

Guidance on Dust Control and Health Surveillance In Bakeries

Revised February 2017

This document, last revised in 2008, has been updated and revised for online publication on the Federation of Bakers website at www.fob.uk.com in March 2017/

The revision has been carried out by the Federation's Health and Safety Committee.

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FOREWORD

This is the revised guidance prepared by the Federation of Bakers (FOB). This guidance addresses one of the more significant OH risks in the industry; respiratory exposure to flour and other ingredient dusts.

The publication first appeared in the 'eighties' and was last revised in 2008. It has now been updated again and reissued as a PDF download available from the FOB's website.

It provides information and advice for bakers and others working in the food manufacturing industry which, if followed, will help them reduce risk arising from employee exposure to flour and other ingredient dusts. Following the guidance will also help employers in the industry meet their duty of care for employees and contribute to ensuring health and safety compliance.

The guidance is complimentary to HSE's own advice on controlling dust in workplaces and related information in the 'A baker's dozen – thirteen essentials for health and safety in bakeries' publication which is also available as a download from the FOB's website (first published by HSE as HSG233 in 2003 and gifted to be updated by the FOB Health and Safety Committee in 2015).

In particular, the guidance provides advice on how to assess dust levels in the work-place and outlines a range of practical measures which can be taken to reduce dust exposures. It also contains useful advice on health surveillance.

I am sure that as before the revised guidance will be read and used throughout the baking and wider food industry.

Gordon Polson
Director
Federation of Bakers

March 2017

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GUIDANCE ON DUST CONTROL AND HEALTH SURVEILLANCE IN BAKERIES

INTRODUCTION

Flour and ingredient dusts can cause health problems for people working in bakeries. If dust becomes airborne and people can breathe in the dust, they might be affected in a number of ways. It can cause rhinitis (running nose) and conjunctivitis (watering and irritation in the eyes). More seriously, for a small number of susceptible individuals, it can cause occupational asthma – attacks of breathlessness, chest tightness and wheezing. This guidance for the baking industry sets out practical measures to reduce this risk to people's health from contact with flour and ingredient dusts.

The legal standard in the UK for controlling risk of exposure to flour and ingredient dust is contained in the Control of Substances Hazardous to Health (CoSHH) Regulations. This guidance is not a definitive interpretation of the law; rather it sets out practical measures, agreed by the UK Health and Safety Executive (HSE) and employers in the bakery trade. Although specific examples are used to illustrate risk control measures, there are always likely to be equally effective alternatives for securing the same objective of minimising risk to people. The most effective measures will often depend on the circumstances of the particular case.

The guidance is based on studies of people working in bakeries, which have shown that allergy (sensitisation) to bakery ingredients such as flour or enzymes (amylase and hemicellulase) in bread improvers can be caused at relatively low levels of exposure. However, studies also showed that the majority of workers with respiratory and nasal symptoms do not become allergic (sensitised) to exposure. Studies in the UK baking industry and by SCOEL (Scientific Committee for Occupational Exposure Limits) also suggest that exposure to high dust levels for short periods of time should also be considered significant in giving rise to symptoms of irritation and sensitisation.

In the non-sensitized group, the cause of symptoms is more likely to be irritation of air passages by relatively high level but short term exposure to airborne dust. This implies the need for controlling exposure in all phases of bakery operation, whether handling small quantities in weighing up ingredients, cleaning machinery, clearing working accumulations of dust from floors or dealing with a major spillage from plant failure in a large bakery. All these eventualities are covered in the guidance.

THE MOST IMPORTANT MESSAGE FOR EMPLOYERS AND PEOPLE WORKING IN A PLACE WHERE THEY MIGHT BE EXPOSED TO FLOUR AND INGREDIENT DUSTS IS THAT DUST IN BAKERIES CAN HARM HEALTH. TO REDUCE THE RISK OF RESPIRATORY ILL HEALTH, MEASURES NEED TO BE TAKEN TO REDUCE THE AMOUNT OF DUST PEOPLE BREATHE IN.

The guidance sets out steps that can be taken to assess and understand the problem and some practical measures which can be taken to reduce the levels of personal exposure to dust.

