Nickel and its inorganic compounds: Health hazards and precautionary measures

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Introduction

1 This environmental hygiene guidance note draws attention to the possible health hazards which could result from occupational exposure to nickel and its inorganic compounds. It gives advice on the precautions that may be needed to prevent or adequately control exposure as required by the Control of Substances Hazardous to Health Regulations 2002 (COSHH).

2 The guidance note is particularly aimed at employers and managers. Other groups, such as employees and health and safety professionals, will also find it useful. Read this guidance in conjunction with the L5, the COSHH Approved Code of Practice and guidance (COSHH ACOP)[1] together with other literature referred to later.

Occurrence, properties and use

3 Nickel (Ni) is found in mineral ores in combination with arsenic, cobalt, iron, oxygen, silicon and sulphur and often in association with copper. Valuable by-products include platinum metal, gold, silver, selenium and tellurium. The important nickel ores are the sulphides, silicates and oxides. The sulphide ores are smelted to produce a high grade matte from which nickel oxide is obtained by roasting.

4 Nickel is a silvery-grey transition metal which is hard, malleable and ductile and of high lustre. It reacts very slowly with water but will dissolve in dilute mineral acids.

5 Inorganic nickel compounds can be divided into three types:

- **Nickel carbonyl $Ni(CO)_4$** is a liquid with a boiling point of 43 °C and decomposes at temperatures above about 60°C at normal atmospheric pressure. Its only important use and occurrence is as an intermediary in the refining of nickel.
- **Soluble nickel compounds:** The main soluble compounds of nickel are the chloride, sulphate and sulphamate which are used for electroplating and electroforming of nickel.
- **Insoluble nickel compounds:** Of the important insoluble nickel compounds, nickel sulphides and the monoxide are intermediaries in nickel refining. Nickel oxide is sometimes used as a nickel source for alloy steel production and in enamelling. Nickel oxides are formed during the welding and casting of nickel-containing alloys.

6 Nickel and some of its compounds are classified under the European Classification, Labelling, and Packaging Regulation No 1272/2008 (CLP). The specified classifications and associated hazard statements for various forms of nickel are set out in Annex VI of CLP (as provided in the C&L inventory).[2]

7 Other forms of nickel not listed in Table 3.1 of Annex VI to the CLP Regulation may also be hazardous. When there is no entry, suppliers have to classify the substance themselves in accordance with the criteria set out in the CLP Regulation.

8 Nickel tetracarbonyl, nickel monoxide, nickel dioxide, dinickel trioxide, nickel sulphide and nickel subsulphide are not sold to the general public and labels on containers of these substances must have an additional safety phrase 'Restricted to Professional Users'.

9 The major use of metallic nickel is in the manufacture of a wide range of alloys, the most important of which are iron-chromium-nickel such as stainless steel, nickel-copper and nickel-chrome. There are over 3000 alloys of nickel which are used in numerous industries and processes including:

- the manufacture of chemical process equipment;
- food process equipment;
- heater elements;
- coins;
- magnets;
- batteries;
- bimetallic strips;
- the aerospace and automotive industries.

10 Nickel and nickel compounds are also used in:

- the production of welding rods;
- the production of the electrodes for nickel-cadmium secondary batteries;
- the production of catalysts;
- the electroplating industry;
- pigments for paint, pottery, glass and polymers.

Effects on health

11 The main health concerns relate to breathing in or having skin contact with various forms of nickel.

Inhalation

12 When inhaled as a vapour, nickel carbonyl can produce immediate or delayed lung damage and also effects on the nervous system. The consequences of such an exposure can be fatal within a period of hours to a few days.

13 Inhaling air containing nickel or nickel compounds may cause occupational asthma. It appears to be the more water-soluble nickel compounds that have produced most of these cases.

14 Breathing in air containing certain nickel compounds over long periods raises concern about cancer including an increased risk of contracting cancers of the nose and lung. Increases in rates of cancer have occurred in both carbonylation and electrolytic refining. The cancer effect appears to be due to long-term exposure to one or more forms of airborne nickel, although it is not clear which form(s) of nickel are responsible for the cancers.

15 Studies of cancer incidence in other industries involving exposure to nickel, such as alloy production, electroplating and welding, have also been conducted.

However, it is not clear whether or not there is a higher risk of cancer due to nickel exposure in these industries.

