DISPOSAL

All asbestos waste is classified as hazardous waste under the Hazardous Waste Regulations and must be disposed of at a licensed waste disposal site. For most waste, double plastic sacks are suitable provided they will not split during normal use. Large pieces of rigid material, e.g. cement sheets, should be double-wrapped intact in heavy gauge polythene sheeting.

The waste should be clearly labelled and transported by registered carrier in an enclosed vehicle, skip or freight container.

TRAINING

The Control of Asbestos Regulations require that anyone liable to be exposed to asbestos fibres at work undertakes relevant training. This includes maintenance workers and others who may come into contact with or who may disturb asbestos (e.g. electricians, plumbers, etc) as well as those involved in asbestos removal work.

The three main types of training cover:

1. licensable work - such as removing asbestos insulation or insulating board;
2. non-licensable work - such as a roofer or demolition worker removing a whole asbestos cement sheet in good condition or analytical staff and asbestos surveyors;
3. asbestos awareness - for those persons who are liable to disturb asbestos while carrying out their normal everyday work, or who may influence how work is carried out.

All training should be provided by someone who has had adequate personal practical experience and who has theoretical knowledge of all relevant aspects of the work carried out by the employer. All training certificates issued by such people or organisations should be traceable and valid for no more than 1 year.

(Chapter 4 of HSG247 Asbestos: The Licensed Contractors' Guide, sets out the detailed content of the asbestos training modules for operatives, supervisors, managers, directors, supervisory licence holders and ancillary licence holders involved in licensable work).

A GUIDE TO LIKELY FIBRE CONCENTRATIONS

The figures below are a guide to the airborne fibre levels that may be expected close to the operator's breathing zone in a number of different processes. The following points should be borne in mind when using them:

- 1 They are based on measurements taken by HSE. Different processes in different locations may result in higher or lower concentrations than those listed in the table.
- 2 They are average concentrations for the time during which the process is actually taking place.
- 3 Selection of a figure from the list is not in itself an assessment. The person making the assessment must consider whether it is reasonably practicable to use methods that give a still lower value.
- 4 The estimated dust concentrations given are to help in making assessments of likely exposure and through the assessment to help in the choice of work methods, exposure control methods and protective equipment. The figures are a guide only; results may vary from one operation to the next, and the assessment should allow for that. If there is doubt about the likely exposure to asbestos dust then the precautions taken should be adequate to meet the worst case.
- 5 These figures are the concentrations found when the processes are carefully carried out. Bad handling practices may result in higher concentrations.
- 6 All the figures given for typical fibre levels for work with asbestos cement sheets and pipes are shown in fibres per millilitre of air. As shown, many of the tasks create dust levels above the control limit (0.1 f/ml) and therefore must be carried out by an asbestos licensed contractor.

Process	Concentration fibres/ml		
Asbestos Stripping Operations			
De-lagging	Dry stripping of Crocidolite 100-1000		
	Dry stripping, except Crocidolite Greater than 20		
	Stripping with water sprays 5-40		
	Controlled wet stripping (thorough soaking of insulation) 1-5		
Removal of insulating board and tiles	Breaking and ripping out 5-20		
	Unscrewing and careful removal with application of local exhaust ventilation Less than 2		
Asbestos Cement Sheets and Pipes (Normally Chrysotile)			
Machine cutting without exhaust ventilation	Abrasive disc cutting 15-25		
	Circular saw 10-20		
	Jig saw 2-10		
Machine sawing with exhaust ventilation	Below 2		
Reciprocating saw	Below 1		
Hand saw	Below 1		
Machine drilling	Below 1		
Removal of asbestos cement sheeting	Below 0.5		
Stacking of asbestos cement sheet after removal	Below 0.5		
Remote demolition of asbestos cement structures	Below 0.1		
(CAUTION: subsequent clearance may give rise to concentrations greater than 1)			
Clearing of asbestos cement	Roofing	Vertical Cladding	
	Dry brushing (wire)	3	5-8
	Wet brushing (wire)	1-3	1-2
	Water jetting	0-0.5	1-2
(NOTE: Water jetting may produce debris and slurry which is difficult to control and needs to be collected and disposed of as hazardous waste)			

Process		Concentration fibres/ml
Asbestos Insulation Board and Tiles (Normally Amosite and Chrysotile)		
Sanding and surfforming		6-20
Machine cutting without exhaust ventilation	Circular saw	Greater than 20
	Jig saw	5-20
Machine cutting with exhaust ventilation		1-5
Drilling overhead		5-10
Drilling vertical columns		2-5
Hand sawing		5-10
Scribing and breaking		1-5
Rough handling of insulating board and removal of pieces		Greater than 15
Careful removal of whole boards		Up to 5
(NOTE: The dust levels are likely to be highest if Amosite is present and the material is handled roughly. Bad handling practices may result in much higher concentrations)		
Decorative Plasters		
Scraping painted plaster		0.1 - 0.2
Light hand sanding of unpainted area		Greater than 0.3
Mixing		Greater than 1

REFERENCES

- SI 2006/2739 The Control of Asbestos Regulations, 2006
- SI 2005/894 The Hazardous Waste (England and Wales) Regulations, 2005
- SI 2005/895 The List of Wastes (England) Regulations, 2005
- L143 Approved Code of Practice and guidance for work with materials containing asbestos, 2006
- HS(G)210 Asbestos Essentials Task Manual

GUIDANCE NOTE	BIOLOGICAL HAZARDS	Code: H004	Issue: A
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Biologically hazardous agents are living micro-organisms capable of causing disease or harm. Pathogenic micro-organisms have special adaptations allowing them to colonise a host and cause disease. Other organisms are opportunist pathogens and are able to cause disease in debilitated hosts or those with immune deficiencies.

The occupational acquired infections are Hepatitis B and HIV infections, which are normally associated with discarded needles and sharps, and Leptospirosis (also known as Weil's Disease), which is a form of jaundice caused by contact with water contaminated by the urine of rats, other small mammals such as mice and voles, and cattle.

Control of Exposure

Where employees are exposed to discarded needles and sharps or other material which may be contaminated with human secretions, the following precautions must be adopted:

1. Keep cuts and abrasions covered with an impervious dressing.
2. Wear heavy duty, impervious gloves to protect the hands whilst collecting the sharps etc.
3. Segregate the needles and sharps from other rubbish in a disposable plastic container.
4. Dispose of the container and its contents by contacting the Local Authority Environmental Health Department.
5. Ensure a strict hygiene culture is enforced prior to eating, drinking, smoking etc.

Where employees may come into contact with contaminated water or work regularly in or near impure water, such as those engaged in:

1. Work on sewers and other drainage systems,
2. Work on canals and similar conservation projects,
3. Work in tunnelling,

the following precautions must be adopted:

1. Discourage the presence of vermin by careful disposal of waste food, especially on sites that are wet or adjacent to rivers and lakes.
2. Do not handle the carcasses of dead rats or other small mammals; use gloves and/or tools to do so.
3. Cover all cuts and abrasions with a waterproof dressing and wear appropriate protective clothing.
4. Ensure a strict hygiene culture is enforced prior to eating, drinking, smoking etc.

First Aid

If discarded needles and sharps are found accidentally then work in that area is to be suspended until the debris has been cleared. Should a worker receive a cut or puncture wound from a needle or sharp then he is to inform his Medical Practitioner at the earliest opportunity.

Information and Training

Where work is to be carried out in an area known to be contaminated with discarded needles and sharps then all employees are to be made aware of the precautions to be adopted and the potential hazards associated with this kind of debris.

Similarly, where work is to be carried out in or near impure water, all employees are to be made aware of the potential for leptospiral infection and the precautions to be adopted.

AIDS

AIDS (Acquired Immune Deficiency Syndrome) is a disease caused by a virus that attacks the body's defence system, allowing illnesses, and infections, which would not otherwise have occurred, to develop. The virus can be transmitted by injection or inoculation with infected blood.

The disease is not transmitted by normal social contact and normally the AIDS virus survives only for a very short period outside the body.

Where there is a risk of contamination, heavy-duty gloves and overalls should be worn as protection against cuts and suspected items should be removed by tongs and placed in puncture proof bins for disposal.

The COSHH Regulations require employers to ensure that exposure of employees to substances hazardous to health is either prevented (or if this is not reasonably practicable) adequately controlled.

Leptospirosis

Leptospirosis is also known as Weil's Disease and is a form of jaundice. It is caused by contact with water contaminated by the urine of rats, other small mammals such as mice and voles, and cattle.

The disease enters the body through breaks in the skin and through the lining of the mouth and nose; it can be caught if water gets in the mouth or nose after falling into contaminated water.

It will start as a mild illness that can be easily cured if treated early enough. The initial symptoms are very similar to flu and it is possible that symptoms could be ignored or be treated as flu. However, if Leptospirosis is left untreated it can become more serious and may be fatal.

Personnel who contract any flu-like symptoms after falling into water that may be contaminated should see their doctor immediately and inform him/her of the potential for leptospiral infection.

It is advisable for persons who frequently work near water to carry a card or tag saying that they may be at risk of catching the disease.

Avian Influenza - H5N1 Virus

There are several different varieties of the Avian Influenza A virus (better known as Bird Flu); however, only four strains are currently known to have caused infections to humans: H5N1, H7N3, H7N7 and H9N2. H5N1 is currently causing the greatest concern for human infection although there still have only been relatively few incidents of people contracting the H5N1 Virus.

Currently the cases where humans have contracted the virus are attributable to exposure to dead or very ill infected birds. The virus does have the potential to evolve quickly, although it is impossible to predict if the virus will evolve into a highly contagious strain that will pass from human to human.

The virus can exist in populations of wild or domestic birds; however, the disease often spreads much faster within domestic populations because of the large numbers in relatively small spaces. Workers who are regularly in environments such as poultry houses, zoos, aviaries and bird sanctuaries, pet shops, abattoirs or any other environment containing birds should take precautions to prevent the risk of contracting the virus.

In humans initial symptoms of infection can include a high fever, a high temperature (>38°C), and flu like symptoms. Diarrhoea, vomiting, abdominal pain, chest pain and bleeding from the nose and gums have also been reported as early symptoms in some patients.

Should any dead birds be found in suspicious circumstances that may indicate the virus is present, the following steps must be undertaken immediately:

1. Cease work;
2. Do not touch the bird;
3. Evacuate the immediate work area;
4. Inform others locally not to disturb area;
5. Inform both the Trade Contractor's senior person on site and the Project Manager, who will call for advice and assistance;
6. Do not return to that task until it has confirmed that it is safe to do so by the project manager.

The work area must be quarantined (with measures being taken to ensure that there is no further contamination) until such time as remedial action is taken.

Avian influenza is a notifiable disease (a disease named in section 88 of the Animal Health Act 1981 or an order made under that Act). Any suspected incidence should be reported to the Department for Environment, Food and Rural Affairs (DEFRA) helpline 08459 335577.

GUIDANCE NOTE	HARMFUL WASTES	Code: H009	Issue: A
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INTRODUCTION

The following are some of the industries that were or are large-scale producers of hazardous waste products:

1. Asbestos;
2. Chemical and allied products;
3. Dock areas;
4. Explosives;
5. Gas works;
6. Metal smelting, refining, treatment and finishing;
7. Mining and extraction;
8. Oil production and storage;
9. Paints and graphics;
10. Pharmaceuticals;
11. Pesticides;
12. Railway storage areas and yards;
13. Scrap yards;
14. Sewage works;
15. Steelworks;
16. Tanning and associated trades;
17. Waste disposal;
18. Wood treatment and preservatives.

Prior to the handling of suspect waste, safe-working procedures shall be drawn up for the specific hazards. These safe systems shall include:

Minimising Of Exposure

There are a number of techniques that can be used. These consist of:

1. Placing a barrier layer of material, if specified, as soon as possible;
2. Providing suitable protective clothing for all exposed persons;
3. Providing adequate washing and changing facilities;
4. Handling suspect waste away from offices, stores and workshops to reduce the numbers of those at risk;
5. Instructing all personnel on the dangers from the waste;
6. Programming the works, where possible, so that they are not carried out in dusty conditions, or damping down the area to prevent or reduce the dust;
7. Prohibiting smoking, eating and drinking in the area.