Janis Murphy
Chair,
Health and Safety Committee
Federation of Bakers
March 2017

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1. ASSESSING DUST LEVELS

When measuring dust in air, levels are expressed as the weight of dust in milligrams (mg) per unit volume of air in cubic metres (m³) abbreviated to mg.m⁻³. There are a number of ways to approach assessment and/or actual measurement of dust levels.

Tables 1 & 2 in Appendix 4 show a range of typical exposure levels for both plant and craft bakeries. Table 1 shows total inhalable dust exposure levels for tasks in plant bakeries, with and without the application of local exhaust ventilation. Table 2 gives measurements from an HSE survey of bakery tasks in Central Scotland and can be used to estimate exposures for typical tasks in small bakeries. Using these tables as a guide, dusty operations can be identified and sources of dust checked. As a first step, simply looking for dust deposits on horizontal surfaces can be a good indicator of dust escaping. For more information on measured dust levels in bakeries reference can be made to the HSE website where reports on more recent studies carried out by the Health and Safety Laboratory can be found. See Appendix 6.

A useful and more informative means of observing dust in the workplace is by using a dust lamp which directs a powerful beam of light on to a dust cloud, allowing the naked eye to identify dust sources and enabling control systems to be assessed. Guidance on the use of these lamps is published by the HSE, MDHS 82/2 "*The Dust Lamp*". Although it cannot completely quantify exposure, it is useful in establishing if additional assessment is required.

Further assessment can be carried out by measuring airborne dust levels using sampling apparatus and methods specified by HSE. In house resources may be available in larger companies, or an externally accredited consultant may be employed to carry out assessments. The British Occupational Hygiene Society maintains a directory of consultants who can carry out such assessments.

2. CONTROLLING DUST LEVELS

Once tasks giving rise to dust exposure in the workplace have been identified and assessed, control measures should be put in place to reduce exposure. Dust levels can be categorized as very high, high or low and control measures matched to the need in each case. Priority should be given to implementing controls for high level exposures first, however, where a number of people are exposed to lower dust levels it might be appropriate to deal with them first.

Workplace exposure limits (WELs) are set by the HSE and published in EH40. A WEL is the maximum permitted concentration of a hazardous substance in air averaged over a reference period, usually 8 hours and known as a time weighted average or TWA. The WEL for flour dust is 10 milligrams per cubic metre of air (mg.m⁻³), measured as an 8 hour TWA – not an absolute. A higher limit, 30mg.m⁻³, averaged over a 15 minute period, is recommended for short term high level exposure. Known as the STEL and also listed in EH40, this is not a compliance level but is a reference point for establishing if short term exposure is a potential problem. Exposure limits should be quoted in suppliers' material safety data sheets.

For compliance, if a substance such as flour dust has been assigned a WEL, employees must not be exposed to levels above that limit and where exposure cannot be eliminated it must be reduced to a level which is **as low as is reasonably practicable below the WEL**. This is explained more fully in Appendix 3 to this guidance.

For flour, given the WEL is 10mg/m³, careful consideration needs to be given to how far below that level meets the 'reasonably practicable' test. It is widely accepted that dust levels at or below 2 mg/m³ represent a good standard of compliance in modern bakeries although, particularly in craft bakeries, this will not always be possible and higher levels might prevail and be acceptable as long as they are below the 10mg/m³ WEL.

Very High Dust Levels

Although the way in which people are affected by dust is not fully understood, exposure to very high levels, even for a short time, may be important. Examples include clearing up large spillages, cleaning filter socks and internal silo cleaning. In cases like this the only practicable way to control exposure is to adopt suitable working practices, use appropriate respiratory protection (see Appendix 5) and wear separate overalls. It should be remembered that the recommended upper limit for high level exposure is 30mg.m^{-3} for a maximum 15 minute period; a measure known as the short term exposure limit (STEL).

High Dust Levels in Production Operations

Averaged over an 8-hour working day, unprotected exposure to any total dust level greater than 10mg.m^{-3} is too high and employees should not be exposed at this level. The people most likely to have exposures in this range are those working directly with flour or other dusty ingredients.