Skin and eye effects

16 Skin contact with nickel and inorganic nickel compounds can cause skin sensitisation. Nickel is a potent skin sensitiser and many people exposed occupationally and/or non-occupationally to various forms of nickel have developed allergic dermatitis.

17 Nickel compounds coming into contact with the eyes can cause irritation.

Risk assessment

18 COSHH requires employers to carry out an assessment of the risks to the health of employees which may be caused by hazardous substances present in the workplace. A suitable and sufficient assessment is required wherever exposure to nickel and its compounds is likely to occur.

19 To assess the risk to employees' health, you must identify all of the potential sources of exposure, who is likely to be exposed and for how long. This may involve carrying out measurements to determine personal exposure to nickel and its compounds by air sampling and biological monitoring. When making the assessment, you should consider all aspects of the handling and processing of nickel and its compounds. Work carried out in confined areas or other locations with poor ventilation could result in higher exposure.

20 *A step by step guide to COSHH assessment*[3] describes in general terms how to carry out an assessment. The COSHH ACOP also gives guidance. You should review your assessment regularly, involving employees and/or their safety representatives.

21 HSE research report RR963[4] identifies that nickel exposures commonly occur via a combination of inhalation, dermal and ingestion routes. This needs to be taken into account when assessing exposure. A positive correlation has been demonstrated between surface contamination, hand contamination and urinary nickel levels among workers in the nickel plating industry. Wherever dermal exposure occurs, there will also be an increased risk of inadvertent ingestion exposure.

22 It is important to tell employees and safety representatives about the risks identified by the risk assessment. They may be able to help identify cases of ill health that can be attributed to exposure to nickel and its compounds.

23 Work activities involving nickel and its compounds which require special attention when assessing exposure include:

- weighing, mixing and sieving operations;
- furnace charging, tapping and cleaning operations;
- welding and hot cutting of stainless steels and nickel alloys;
- nickel plating and electroforming operations;
- pickling operations;
- packing operations relating to nickel metal powders and compounds;
- dissolving nickel compounds and spray-drying operations;
- grinding, polishing or other machining operations;

- welding of nickel alloys and the use of nickel consumable electrodes;
- processes involving the use of nickel carbonyl;
- handling and storing of nickel wastes;
- maintenance of plant and equipment.

Prevention and control of exposure

Prevention of exposure: substitution

24 As with all substances hazardous to health, your first priority must be to prevent your employees being exposed to nickel and its compounds. This can be achieved in a number of ways:

- substituting it with another substance which presents less, or no risk; or
- using another process which doesn't create a hazardous form of that substance.

In considering substitution it is important to take account of any hazards of the substitute material or process and balance the risks it might present against the benefits. More guidance is given in the COSHH ACOP.

25 The COSHH Regulations require the prevention of exposure of employees to nickel and its compounds, or if this is not reasonably practicable, to adequately control it.

Workplace exposure limits

26 Nickel and its inorganic compounds have been assigned workplace exposure limits (WELs) under COSHH.

27 For the purposes of these WELs, a water-soluble nickel compound should be regarded as any single nickel salt or nickel complex, eg nickel acetate or formate, which has a solubility greater than 10 grams per 100 ml of water at 20 °C. Such compounds are mainly used in nickel plating operations. Soluble and insoluble compounds do not commonly occur in the same process. Table 1 distinguishes some of the more commercially important nickel compounds on the basis of their solubility.

Table1 Nickel compounds

Soluble nickel compounds	Insoluble nickel compounds
Nickel chloride	Nickel hydroxy carbonate
Nickel nitrate	Nickel dihydroxide
Nickel sulphate	Nickel monoxide
Nickel sulphamate	Nickel sulphide
Nickel acetate	Nickel subsulphide

28 Please refer to EH40/2005[5] for up to date WELs.

Control of exposure

29 Where there is exposure to a carcinogen as defined in COSHH, you must follow the special requirements of COSHH regulations 7(3), 7(5), and 7(9).

30 The special requirements listed in paragraph 29 apply to nickel monoxide, nickel dioxide, dinickel trioxide, nickel sulphide and nickel subsulphide, to any other nickel compound self-classified by the supplier as a category 1 or 2 carcinogen, and also to the calcining, sintering or smelting of nickel copper matte or acid leaching or electrorefining of roasted matte.

