



Controlling Exposures to prevent occupational lung disease in the construction industry

Roofer

HAZARDS AND RISKS

Roofing work is varied – covering structures with shingles, slate, asphalt and other materials; spraying roofs, sidings, and walls to bind, seal, insulate, or soundproof; demolishing or repairing asbestos cement roofs; cutting wooden battens; cleaning roofs and clearing out roof spaces. It can, therefore, involve exposure to many different harmful substances which might generate hazardous dusts, or give off toxic fumes and vapours. The biggest respiratory health risks come from asbestos and silica.

Asbestos*

Roofers may come into contact with or disturb a number of asbestos containing materials (ACMs) during maintenance work. Asbestos is classified as a category 1 carcinogen and causes over 5000 work-related deaths each year in the UK. Inhalation of asbestos fibres can cause mesothelioma, asbestos-related lung cancer, asbestosis, and pleural thickening - all fatal or serious and incurable diseases that take many years to manifest.

Silica

Silica occurs in many types of stone and in concrete, including roof tiles and slate. In dust form it will be released during cutting or grinding, and when sweeping/cleaning work areas. Inhaling fine silica dust (respirable crystalline silica or RCS) can lead to serious lung diseases, including fibrosis, silicosis, chronic obstructive pulmonary disease (COPD) and lung cancer. Over 500 construction workers die every year from exposure to silica dust.

Bitumen & asphalt

Bitumen (aka asphalt) is commonly used as an adhesive to bond membranes onto the deck or insulation board. When inhaled, bitumen fume can cause irritation of the respiratory tract, eyes and skin, burns, and possibly lung cancer.

Glues and solvents

There are a variety of roofing products that use or contain glues and solvents which, when breathed in as vapour, can irritate the lungs. Exposure can also affect co-ordination and so increase the likelihood of accidents. Very high exposures can cause unconsciousness and even death, for instance where adhesives are used in unventilated confined spaces.

Wood dust

Breathing in wood dust can cause asthma, a serious, debilitating, life-limiting condition, as well as irritation, allergic rhinitis and, rarely, nasal cancer, as well as impaired lung function.

Biological hazards

Breathing in dust from dried bird droppings, often found in roof spaces, can cause psittacosis which in turn can lead to severe pneumonia.

CONTROL OPTIONS

Elimination/prevention

- Information on the presence of asbestos should come from the premises' asbestos management plan and asbestos register. For information on non-licensed work tasks involving asbestos and how to safely carry them out, refer to HSE's HSG210: Asbestos Essentials: www.hse.gov.uk/asbestos/essentials/index.htm [NNLW requires, in addition, for employers to notify the relevant enforcing authority (usually the HSE), designate areas where the work is being done, ensure medical examinations take place, and maintain health records.]
- Eliminate tile cutting by using ½ or 1½ size tiles.
- Do not exceed the recommended operating temperature for the asphalt mix whilst roof laying, as this may cause excessive fumes

Safe working methods

- Choose methods that avoid or limit cutting, grinding, drilling, chiselling or abrasion of silica/wood materials wherever practicable.
- Set up a cutting area on surrounding scaffolding not on the roof itself; where practical apply this also to valleys.
- Eliminate or minimise dust creation through wet working: damp down the work area beforehand, use water suppression for repair/demolition tasks, and damp down during debris removal and cleaning. Where tile resizing is needed, use water to stop the release of dust into the air (eg. modern cut-off saws have an attachment for a water hose).
- Avoid high pressure spraying for dust and debris removal, as this can release dust into the air and make contaminated slurry difficult to contain.
- Apply glues and solvents by brush, rather than spraying.
- Use covered chutes and skips and, where needed, screen off areas to prevent dust spreading.
- Safely and regularly dispose of asbestos waste from site.
- Keep workers and others not directly involved in the task as far away from the source of the bitumen fumes as possible.

PPE

For non-licensed asbestos work

- Disposable overalls (type 5 (BS EN ISO 13982-1) are necessary. Waterproof overalls may be needed for outdoor work. Dispose of used overalls as asbestos waste.
- Single-use disposable gloves should be worn.
- Boots are preferable to disposable overshoes; never use laced boots as these are very difficult to clean properly.
- RPE selection should be made in line with the risk assessment and with advice from the supplier sought if needed.

For silica

- Use either a FFP3 disposable dust mask or a half mask with P3 filters. Wearers must be face fit tested.

All roofing work

- RPE may also be appropriate in poorly ventilated areas such as roof spaces.