There are also specific precautions that are necessary for the handling of certain substances, such as asbestos and lead and the relevant section of this manual shall be consulted.

Where any doubt is experienced as to the method of minimising or reducing exposure, expert advice shall be taken.

Containment of Contamination

Where the dust from the waste is likely to be contaminated, dust monitoring and wetting down of the site shall be carried out.

The waste shall be located, where possible, at a sufficient distance from the site boundary to ensure that contamination leaving the site is at acceptable levels.

Vehicles that may be contaminated shall be washed down before leaving the site.

Monitoring of Employees

If employees are likely to be absorbing any of the chemicals on site, medical examinations shall be carried out by an occupational physician, as recommended by the Employment Medical Advisory Service. All records of these medicals shall be confidential and copies shall be forwarded to EMAS for retention on their data bank.

Authorities and Advisory Bodies

Prior to work commencing on suspect waste, the following authorities and/or advisory bodies shall be consulted, where appropriate:

1. Health and Safety Executive;
2. Local Authority Environmental Health Department;
3. Local Authority Waste Disposal Department;
4. Interdepartmental Committee of the Redevelopment of Contaminated Land, Department of the Environment, 43 Marsham Street, London SW1 3PY.

GUIDANCE NOTE	GAS SAFETY INSTALLATION AND USE	Code: H010	Issue: C
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INTRODUCTION

Gas is widely used in commercial and industrial environments. When handled and stored correctly it is a safe fuel, but when mistreated it can prove to be volatile and can result in oxygen deficient environments.

REGULATORY COMPLIANCE

The Gas Safety (Installation and Use) Regulations specifically deal with the installation, maintenance and use of gas appliances, fittings and flues in domestic and certain commercial premises. They place duties on certain landlords to ensure that gas appliances, fittings and flues provided for tenants' use are safe.

DEFINITION OF GAS

Gas, within the above regulations, concerns the use of natural gas, LPG, methane from coal mines, landfill gases, etc.

GAS SAFETY LEGISLATION REQUIRES THAT:

- Anyone who carries out work on gas fittings or gas storage vessels must be competent to do so. The level of competence should match the full extent of the work done.
- All personnel undertaking work on gas must be Gas Safe Registered; this scheme is operated by Capita and regulated by the Health and Safety Executive.
- Any employer or self-employed person instructing such work, or in control of such work, must ensure that the work is carried out by a person or organisation registered with Gas Safe.
- The equipment must be suitable for the task.
- New gas appliances used for domestic purposes are subject to the Gas Appliances (Safety) Regulations. They are to carry the CE marking, in addition to any recognised European Standard mark and/or BSI Kitemark.
- Pipes should be of a suitable construction, material, strength and size to convey gas to the appliance and to ensure its safe operation.
- Connections can be made to existing lead piping using suitable fittings, provided that the piping is in a safe condition.

The following general safety precautions should be taken:

- No person shall carry out any work in relation to a gas fitting unless steps are taken to prevent gas release. This generally covers work which involves breaking into an existing gas main to carry out the modification/extension of an existing system. If work is left unfinished for any significant period, during which appliances might be deliberately or inadvertently used, the gas supply to the (disconnected) appliance should be sealed using an appropriate fitting.
- Where a gas fitting, e.g. an appliance, is removed from the system an appropriate seal fitting must be fitted and checked for leakage.
- Purging of vessels/tanks should be carried out in accordance with appropriate working practices outlined in the HSE guidance notes The Cleaning and Gas Freeing of Tanks Containing Flammable Residues.
- A safe system of work must be implemented, including the isolation and purging of the system, prior to the use of sources of ignition, including blowlamps, hot air guns, etc. (This would include a series of permits-to-work dependent on the location or position of the appliance being worked on.)
- No person searching for the escape of gas is to use any source of ignition - use of sense of smell, gas detection instruments, leak detection fluids, pressure test equipment or a combination of these methods should be used.
- The gas tightness of the installation should be tested in accordance with the appropriate standard. This can be via a pressure decay test. This test must incorporate areas at least as far as the nearest valves up and downstream in the installation.
- The installation of LPG tanks must be fitted in a suitable location, taking into account provision for off-road parking for the safe delivery of LPG.
- Gas fittings must be correctly supported and protected from damage.
- Emergency controls must be fitted where a new gas supply is being provided to the premises.
- Measures are to be taken in respect of the siting and installation of pipework to ensure that it is sited in appropriate areas of any premises.
- Measures are to be taken in respect of primary or secondary meters.
- Pipework in commercial premises must be marked to indicate it is carrying gas - in accessible inspection areas.
- Manufacturers' instructions are to be provided to the owner/occupier of the premises.
- There must be no unsafe appliances for use - the owner or landlord is responsible for ensuring compliance. Should defects be found they are to be immediately reported.
- Equipment must be regularly maintained and records held to show compliance.

GAS SAFETY LEGISLATION ALSO PROHIBITS:

- Alterations which do not comply with the regulations.
- Installation of certain appliances in certain environments.
- Installation of suspended appliances unless suitable for use and supporting structure is in place.

RESPONSIBILITIES OF LANDLORDS

By law you must:

- Ensure installation pipe work, appliances and flues provided for tenants are maintained in a safe condition.
- Ensure an annual safety check is carried out on each appliance and/or flue that you provide for tenants use.
- Ensure maintenance and annual safety checks are carried out by a Gas Safe registered installer.
- Keep a record of each safety check for 2 years.
- Issue a copy of the safety check to each existing tenant within 28 days of check being completed and to any new tenant before they move in.
- Ensure all gas equipment (including any appliance left by a previous tenant) is safe or otherwise removed before re-letting.
- If a managing agent is used to help the landlord in meeting their duties, make sure that the management contract clearly specifies who is to make arrangements for maintenance and safety checks to be carried out and for keeping records. However, the landlord maintains overall responsibility for ensuring duties are met, irrespective of whether a managing agent is employed.
- Ensure that anyone carrying out work on gas appliances/fittings and/or flues provided for tenants use has the required competence and that only Gas Safe registered installers are used.

RESPONSIBILITIES OF EMPLOYERS

- To ensure that equipment and associated systems are inspected/maintained by a Gas Safe registered competent person.
- To ensure that gas safety procedures are documented and training is given to all staff.
- To implement emergency procedures and train personnel in their operation.
- To ensure clear access to the main isolation point of the gas supply at all times.
- To ensure only Gas Safe registered personnel are authorised to tamper with appliances.
- To ensure pipework is labelled to show that it is a gas carrying pipe.

EMERGENCY PLAN FOR A GAS LEAK

- Ensure that the gas supply is shut-off at the meter control valve.
- Make safe any machinery that may cause fire or explosion in a gas-rich atmosphere.
- Open all doors and windows.
- Do not search for the leak area with a naked flame.
- Do not switch on electric lights or operate switches which will provide a source of ignition.
- Leave the affected area; ensuring that equipment and services are in a safe condition.
- Telephone the gas emergency services.
- Meet the gas emergency services, brief them and identify any other associated hazards which may affect their works.
- In the case of suspected carbon monoxide leakage, follow the above Procedure, except that if you are able to identify the specific appliance at fault then you should consult a Gas Safe-registered installer to investigate and make repairs.
- If you provide liquefied petroleum gas (LPG) for use by a tenant in premises **other than a building**, eg a caravan or holiday home park, you must discuss emergency arrangements with your LPG supplier and agree what action to take in case of a gas escape or emission of carbon monoxide from any LPG appliance.

SOURCES

- HSE " A GUIDE TO LANDLORDS DUTIES: GAS SAFETY (INSTALLATION AND USE) REGULATIONS
- HSE " GAS SAFETY - THE LAW"

GUIDANCE NOTE	HAZARDOUS DUSTS, FUMES, GASES AND VAPOURS	Code: H011	Issue: A
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INTRODUCTION

Hazards from substances can be divided into two main areas: “Physical Hazards” and “Health Hazards”. This section looks at the health hazards from situations in which internal damage to employees can be caused, involving, for example, disorder or malfunction of the lungs, stomach, ear or brain.

HAZARDOUS DUSTS, FUMES, GASES AND VAPOURS

Substances harmful by inhalation are usually in the form of dusts, fumes, gases or vapours.

It should be noted that smoking increases the health risks associated with inhalation hazards. This has particular importance where there is a risk of lung disease or cancer. Active measures shall be taken to promote awareness of this fact to all levels of employees.

It is a legal requirement under the Control of Substances Hazardous to Health Regulations to assess the extent of the risk prior to permitting anyone to enter or work in an area where such hazards exist. An assessment may reveal that it is necessary to provide adequate natural ventilation, however, in many cases, the assessment will initially have led to an evaluation of both the amount and concentration of the hazardous substance present in the atmosphere, which in turn would have resulted in implementing controls for entry into the area, the provision of forced ventilation and/or extraction, the monitoring of the atmosphere and the provision and use of respiratory protection.

In a confined space an assessment of the oxygen content to ensure that the oxygen levels are within the range of 18% to 21.5% and the possibility of the atmosphere being explosive or flammable shall be carried out.

Entry into any area where the atmosphere is unsafe shall be strictly controlled and supervised, and the necessary safety precautions shall be laid down and strictly complied with.

If, after all reasonably practicable steps have been taken to ensure adequate ventilation, the hazard still exists; the use of respirators or breathing apparatus shall be necessary. The type of respiratory protective equipment (RPE) required needs careful evaluation if the correct and most cost-effective choice is to be made. Respirators shall not be worn in oxygen deficient areas; only breathing apparatus that are self contained or fed by an airline shall be used.

The Certificate of Approval, issued annually by the Health and Safety Executive, lists the types of RPE approved for use in conjunction with specific legislation, such as the Regulations applicable to lead and asbestos. The types of RPE available may be suitable for the filtration of a variety of substances - the suitability shall be checked with the manufacturers or suppliers of the equipment.

Adequate instruction and training shall be given to all those required to use RPE, both in use, hazards and rescue procedures.

All dusts, gases and fumes shall be regarded as hazardous to health until such time as evidence to the contrary is provided.

Most of the damage and toxic effects take place once the dusts, etc., reach the deep lung spaces and those particles that are small enough to reach these areas are regarded as “respirable” dusts. Airborne dusts that do not contain substances recognised as being hazardous to health are regarded as “nuisance” dusts.

Where possible the dusts shall be cleaned up as they are created and dust-inhibiting measures, such as damping down surfaces, vacuum cleaning and the exhaust ventilation of power tools, shall be taken.

Typical hazardous dusts are:

- **Asbestos**

In maintenance, refurbishment and demolition, asbestos in the form of cement products, lagging, sprayed coatings and insulation boarding (including old ceiling tiles) is often encountered.

There are two main safety hazards associated with asbestos:

1. Asbestosis: This may result from working with all types of asbestos. It is a chronic industrial lung disease, slow in onset leading to increasing breathing difficulties and eventual respiratory disablement. It is dose related and results from a long exposure,
2. Mesothelioma: This is resulting from the inhalation of asbestos. This is a specific and serious form of cancer only found after exposure to asbestos and affects either the lining of the lung cavity or the abdominal wall.

- **Wood Dust**

This is caused through sawing, routing, moulding, carving and sanding.

The hazards associated with exposure to wood dusts include asthma, skin disorders, irritation to the eyes and respiratory system. There is also evidence that certain wood dusts are carcinogenic.

Where exposure cannot be prevented, suitable and sufficient assessment of the risks from airborne dust must be carried out such that adequate controls can be implemented. This may mean additional ventilation is required i.e. local exhaust ventilation at machines, along with the use of suitable personal protective equipment (PPE).