31 Where it is not reasonably practicable to prevent exposure to nickel and its compounds, you should follow the principles of good practice to control exposure. It is usual for manufacturers and users of nickel and its compounds to use a combination of methods to control exposure which may include:

- total enclosure of the process and automatic handling techniques;
- partial enclosure;
- use of local exhaust ventilation (LEV).

32 Total or partial enclosure and the use of LEV will be reasonably practicable in many manufacturing processes although this may not be so in some user industries. However, certain work activities may lead to higher potential exposures and therefore a higher standard of control may be necessary.

33 LEV equipment should be designed and installed so that exhausted air is not recirculated into a workplace unless effectively filtered. Further guidance on general methods of controlling exposure is contained in the COSHH ACOP.

Maintenance, examination and testing of control measures

34 You must ensure that:

- all equipment used to control exposure to nickel and its inorganic compounds is maintained in good working order;
- competent people carry out frequent visual checks and periodically carry out thorough examinations of LEV to check that its efficiency is being maintained;
- all LEV is thoroughly examined and tested at least once every 14 months. A record of such tests must be kept for at least five years after the date on which they were made.

35 Further general information about LEV is contained in HSG258 *Controlling airborne contaminants at work. A guide to local exhaust ventilation (LEV)*.[6]

Monitoring exposure

36 Monitoring employees' exposure to nickel and its inorganic compounds may be necessary to:

- establish that engineering controls are effective;
- confirm that the WEL is not exceeded.

Air monitoring

37 Guidance on air monitoring, its frequency and the record-keeping required, is given in the COSHH ACOP, while detailed information and advice on air monitoring strategies is given in HSG167[7], HSG173[8] and the HSE exposure monitoring web pages.[9] Measurement of nickel and its soluble and insoluble compounds is decribed in BS EN 15202.[10]

38 Nickel carbonyl is usually only used in enclosed plant where instrumental detectors are used to alert personnel to any leaks. Nickel carbonyl can also be measured using a charcoal tube sampler followed by atomic absorption spectrophotometry.[11] Colorimetric detection tubes are also available.

Biological monitoring

39 The most common way to estimate employee exposure to substances in the workplace is to measure the amount of substance in the air. This, however, does not indicate how much of a substance has been absorbed by workers from other routes of exposure (ie oral and dermal). Biological monitoring (BM) is a technique which can be used to estimate the uptake of substances by workers from all routes of exposure. BM involves measuring the substance in workers' body fluids (eg urine or blood) or breath. The BM technique for nickel usually involves measuring the substance in workers' urine.

40 There is no statutory UK Biological Monitoring Guidance Value (BMGV) for nickel. The 90th percentile of urinary nickel exposure data measured in HSE research (RR963) indicates that with good control, exposures can be reduced to a level of 24 µmol/mol creatinine. Typically, urinary nickel levels in individuals with no occupational exposure will not exceed 10 µmol/mol creatinine. Published data[12] indicates that an 8-hour inhalation exposure to soluble nickel at 0.1 mg/m^3, with no additional exposure by other routes, would result in a urinary nickel level of around 100 µmol/mol creatinine.

41 Measuring the amount of nickel in urine can be used to estimate recent uptake of nickel carbonyl, soluble nickel salts and dust and fume containing nickel. When BM is used to estimate the recent uptake of nickel in the workplace it is important to know whether exposure is to soluble or insoluble nickel-containing compounds. For people who work with soluble nickel compounds, the amount of nickel present in urine is a reflection of recent uptake. However, insoluble nickel compounds can build up in the lungs and the nickel is absorbed slowly over time. As a result, all of the nickel from this type of exposure does not appear in body fluids immediately, and a lack of increase in urinary nickel levels does not indicate that uptake has not taken place.

42 HSE research report RR963 identifies that the use of repeated BM over time improves the risk awareness of individual workers, and can help to drive sustainable reductions in exposure. More information on the use of BM in the workplace can be obtained in HSG167, HSG173 and the HSE exposure monitoring webpages.

Work planning and housekeeping

43 Accumulations of dusts, wastes and offcut materials are potential sources of exposure to nickel and its compounds. Waste and offcuts should be cleared up frequently and care taken not to disturb dust accumulations. Suitable vacuum cleaning methods to remove dust should be used in preference to brushing or sweeping. If surfaces are brushed or swept then a fine mist of water should be sprayed on the areas to be cleaned to minimise airborne dust levels. It is particularly important to avoid creating dusts or mists of soluble nickel compounds, as they may cause respiratory sensitisation.

