

Maggot-Bait-Breeding Establishments – Health Problems

◆OC 400/9

Target Audience:

Agricultural Inspectors
Employment Medical Advisors
FCG Specialist Inspectors (Occ Hyg)

Date issued: 1992-11-27	OG Status: Partially Open
Review date: 2002-11-27	Author Unit/Section:

SUMMARY

The attached Information Document describes the main health hazards in the maggot-bait-breeding industry. It has been drawn up by HSE and the British Bait Breeders Association (BBBA), the maggot-breeding-industry trade body. The Information Document may be copied and given to interested persons outside HSE, but note that copies have already been sent by BBBA to their members.

BACKGROUND

1 The 20 or so members of the BBBA supply about 65-70% of the multi-million-pound maggot market. The remainder of the breeders are mainly smaller establishments, who may only operate for part of the year. The BBBA is attempting to raise standards in the industry, and improve the public perception of it, and therefore, they are keen to see the standards outlined in the guidance met by the whole of the industry.

ACTION BY INSPECTORS

2 Agricultural groups are encouraged to arrange a programme of visits to bait breeders in their areas, and the following inspection points may be of interest:

- (1) visits during the peak production period between May and mid-September will reveal the highest levels of ammonia;
- (2) ammonia levels will be at their peak in mid- to late afternoon on Wednesdays and Thursdays, when production for the weekend market is at its highest.
- (3) maggots produce most ammonia at the beginning of their growth cycle; after the fifth day emissions decrease;



¹ Exemption 7 – Effective management and operations of the public service



Cancellation of instructions

- 4 AIC 1986/46 - cancel and destroy.
- 5 NIGM 09(Ag)/1992/12 - cancel and destroy.

27 November 1992
(2589/FOD/1992)
Disc No: FODA1.Edt\J479\9.92\DH

ASI headings

Amines: ammonia: Control of Substances Hazardous to Health Regulations 1988:
dyestuffs: maggots: zoonoses.

² Exemption 15 – Statutory and other restrictions (Health and Safety at Work etc Act 1974 s.28)

ANNEX
(para 3)



³Exemption 15 – Statutory and other restrictions (Health and Safety at Work etc Act 1974 s.28)

SOME OF THE HEALTH AND SAFETY ASPECTS OF MAGGOT-BAIT-BREEDING

INTRODUCTION

1 This document contains internal guidance which has been made available to the public. The information may not be applicable in all circumstances and any queries should be directed to the appropriate enforcing authority.

2 Maggot-bait-breeding may involve the exposure of operators to many hazards which can cause injury or ill health. There is potential for prolonged disability or ill health, caused directly by the use of equipment and substances in the process or from buildings and the general environment in which maggots are bred.

3 Maggot-bait-breeding utilises fish, animal and bird matter for the purpose of breeding maggots (the larval stage of the insect order Diptera). Fish, bird or animal matter is exposed to adult flies, in a purpose-made building (the fly house), and the female flies lay eggs in the fish, bird or animal flesh (known as 'blowing'). The flesh and eggs are then transferred into shallow bays or vats where the larvae develop and are fed animal, bird or fish matter for periods of up to 7 days. The maggots and pupae are then separated from the waste matter, in some cases coloured by the addition of dyes, and sold for use as fishing bait.

4 This document highlights some of the hazards associated with maggot bait breeding. It is intended to help employers, the self-employed and employees understand the potential hazards and the precautions which should be taken to reduce the risk of injury or ill health at work. It will assist people in fulfilling their statutory duties under the Health and Safety at Work etc Act 1974 and other relevant statutory provisions. It does not set out to cover all health and safety matters relevant to maggot-bait-breeding.

5 New premises should be designed and constructed to reflect the highest reasonably practicable standards of safety and hygiene in the work place. Existing structures used or intended to be used for maggot bait breeding should be improved and modified to reflect the standards outlined in this document.

LEGAL OBLIGATIONS

Health and Safety at Work etc Act 1974 (HSW Act)

6 Employers, employees and the self-employed have far-reaching duties under the HSW Act. Employers must do everything reasonably practicable to ensure the health, safety and welfare of their employees. In addition, employers and the self-employed must do everything reasonably practicable to ensure their own safety and that of other people, who are not their employees, but who may be affected by the work activity.

7 Duties are also placed on persons having control to any extent of non-domestic premises, used by people who are not their employees. These duties apply when people enter to work there or where machinery or substances are provided for their use.