- **Man-Made Mineral Fibres (MMMF)**

These fibres are widely found in use as a replacement for asbestos and in the form of fibreglass insulation in lofts and other areas.

There is little evidence to indicate that MMMF are a cause of cancer; however, inhalation is to be avoided, as irritation of the respiratory system is a common health effect. Other effects include skin irritation and dermatitis where contact with the skin is regular and/or prolonged.

PPE would normally include overalls (tightly woven Terylene or similar), impervious gloves and approved respirators.

- **Plaster, Mortar and Cement**

Cementitious materials contain lime. Inhalation of dry dust is likely to irritate the respiratory system. Contact with the eyes and skin may also irritate and burn.

Dust respirators shall be used along with eye protection and the skin shall be protected.

When wet the skin shall be protected either by gloves or with the use of barrier creams.

- **Silica and Quartz Dust**

Large quantities of silica bearing rocks are crushed for the production of aggregates to make concrete. There are hazards, not only in the crushing operation, but also in the batching of the aggregates, the abrasive cleaning of buildings and the drilling or scabbling of concrete.

The major hazard is that of silicosis, the effects of which are the same as asbestosis. The precautions to be taken are, where appropriate, the use of “wet” methods of work, total enclosure of the work area, exhaust ventilation, RPE and the segregation of other workers.

Fumes, Gases and Vapours

The majority of gases and vapours have a toxic effect and inhalation usually results in rapid absorption into the blood stream. Others may have the effect of reducing the percentage of the oxygen in the atmosphere, which could lead to the asphyxiation (suffocation) of workers. Exposure to exhaust gases from vehicles and machinery are particularly dangerous in confined spaces, such as tunnels, sewers and manholes.

Oil mists can also be created by the exhaust of pneumatic tools and can build up in a confined space or poorly ventilated area and can cause nausea.

The use of chemicals with potential toxic properties is increasing in the workplace. Solvent fumes can be given off by drying paint, lacquers and adhesives. They are frequently heavier than air and can build up in confined spaces, displacing the oxygen. Polymer resins give off styrene and glues and foams can give off isocyanates.

Examples of hazardous fumes, gases and vapours include:

- **Isocyanates**

These are used in adhesives, insulation foams, paints and varnishes. The most hazardous operation involving isocyanates is the spraying of foam compounds in which isocyanates are present.

They act as an irritant to the respiratory tract and may cause sensitisation (leading to asthma), dermatitis and damage to the eyes.

Precautions include the wearing of protective clothing, the provision of exhaust ventilation and where necessary, the use of full-face breathing apparatus.

- **Liquefied Petroleum Gases (LPG)**

Though we are usually well aware of the hazards connected with LPG it is not usually appreciated that the use of LPG space heaters in confined areas can, without adequate ventilation, cause a deficiency of oxygen in the atmosphere, resulting in asphyxiation. Propane and butane have a narcotic effect as well as presenting a risk of explosion.

When using LPG it must be ensured that there is adequate high and low level ventilation.

- **Solvents**

Solvents normally give off a vapour, can be flammable and even explosive. These are frequently found in paints, adhesives, paint strippers, varnishes, mastics, surface coatings etc. The inhalation or absorption through the skin of solvents can result in impaired judgement, dizziness, headaches and unconsciousness. Other possible effects include skin irritation and dermatitis. The risk is greater when the solvents are used in confined spaces or poorly ventilated areas.

Where possible, the area should be well ventilated; however, air quality monitoring and the use of respiratory protective equipment (RPE) may be required in potentially confined space situations. Skin contact should be avoided by means of impervious clothing and gloves. Smoking, eating and drinking should be prohibited in the working area and good personal hygiene practices encouraged.

HAZARDOUS CONTACT WITH THE SKIN AND MUCOUS MEMBRANES

Many fumes and dusts can be harmful in contact with the skin and mucous membranes (e.g. eyes and nasal passages). There are also many equally harmful chemical based products.

The most common hazard is occupational dermatitis. Occupational dermatitis is neither infectious nor contagious, but will continue for as long as the sufferer is in contact with the offending substance and often long after. If a person is allergic to the substance it is not safe for him to handle that substance at any time.

Many materials are known to potentially cause adverse health effects, although the level of reactions to substances does vary from person to person. The following list includes some known to fall into this category:

- Pitch, tar and bitumen;
- Brick, stone and plaster dust;
- Cement;
- Paints, lacquers, stains and varnishes;
- Woods;
- Epoxy resins;
- Acrylic and formaldehyde resins;
- Chromates present in primer paints, cement, etc.;
- Petrol, thinners, white spirit;
- Acids, alkalis.

The incidence of occupational dermatitis can be reduced by the provision and use of protective clothing and barrier creams to help prevent skin contact with the material, and by practicing good personal hygiene such as regularly washing off contaminants.

SUBSTANCES HAZARDOUS BY INGESTION

The ingestion (swallowing) of hazardous substances is likely to cause internal irritation and may cause systemic poisoning. In the majority of cases, the risk of this occurring can be significantly reduced or even eliminated when the following precautionary steps are followed:

1. Using substitute materials which are safer or less toxic;
2. Ensuring that employees are aware of the hazard when using substances;
3. Establishing safe systems and instructing employees in the safe use of toxic substances;
4. Ensuring that all substances are correctly and clearly labelled;
5. Prohibiting drinking, eating and smoking in areas where toxic substances are stored or used;
6. Promotion of a personal hygiene programme and health education;
7. Provision of the correct personal protective equipment and ensuring its use.

GUIDANCE NOTE	INSULATION	Code: H012	Issue: A
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GLASS FIBRE AND ROCKWOOL

Handling Precautions

The amount of cutting and handling of these shall be kept to a minimum. All cutting shall normally be undertaken with handsaws and knives.

Where power saws are used they shall be connected to a dust extractor or vacuum unit, fitted with a filtration system designed to remove the dust created. The dust extractor or vacuum unit shall be maintained, emptied and used in accordance with the manufacturer's instructions. Under no circumstances shall a power saw be used to cut glass fibre or rockwool, unless the extractor or vacuum is connected and running.

All operators shall be provided with and wear one-piece overalls and gloves.

First Aid

Both of these materials are irritants and the following first aid treatments shall be followed:

Skin: Any areas of the skin that have been in contact with glass fibre or rockwool shall be washed with soap and luke-warm water. Under no circumstances shall hot water be used;

Eyes: Wash immediately with large volumes of clean water;

Inhalation: Remove to the fresh air.

In all cases, medical attention shall be sought if irritation continues and the medical practitioner giving attention shall be advised of the exposure to the fibre.

Fire

Neither of these materials are flammable and no special precautions shall be required.

Spillage

Where spillage of loose fibre occurs the area shall be dampened down and the spillage swept up. Care shall be taken to ensure that the fibres are not disturbed in a way that will give rise to airborne contamination.

Disposal

Waste shall be disposed of as normal waste.

POLYURETHANE FOAM

Handling Precautions

Contact with the skin shall be avoided. Overalls and gloves shall be provided and used whenever the foam is handled or applied.

When spraying polyurethane foam, full respiratory protection, in the form of self-contained breathing apparatus or airlines, shall be provided and used by trained, experienced and authorised persons.

The work area shall be well ventilated, with forced ventilation provided if the natural airflow is insufficient to keep the area free of fumes.

Only authorised persons shall be permitted to enter the work area.

First Aid

If exposed to the uncured foam, the following first aid action shall be taken:

Eyes: Wash immediately with large volumes of clean water and seek medical attention;

Skin: Wash the affected parts with soap and water - if any irritation or rash appears, seek medical attention;

Inhalation: Remove to the fresh air and seek urgent medical attention.

In all cases, the medical practitioner giving attention shall be advised of the exposure to the polyurethane foam.

Fire

All materials shall be kept in a secure storage area, signed to give details of the contents. As the fumes from a fire may be very toxic, only persons wearing self-contained breathing apparatus shall tackle the fire. In the event of a fire the local Fire Brigade shall be notified accordingly.

Spillage

Any spillage shall be sprinkled with sand or absorbent granules.

Waste Disposal

Components shall be mixed to form foam and left to cure, thus requiring no special precautions for disposal.

GUIDANCE NOTE	LIQUEFIED PETROLEUM GASES	Code: H014	Issue: A
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INTRODUCTION

Liquefied Petroleum Gas (LPG) is defined in The Dangerous Substances and Explosive Atmospheres Regulations, 2002 as "commercial butane, commercial propane or any mixture of both", and should conform to BS 4250.

LPG is sold under a variety of names such as:

LPG Names	Cylinder Colour
Bottogas	Grey/Red top
BOC Propane	Red
Calor Butane	Blue (some Green)
Calor Propane	Red
Glogas	Yellow
Propagas	Grey/Red top

PHYSICAL PROPERTIES

At normal temperature and pressure LPG is a gas but as supplied it is a liquid under pressure. When the pressure is reduced, the liquid starts to boil and a gas is given off. One litre of liquid will provide approximately 250 litres of gas.

LPG is colourless. It is heavier than air and will travel great distances along the ground, collecting in cellars, basements, drains, excavations and other low lying areas. If the air is relatively still, the vapour will linger for a long time and if ignition occurs at a remote point, the flame will travel back to the source of the leak.

LPG is not toxic but can produce a narcotic effect, leading to asphyxiation. There is also a risk of asphyxiation when LPG is burnt, unless there is sufficient ventilation.

LPG usually has a smell added to it prior to distribution. Because of its rapid vaporisation, liquid LPG can cause severe frost burns if it comes into contact with the skin.

CYLINDERS

Storage

Cylinders must be stored at ground level and easily accessible, in case of emergencies. Wherever possible, the storage is to be in the open air, protected by a fence, at least 2m high. There should be sufficient shelter to protect the cylinders from the sun.

The area is to be kept clear of flammable materials and there should be no adjacent drains, cellars, etc. Notices stating "LPG - HIGHLY FLAMMABLE" and "NO SMOKING" are to be displayed.

LPG cylinders are not to be stored within:

1. 3m of cylinders containing oxygen or materials which are toxic or corrosive;
2. 3m of highly flammable liquids;
3. 7.5m of a fixed LPG installation of more than 5000 litres.

Cylinders, full or empty, are to be stored with their valves uppermost.

If storage in the open air is not practicable, the building, or part of the building used, is to be either designed specifically or modified for the purpose, to ensure an adequate degree of fire resistance and a good rate of low-level ventilation. All electrical installations within the area are to be intrinsically safe. Only the minimum quantity of cylinders necessary, are to be stored under these conditions.

Handling

Hands and clothing are to be free from grease, oil and grit when cylinders are handled to prevent them from slipping and to prevent grit getting into the valve assembly, or grease onto the nozzle or valve.

Nozzles are not to be used for handling purposes; they are not designed to withstand the weight or stress.

Cylinders in use are to be stored and transported on the trolleys provided. If it is necessary to move a cylinder that is not on a trolley, all regulators and hoses are to be removed and a check made to ensure that the valve is shut.

Under no circumstances are cylinders to be rolled along the ground.

If cylinders are to be moved by crane they are to be secured in a cradle. On no account are they to be moved using chains or slings, as these are likely to slip, allowing the cylinder to fall.

Gas cylinders are to be treated with care and not subjected to falls or shocks. When they are being unloaded from vehicles they are to be lowered and never to be dropped.

Leak Detection

Cylinders, valves, connections, piping and hoses are to be inspected regularly for leaks. Leaks may be identified by:

1. Smell;
2. Sound of escaping gas;
3. Condensation or frost around the area of the leak;
4. Brushing soapy water over the suspect area or valve and looking for bubbles.

If a leak is discovered and it cannot be stopped, the cylinder is to be removed as quickly as possible to an open space, clear of drains, culverts, etc. It is to be placed with the leak uppermost, marked with warning notices and the supplier notified.