44 In addition, RR963 identifies that improved exposure control can be achieved by the adoption of simple, low cost control solutions such as:

- provision of a recognised canteen area which is kept clean;
- food and drink to be taken only in that area;
- provision of a clean coveralls and laundry service for workers;
- ensuring workers do not wear contaminated clothing outside the workplace.

Skin protection

45 Because metallic nickel and some nickel compounds can cause skin sensitisation, skin contact should be prevented as far as is reasonably practicable. Where this is not possible, control measures will need to be introduced to minimise skin contact. These may include:

- identifying materials and/or conditions likely to cause skin rashes;
- organising work to reduce contact with harmful substances;
- adequate and accessible washing and hygiene facilities;
- the provision and proper use of protective clothing and equipment to minimise skin contact;
- provision of gloves which resist permeation of solvents in which nickel may be dissolved, but allow for dexterity in any necessary manual handling process, plus protection against any mechanical hazards which may be present;
- a training programme for employees;
- appropriate use of barrier creams;
- implementing a programme of health surveillance.

46 It is important that skin rashes which begin to develop when working with nickel or its compounds are reported to a doctor, occupational health nurse or other responsible person.

47 Further information is contained in Guidance Note MS24 *Medical aspects of occupational skin disease*.[13]

Eye protection

48 Soluble and insoluble nickel compounds can be eye irritants; suitable eye protection to protect against chemical splash or airborne dusts, as appropriate, should be provided for, and worn by, workers who may be at risk.

Personal protective equipment and respiratory protective equipment

49 Personal protective equipment (PPE), which includes protective clothing and respiratory protective equipment (RPE), should only be used when all other reasonably practicable measures have been taken but they have not achieved adequate control and there remains some residual risk.

50 Where **all** other control measures do not reduce exposure to nickel and its compounds by inhalation as low as reasonably practicable, further control will be required by using RPE. While the installation of, and improvements to, engineering methods may reduce exposures in some processes, RPE may be required in addition for certain activities to adequately control exposure to nickel. These include filling containers with kiln waste, furnace cleaning, plasma spraying and spray-drying. It should be noted that the controlling factor in some of these processes may be exposure to airborne chromium (VI) compounds, which have a more stringent WEL than the nickel WELs.

51 RPE must be both adequate and suitable:

- Adequate – it is right for the hazard and reduces exposure to the level required to protect the wearer's health.
- Suitable – it is right for the wearer, task and environment; the wearer can work freely and without additional risks due to the RPE.

52 If you are considering RPE with a tight-fitting facepiece, you should make sure that each wearer undergoes a fit test. Remember, people come in different shapes and sizes, so facial differences will mean that one kind of RPE is unlikely to fit all.

53 Your employees need to use RPE in accordance with the manufacturer's instructions and the training and instruction you provide. If RPE is not worn properly, it will not provide the required protection. It is often best, if possible, to give a choice of several adequate and suitable RPE types to wearers so they can choose the one they find most comfortable. The RPE must be CE-marked or of an approved type/standard approved by HSE.

54 Maintenance is a requirement for all RPE, except for disposable (single use) RPE, and should be carried out by properly trained people. Thorough maintenance, examination and tests should be carried out at least once a month. However, if the RPE is used only occasionally, an examination and test should be carried out before use and, in any event, the interval should not exceed three months. Remember that all RPE requires clean storage facilities.

55 Further guidance on the selection and use of RPE, including fit testing, is given in HSG53 *Respiratory protective equipment at work: A practical guide*.[13] For PPE, see L25 *Personal Protective Equipment at Work (Second edition)*. *Personal Protective Equipment at Work Regulations 1992 (as amended). Guidance on Regulations*.[15]

Health surveillance

56 Health surveillance is a system of ongoing health checks. These health checks may be required by law for employees who are exposed to nickel and its inorganic compounds. For more information on health surveillance please visit HSE's health surveillance web pages.[16]

57 Exposure to nickel and its inorganic compounds can cause a number of occupationally-related diseases, eg occupational asthma or skin sensitisation.