The Control of Substances Hazardous to Health Regulations 1988 (COSHH)

8 These Regulations came fully into force on 1 January 1990. They apply to the exposure at work to any substance, including micro-organisms, which may be hazardous to health. The Health and Safety Executive (HSE) has produced various summary and explanatory guidance on COSHH (see Appendix). Under the COSHH Regulations a suitable and sufficient assessment must be made in order to identify the hazardous nature of the substances, the likely risk of exposure and the necessary control measures which are to be used to prevent, or reduce, exposure. The assessment should normally be made in writing and communicated to the workers whom it affects.

9 The hierarchy of control measures laid down by the COSHH Regulations indicates that substances hazardous to health should, whenever reasonably practicable, be replaced with less hazardous alternatives. If this cannot be achieved, then process and/or engineering control measures must be introduced to reduce exposure. The system of work may need to be changed to reduce the likely risk of exposure and, in addition to these measures, it may be necessary to provide adequate protective clothing.

Sources of advice

10 It is the responsibility of the owner or employer to ensure compliance with the law, but those intending to erect new buildings, or to alter substantially or modify existing buildings, are advised to consult, amongst others, the local planning, water, fire and environmental health authorities (in particular, in relation to Part I of the Environmental Protection Act 1990 - see appendix) and HSE before beginning work. Advice from these authorities can lead to more efficient and cost-effective expenditure.

RISKS FROM MACHINERY AND ELECTRICITY

11 All machinery and equipment must be safely installed and properly maintained. Specific regulations apply to the use of equipment at work and these must be adhered to.

12 Particular hazards are posed by mincer augers used for carcass processing, and special consideration must be given to their guarding. Distance guards or inlet hopper extensions can be used to prevent operators from contacting the rotating auger screw. All reasonable steps must be taken to prevent operators falling into the rotating mechanism. Where a fixed fence is used it should be of sufficient height and distance from the mincer auger inlet to prevent an operator from gaining access to the rotating auger screw. Typically, a suitable fence would be 1m high and 1.1m from the auger inlet, where the auger screw was less than 200mm above ground or platform level. Where a hopper extension is used, it should have a minimum reach distance from the edge of the hopper to the mincer auger screw of at least 850mm and should be at least 1.3m above the ground or work platform. The open aperture of the hopper should be in the horizontal plane. Smaller, curved hopper extensions are unlikely to provide adequate protection nor be practical for use. All carcass mincers must be fitted with a positive action-stop switch which is accessible to the operator at his/her normal working position.

HEALTH HAZARDS

Personal hygiene

13 Many areas of a maggot farm, notably the dye-handling and animal-materials-handling areas, involve contact with hazardous or unpleasant materials. All premises should be provided with toilet and washing facilities, and workers should be strongly encouraged to use washing facilities regularly. Sufficient water closets and urinals should be provided to allow all those who may be expected to use them at any one time to do so without undue delay; washing facilities should be provided in the immediate vicinity of the toilet facilities, as well as elsewhere if necessary. Showers and/or baths are also required.

14 Suitable accommodation for personal clothing not worn whilst at work should also be provided, preferably using lockable lockers or similar.

15 Hands, arms and face should be thoroughly washed before eating, drinking or smoking. Meals should not be taken in workrooms, but in a separate area where hygienic conditions can be provided.

16 All welfare facilities must be regularly cleaned so as to remain in a hygienic condition, and kept in good working order. Hand-drying facilities, toilet tissue and soap must be provided and renewed or cleaned when necessary.

Hazardous gases

17 All substances referred to in paragraphs 18-46 are subject to the COSHH Regulations and the actions described are required by those Regulations.

18 Gases usually liberated in quantity by growing maggots include ammonia, methyl mercaptan and trimethylamine. The amounts generated depend upon various factors including the age and type of maggot being reared, the stocking rate of the growing vat, the ambient temperature and work activities. Thus, for instance, there can be sudden, rapid increases in the amount of gas produced during manual operations, such as the splitting and lifting of vats. Peak levels in excess of 500 parts per million (ppm) of ammonia have been measured during such operations. Occupational exposure standards (OESs) are listed in HSE Guidance Note EH40 (reprinted annually with revisions) and current standards are reproduced below for the 3 gases above.