IGNITION SOURCES

The following sources of ignition must be excluded from hazardous areas where LPG is present:

1. Smoking and naked lights;
2. Welding, cutting and blowlamps;
3. Abrasive wheels and disc cutters;
4. Heating appliances;
5. Steel tools;
6. Mechanically propelled vehicles;
7. Unprotected electrical equipment.

FIRE PROTECTION

A sufficient number of dry powder fire extinguishers are to be placed around the storage area. These are to be maintained on a regular basis, at least annually.

Weeds, long grass and other combustible materials are to be kept clear of the storage area.

EMERGENCY ACTION

In the event of an emergency it is important to avoid endangering life. The following action is to be taken in all but the most minor of incidents:

Call the emergency services;
Evacuate all unnecessary personnel.

In the case of a leak without a fire, stop the escape of gas, if possible. Remove defective cylinders, as detailed under "Leak Detection".

See also, Safe Systems of Work: -

Oxy/Liquid Petroleum Gas Welding.
Oxy/Acetylene Welding.
Oxy/Acetylene Cutting.

GUIDANCE NOTE	OXY/GAS WELDING & CUTTING	Code: H016	Issue: A
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There may be a need for a hot works permit to be in place prior to commencing the task.

CYLINDER IDENTIFICATION

Acetylene cylinders are painted maroon and the outlet valves are threaded left-handed. Propane cylinders are painted red and the outlet valves are also threaded left handed.

Oxygen cylinders are painted black and the outlet valve threads are right handed. Valves are, therefore, not interchangeable.

Under no circumstances are cylinders to be painted other than in their original colours or coated in any way to mask these colours.

GAS CHARACTERISTICS

Oxygen has no smell and is not itself flammable. However, an oxygen enriched atmosphere can be extremely dangerous, causing otherwise non-flammable materials to burst into flames.

Acetylene has a distinctive smell of garlic, is highly flammable and may, mixed with air or oxygen, form an explosive mixture.

Propane smells of rotting vegetation and is heavier than air. It may, therefore, collect in low lying areas. Further information is given in the section Liquefied Petroleum Gases.

STORAGE OF CYLINDERS

Oxygen cylinders are to be stored at least 3m away from those containing fuel gases, since any mixture of either fuel gas and oxygen, which might result from leaking cylinders, can cause an explosive mixture.

Gas cylinders are to be kept on a hard standing, in a safe place, in the open air wherever possible. Where this is not possible they are to be kept in a storeroom, constructed of non-flammable materials, with adequate high and low ventilation. Oxygen cylinders are not to be kept in the same storeroom as acetylene or liquefied petroleum gas.

Gas cylinders, whether full or empty, are to be stored in an upright position.

Oxygen cylinders may be stored horizontally, no more than 4 cylinders high and wedged to prevent rolling.

All vertically stored cylinders are to be secured to prevent falling.

Full cylinders are to be stored apart from empty ones.

Cylinders are to be shielded from direct sunlight or other heat sources, to prevent the build up of excessive internal pressure.

CYLINDER HANDLING

Hands and clothing are to be free from grease, oil and grit, when cylinders are handled, to prevent them from slipping and to prevent grit getting into the valve assembly, or grease onto the nozzle or valve.

Nozzles are not to be used for handling purposes, they are not designed to withstand the weight or stress.

Cylinders in use are to be stored and transported on the trolleys provided. If it is necessary to move a cylinder, which is not on a trolley, all regulators, hoses are to be removed, and a check made to ensure that the valve is shut.

Under no circumstances are cylinders to be rolled along the ground.

If cylinders are to be moved by crane they are to be secured in a cradle. On no account are they to be moved using chains or slings, as these are likely to slip, allowing the cylinder to fall.

Gas cylinders are to be treated with care and not subjected to falls or shocks. When they are being unloaded from vehicles, they are to be lowered and never to be dropped.

Gas cylinders are to be transported in the vertical position. If they are ever left lying down, they are to be stood upright for at least 10 minutes prior to being used.

REGULATORS

Regulators are always to be fitted to the cylinders, to reduce the gas pressure from that in the cylinder to the working pressure of the blowpipe. Only regulators designed for the gas are to be fitted to the cylinder.

All regulators are to be fitted with filters, but too much dust can clog them. To prevent this happening the cylinder valve is to be "cracked open" before the regulator is fitted to the cylinder, this will blow all the dust clear.

The adjusting screw of the regulator is to be released before the cylinder valve is opened and the valve opened gradually. If the valve is opened suddenly, the abrupt compression of the gas may generate excessive heat, causing the valve seat material to ignite and damage the gauge.

Periodic checks are to be made, to ensure that no gas is escaping from the regulator when the pressure regulating screw is set at zero. A leak may cause a pressure build up in the hose. Water, containing detergent, is to be used to check for leaks. Bubbles in the detergent are an indication of leaking gas.

HOSES

Hoses are to be kept for one type of gas only and colour coded for identification: -

1. Acetylene: Red.
2. Propane: Orange.
3. Nitrogen/Inert Gases: Black.
4. Oxygen: Blue.

Hoses are to be inspected daily to ensure that they are free from: -

1. Cuts;
2. Cracks;
3. Burns;
4. Worn patches.

Hoses are to be effectively clipped or crimped (not with jubilee clips) to the equipment and protected from: -

1. Sharp edges;
2. Falling metal;
3. Passing traffic;
4. Sparks from welding.

NON-RETURN VALVES AND FLASHBACK ARRESTORS

If the oxygen and fuel gases become mixed in one hose, an explosive mixture can result in a “flashback”. To prevent this, each hose is to be flushed with its own gas prior to the blowpipe being lit. This is to be done in a well-ventilated area and away from ignition sources.

To prevent the gases mixing in the hoses during use, non-return valves are to be fitted to each blowpipe inlet connection. Flame arrestors are also to be fitted.

If the nozzle of the blowpipe becomes damaged or blocked a build up of pressure can result in a reverse flow of gas and a “flashback” can occur. Therefore, blowpipes are to be checked prior to use and are to be dismantled and cleaned on a weekly basis.

GENERAL PRECAUTIONS

1. Only proprietary fittings are to be used.
2. If cylinders valve leaks and cannot be closed with a spanner, the valve is to be shut and the cylinder returned to the supplier, with a label attached detailing the problem.
3. Cylinder valves are never to be packed with washers.
4. Oil, grease or other fatty substances are not to be allowed to come into contact with oxygen regulators, valves or fittings, as these are spontaneously combustible in contact with oxygen.
5. The flame is never to come into contact with the cylinder.
6. Disused oil drums are not to be used as “work benches” as only a small amount of residual oil within the drum can lead to an explosion.
7. If an oxygen cylinder leaks in an enclosed area, the area is to be purged with fresh air.

OPERATIONAL FAULTS

Flame snap out: Unintentional extinction of the flame outside the nozzle.

Occurring during use due to: -

1. Both regulators at incorrect pressure;
2. Torch nozzle obstructed;
3. Nozzle held too close to the work;
4. Blowpipe valves not open sufficiently to allow adequate flow of gas.

Corrective action: -

1. Completely shut both torch valves;
2. Check regulator settings;
3. Check nozzles;
4. Re-light;
5. Ensure adequate gas flow.

Backfire: Retrogression of the flame towards the blowpipe mixer, the flame either being extinguished or re-ignited at the nozzle, for causes and action see under "Sustained Backfire".

Sustained Backfire: Retrogression of the flame into the blowpipe neck or body, the flame remaining alight.

Occurring on lighting up due to: -

1. Regulators not set to the correct pressure;
2. Light applied before flow of gas mixture properly established.

Corrective action: -

1. Shut both blowpipe valves, oxygen first;
2. Check cylinder pressure;
3. Check and adjust regulator setting;
4. Check torch;
5. Re-light when the gas flow is properly established.

Occurring during use due to: -

1. Regulators not set to correct pressure;
2. Nozzle obstructed;
3. Nozzle overheated.

Corrective action: -

1. Close both blowpipe valves, oxygen first;
2. Check cylinder pressure;
3. Check and adjust regulator settings;
4. Cool torch and check;
5. Clean nozzle of any obstruction;
6. Purge both hoses and re-light.

Flashback: The most dangerous of these occurrences, the cause being mixed gases in the hose or hoses.

Preventive action: -

1. Ensure all connections are tight;
2. Ensure cylinder valves are open and blowpipe valves shut;
3. Set regulators to required pressure;
4. Purge each hose separately by opening the blowpipe valve and allowing gas to flow long enough to ensure only pure gas is in the hose;
5. Shut the valve for each hose as the exercise is completed;
6. Only carry out this procedure in a well-ventilated area.

Corrective action: -

1. Shut both blowpipe valves;
2. Shut both cylinder valves;
3. Extinguish hose if alight;
4. Remove gas regulator, if "bull nose" is sooty, carry out the procedure for a heated cylinder;
5. If "bull nose" is clean, replace regulator;
6. Repair or replace hose or hoses;
7. Check if cut-off valve has shut, re-set or replace;
8. Re-assemble equipment and continue with work.

Heated cylinder: The gas cylinder becomes accidentally heated or gets hot due to internal decomposition.

The operator should: -

1. Raise the alarm;
2. Remove any external heat source;
3. Shut off valves, detach regulator and other fittings;
4. Drag cylinder into an open space;
5. Apply a flow of water until the cylinder is cool, or immerse the cylinder;
6. Open valve fully and apply water until the cylinder is empty.

Site supervision is to: -

1. Clear the area of personnel;
2. Ring the fire brigade;
3. Contact the supplier/manufacturer for advice.

HAZARDS

The main hazards from gas welding are: -

1. Fires;
2. Explosions;
3. Burns;
4. Eye damage;
5. Respiratory disease;
6. Systemic poisoning.

Correct organisation of the work and the choice of suitable equipment can minimise these risks.

PRECAUTIONS

Burns

Skin burns can result from metal splatter or from touching hot work pieces. Prolonged exposure to the heat from welding can result in reddening of the face.

The hands, arms and legs are to be covered at all times whilst welding. Where necessary, leather gauntlets, jackets and spats shall be issued.

Eye Damage

Sparks, splatter, slag and other foreign bodies may penetrate the eyes. During gas welding, infrared (IR.) radiation and visible light are produced. Exposure of the eyes to IR radiation may cause the outer surface of the eye to dry out and the eye to become irritated. The eyes must be protected from infra-red and visible light by means of box goggles with a housing made to comply with BS EN175 and fitted with the appropriate filters to BS EN166, as required by The Personal Protective Equipment at Work Regulations, 1992.

Persons working in the vicinity of welding are to be protected by welding screens around the working area, or, if that is not practicable, shall be issued with the appropriate eye protection.

Heat Stress

The longer the duration of welding, the hotter the surrounding can become. This is intensified in confined spaces. In extreme cases the operator may faint. Ventilation shall be provided in areas where thermal stress can be envisaged and a second person shall stand by in case of emergencies.

Respiratory Disease

All welding processes produce gases and fumes, which can result in respiratory diseases.

Harmful gases may also be produced during gas welding, the principal toxic gases produced being carbon monoxide and nitrous fumes. Carbon monoxide is only produced in large enough amounts to be dangerous when there is incomplete combustion.

In working areas, where there is insufficient natural ventilation to clear any fumes or gases, extract ventilation shall be provided along with any respiratory PPE that is deemed necessary.

Systemic Poisoning

Galvanised metal, lead coated or other toxic metals may give off toxic fumes, which may affect other parts of the body. Exhaust ventilation shall be provided for all welding or cutting taking place on these types of materials along with any respiratory PPE that is deemed necessary.

Lead

When working with lead, the requirements of the Control of Lead at Work Regulations 2002 come into effect. The section Working with Lead will be provided where applicable.