Examples of such activities include work at dough brakes, other work involving hand dusting with flour, sieving, weighing, hand addition of ingredients, mixing, work at roll plants and some cleaning operations. Enclosure, local exhaust ventilation (LEV), good working practices and where appropriate the wearing of respiratory protective equipment can greatly reduce airborne dust and exposure levels below 10mg.m^{-3} are achievable.

Lower Dust Levels

It is not possible to set an exposure level for airborne flour or ingredient dust which is totally safe because, when sensitisation occurs, it is not known what level of exposure provides the trigger. Ill health can occur even at low levels. This is why, exposure to dust must be reduced to levels which are as low as reasonably practicable below 10mg.m^{-3} ; a level to which nearly all employees could be exposed daily at work without adverse affect on health. For some tasks involving direct handling of flour or other dusty ingredients, it may be difficult to get exposure very far below 10mg.m^{-3} , for example work at dough brakes, without wearing suitable respiratory protection.

For the majority of bakery employees, dust exposures are already a lot less than this. In all cases, however, some effort will still be required to ensure dust exposures are reduced. Where the remedies are already known and are relatively easy, such as the regular cleaning of spillages and minimising of hand dusting and dry sweeping, there should be immediate action to reduce risks. If risk assessment or health surveillance suggest there may be a problem, further measures such as local exhaust ventilation on mixers, work tables and sieves may be necessary.

3. REDUCING EXPOSURE TO DUST

Priority should be given to elimination of dust or substituting unsafe materials. In practical terms the prevention of dust generation or the removal of dust from the air should be considered first. The following examples describe methods which are thought to be most appropriate for bakers both in plant and craft bakeries. These measures should be used to ensure dust exposure is reduced to below 10mg.m^{-3} – in fact as low as is reasonable practicable below this level. Risk assessment and the results of health surveillance may indicate the need for further controls.

In addition to the dust level, the length of time plant is used and the number of people involved, will also influence the control strategy.

ELIMINATION/SUBSTITUTION

The need for controls in the workplace may be reduced by the use of alternative forms of some ingredients. Some flour treatment agents (improvers) are now available in either liquid or paste form. It is also possible to obtain some dry ingredients (e.g. enzymes) in a granular form. Bakers should ask their suppliers for ingredients which are likely to give rise to less dust when handled. In small bakeries the use of pre-weighed sachets of flour treatment agents is possible.

PLANT AND EQUIPMENT

New Equipment

The need for dust control should be considered in reaching decisions on purchasing all new equipment.

Bulk Flour Storage

Use of silos and associated closed conveying, weighing and dispensing equipment can greatly reduce dust levels. Silo overfilling and spillage can, however, cause serious dust problems. Clear written instructions to staff and drivers involved in flour delivery on how to prevent this are essential. Siting of the high level alarm where it cannot be heard by the driver is a common cause of overfilling.

Bag Tipping

Bag tip units should be enclosed as far as possible and fitted with local exhaust ventilation (see examples 1 and 4). For large scale users of bagged flour and ingredients, bag slitting, emptying and disposal machines should be considered. Smaller scale users should consider providing local extraction.

Mixer Filling

Where bags are tipped directly into mixers, the bowl should be covered as far as possible to contain the dust when the bag is emptied. The mixer lid or a purpose built cover should be used for this purpose. Mixer lids should be as close fitting as possible to prevent the escape of dust before liquid is added (example 6). The effectiveness of partial enclosures can be improved by the provision of local exhaust ventilation.

Where mixers or bowls are filled from a weigh hopper, the bowl should be sealed during loading and either local exhaust ventilation provided to remove the dust generated (examples 3 and 5) or a filtered outlet on the lid provided to allow the escape of displaced air. Control measures are not usually practicable or necessary for hand tipping of small quantities of dry ingredients into high speed mixers in plant bakeries.

On large scale plant, dust prevention is achieved by use of automatic closed conveying of flour to the mixer. Regular checking for leaks minimises the possibility of flour dust from this source.