Gas/Vapour	8-hour TWA* (ppm)	10-minute STEL* (ppm)
Ammonia	25	35
Methyl mercaptan	0.5	-
Trimethylamine	10	15

*TWA = Time Weighted Average

*STEL = Short Term Exposure Limit

19 Exposure by inhalation should be reduced to these standards. In practice, so as to be sure people are not exposed above these standards it will be necessary to control exposure to levels significantly below the OESs. For practical purposes ammonia can be used as the reference gas and adequate control of exposure to it will ensure adequate control of exposure to the other potentially hazardous gases.

20 Exposure will vary depending upon the stocking rate, the growing phase of the maggots, the temperature, the size of the workroom, general and local exhaust ventilation rates and effectiveness and an individual's pattern of work. There are no hard-and-fast rules which can be applied to predict exposure. Thus, exposures considerably above the ammonia OES in small workrooms with relatively low stocking rates can occur if ventilation is poor, and, conversely, over-exposures can occur in large buildings with relatively high stocking rates and some powered general ventilation. Short-term and long-term exposures to ammonia can be relatively easily measured by, for instance, chemical indicator tubes. Such methods can be used initially as part of the COSHH assessment and later to check that control measures are still working effectively. However, it may be necessary to allow for cross-sensitivity to, for example, amines.

Control of exposure

21 Under the COSHH Regulations people should not be exposed to levels above the OES. If they are, the reasons for over-exposure should be identified and exposure should be reduced as soon as is reasonably practicable.

22 The Approved Code of Practice (see appendix) which accompanies the COSHH Regulations describes the hierarchy of control measures which can be applied to the control of hazardous substances. The hierarchy starts with the elimination of the use of a substance, eg by substitution, continues through engineering control measures, and concludes with, as a last resort, personal protective equipment. In the case of bait-breeding the elimination of exposure to ammonia is not an option but could be considered for other substances used in breeding. It may be possible to alter the process to reduce the rate at which ammonia and other gases are produced, for instance:

1. wherever practicable, manual handling of growing maggots should be avoided, eg by even distribution of the initial blow the need for vat-splitting can be reduced;
2. Chemical absorbents could be added to the vats to reduce the amount of gas liberated into the workroom. Reducing the amounts liberated reduces the amount of ventilation which may have to be applied to control residual ammonia and odour escape from the bait breeding building. Many absorbents are composed of very finely ground minerals and will present a dust hazard. Adequate precautions against inhaling or ingesting the dust must be taken;
3. In order to make the application of local exhaust ventilation to vats technically feasible it may be necessary to alter their layout and spacing. The fabric and internal layout of bait-breeding buildings should, if possible, be purpose-designed to minimise the amount of ventilation that needs to be applied and maximise the effectiveness of such ventilation.

23 There has been a clear tendency in the past to confuse the purpose of ventilation applied to bait-breeding buildings. Usually air has been drawn out of the building to reduce odour escape. The hope has been that this general ventilation would reduce ammonia concentrations to acceptable levels. In many cases general ventilation to control odour leakage has not adequately reduced exposure to ammonia.

24 It is more efficient and effective to contain/capture an air contaminant as soon as possible after it is released than to allow it to spread through a building and then try to dilute or restrain it.

25 The basic principles are simple:

1. to reduce the escape of odour from a building containing odoriferous processes, the vats should be physically enclosed within the buildings as much as possible and ventilation should be applied to these enclosures;
2. total air-extraction rate from the building should be greater than the air input under foreseeable weather conditions;
3. air input ("make-up" air) should be planned and air should be introduced directly into those areas where people work.

(1) and (2) apply to the control of odour and ammonia.

26 By adopting these principles (especially 25(1)) the volume of air extracted from a building is reduced to a minimum, as is the size and cost of the abatement equipment needed to treat the effluent air, and the chances of successfully controlling ammonia exposure are increased. It is unlikely that ammonia exposure will be adequately controlled by general ventilation alone, although carefully designed displacement general ventilation can reduce exposure to ammonia adequately. In such systems air is introduced on one side of the building, blown evenly across the vats and extracted on the other side of the building. General, random air movement and mixing is reduced to a minimum. However, these systems require large volumes of air, fans and abatement systems. Successful systems are likely to require local exhaust ventilation supplemented by general dilution/displacement ventilation produced by the input of make-up air.

27 Segregation of operations within a building may also help to reduce exposure. For example, the maggot-breeding area could be separated from other areas such as raw-material reception or maggot-cleaning area, thus reducing the length of time spent in the breeding area which is the principal source of emission. Adequate engineering controls will still be necessary, but their extent and therefore their cost will be lower.