Skin sensitisation

58 Health surveillance should be considered when there is a residual risk of harm from dermal exposure, eg when there is a reliance on PPE as an exposure control measure or if there have been previous cases of work-related skin disease. An occupational health professional can advise on the health surveillance required.

Occupational asthma

59 Health surveillance should be considered wherever exposure is considered significant because the risk of causing adverse health effects has not been eliminated. 'Significant exposure' is considered to be where urinary nickel levels in individuals exceed 10 µmol/mol creatinine (ie the reference background level in non-occupationally exposed individuals).

60 Where exposure to inhalable nickel is considered significant, all employees should be under suitable health surveillance for occupational asthma. An occupational health professional needs to be involved in drawing up your health surveillance programme. If the symptoms of occupational asthma are detected early enough, and steps are taken to manage employee exposure, the long-term health consequences will be minimised. Information from suitable health surveillance may highlight lapses in workplace control measures.

61 Health surveillance for occupational asthma will **not** be required where you can demonstrate that there is no 'significant exposure'. For asthmagens, as low as reasonably practicable (ALARP) considerations apply and therefore, if you can demonstrate through BM that all potentially exposed people are only receiving background exposures to nickel (ie <10 µmol/mol creatinine), then you can conclude that there is no additional occupational exposure. To enable this exclusion to apply, all BM results, for all employees must be at background levels for at least two consecutive periodic sample results, or for over a year (including those for new employees and new processes) in addition to the periodic BM samples.

62 For further information see COSHH Essentials guidance sheets G402 and G403.[17]

Notification of reportable disease

63 All employers, the self-employed and people in control of work premises have duties under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR).

64 They must report certain work-related injuries, cases of ill health and dangerous occurrences. HSE will pass details to the relevant enforcing authority.

65 RIDDOR applies to all work activities but not all incidents are reportable.

Find out more

66 Further information about what must be reported and how to report it can be found at www.hse.gov.uk/riddor or in the leaflet INDG453(rev1) *Reporting accidents and incidents at work: A brief guide to the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR).*[18]

Information, instruction and training for employees

67 Employers have a legal duty to provide information, instruction and training for employees who may be exposed to nickel and its inorganic compounds under Regulation 12 of COSHH and to ensure they understand the potential health issues and the precautions they need to take. The training should include details of how control measures are to be used. Proper supervision, particularly of new or inexperienced workers, should also be in place. Those who carry out the various assessments, thorough examinations and tests, monitoring and health surveillance should have received the necessary information, instruction and training to ensure that they are competent to do the work. Employees should be told to report any obvious defects in the control measures to their supervisor. The leaflet *Nickel and you: Working with nickel: Are you at risk?* INDG351(rev1)[19] provides useful information for employees, together with any relevant industry guidance.

68 If health surveillance is carried out, employees must have access to their own health records and any collective results of health surveillance, as well as any biological monitoring or air monitoring. Practical advice on this is given in the COSHH ACOP.

Safety representatives

69 Consultation with employees is an essential aspect of arrangements for managing health and safety effectively. Employee representatives can have a particularly important part to play in this. Safety representatives appointed by recognised trade unions under the Safety Representatives and Safety Committee Regulations 1977 should be consulted. Other employees not covered by such representatives must be consulted, either directly or indirectly via elected representatives of employee safety, according to the Health and Safety (Consultation with Employees) Regulations 1996 (as amended). Such

consultations allow employees or their representatives to help you develop the most suitable control measures for the workplace. More information is given in leaflet INDG232(rev2) *Consulting employees on health and safety: A brief guide to the law.*[20]

Emergency procedures

70 You should consider the procedures to be followed in the event of a serious plant failure or other incident in which a significant release of nickel or its compounds may occur. Emergency evacuation procedures may need to be devised and practised. The provision and maintenance of self-contained breathing apparatus for use in emergencies may be necessary.

Preventing major accidents

71 Depending on the inventories of nickel and its compounds, the Control of Major Accident Hazards (COMAH) Regulations 2015 may apply. COMAH requirements are explained in HSE's L111 *A guide to the Control of Major Accident Hazards Regulations (COMAH) 2015*[21] as well as on HSE's COMAH web pages.[22] In addition to a duty to take all measures necessary to prevent major accidents, COMAH also includes provisions requiring appropriate emergency planning.