Sieving and Dispensing of Powdered Ingredients

Where manual sieving and weighing is carried out on a regular/long term basis, local exhaust ventilation should be provided (examples 2, 4, 7, 8 and 9). In plant bakeries, large walk-in laminar or downflow booths may be needed to allow containment of containers as well as scales.

In smaller bakeries, use of holding or dispensing bins is recommended which should be covered when not in use. Unless local exhaust ventilation is provided, a disposable respirator should be worn when tipping into bins. Careful consideration should be given to the layout and positioning of bins, scales etc. to minimise the movement of open scoops and to prevent spillages.

Dusting

The use of flour sprinklers for hand dusting on dough brakes and other plant should be introduced as a control measure.

IMPROVING WORKING PRACTICES

- (i) Segregation of dusty processes can prevent exposure of employees not involved in handling flour or other dusty ingredients.
- (ii) Changes in work techniques which can reduce dust levels include:
 - Use of dredgers or sprinklers to spread dusting flour rather than hand throwing;
 - Minimising the use of flour for dusting;
 - Improving care and attention to the prevention of spillages especially around roll and pastry plants, sieves and mixers;
 - Starting up mixers on slow speed for an initial period;
 - Avoiding damage to bags to prevent leaks;
 - Minimising the creation of airborne dust when folding or disposing of empty bags. If not done carefully, bag disposal generates dust and care should be taken to minimise dust. One effective method is to roll the bag up from the bottom whilst tipping, avoiding the need to flatten or fold empty bags;
 - Prohibiting use of compressed air lines for cleaning unless all other methods are impracticable. When use of compressed air is unavoidable, for example in awkward openings in machines, and vacuum cleaning is ineffective, a combined air jet/vacuum device should be used;
 - Using suitably approved vacuum cleaners* for general cleaning. Shovels may have to be used for larger volumes and in this case suitable respiratory protective equipment should be worn. Brushing should be minimised and preferably eliminated altogether as it causes high levels of airborne dust.

Whilst these measures can dramatically reduce airborne dust levels, it is likely that detailed training and careful supervision will be needed for them to be effective. Employers must monitor control measures carefully, for example, by measuring the amount of flour used for hand dusting. Employees encouraged to adopt good working practices to reduce dust will also reduce ingredient waste levels.

**Note: in selecting vacuum cleaners for use in dusty environments, consideration may need to be given to dust explosion risk and the possible need for using vacuum cleaners with 'spark proof' motors. In this context further guidance can be found in HSE guidance 'Prevention of dust explosions in the food industry Appendix 1 – Guidance on the selection of vacuum cleaners for low combustibility organic granules and dusts (e.g. flour)'*

General Note re Explosion Risk: It should be noted that as flour and ingredient dusts are classified as 'flammable', in the right conditions, an explosion can take place in a dust cloud. In this context closed handling systems for flour and ingredients and dust collection equipment are prone to explosion risk as well as open working environments. UK Regulatory standards and guidance can be found in the Dangerous Substances and Explosive Atmospheres Regulations and the associated approved code of practice.

ILLUSTRATIONS
**Photographs of local exhaust ventilation and
extraction systems**



Example 1: Enclosed bag tip with LEV and curtain



Example 2: Weighing stations in LEV booth



Example 3: Enclosed bulk ingredient dispense



Example 4: Sieving stations with LEV



Example 5: Bulk ingredient dispense



Example 6: Enclosed mixers



Example 7: Weighing station with lip extraction at tub height



Example 8: Sieving station with LEV at outflow



Example 9: Weighing stations with positional LEV captor hoods

4. PERSONAL PROTECTIVE EQUIPMENT

Overalls

For work in very high dust levels, overalls which prevent contamination of normal working clothes are essential e.g. one-piece boiler suit. Ideally these would be of non-dust retentive materials and disposable. Contaminated overalls should not be re-used without washing.

Respirators

For most applications this will mean disposable dust masks. Table 3 gives general guidance on the standard of protection required. Respiratory protective equipment should be considered only where other control measures are not reasonably practicable and do not provide adequate control. However, it may need to be used in addition to other measures in order to achieve adequate control over exposure. Wearers must be trained in its use.