Local exhaust ventilation design

28 Feeding maggots and bacterial decay generate metabolic heat. Ammonia given off by the degradation process rises into the roof space in the thermal lift due to the heat of the process and there is often a detectable floor- to-ceiling ammonia concentration gradient. Any design of local exhaust ventilation should try to take account of this process-generated air movement.

29 Local exhaust ventilation should be designed for maximum effectiveness. The designer of the local exhaust ventilation should work closely with management and workforce to ensure that the system is effective and practicable. For instance, in order to install a system of enclosures it may be necessary to reorganise the layout of vats in a workroom. Work methods may also need some reorganisation so that workers use the exhaust ventilation system to best advantage. To do so they will need training in how the system works.

30 Uncontrolled air leakage from the building should be reduced to a minimum (primarily to prevent odour escape). The entry of make-up air (air to replace that extracted by the ventilation system) should be planned and mechanically drawn into the building. Traditionally make-up air is either blown into the workroom via fans in the walls or is passively sucked into the building via doors and gaps in the building fabric due to the action of the general and/or local extraction systems. This second method of make-up air input is particularly haphazard and wasteful and neither method can be relied upon to dilute ammonia concentrations in the areas where work takes place. To ensure such dilution, air should be blown directly, at low velocity via plenums, into those areas where people spend most of their working time. The air input should be arranged so that it does not cause draughts which disrupt the effectiveness of any local exhaust hoods.

31 In general, the most effective and efficient type of hood for containing air contaminants from a warm/hot process is a canopy hood over the process. However, extending the side-walls of such hoods greatly increases their effectiveness. Careful design of such a system will be necessary to minimise production problems; but a canopy hood with flexible or hinged plastic sides which can be folded out of the way for access would probably be the most efficient and cost-effective design. The extension of the sides of the canopy to the floor/walls of the pit so that the only path of entry for air is through the front of what is in effect the face of a booth will minimise the leakage of ammonia/odour and the volume of air required for containment. The careful selection of arrestment equipment will be vital as the concentration of ammonia and other gases will be increased, with the possibility of emissions to the environment.

32 If a person has to enter a booth in which ammonia concentrations could be significant, easily accessible dampers, to reduce airflow to surrounding booths and increase airflow in the booth to be worked, may be of benefit. However, they are unlikely to be used for the short-duration work most common in such booths, and are prone to malfunctioning. It is important that the design of the extract system fully caters for the foreseeable system pressure losses caused by odour abatement systems. Resistance to airflow increases in soil or peat bed abatement systems and should be allowed for.

Commissioning and maintenance

33 Once the system is commissioned it should be properly maintained, with a test every 14 months, and records kept. Commissioning should include simple containment testing using smoke tracers, measuring face velocities at hoods, volumetric flow rates, duct velocities and static pressures at various test points in the duct work. For sources of further advice, see appendix.

34 It is important that the ability of the control measures to maintain exposures below current OESs should be tested as required by COSHH. An initial occupational hygiene survey by a competent practitioner should be carried out to determine people's short-term and long-term exposures to ammonia, and identify any residual sources of ammonia. Simple gas-detection equipment, for instance chemical indicator tubes, should be available and used to check that control is maintained. Tubes may be cross-sensitive to amines and this should be allowed for. Equipment manufacturers or suppliers should be able to advise. Adequate records of the ventilation control system and gas-level checks should be kept and be available for inspection. If adequate control is not achieved then further alterations to the exhaust ventilation system may be required and/or for certain jobs respiratory protective equipment (RPE) may be required. While the effectiveness of the ventilation system may be improved, the gas-emission rate from the vats may need to be reduced by, for instance, use of absorbents where appropriate or reduced vat-stocking and production rates.

Ventilation cost-saving measures

35 A number of measures can be taken to improve the efficiency of ventilation systems and reduce operating costs.

1. Convert general ventilation to exhaust ventilation systems as far as possible.
2. Design exhaust ventilation as a variable volume system. For instance, link airflow rate to an ammonia sensor system so that adequate but not excessive airflow volume is used.
3. Obtain advice on energy efficiency measures which can be applied to motor control, electric motors and variable volume fans.

For sources of further guidance on local exhaust ventilation see appendix.