References

1 *Control of substances hazardous to health (Sixth edition). The Control of Substances Hazardous to Health Regulations 2002. Approved Code of Practice and guidance* L5 (Sixth edition) HSE Books 2013 www.hse.gov.uk/pubns/books/l5.htm

2 Annex VI of CLP (as provided in the C&L inventory) www.echa.europa.eu/web/guest/regulations/clp/cl-inventory

3 *A step by step guide to COSHH assessment* HSG97 (Second edition) HSE Books 2004 www.hse.gov.uk/pubns/books/hsg97.htm

4 *Exposure to hexavalent chromium, nickel and cadmium compounds in the electroplating industry* Research report RR963 HSE 2013. www.hse.gov.uk/research/rrhtm/rr963.htm

5 *EH40/2005 Workplace exposure limits: Containing the list of workplace exposure limits for use with the Control of Substances Hazardous to Health Regulations 2002 (as amended)* Environmental Hygiene Guidance Note EH40 (Second edition) HSE 2011 www.hse.gov.uk/pubns/books/eh40.htm

6 *Controlling airborne contaminants at work. A guide to local exhaust ventilation (LEV)* HSG258 (Second edition) HSE Books 2011 www.hse.gov.uk/pubns/books/hsg258.htm

7 *Monitoring strategies for toxic substances* HSG173 (Second edition) HSE Books 2006 www.hse.gov.uk/pubns/books/hsg173.htm

8 *Biological monitoring in the workplace: A guide to its practical application to chemical exposure* HSG167 HSE Books 1997 www.hse.gov.uk/pubns/books/hsg167.htm

9 HSE's exposure monitoring webpages www.hse.gov.uk/coshh/basics/monitoring.htm

10 BS ISO 15202 *Workplace air. Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry. Part 2 Sample preparation and Part 3 Analysis* British Standards Institution

11 *NIOSH Manual of Analytical Methods (NMAM)* Publication 94 -113 (4th edition), National Institute of Occupational Safety and Health (NIOSH) 1994 Method 6007 – Nickel Carbonyl www.cdc.gov/niosh/docs/2003-154/

12 List of MAK and BAT Values Deutsche Forschungsgemeinschaft 2015 http://onlinelibrary.wiley.com/book/10.1002/9783527695539

13 *Medical aspects of occupational skin disease* MS24 HSE Books 1998 www.hse.gov.uk/pubns/books/ms24.htm

14 *Respiratory protective equipment at work: A practical guide* HSG53 (Fourth edition) HSE Books 2013 www.hse.gov.uk/pubns/books/hsg53.htm

15 *Personal Protective Equipment at Work (Second edition). Personal Protective Equipment at Work Regulations 1992 (as amended). Guidance on Regulations* L25 (Second edition) HSE Books 2005 www.hse.gov.uk/pubns/books/l25.htm

16 http://www.hse.gov.uk/health-surveillance/index.htm

17 *Health surveillance for occupational asthma COSHH Guidance Sheet G402 HSE 2011 and Health surveillance for occupational dermatitis* COSHH Guidance Sheet G403 HSE 2011 www.hse.gov.uk/pubns/guidance/gseries.htm

18 *Reporting accidents and incidents at work: A brief guide to the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR)* Leaflet INDG453(rev1) HSE Books 2013 www.hse.gov.uk/riddor/resources.htm

19 *Nickel and you: Working with nickel: Are you at risk?* Leaflet INDG351(rev1) HSE 2013 http://www.hse.gov.uk/pubns/indg351.htm

20 *Consulting employees on health and safety: A brief guide to the law* Leaflet INDG232(rev2) HSE 2013 www.hse.gov.uk/pubns/indg232.htm

21 *A guide to the Control of Major Accident Hazards Regulations (COMAH) 2015* L111 (Third edition - reissued with amendments October 2015) HSE Books 2015 www.hse.gov.uk/pubns/books/l111.htm

22 Control of Major Accident Hazards (COMAH) web page: www.hse.gov.uk/comah/

Further information

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit www.hse.gov.uk/. You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

British Standards can be obtained in PDF or hard copy formats from BSI: http://shop.bsigroup.com or by contacting BSI Customer Services for hard copies only Tel: 0845 086 9001 email: cservices@bsigroup.com.

This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory, unless specifically stated, and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance.

This leaflet is available at: www.hse.gov.uk/pubns/guidanceindex.htm.