To be effective, respirators, especially non-powered types must be a close fit to the face and be properly maintained. For further information and in particular for guidance on face fit testing, reference should be made to HSE guidance 'Selection maintenance of respiratory protective equipment' (HSG 53) and 'OC282/28 HSE 2003: Fit testing of RPE face pieces'. In addition, a fit check (as recommended by the manufacturer) needs to be performed by the user each time this type of RPE is put on.

5. HEALTH SURVEILLANCE

Where employees are exposed to significant dust levels, a system of health surveillance is essential. The aim of surveillance is to positively enquire about any early symptoms of nasal and respiratory ill health. The benefits are twofold. Firstly, early identification of cases will enable their optimum management and, secondly, a long-term check is provided on the adequacy of risk control measures.

Health surveillance consists of a set of simple steps to identify symptoms. In the first instance, questions can be asked by a trained, responsible person, who understands their purpose and can keep records. Some examples of questions and actions to be taken are given below. Employees who have symptoms should then be referred to an occupational health professional who can advise on any adverse findings from surveillance. If an OH specialist is not available, referral should be to a doctor who may arrange for assessment by a specialist chest or occupational health physician.

■ Pre-employment screening:

- Enquire about present or past asthma or chest illness;
- Advise new starters of symptoms to look out for;
- Advise new starters that they must report symptoms.

■ Follow up screening:

The HSE recommend that screening should also be carried out at 6 weeks, 12 weeks and then annually after employment. The questions to be asked are:

- At work, do you suffer from sore eyes, sore throat, blocked or runny nose, coughing, breathlessness, chest tightness wheezing?
- Do any of these symptoms get better when you are not at work? (e.g. off shift or on holiday).

- Encourage reporting of any such symptoms at any time. Employees have a legal duty to report such symptoms.
- Check sickness absence records for any pattern of respiratory illness.
- Keep simple records of all answers and information gathered.
- Enquire about any ill health reasons for leaving work.

A suggested format for health surveillance is included in Appendix 1 for new starters and Appendix 2 for in service employees. Properly carried out, the findings of health surveillance will be a good indicator of whether dust levels are causing ill health. If no occupational ill health is detected over a period of years, then health surveillance may be limited to a simple enquiry about past or present asthma, advice on symptoms to watch out for and an annual positive enquiry to check that no symptoms have gone unreported. Records should be kept of these enquiries.

APPENDICES

1. Health Surveillance Format – New Starter
2. Health Surveillance Format – In Service
3. Legal Commentary
4. Typical Bakery Dust Levels
5. Personal Protective Equipment
6. References

APPENDIX 1

SPECIMEN FORMAT FOR HEALTH SURVEILLANCE

Initial questionnaire

Surname:

Forenames:

Date of birth:

Home address:

Tel. number:

	YES	NO
1. Have you any chest problems such as periods of breathlessness, wheeze, chest tightness or persistent coughing?	<input type="checkbox"/>	<input type="checkbox"/>
2. Do you believe that your chest has suffered as a result of any previous employment?	<input type="checkbox"/>	<input type="checkbox"/>
3. Do any of these symptoms get better when you are not at work? (e.g. off shift or on holiday).	<input type="checkbox"/>	<input type="checkbox"/>
4. Do you or have you ever had any of the following? (do not include isolated colds, sore throats or flu)	<input type="checkbox"/>	<input type="checkbox"/>
Recurring soreness or watering of the eye	<input type="checkbox"/>	<input type="checkbox"/>
Recurring blocked or running nose	<input type="checkbox"/>	<input type="checkbox"/>
Bouts of coughing	<input type="checkbox"/>	<input type="checkbox"/>
Chest tightness	<input type="checkbox"/>	<input type="checkbox"/>
Wheezing	<input type="checkbox"/>	<input type="checkbox"/>
Breathlessness	<input type="checkbox"/>	<input type="checkbox"/>
Any other persistent or history of chest problems	<input type="checkbox"/>	<input type="checkbox"/>

To be completed by the responsible person:

- | | | |
|--------------------------------|--------------------------|--------------------------|
| a) No further action required | <input type="checkbox"/> | <input type="checkbox"/> |
| b) Refer to company occupation | <input type="checkbox"/> | <input type="checkbox"/> |

Signed (responsible person):

Date:

I confirm that the responses given by me are correct and that I have received a copy of the completed questionnaire

Signed:

Date:

APPENDIX 2

SPECIMEN FORMAT FOR HEALTH SURVEILLANCE

On-going questionnaire

To be completed by the responsible person

Employee's name:

Works No:

The questionnaire should be completed six weeks, six months and annually after employment commences or as advised by the company occupational health adviser.

Further advice will be required from the company occupational health adviser if any YES box is ticked.

Since starting your present job have you had any of the following symptoms either at work or at home? (do not include isolated colds, sore throats or flu).

	YES	NO
a) Recurring soreness or watering of eyes	<input type="checkbox"/>	<input type="checkbox"/>
b) Recurring blocked or runny nose	<input type="checkbox"/>	<input type="checkbox"/>
c) Bouts of coughing	<input type="checkbox"/>	<input type="checkbox"/>
d) Chest tightness	<input type="checkbox"/>	<input type="checkbox"/>
e) Wheeze	<input type="checkbox"/>	<input type="checkbox"/>
f) Breathlessness	<input type="checkbox"/>	<input type="checkbox"/>
g) Do any of these symptoms get better when you are not at work? (e.g. off shift or on holiday)	<input type="checkbox"/>	<input type="checkbox"/>
h) Have you consulted your doctor about chest problems since the last questionnaire?	<input type="checkbox"/>	<input type="checkbox"/>

To be completed by the responsible person:

- | | | |
|---|--------------------------|--------------------------|
| a) No further action required | <input type="checkbox"/> | <input type="checkbox"/> |
| b) Refer to company occupational health adviser | <input type="checkbox"/> | <input type="checkbox"/> |

Signed (responsible person):

Date:

I confirm that the responses given by me are correct and that I have received a copy of the completed questionnaire

Signed:

Date:

APPENDIX 3

COMMENTARY ON CONTROL OF EXPOSURE TO SUBSTANCES HAZARDOUS TO HEALTH

CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH REGULATIONS 2002

Regulation 7 (1) requires every employer to ensure exposure of employees to substances hazardous to health is either prevented or, where this is not reasonably practicable, adequately controlled.

Flour and other ingredient dusts encountered in bakeries have irritant and in some instances asthmagenic properties, which brings them within the scope of the definition of substances hazardous to health under the regulations.

Regulation 7 (7) states that where it is not reasonably practicable to prevent exposure to hazardous substances, control of that exposure shall only be deemed adequate if: -

- a) The principles of good practice for the control of exposure (set out in Schedule 2A to the regulations) are applied;
- b) Any workplace exposure limit (WEL) is not exceeded; and
- c) Exposure is reduced to as low as is reasonably practicable.

Effectively for flour dust, this means that exposure should be reduced to a level as low as is reasonably practicable below the WEL of 10mg.m^{-3} (milligrams per metre³ in air). Properly followed, the recommendations on control of exposure contained in this Guidance should ensure this requirement is met.

Where exposure cannot be prevented, good control practices should follow the principles of the hierarchy of risk control; Priority being given to reducing exposure by substitution of material, engineering controls through general ventilation and local exhaust ventilation and improved working practices in descending order of preference. Even after these measures have been taken, the wearing of suitable respiratory protection might still be necessary, but only as a last line of defence.