Respiratory protective equipment

36 COSHH requires that control of exposure should be achieved by process modification, work organisation changes and ventilation measures. There are difficulties with monitoring and policing the correct use of RPE, and it should only be used as a last resort. However, whilst other measures are being developed and implemented people likely to be over-exposed to ammonia and other gases should be protected by means of adequate and suitable RPE. Such RPE should not only be technically capable of reducing over-exposure but should also fit the individual well and be comfortable. The absorbent medium in the RPE will become saturated after a while and a policy of replacement of cartridges or RPE will need to be developed, taking account of advice from suppliers and/or manufacturers. Adequate cleaning and storage facilities will be required and records should be kept. For sources of further guidance see appendix.

Dyes

37 Several dyes used in bait-breeding are suspected carcinogens (substances that cause cancer). Auramine and rhodamine are known to cause cancer in animals. Chrysoidine dyes cause cancer in animals and have been shown to cause cancer in

coarse fishermen. Although these and other suspect dyes do not carry the R45 risk phrase "May cause cancer" under the Classification, Packaging and Labelling of Dangerous Substances Regulations 1984 they should be handled as if they carried this risk phrase and additional measures to control risk applied as detailed in the COSHH Regulations Approved Code of Practice Control of Carcinogenic Substances (see appendix).

38 The least hazardous dyes should always be used wherever reasonably practicable. If a low toxicity substitute is not available the supplier should be approached and asked to supply the dye in a non-dusty form, for example in oil-bound pellets or in an oil-based liquid solution. If this cannot be done the powder should be weighed and mixed under effective local exhaust ventilation. Particular care should be taken to prevent skin contact with the dye dissolved in oil. It is possible that the oil may facilitate the penetration of dye through the skin; certainly it would aid the penetration of dye through work clothing leading to skin contamination.

39 Careful selection, use and cleaning of personal protective equipment is important as is the need for scrupulous personal hygiene. Protective clothing would normally comprise a coverall, apron, face shield and gauntlet gloves. Separate running hot and cold washing facilities should be readily available to persons handling dyes. All dyestuffs should be stored away from other chemicals in a purpose-built store. For sources of further guidance, see appendix.

Diseases

40 Some of the many diseases which affect animals can be transmitted to humans, and are known as zoonoses. Other diseases will be present in the environment in which animals are kept, or are associated with putrefying carcasses. Education of the employees on the risks involved, the precautions they should take and the need for early reporting of symptoms are essential, as are immunisation and regular boosters, against tetanus.

41 Disease symptoms can vary from skin lesions (orf, ringworm, anthrax), general gastro-intestinal symptoms (salmonella, listeria, camphylobacter) to more general symptoms which, if untreated, can result in more severe symptoms or even death (leptospirosis, toxoplasmosis, tetanus).

42 Infection can result from handling infected carcasses or other contaminated products, and is usually through cuts, broken skin or puncture wounds. It can also occur through the mucous membranes in the nose, eyes or mouth.

43 Before any work commences, adequate information should be obtained from suppliers regarding the likely disease status of any carcass. This information should be in writing and kept in a suitable register. Carcasses which are infected with any notifiable diseases, eg BSE, anthrax, brucellosis, Newcastle's disease etc; or those suffering from pathogenic bacterial infections, eg salmonella, camphylobacter etc, must not be used for maggot- bait-breeding.

44 However, it is possible that carcasses of animals carrying BSE or other diseases but not diagnosed as such may be used. The precautions below should be implemented whenever carcasses are handled or otherwise worked with:

1. when handling carcasses and wastes, gloves should be worn and any cuts or abrasions covered with waterproof plasters before work starts;
2. all those working in the carcass-processing or maggot-breeding areas should wear protective gloves, coverall and rubber boots. When using sharp knives for boning and cutting, protective clothing such as gauntlets and protective aprons should be worn;
3. brains must not be removed by hand;
4. a high standard of general housekeeping should be maintained in the premises and contaminated areas washed down with detergent and warm water;
5. hands, face and arms should be washed frequently and before eating, drinking or smoking. These activities should be in a separate area from the main workplace.

45 Where animal carcasses or other feed materials are not introduced to the maggot-breeding areas within 12 hours of arrival on the premises, adequate arrangements should be provided to store the material at temperatures below 5°C to prevent decay and putrefaction. Where carcasses are unprocessed for periods in excess of 48 hours adequate freezing facilities, maintaining a temperature of at least -18°C, should be provided. Carcasses should not be stored in the same refrigerator as maggots.