Fire/Explosion

Where welding is carried out near to flammable materials or gases, fire and explosion are always a danger. Wherever possible, flammable substances are to be removed from, or kept out of, welding areas. If this is not possible, fire-resisting sheets are to be utilised to protect the surroundings from flames, sparks and splatter. At least one fire extinguisher is to be available in every area where welding is carried out. The following types of extinguishers are to be provided:-

Combustible Material	Type of Extinguisher
Organic such as paper and wood.	Water
Electrical Installations	Dry Powder CO2 BCF
Oil or flammable liquid fires	Dry Powder Foam CO2 BCF

Noise

Oxy/Gas welding and any associated chipping can result in noise levels above the control levels. See also the section entitled "Noise".

GUIDANCE NOTE	PIPE AND CABLE FREEZING	Code: H017	Issue: A
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INTRODUCTION

The process involves the local application of a refrigerant to the outer wall of a pipe, or the covering of an oil filled cable, to freeze the liquid content of the pipe or cable thus forming an ice plug. By suitable choice of plug position and dimensions a section of pipe can thus be isolated to allow its safe removal for repair and/ or modification.

By employing the pipe freezing process, the whole system does not have to be drained down and in most cases it can continue to operate without interruption.

PRACTICAL APPLICATION

Refrigerants used include carbon dioxide and liquid nitrogen. Carbon dioxide is used for pipe sizes up to 50mm and up to 100mm if the user is sufficiently experienced. Liquid nitrogen has been used more recently and allows a much wider range of applications to be covered. It is strongly recommended that liquid air or liquid oxygen should not be used as refrigerants, due to the risk of fire and explosion.

The most practical and economic method of applying the refrigerant to the pipe is to clamp a split jacket around the pipe at the position chosen as most suitable to apply the freeze. This means that it should be on a straight run of pipe, a reasonable distance from the repair and free from stress.

The freezing jacket is then connected to a source of refrigerant, which is normally stored in a self-pressuring vacuum insulated vessel. The refrigerant is then injected in to the jacket where the liquid boils off and vents to atmosphere through an outlet. Once liquid issues from this outlet the injection of liquid is continued at a reduced rate to maintain the temperature reduction until a freeze is established. This can be seen by the frosting of the pipe at the ends of the freezing jacket. The freeze is then tested to ensure it is fully established before proceeding with the repair or modifications to the system.

During the repair a reduced amount of liquid is applied to ensure the freeze remains fully established.

This method is applied to all sizes of pipe from 13mm or smaller to the largest pipeline or header pipes of 800mm or larger. Obviously as the large sizes are approached, the question of jacket design and supply of refrigerant becomes increasingly significant and must be considered carefully.

HAZARDS AND PRECAUTIONS

Any refrigerant capable of freezing not only water, but many other fluids must be cold. The temperature of liquid nitrogen at the point of application (its boiling point is minus 196 degrees centigrade). Precautions are also necessary in handling low temperature solids, such as carbon dioxide. Protective clothing: gloves, boots, overalls and safety helmets are essential.

Nitrogen although not toxic does asphyxiate and therefore particular care must be taken when it is used in confined spaces.

A large change in volume occurs at the vaporisation point where the liquid turns into a gas (700 fold increase) Oxygen deficiency alarms should be worn by all personnel working in the vicinity and emergency breathing apparatus must be immediately available.

Persons carrying out pipe or cable freezing should receive specific training in the use of Dewar flasks and must be familiar with the correct use of the equipment, and manufacturer instructions for operating.

STORAGE

It is essential that the containers used for the storage of cryogenic liquids be clearly marked to avoid the possibility of mixing the contents. E.g. mixing liquid oxygen and liquid nitrogen in a vessel can cause organic matter to burst into flame.

Liquid nitrogen should be stored in Dewar flasks with the outlets always left open to atmosphere to avoid a build up of excessive pressure. At least two 20-25-litre flasks will be required for most cable freezing operations.

Liquid nitrogen must be stored in a well-ventilated place. If enough gas were to escape into an unventilated place the oxygen levels would become dangerously low (25 litres of liquid produces 17000 litres of gas at atmospheric temperature and pressure). Unconsciousness can suddenly occur without warning and death within 2-3 minutes in pure nitrogen.

When transporting liquid nitrogen in closed vans the container must be secured and the van well ventilated. Liquid nitrogen must not be left stored in vans over night, parked in public places, or left un-secured in a public place. Vans must be fitted with a solid partition between the cab and the body of the vehicle.

HANDLING

Cryogenic liquids must be handled carefully and skin contact avoided. When spilled on to a surface, these liquids break in to small droplets and quickly boil and cover the surface. A large area is rapidly cooled producing a hazard of extreme cold quickly.

Only containers designed to hold cryogenic liquids must be used. Although these containers are designed to withstand the temperatures they are to be exposed to they must be filled slowly to prevent thermal shock, which occurs when material is rapidly cooled. This also prevents splashing and a rapid build up of pressure.

PROTECTIVE CLOTHING

Protective clothing will be required to prevent frost burns.

Specially insulated gloves should be worn when handling anything that is or may have been in contact with cold liquids. Even with gloves anything that has been cooled in this way can only be handled for a short time. Gloves should fit loosely so that they can be removed quickly in event of spillage.

Eye and face protection must be worn

Overalls or similar clothing without pockets or turn-ups should be worn.

FIRE HAZARD

Under some conditions, a fire hazard may be created by the condensation of atmospheric oxygen on tubes containing liquid nitrogen. In the event of fire, an inert gas extinguisher should be used.

Confined spaces

Generally pipe freezing is done in well-ventilated areas such as open sites, free to air movement. However, even in the open, if the application is in a trench, an air mover or blower will be required. This must be of sufficient power to provide a constant change to the air in the bottom of the trench. If the operation is to take place in an enclosed space or building e.g. an underground boiler room, then not only should mechanical ventilation be used but also the operatives should wear breathing apparatus.

In addition to monitoring for oxygen deficiency, a clear safe system of work must be established: This should be in accordance with the confined space regulations and include a rescue procedure with a trained person with breathing apparatus outside the area.

GUIDANCE NOTE	PSITTACOSIS	Code: H018	Issue: A
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PSITTACOSIS

This disease is acquired by contact with infected birds. The disease varies from a flu-like illness to an pneumonia with the possible involvement of other organs. Usually through inhalation of dust or aerosol contaminated by bird faeces or nasal discharge. The organism can survive many months in dry dust

Person to person spread has also been reported

Incubation period usually 4-15 days, disease varies from flu-like illness with a fever, headache, joint and muscle pains of a few days to pneumonia and possible endocarditis and hepatitis.

Early detection and treatment normally results in complete recovery although delay or susceptible individuals may progress to more severe illness or even death.

CONTROL OF EXPOSURE:

Good general ventilation is required.

Cleaning procedures should avoid creating aerosols and dust, no high pressure jetting.

Work techniques should be designed to keep the workers BREATHING ZONE away from possible aerosol (dust) clouds, avoid the need for close approach during demolition.

High levels of faeces/dust should, where possible, be enclosed with local exhaust ventilation..

Handling systems, e.g. for waste, diseased birds, and feathers should be enclosed where reasonably practicable. All bird waste to be contained in polythene sacks sealed and disposed of by an approved contractor.

Respiratory protective equipment (RPE) is most likely to be needed when demolition work is in progress.

Personal protective equipment as appropriate should be worn i.e. Hand protection, Disposable hooded coverall and Eye protection.

Good standards of personal hygiene and of washing facilities with separate eating facilities should be provided.

Employees and visitors should be alerted to the potential hazard and of the precautions which they need to adopt also the need to seek help from and inform their doctor if illness develops

GUIDANCE NOTE	SEWERS	Code: H019	Issue: A
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PERSONNEL SELECTION

Persons expected to work in sewers shall be physically and mentally suitable. Persons who are willing to take chances are not suitable. If an employee under the age of 18 years has to enter a sewer for training purposes, then the employee must comply with Regulation 19 of the MHSW Reg. 1999.

The following disabilities shall preclude any one from this type of work:-

1. A history of fits, blackouts or fainting;
2. A history of heart disease or disorder;
3. High blood pressure;
4. Asthma, bronchitis or shortness of breath;
5. Deafness;
6. Meniere's disease or any illness causing giddiness or loss of balance;
7. Claustrophobia or other nervous or mental disorder;
8. Back pain or joint trouble that would limit mobility in cramped spaces;
9. Deformity or disease of the lower limbs which limits movement;
10. Chronic skin disease;
11. Serious eyesight defect;
12. Lack of sense of smell.

TRAINING

Employees who have been adequately trained for the task shall only undertake work in sewers.

Specifically, training shall be given to: -

1. Supervision;
2. Those expected to enter sewers;
3. Those who will act as attendants;
4. Those who will act as a rescue team.

The training shall cover: -

1. Observance of the safe system of work;
2. Use, care and maintenance of breathing apparatus;
3. Use of atmospheric testing apparatus;
4. Procedures for rescue and first aid;
5. Emergency procedures;
6. Fire fighting equipment;
7. Personal hygiene and rules to avoid risks to health.

TOXIC AND FLAMMABLE ATMOSPHERE

Contamination of the atmosphere can arise from: -

1. Adjoining plant: gas or vapour may enter from adjoining plant and seep into the sewer system, as may exhaust fumes from plant and vehicles;
2. Nearby operations: effluent discharges from nearby operations could contaminate the sewer with a range of toxic substances.

ATMOSPHERE MONITORING

If there is a risk of the atmosphere becoming deficient in oxygen or contaminated with dangerous or injurious dust, fumes or gases, ventilation shall be provided naturally or by a forced air system.

The atmosphere is to be tested for explosive gases and oxygen prior to entry being made and regular checks shall be carried out during the duration of the works to ensure that there is no change in the atmospheric constituents.

OXYGEN DEFICIENCY

Normal air contains about 21% of oxygen. Below 17% a flame will not burn and the atmosphere is unsafe to breathe.

Any person working in an oxygen deficient atmosphere may not be aware that they are in danger. Therefore, symptoms such as breathlessness, faintness or lack of co-ordination shall lead to immediate evacuation of the area.

Oxygen deficiency can be caused by the decay of organic matter within the sewer.

OXYGEN ENRICHMENT

With excess oxygen in the atmosphere organic materials are prone to spontaneous combustion. Oxygen enrichment can occur as a result of work, such as welding, which releases oxygen into the area.

Oxygen is not to be used to purge or sweeten the air in sewers.

DROWNING OR BEING SWEEP AWAY

200mm of fast flowing water in a sewer is difficult to stand against and 600mm of water is a danger. Conditions in a sewer can alter very quickly and workers are to be able to recognise the indications of danger, such as:-

1. Movement of air through the sewer;
2. Increase in depth or velocity of the water;
3. Noise of approaching water.

In any of the above conditions immediate evacuation is to be carried out. Preliminary precautions in the planning of the work shall include:-

1. Obtaining a local weather forecast to ascertain whether rain is expected;
2. Establishment of local control procedures in collaboration with sources of large amounts of industrial effluent in the area;
3. Collaboration with local emergency services, to establish contingency plans to ensure that those involved in the works are informed of any emergency, such as the discharge of any flammable or harmful substance into the sewer as a result of a road accident or any other emergency.

Chains or bars shall, where practicable, be fitted down stream of the work before work starts. If this is not possible safety belts and running lines shall be provided.

BACTERIAL INFECTION

Infection can arise through exposure to rats' urine (Weil's disease), from putrefying solids, discharges from hospitals or general discharges during epidemics of contagious diseases. Weil's disease begins with flu-like symptoms, and to safeguard against any wrong diagnosis employees who are to be working in sewers should be provided with a card to present to their doctor, which informs him of the employee's occupation.

All employees involved in sewer work are to be inoculated against tetanus and polio, and the immunity is to be maintained whilst they are involved in such work.

Precautions consist of routine personal hygiene. The appropriate protective clothing shall be issued and is to be worn.

Even the smallest scratch is to be cleaned and dressed and is to be reported.

Eating, drinking or smoking is not allowed until employees have thoroughly washed their hands and faces.

Hands are to be kept away from the face during work and any accidental splashes to, or irritation of, the eyes ARE to be treated.