APPENDIX 4: Typical Bakery Dust Levels

TABLE 1

TOTAL INHALABLE DUST LEVELS (mg.m⁻³) FOR PLANT BAKERY JOBS

Job Activity	Exposure without LEV			Exposure with LEV		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean
Sieving	2.3	28.5	14.9	2.1	21.2	8.0
Combined sieving/weighing	0.9	31.6	9.7	0.8	27.7	6.9
Weighing	4.2	45.7	17.8	0.3	8.0	2.7
Mixing	0.3	21.7	4.6	2.8	4.2	3.3
Plant operative	0.1	49.9	5.8	-	-	-
General Cleaning	1.2	24.9	6.1	-	-	-

TABLE 2

TOTAL DUST LEVELS (mg.m⁻³, 8-HOUR TIME WEIGHTED AVERAGE) FOR INDIVIDUAL JOBS IN SMALL BAKERIES

Job	Number of samples	Maximum	Minimum	Average
Proving and baking	23	5.3	0.1	1.6
Flour confectionery	7	2.1	0.2	0.5
Pie shell making/cleaning	11	2.8	0.1	1.2
Cake mixing	4	3.0	0.7	1.8
Hand dividing/moulding	16	19.1	1.6	5.9
Weighing and mixing	3	15.8	3.3	10.4
Dough brake/roll plant	4	22.0	2.8	9.3

Table 2 shows dust levels for particular bakery jobs. It uses measurements from an HSE survey of small bakeries in Central Scotland. Levels measured are only included in this table when a worker spent all or nearly all of the sampling time at the job shown.

APPENDIX 5: Personal Protective Equipment

RESPIRATORY PROTECTIVE EQUIPMENT

Type of Equipment	Filter Classification	Assigned Protection Factor APF's	Suitability	Examples
Disposable Respirators	FFP2 FFP3	10 20	Normal bakery operations	
Half Mask Respirators	P2 P3	10 20	Normal cleaning and minor spillages	
Full Face Mask Respirators	P2 P3	10 20	Normal cleaning and minor spillages	
Powered Air Flow Respirators with Hood or Visor	THP1 THP2 THP3	10 20 40	Dealing with spillages and blow outs. silo cleaning etc.	
Powered Respirators with Full Face Mask	TMP1 TMP2 TMP3	10 20 40	Dealing with spillages and blow outs. silo cleaning etc.	

THE ABOVE TABLE SHOULD BE USED AS GUIDANCE ONLY

Assigned Protection Factor (APF): An indication of the proportion of air borne dust removed by the RPE to which it is assigned.

Example: FFP2 - disposable respirator with APF of 10 - used in an area with dust levels at 20 mg.m⁻³ will reduce the concentration of dust inhaled to 2 mg. m⁻³ reduced by a factor of 10.

Guidance on Protection Factors: reputable suppliers should be able to provide advice on APF provided for each item in their catalogue.

APPENDIX 6

REFERENCES

1. INDG 136 REV3 COSHH: A brief guide to the Regulations ISBN 0 7176 2982 1 (free)
2. HSG 97 A step by step guide to COSHH assessment ISBN 0 7176 2785 3 (priced)
3. Health and Safety Laboratory Report - Exposure to Flour Dust in UK bakeries and Current use of Control Measures (available on request from HSL)
4. Health and Safety Laboratory Report - Flour Dust Initiative Report on Bakeries in Scotland (available on request from HSL)
5. HSE Research Report RR460 – Trends in inhalation exposure mid 1980s till present (www.hse.gov.uk/research/rrpdf/rr460.pdf)
6. MDHS 82 The dust lamp: a simple tool for observing the presence of airborne particles ISBN 0 7176 1362 3 (free)
7. MDHS 14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust ISBN 0 7176 1749 1 (free)
8. Electronic versions of current methods in the MDHS series can be downloaded from www.hse.gov.uk/pubns/mdhs/index.htm
9. HSG 173 Monitoring strategies for toxic substances ISBN 0 7176 6188 1 (priced)
10. EH40/2005 Workplace exposure limits ISBN 978 0 7176 2977 5 (priced)
11. HSG 258 Controlling airborne contaminants at work - A guide to local exhaust ventilation (LEV) ISBN 978 0 7176 6298 2 (priced)
12. HSG 53 Respiratory protective equipment at work: A practical guide ISBN 0 7176 2904 X (priced)
13. Fit testing of respiratory protective equipment face pieces OC 282/28(rev). (free) Web only version available at www.hse.gov.uk/pubns/fittesting.pdf
14. HSG 61 Health surveillance at work ISBN 978 0 7176 1705 X (priced)
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