46 Adequate hygienic arrangements must be made for operators involved in animal carcass collection. Normally, protective clothing comprising gloves, coverall and rubber boots will be required together with transportable washing facilities and a suitable first-aid kit. Protective clothing should be stored outside the driver's cab.

HEALTH SURVEILLANCE

47 In some cases health surveillance will be required where there is exposure to hazardous substances such as ammonia. The need for health surveillance should be considered in the COSHH assessment. The appropriateness and type of surveillance is decided largely by the likelihood of ill health occurring in any particular circumstances. However, where potential carcinogens, such as dusty dye formulations, are involved health surveillance will always be required unless exposure can be shown to be insignificant.

48 Health surveillance should be carried out by a competent person (not necessarily a doctor) who is familiar with the processes and working conditions and could include:

1. for new workers, an assessment to establish their state of health prior to being exposed to the dangerous substance;
2. periodic enquiry to ensure continuing absence of symptoms;
3. monitoring causes of sickness absence;

4. positive enquiry on return to work after absence which may have been work related;
5. an annual check by a doctor familiar with the work.

Simple records should be kept of all health surveillance carried out.

Hazards from odour abatement equipment

49 Maggot rearing is a process prescribed for control by local authorities under section 2(1) of the Environmental Protection Act 1990 (EPA). Enforcement duties lie with the environmental health department of those Authorities, who also issue the authorisations necessary under the EPA. Specific guidance on control of emissions from maggot-bait-breeding premises has been produced (see appendix), and further advice on the suitability and efficiency of odour abatement systems for use at individual premises may be given by the local authority.

50 In general, 3 methods may be used for odour abatement at maggot-breeding premises. The hazards arising from their use are described below.

1. Thermal incinerators - these oxidise the waste gases in a combustion chamber. The potential hazards are limited to those associated with the fire or explosion risk from the fuel used in the burners, normally gas but occasionally paraffin or diesel oil.
2. Biological filters - these utilise natural bacterial action to decompose odiferous gases present in the exhaust air drawn from maggot buildings. There are no specific health or safety hazards associated with such systems.
3. Chemical scrubbers - these remove contaminants by a series of chemical reactions. Exhausted air is passed through a series of chemical solutions, which remove various contaminations from the air. Usually a 3-stage system is used comprising an acid stage to neutralise ammonia, a hypochlorite stage to neutralise sulphur compounds and a caustic stage to neutralise amine compounds. The last 2 stages are often combined in one scrubbing tower.

51 Hazards associated with chemical scrubbers mainly concern the acids and alkalis used in the chemical wash. The COSHH hierarchy of control measures described earlier should be considered, but it is unlikely that alternative substances can be used in these installations. However, handling problems can be reduced by using automatic metering pumps for handling the concentrated substances. Adequate and suitable protective clothing should be provided and worn for maintenance operations and dealing with spillages etc. Normally, protective clothing would comprise a face shield, gauntlet gloves, coverall, acid proof apron (of neoprene, butyl, or viton) and rubber boots.

52 Consideration must be given to the safe storage of chemicals used in scrubbing systems. Individual chemicals must be kept physically separate in locked, secure stores which can adequately contain the chemicals in the event of spillage. The stores must be clearly marked; a suitable sign would be a black exclamation mark on a yellow background

within a black-bordered triangle. Under no circumstances should concentrated acids be stored with concentrated alkaline or hypochlorite solutions.

FURTHER INFORMATION

53 Further advice and information on the health and safety aspects of maggot bait breeding can be obtained from local offices of the Health and Safety Executive, listed in the telephone directory.

APPENDIX

Other useful sources of information:

1. L5 Control of substances hazardous to health (General ACoP - Third edition) and Control of carcinogenic substances (Carcinogens ACoP - Third edition) ISBN 0 11 885698 7
2. SE Booklet HS(G)37 An introduction to local exhaust ventilation ISBN 0 11 883954 3
3. HSE Booklet HS(G)54 Maintenance, examination and testing of local exhaust ventilation ISBN 0 11 885438 0
4. HSE Booklet HS(G)53 Respiratory protective equipment - A practical guide for users ISBN 0 11 885522 0
5. HSE Guidance Note EH34 Benzidine-based dyes: health and safety precautions ISBN 0 11 883551 3
6. HSE Guidance Note EH40/92 Occupational exposure limits (revised annually) ISBN 0 11 885696 0
7. Environmental Protection Act Part I, Secretary of State's Guidance - Maggot breeding processes ISBN 0 11 752396 8

All available from HMSO