If employees feel unwell, they are to seek medical attention and are to inform their doctor that they are involved with sewer work.

PERMITS TO WORK

For work in sewers a permit to work system is to be used. This system is to ensure that the correct procedures have been adopted prior to entry.

SEWER ENTRY PERMIT

Contract:..... Permit No:.....

This permit is valid from Hours to Date

This permit covers entry to sewer:

Location:.....

CONDITION OF SEWER			
	Y/N	N/A	SIGNED
ATMOSPHERE TESTED?			
ADEQUATE SUPPLY OF FRESH AIR?			
ANY MACHINERY/PLANT ISOLATION REQUIRED?			
SPECIAL PRECAUTIONS			
PROTECTIVE CLOTHING TO BE WORN			
Safety belt/lifeline to be worn			
Forced ventilation to be provided			
Breathing apparatus to be worn			
Watchers to be posted			
Any other precautions			
AUTHORISATION:- Name.....			
Signed..... Time..... Date.....			
RECEIPT I have read this form and understand the special precautions to be taken prior to and upon entry Name.....			
Signed..... Time..... Date.....			
CANCELLATION Name.....			
Signed..... Time..... Date.....			

This permit is automatically suspended upon the sounding of any emergency alarm or in the event of any accident or dangerous incident.

GUIDANCE NOTE	SOLDERING	Code: H020	Issue: A
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CYLINDER IDENTIFICATION

LPG cylinders are painted red and the outlet valves are threaded left-handed.

Under no circumstances are cylinders to be painted other than in their original colours or coated in any way to mask these colours.

GAS CHARACTERISTICS

LPG is heavier than air and may, therefore, collect in low-lying areas. Further information is given in the section Liquefied Petroleum Gases.

STORAGE OF CYLINDERS

LPG cylinders are to be stored at least 3m away from those containing oxygen, since any mixture of either fuel gas and oxygen, which might result from leaking cylinders, can become explosive.

LPG cylinders are to be kept on a hard standing, in a safe place, in the open air wherever possible. Where this is not possible, they are to be kept in a store, constructed of non-flammable materials, with adequate high and low ventilation.

LPG cylinders, whether full or empty, are to be stored in an upright position.

Full cylinders are to be stored apart from empty ones.

Cylinders are to be shielded from direct sunlight, or other heat sources, to prevent the build up of excessive internal pressure.

CYLINDER HANDLING

Hands and clothing are to be free from grease, oil and grit when cylinders are handled, to prevent them from slipping and grit from getting into the valve assembly, or grease onto the nozzle or valve.

Nozzles are not to be used for handling purposes; they are not designed to withstand the weight or stress.

Cylinders in use are to be stored and transported on the trolleys provided. If it is necessary to move a cylinder that is not on a trolley, all regulators and hoses are to be removed and a check made to ensure that the valve is shut. Under no circumstances are cylinders to be rolled along the ground.

If cylinders are to be moved by crane they are to be secured in a cradle. On no account are they to be moved using chains or slings, as these are likely to slip, allowing the cylinder to fall.

Gas cylinders are to be treated with care and not subjected to falls or shocks. When they are being unloaded from vehicles they are to be lowered and never to be dropped.

TRANSPORTING CYLINDERS

Transporting cylinders of more than 5 litres capacity by road will invoke the Carriage of Dangerous Goods by Road Regulations 1996.

REGULATORS

Regulators are always to be fitted to the cylinders to reduce the gas pressure from that in the cylinder to the working pressure of the torch. Only regulators designed for the gas are to be fitted to the cylinder.

All regulators are to be fitted with filters, but too much dust can clog them. To prevent this happening the cylinder valve is to be "cracked open" before the regulator is fitted to the cylinder. This will blow all the dust clear.

The adjusting screw of the regulator is to be released before the cylinder valve is opened and the valve opened gradually. If the valve is opened suddenly the abrupt compression of the gas may generate excessive heat, causing the valve seat material to ignite and damage the gauge.

Periodic checks are to be made to ensure that no gas is escaping from the regulator when the pressure regulating screw is set at zero. A leak may cause a pressure build up in the hose. Water, containing detergent, is to be used to check for leaks. Bubbles in the detergent are an indication of leaking gas.

HOSES

Hoses are to be kept for one type of gas only and colour coded for identification - LPG hoses are Orange.

Hoses are to be inspected daily to ensure that they are free from: -

1. Cuts
2. Cracks
3. Burns
4. Worn patches

They are to be effectively clipped or crimped to the equipment and protected from: -

1. Sharp edges
2. Falling metal
3. Passing traffic

GENERAL PRECAUTIONS

1. Only proprietary fittings are to be used.
2. If a cylinder valve leaks and cannot be closed with a spanner, the valve is to be shut and the cylinder returned to the supplier, with a label attached detailing the problem.
3. Cylinder valves are never to be packed with washers.
4. The flame is never to come into contact with the cylinder.
5. Disused oil drums are not to be used as "work benches" as only a small amount of residual oil within the drum can lead to an explosion.

OPERATIONAL FAULTS

Flame Snap Out

Unintentional extinction of the flame outside the nozzle occurs during use due to: -

1. Both regulators at incorrect pressure
2. Torch nozzle obstructed
3. Nozzle held too close to the work
4. Torch valve not open sufficiently to allow adequate flow of gas

Corrective action: -

1. Completely shut torch valve
2. Check regulator setting
3. Check nozzle
4. Re-light
5. Ensure adequate gas flow

Backfire

Retrogression of the flame towards the blowpipe mixer, the flame either being extinguished or re-ignited at the nozzle, and Sustained Backfire are to be eliminated using a flashback-arresting device.

HAZARDS

The main hazards from gas soldering are: -

1. Fires
2. Explosions
3. Burns
4. Fume inhalation

Correct organisation of the work and the choice of suitable equipment can minimise these risks.

PRECAUTIONS

Burns

The work piece, if it is unsecured, is to be held firmly in a clamp or vice. Should it be necessary for it to be held by hand, the person holding it is to wear heat resistant gloves.

Heat Stress

The longer the duration of soldering the hotter the surrounding can become. This is intensified in confined spaces. In extreme cases the operator may faint. Ventilation will be provided in areas where thermal stress can be envisaged and a second person will standby in case of emergencies.

Respiratory Disease

Harmful gases may be produced during gas soldering, the principal toxic gases produced being carbon monoxide and nitrous fumes. Carbon monoxide is only produced in large enough amounts to be dangerous when there is incomplete combustion.

In working areas, where there is insufficient natural ventilation to clear any fumes or gases, extract ventilation will be provided.

If there is any doubt as to the quality of the air being breathed tests are to be made to establish the safety or otherwise of the atmosphere.

Systemic Poisoning

Galvanised metal, lead coated or other toxic metals may give off toxic fumes, which may affect other parts of the body. Exhaust ventilation will be provided for all soldering taking place on these types of materials.

Lead

When working with lead the requirements of the Control of Lead at Work Regulations 2002 will be applicable.

Fire/Explosion

Where soldering is carried out near to flammable materials or gases, fire and explosion is always a danger. Wherever possible flammable substances are to be removed from, or kept out of, soldering areas. At least one fire extinguisher is to be available in every area where soldering is carried out.

The following types of extinguishers shall be provided where the combustible materials are.

Organic e.g. paper and wood.	Water.
Electrical installations.	Dry powder CO ² .
Oil or flammable liquid fires.	Dry powder foam.

GUIDANCE NOTE	SOLVENT CLEANING FLUIDS & ADHESIVES	Code: H021	Issue: A
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INTRODUCTION

Solvents can have serious, even lethal, effects on workers' health. Some are also flammable and explosive. Proper handling is essential to avoid risks, particularly in confined spaces.

Solvents are liquids commonly found in paints, paint strippers, lacquers, varnishes, mastics, glues, surface coatings and in thinners and other associated cleaning materials.

Manufacturer's labels and data sheets give specific health and safety precautions for using, transporting and storing their products. These are to be read carefully and the manufacturer's instructions followed.

All such substances are subject to the COSHH Regulations and suitable assessments of the hazard involved be made. The findings of those assessments are to be followed and those operatives who may be affected informed of the findings.

HEALTH EFFECTS

Serious health effects can result from even a short period of exposure to high concentrations of solvents or from longer periods exposed to low concentrations.

Solvents enter the body by:

1. inhalation of vapour or mist. This is always possible where solvents are handled. Deliberate abuse of solvents, e.g. "glue sniffing", has led to a number of deaths of those taking part in this activity.
2. ingestion (swallowing) of solvents. Deliberate ingestion is rare, however, accidental ingestion of solvents on contaminated foods, etc., can occur.
3. skin contact. Some solvents are absorbed through the skin with effects similar to those experienced with inhalation. With many solvents, skin contact can result in dermatitis.

The common symptoms that occur with exposure to solvents are:

1. Stinging eyes;
2. Nose irritation;
3. Headache.

More serious symptoms include:

1. Initial excitement;
2. Impaired judgement;
3. Dizziness.

Followed by:

1. Confusion;
2. Sleepiness;
3. Unconsciousness.

Various long-term effects can follow.

PRECAUTIONS

Avoid the inhalation of vapours and be alert to the possible abuse of solvent-based products by other employees.

The inhalation risk is greatest when solvents are used in confined spaces. Natural ventilation should be utilised, where possible, by opening any doors and windows. If this is insufficient, forced ventilation is to be supplied.

To prevent the ingestion of solvents, they are not to be placed or left in any drinks container or other unmarked or incorrectly marked containers. After handling solvents, hands must to be washed, especially prior to the consumption of any food stuffs or smoking.

Avoid skin contact with solvents, they are never to be used to clean the hands or skin. Where large amounts of solvents are being used, impervious clothing will be provided.

The carrying of cigarettes in any work area where solvents are being used is forbidden.

Should any one feel that they have been over-exposed to solvents they are to seek medical attention immediately.

STORAGE

Materials containing solvents are to be stored, in a dry, cool and well ventilated area and sealed in their original containers. Smoking is prohibited in this area.

PROTECTION

Where it is practical to do so, operatives will wear impervious gloves and goggles or eye shields, whilst using solvent based materials.

FIRST AID TREATMENT

The following is the basic first aid treatment for solvent exposure:-

1. eyes:- wash copiously with running water and seek medical attention;
2. skin:- wash with soap and water and apply hand cream, if a rash develops, seek medical attention;
3. swallowing:- wash out mouth with water and seek medical attention immediately;
4. inhalation:- remove the affected person to the open air and seek medical attention.

GUIDANCE NOTE	SPRAY PAINTING	Code: H022	Issue: A
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INTRODUCTION

The hazards from this type of painting are potential irritation of the eyes and respiratory system and dermatitis. Therefore, protective equipment as detailed shall be provided to, and worn by, all operators who are involved in or working near paint spraying.

EYE PROTECTION

Goggles or face shields, manufactured to BS EN 166, shall be supplied and worn at all times whilst spray painting or working adjacent to spray painting.

The goggles or face shields are to be kept clean; all paint splashes being removed with soap and water. The use of solvent will, generally, damage eye protection.

RESPIRATORY PROTECTION

Respiratory protection, in the form of facemasks, shall be provided and is to be worn whilst spray painting or working adjacent to spray painting. These facemasks shall take the form of disposable cup masks or respirators with disposable cartridges.

When spraying in a confined area positive ventilation, or self-contained or air line fed breathing apparatus, shall be provided. Self contained or air-fed breathing apparatus shall only be worn by persons trained and competent to do so.

PROTECTIVE CLOTHING

Protective clothing, in the form of coveralls, shall be provided and worn, whilst spray painting. These shall be regularly cleaned and shall be replaced as and when necessary.

SKIN PROTECTION

Gloves or barrier creams are to be used whilst spray painting.

Barrier creams are to be applied before work starts and reapplied after washing.

SPILLAGE

All spillage of paint is to be cleaned up immediately, using clean cloths and water or thinners. On no account is any spillage to be allowed to dry.

SPRAYING EQUIPMENT

If compressors are used to supply air for spraying they are to comply with the requirements as detailed in the section "Compressors and Pneumatic Tools".

If electrically operated paint sprayers or portable electric hand tools are used, they are to conform to the requirements as detailed in the section "Electrically Operated Tools".

FIRST AID

Eye wash bottles, containing sterile eye wash solution, are to be available whenever spray painting is undertaken. If paint enters the eyes, they are to be washed immediately with copious amounts of eyewash. Medical attention is to be immediately sought, if the paint cannot be removed easily. Details of the paint and thinners used are to be given to the medical practitioner.

GUIDANCE NOTE	DEALING WITH SUSPICIOUS MATERIALS	Code: H024	Issue: A
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INTRODUCTION

Contact with suspicious substances can have a severe detrimental impact on human health. Therefore, it is vital to eliminate the exposure to dangerous substances, wherever possible.

In order to reduce exposure and spread of contamination if materials are disturbed, it is vital that a plan of action is implemented immediately.

Suspicious materials can occur in many forms, including suspected asbestos- containing material, lead and contaminated land.

IDENTIFICATION OF SUSPICIOUS MATERIAL PRIOR TO COMMENCEMENT OF WORKS

Prior to the commencement of any work, reference must be made to existing documentation and information relating to the identity and location of suspicious materials. Information can be found from existing surveys, health and safety files, historical records etc.

Information provided must be up to date and valid. If in doubt ensure further investigations are carried out, which may include further detailed surveys, sampling of materials etc in accordance with current relevant legislation, e.g. the Control of Lead at Work Regulations, the Control of Asbestos Regulations, etc.

Upon identification, the material must be dealt with in accordance with this legislation; this will often require the appointment of licensed specialists who will advise on all aspects of containment/removal and disposal methods as appropriate.

DISCOVERY OF SUSPICIOUS MATERIAL DURING WORKS

Should suspicious material be accidentally disturbed, the following steps must be undertaken immediately:

1. Cease work;
2. Do not disturb the material;
3. Evacuate the immediate work area;
4. Inform others locally not to disturb the material;
5. Inform both the Trade Contractor's senior person on site and the Project Manager, who will call for advice and assistance;
6. Do not return to that task until it has confirmed that it is safe to do so by the project manager.

The work area must be quarantined (with measures being taken to ensure that there is no further contamination) until such time as the material has been analysed to establish its nature and appropriate remedial action is taken.

GUIDANCE NOTE	EXPOSURE TO LEAD IN THE CONSTRUCTION INDUSTRY	Code: H025	Issue: A
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INTRODUCTION

The toxic effects of lead in the body have been recognised and studied for many years. The present legislation governing the exposure of persons to lead is: - *The Control of Lead at Work Regulations 2002*, which apply to any work exposing a person to lead or its compounds by ingestion, inhalation or absorption. In addition the *Environmental Protection (Controls on Injurious Substances) Regulations 1992*, ban the sale of lead carbonate and lead sulphate based paints.

LEGAL REQUIREMENTS

The Control of Lead at Work Regulations 2002 require an employer to assess the nature and extent of exposure, prior to the commencement of work, to determine the measures that will be required to control that exposure.

The current occupational exposure limits for lead in the atmosphere are as follows:

Lead (except lead alkyls)	0.15mg/m ³
Lead in lead alkyls	0.10mg/m ³

Exposure to lead is deemed “*significant*” where:

1. Persons at work are exposed to airborne lead at levels that are liable to exceed half the occupational exposure limit.
2. There is a substantial risk of ingesting lead.
3. There is risk of skin contact with lead alkyls or other substances containing lead that could be absorbed through the skin.

In any of the above cases, all the requirements of the regulations will apply.

The regulations require that air monitoring is undertaken and the results recorded to ensure that control measures are working effectively. Within the construction industry effective engineering controls may not be practicable so the use of Personnel Protective Equipment (respiratory protection, protective clothing etc) may be required.

Where exposure to lead is deemed to be significant medical surveillance will be required by a designated medical practitioner, with an assessment prior to commencement of work and at three monthly intervals.

Where the levels of lead exposure are not deemed to be significant, air monitoring and health surveillance will not be required, however in all case the employer must provide adequate information and training for the employee to be aware of the extent of the risks and to enable them to undertake those duties required of them.

Exposure to lead from vehicle exhaust fumes on *public* roads is not governed by these regulations.

If exposure to lead is likely to be significant, the assessment should be documented and take into account the following: -

1. The physical state of the lead, e.g. vapour, dust etc.
2. The anticipated level of exposure.
3. The number of persons exposed (directly or indirectly).
4. The anticipated duration of exposure.
5. The environment in which exposure occurs, e.g. confined space, open air etc.
6. The level of ventilation available (natural or forced).

EXPOSURE TO LEAD ON CONSTRUCTION SITES

Lead, lead alloys and other lead containing substances maybe used or already exist on many construction sites. Exposure can be to the metal in its elemental state, or as a compound, and may be present as vapours, fumes, dust, or solid.

Lead content of a substance (e.g. paint) is not directly linked to lead content of the associated atmosphere when cutting etc, which may have significantly higher levels present.

Works where exposure is likely to be significant:

1. Burning, welding, cutting and abrasion of lead/lead containing materials.
2. Stripping of lead based paint with hot air blowers etc.
3. Demolition, inspection, cleaning and maintenance of fuel tanks. Lead from lead containing fuel is often adsorbed by the metal tanks and can be absorbed through the skin when handling, or released when dismantling, cutting or burning.
4. Handling of sheet lead or stripping lead flashings etc. Old lead that has a surface covering of lead oxide poses a higher risk of ingestion and absorption than clean new lead.
5. Demolition of premises that have used lead in industrial processes, which may remain in various forms and location.

Works where exposure is unlikely to be significant:

1. Handling clean solid metallic lead.
2. Low temperature melting of lead (<500 °C) e.g. plumbing, soldering etc. It should be noted that flux may give rise to hazardous emissions subject to the Control of Substances Hazardous to Health 2002

HEALTH HAZARDS

Exposure to lead and its build up in the body can give rise to the following effects: -

1. Headaches
2. Fatigue
3. Constipation
4. Weight loss
5. Abdominal Pain
6. Anaemia
7. Weakness of extremities (due to nerve damage)
8. Brain damage (at high concentrations)
9. Lead line on the gums
10. Damage to the female reproductive system

Certain lead compounds may also give rise to psychosis, mania, convulsions, insomnia, nightmares and hallucinations.

CONTROL MEASURES

Elimination: Do not use lead, or remove lead containing materials to prevent future exposure.

Substitution: Replace lead with a less hazardous substance.

Job Rotation: Reduce exposure time of individuals by ensuring tasks are shared between several persons.

Mechanical Devices: The use of shears or other non-abrasive, cold cutting methods can reduce the amount lead dust and /or fume produced in an operation.

Local Exhaust Ventilation: The provision and use of LEV can be used to reduce build up of lead fumes and dust in the air, when sanding etc.

Enclosure: The use of enclosures enables the control of lead fume by preventing exposure of other persons not directly involved with the operation.

Wetting: Wetting of lead (or lead containing material) surfaces reduces the amount of dust and airborne lead. All lead dust should be wetted prior to disposal.

Hygiene: Good hygiene is essential to prevent the passage of lead into the body. Persons should not be allowed to eat, drink or smoke whilst working with lead and must wash thoroughly after undertaking these activities. Suitable hygiene facilities must be provided, including showers and a means of disposing of contaminated overalls etc, if appropriate. To prevent the build up of lead under fingernails, nailbrushes should be made available.

Personnel Protective Equipment: Where the exposure to lead cannot be controlled by other means, as described above, Personnel Protective Equipment (PPE) will be required. Suitable gloves, protective clothing (overalls), and respiratory protection must be provided and utilized.

PROCEDURES

Before works are undertaken, a documented procedure (method statement) for the operation should be established and communicated to the employees and supervisor.

This should detail:

1. Description of the works
2. Likely Exposure level
3. PPE required
4. Location and nature of hygiene facility
5. The extent of decontamination required
6. Emergency procedures to be adopted, including failure of a control measure leading to significant increase in the concentration of lead.

Procedures should also include the following as standard:

1. No eating, drinking or smoking until after undertaking thorough decontamination.
2. To report as required for health examinations.
3. To report immediately any of the describe symptoms of lead exposure.
4. To report and defect in PPE or the hygiene facility.
5. To contact the supervisor if any aspect of the procedure is unclear or if the operative is not sufficiently trained to undertake the work.

LEAD POISONING

Lead poisoning is a reportable disease as defined under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995, and must be reported accordingly after diagnosis.

WASTE CONTAINING LEAD

Waste material containing in excess of 3% lead is classified as Hazardous Waste and must be disposed of in accordance with the Hazardous Waste (England and Wales) Regulations, 2005.

GUIDANCE NOTE	FOUL WATER & SLUDGE	Code: H026	Issue: A
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Polluted or foul water contains bacteriological contamination or some chemical substance which could be harmful to health.

Occupational acquired infections include Hepatitis B and HIV infections, together with Leptospirosis (also known as Weil’s Disease), which is a form of jaundice caused by contact with water contaminated by the urine of rats, other small mammals such as mice and voles, and cattle.

It is clearly impractical to test the water lying in all gullies or inverts and all such water should be treated as a hazard.

Where it is possible and does not constitute a greater hazard, the water should be removed.

Control of Exposure

Where employees may come into contact with contaminated water or work regularly in or near impure water, the following precautions must be adopted:

1. Cover all cuts and abrasions with a waterproof dressing and wear appropriate protective clothing.
2. Ensure a strict hygiene culture is enforced prior to eating, drinking, smoking etc.
3. Wear waterproof boots or waders; impervious gloves and barrier creams;
4. Cover any and all cuts, scratches or abrasions with waterproof plasters;
5. Where the water may be splashed wear face mask and chemical splash goggles;
6. Overalls must be changed if they become heavily contaminated and stored in plastic bags until they are laundered. Lightly soiled overalls should be changed in the normal way;
7. There must be a supply of fresh, clean water e.g. from a hosepipe, where this is not possible there must be waterless hand cleanser, clean rags and towels;
8. Do not smoke, eat or drink until you have washed, and only in designated clean areas;
9. Be scrupulous in your personal hygiene.

Information and Training

Where work is to be carried out in or near impure water, all employees are to be made aware of the potential for leptospiral infection and other biological infections and the precautions to be adopted.

Bacterial Infection

Infection can arise through exposure to rats’ urine (Weil’s disease), from putrefying solids, discharges from hospitals or general discharges during epidemics of contagious diseases. Weil’s disease begins with flu-like symptoms, and to safeguard against any wrong diagnosis employees who are to be working in sewers should be provided with a card to present to their doctor, which informs him of the employee’s occupation.

All employees involved in working with sludge are to be inoculated against tetanus and polio, and the immunity is to be maintained whilst they are involved in such work.

Precautions consist of routine personal hygiene. The appropriate protective clothing shall be issued and is to be worn.

Even the smallest scratch is to be cleaned and dressed and is to be reported.

Eating, drinking or smoking is not allowed until employees have thoroughly washed their hands and faces.

Hands are to be kept away from the face during work and any accidental splashes to, or irritation of the eyes ARE to be treated.

If employees feel unwell, they are to seek medical attention and are to inform their doctor that they are involved with working with contaminated water.

GUIDANCE NOTE	HANDLING AND CHARGING BATTERIES	Code: H027	Issue: A
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INTRODUCTION

Acid burns to the face, eyes and hands are common injuries associated with the handling and charging of batteries. Batteries can require frequent re-charging and prior to the charging process the battery cell vent covers are removed to allow the cells to be topped-up with distilled or de-ionised water. It is during this process that employees can be at risk from being splashed with acid, which is contained in the individual battery cells

When being charged, batteries produce an explosive gas called hydrogen, which is released during the process through the battery vent covers.

Due to the risks involved in the process, it must be ensured that only trained and competent persons are allowed to carry out battery charging activities.

BATTERY CHARGING UNIT

The charging units should be placed in a well ventilated area which is free from sources of ignition. Forced ventilation should be provided in the battery charging area if natural ventilation is not sufficient. Adequate lighting in the battery charging area must be provided.

Cautionary signage should be displayed in the charging area with the words 'No smoking -No Naked Lights'.

Battery charging units are supplied in a wide variety of sizes and can be portable or fixed. Due to the nature of the process, it is important that the equipment is maintained and is kept in good working order. The charging units must be regularly maintained and inspected for signs of mechanical defects and electrical faults. The units need to be subject to electrical testing and inspection in accordance with approved electrical codes of practice.

Employees should be instructed to report any visual defects or damage to the equipment. Routine inspection of cabling and glanding must be carried out along its entire length for signs of mechanical damage which could lead to short circuiting.

Residual current devices (RCD), where fitted locally, should be periodically tested for functionality.

STORAGE OF BATTERIES

Batteries should be stored in tidy and dry work areas. Clear space must be provided between them to allow natural ventilation between the batteries.

FIRST AID

Adequate arrangements should be made for first aid provisions are adequate.

An emergency eye wash station should be provided near the battery charging facility and a sign displayed informing that, '**if splashed with acid, wash off immediately and seek medical attention.**'

FIRE SAFETY

Lighting and electrical control switches in the battery charging area should be flameproof and intrinsically safe to ensure that lighting and electrical switches do not provide a source of ignition for gases created during the process.

A suitable fire extinguisher should be provided in the battery charging area which is mounted and clearly signed.

WORKING PROCEDURES

When carrying out battery charging employees must:

1. Be suitably instructed and trained in the charging and topping up of batteries
2. Wear suitable personal protection equipment such as eye protection, gloves and splash resistant aprons
3. Not wear finger jewellery when connecting and disconnecting batteries
4. Adhere to the manufacturer's specification on charging rates and time
5. Ensure that hands are dry when handling batteries
6. Ensure that the battery charger is switched off during the connection and disconnection of the leads
7. Ensure that all battery vent covers are adjusted or removed prior to charging
8. Ensure batteries are not connected to the charging unit during the topping up process.
9. Do not over fill the battery cells during topping-up
10. Prevent the possibility of 'short circuiting' by ensuring connections are secure
11. Ensure battery polarities are connected correctly

GUIDANCE NOTE	FLUORESCENT LAMPS	Code: H028	Issue: A
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CONTROLLED CHEMICALS

Lamp manufacturers are not required to list the chemical composition of their lamps, consequently, few people are aware of their hazardous nature or the risks to which they are exposed when smashing them haphazardly or simply storing used lamps inadequately.

HAZARDS

Mercury, Sodium, Lead and Cadmium

Most fluorescent lamps also contain potentially harmful substances such as highly toxic heavy metals, in particular mercury, lead and cadmium. These substances can be absorbed through inhalation or skin contact. If they enter the body, they can cause damage to the liver, kidneys and the brain. Other lamps contain sodium, which if exposed to damp air will produce gasses, which may ignite or explode.

INHALING POISONOUS VAPOURS

Mercury readily vaporises at temperatures, which may be experienced on a cool day and even faster on a warm day. It causes rashes on the skin and can give a feeling of excessive fatigue. Both mercury and cadmium can accumulate in various organs in the body and therefore pose a long-term health risk. Tests carried out on overalls worn by staff loading broken fluorescent tubes into a skip have confirmed they can become heavily contaminated with mercury as can the surrounding area. In addition lamps stored in closed containers produce a risk to health because vapours from their highly toxic contents will accumulate to expose anyone opening the container to an excessive concentration of these vapours.

EASILY BROKEN GLASS - FLYING GLASS SPLINTERS

Tubes are assembled under vacuum and once the structural integrity of the glass is breached they shatter spreading their contents over a wide area. Dust from broken lamps contains chemicals, glass and old dirt deposited on the lamp itself. Thus severe injuries can result from apparently simple cuts contaminated by a variety of these unpleasant substances.

ELECTRICAL SAFETY

All portable electrical appliances are to be protected by the use of an earth leakage circuit breaker, installed either locally or at the main circuit board, and are to be manufactured to BS EN 50144-1 or a similar European standard.

All electrical appliances are to be either “double insulated” or earthed. The former is recommended.

GENERAL PRECAUTIONS

Whenever any maintenance or repairs need to be made, appliances are to be disconnected from the mains supply. Use of the control switch on the appliance is not sufficient. The plug is to be removed from the socket and should be visible to the person carrying out such maintenance or repair.

Sufficient temporary lighting should be provided to give a level of illumination to carry out the task safely.

ACCESS

Suitable equipment shall be provided to give safe access to the working area, for example:-

1. Ladders;
2. Tower Scaffolds;
3. Independent Scaffolds;
4. Mobile Work Platforms.

Full details of the above are given in the Safe system of work "Working at Height". Under no circumstances are makeshift forms of access to be used.

SAFE PLACE OF WORK

The appropriate precautions shall be dictated by the type of work being carried out and the areas in which that work is taking place.

INSPECTION AND MAINTENANCE

Each appliance shall be clearly marked with a unique identification number, to enable records to be kept of the inspections and maintenance carried out. Any appliance without an identification number shall not be used until it has been inspected and recorded and an identification number marked onto it.

All electrically operated appliances shall be inspected prior to use for signs of faults as per the safe system of work for electrical appliances. Any defective equipment shall be taken out of use and a label, clearly identifying it as defective, shall be attached to the appliance.

PROTECTIVE CLOTHING

Operatives wearing as minimum gloves shall carry out replacement of tubes. If however, prolonged periods of tube replacement are expected operatives should in addition wear, protective coveralls, facemask, and eye protection.

REPLACEMENT OF TUBES

1. Ensure all power is isolated from equipment.
2. Ensure sufficient access equipment is available to provide a safe place of work.
3. Ensure operative is wearing suitable PPE
4. Several variants on the tube holder are common; therefore specific instructions cannot be given in this document.
5. To overcome this, the tube replacement should be carried out as per the instructions in the manufacturer's handbook.
6. Care should be taken when handling the tubes as the glass is extremely fragile.
7. The defective tube should be protected from accidental damage by replacing in the cardboard protection.
8. On completion of replacing the tube, return the equipment to full operation.

DISPOSAL

Defective tubes are to be disposed of through a recycling contractor. This may require storage of defective tubes until sufficient quantities have accumulated.

Tubes are to be stored in a safe manner, to avoid accidental damage. Where a dedicated suitable container has been provided ensure all tubes are stacked in the container in such a way as to minimise damage.

GUIDANCE NOTE	NEEDLES AND SHARPS	Code: H032	Issue: A
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Introduction

Biologically hazardous agents are living micro-organisms capable of causing disease or harm.

Pathogenic micro-organisms have special adaptations allowing them to colonise a host and cause disease. Other organisms are opportunist pathogens and are able to cause disease in debilitated hosts or those with immune deficiencies.

The occupational acquired infections which are normally associated with discarded needles and sharps are Hepatitis B and HIV infections.

Control of Exposure

Where employees are exposed to discarded needles and sharps or other material that may be contaminated with human secretions, the following precautions must be adopted:

1. Keep cuts and abrasions covered with an impervious dressing;
2. Wear heavy duty, impervious gloves to protect the hands whilst collecting the sharps, etc;
3. Segregate the needles and sharps from other rubbish in a disposable plastic container;
4. Dispose of the container and its contents by contacting the local authority's Environmental Health Department;
5. Ensure a strict hygiene culture is enforced prior to eating, drinking, smoking, etc.

First Aid

If discarded needles and sharps are found accidentally, then work in that area is to be suspended until the debris has been cleared. Should a worker receive a cut or puncture wound from a needle or sharp, then he is to inform his Medical Practitioner at the earliest opportunity.

Information and Training

Where work is to be carried out in an area known to be contaminated with discarded needles and sharps, then all employees are to be made aware of the precautions to be adopted and the potential hazards associated with this kind of debris.

AIDS

AIDS (Acquired Immune Deficiency Syndrome) is a disease caused by a virus that attacks the body's defence system, allowing illnesses and infections, which would not otherwise have occurred, to develop. The virus can be transmitted by injection or inoculation with infected blood.

The disease is not transmitted by normal social contact and, normally, the AIDS virus survives only for a very short period outside the body.

Where there is a risk of contamination, heavy-duty gloves and overalls should be worn as protection against cuts; suspected items should be removed by tongs and placed in puncture proof bins for disposal.

The COSHH Regulations require employers to ensure that exposure of employees to substances hazardous to health is either prevented or, if this is not reasonably practicable, adequately controlled.

GUIDANCE NOTE	LASERS	Code: H033	Issue: A
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HAZARDS

Due to the wide range in possible wavelengths, energy content and pulse length of laser beams the hazards vary widely. Therefore, it is considered impracticable to regard lasers as a single group to which common standards apply. Three aspects of laser application influence the total hazard evaluation and, therefore, the control measures to be applied. These are:

- The laser systems capability to injure personnel, which includes skin burns or severe damage to the retina of the eye;
- The environment in which the laser is used;
- The personnel who operate, or may be exposed to, the laser.

CLASSIFICATION

BS EN 60825-1 groups lasers into five classes based on the accessible emission levels (AELs), (the measured level or radiation to which human access is possible). To conform to this standard, the manufacturer is required to label the product with the classification number and to provide certain engineering controls, warning signals, etc. The use of equipment meeting this standard will, in most cases, preclude the necessity to carry out radiometric measurements. Only equipment meeting this standard shall be used.

PRECAUTIONS

In line with the classification of the laser products the precautions shall be as follows:

Class 1. These products are safe under all viewing conditions.

Class 2. The laser beam shall, where practicable, be terminated at the end of its useful path, it shall not be directed at vehicles or personnel, particularly at head height.

Class 3A. While Class 2 products shall be used wherever practicable, there are times when more power than these can provide may be required. In these cases Class 3A lasers may be used, which require the following additional precautions:

- A person competent to supervise the safe use of lasers shall be appointed wherever lasers above Class 2 are used.
- Trained personnel shall be assigned to install, adjust and operate the equipment.
- Areas where such lasers are being used shall be treated as controlled areas, be posted with the standard laser warning signs and access shall be restricted to persons who have been instructed in the precautions that shall be taken.
- Precautions shall be taken to ensure that the laser beam is not intentionally directed at reflective surfaces, such as mirrors, lenses, etc. Care shall also be taken to ensure that such reflective surfaces are not introduced into the path of the laser.

Class 3B & 4. These lasers are hazardous, particularly as the beam may be invisible to the eye. They require extreme caution and careful evaluation prior to their use and are not normally used in construction. Should their use be necessary, a method statement shall be prepared, specifically for the task for which they are used.

EYE PROTECTION

Eye protection shall conform to the P.P.E. Regulations 1992. They shall:

1. Be soundly constructed;
2. Have filters which provide a lasting and adequate factor of attenuation;
3. Have the following identification on them:
 - The manufacturer's name;
 - The wavelengths for which they are suitable;
 - The optical density and the attenuating factor of the filter relevant to those wavelengths.

They must come supplied with the following information:

1. The manufacturer's product reference;
2. The maximum permissible designed input of the filter in Watts per square metre for continuous wave radiation;
3. The maximum permissible designed input of the filter in Joules per square metre and the pulse length in relation to which that input is determined for single pulse or train of pulse radiation.

(The maximum permissible designed input is the least level of radiation exposure (Joules per square metre) or irradiance (Watts per square metre) at the wavelength of use that causes either:

- Structural damage or a reduction of the specified attenuation of the eye protection, or
- Eye damage
- The luminous transmission factor of the filter.

Eye protection shall be issued to all personnel as required and shall be worn as and when directed.