MANAGING THE RISK

Training & communication, supervision, maintenance & testing of controls and air monitoring* are all vital aspects of managing the risk, in addition to health surveillance which can be a requirement in certain circumstances.

See our introductory [Respiratory Health Hazards in Construction Fact Sheet Series: Overview](#) for more information about what things to consider and implement.

Air monitoring*

Air monitoring is a specialist activity. It may be needed as part of a COSHH assessment, as a periodic check on control effectiveness and to assess compliance with relevant WELs, or where there has been a failure in a control (for example if a worker reports respiratory symptoms). A qualified Occupational Hygienist can ensure it is carried out in a way that provides meaningful and helpful results.

The decision to undertake exposure monitoring should be made in accordance with HSE's monitoring strategies outlined in HSG173. In some situations, qualitative or semi-quantitative methods may be suitable. See also COSHH regulation 10 ACOP which details when exposure monitoring is necessary or unnecessary.

Also, see HSE leaflet G409, Exposure measurement: Air sampling. www.hse.gov.uk/pubns/guidance/g409.pdf



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WORKPLACE EXPOSURE LIMITS (WELs) & EXPOSURE LEVELS

Agent or substance	Control/Exposure Limit	Exposure Levels
Asbestos (all types)*	0.1 fibres/ml (4 hr TWA) 0.6 fibres/ml (10 min TWA)	The aim should be to avoid any exposure. Some non-licensed work and Notifiable Non-Licensed Work (NNLW) with asbestos may be done by trained personnel. However, there is a very high risk from asbestos insulation board (in soffits and roof linings), sprayed asbestos (on structural roof members and applied as a coating to asbestos cement sheets) and asbestos pipe insulation in roof spaces; work on these materials as well as any at exposures above the control and short-term exposure limits, must be carried out by an HSE licensed contractor.
Silica - RCS	0.1 mg/m ³ (8 hr TWA)	Different materials contain different amounts of silica, so concrete tiles can comprise between 25-75%, and slate 30%. Even short periods of roof tile cutting can create high levels of silica dust. All Party Parliamentary Group for Respiratory Health (which is an informal, cross-party group formed by MPs and Members of the House of Lords) published a report named "Silica- the next asbestos". This recommends that the WEL for RCS is reduced to 0.05 mg.m-3 as this would be in line with the recommended exposure standard from the Scientific Committee on Occupational Exposure Limits proposed in 2003.
Hardwood Dust	3 mg/m ³ (8 hr TWA)	Capable of causing cancer. Capable of causing occupational asthma. If hardwood dusts are mixed with other wood dusts, the WEL shall apply to all the wood dusts present in that mixture. All dust exposure levels are affected by the frequency and duration of the work and are likely to be higher in poorly ventilated spaces. Dry working without extraction controls is likely to produce the highest levels of dust.
Softwood Dust	5 mg/m ³ (8 hr TWA)	Capable of causing occupational asthma. If softwood dusts are mixed with hardwood dusts, the WEL for hardwood dusts shall apply to all the wood dusts present in that mixture. All dust exposure levels are affected by the frequency and duration of the work and are likely to be higher in poorly ventilated spaces. Dry working without extraction controls is likely to produce the highest levels of dust.
Asphalt, petroleum fumes	5 mg/m ³ (8 hr TWA) WEL, 10 mg/m ³ 15-min STEL, based on gravimetric analysis. Note: an ACGIH TLV for asphalt fume (as the solvent extractable fraction) is 0.5 mg/m ³ (8 hr TWA)	There is no current WEL for total PAHs although occupational exposure limits are available for some PAHs. Biological monitoring may be carried out for PAHs; guidance value: 4 µmol 1-hydroxypyrene/mol creatinine in urine.
Glues/Solvents	Refer to SDS for solvents present and to EH40/2005 for limits	

Further information

- Asbestos essentials: A task manual for building, maintenance and allied trades on how to safely carry out non-licensed work: www.hse.gov.uk/asbestos/essentials/index.htm
- COSHH Essentials guidance sheet on how to control exposure to hazards in construction: www.hse.gov.uk/pubns/guidance/cnseries.htm
- Silica dust: www.hse.gov.uk/construction/healthrisks/cancer-and-construction/silica-dust.htm
- HSE Construction micro-organisms and diseases from work involving guano: www.hse.gov.uk/construction/healthrisks/hazardous-substances/harmful-micro-organisms/other-diseases.htm
- COSHH Essentials guidance: Woodworking: www.hse.gov.uk/coshh/essentials/direct-advice/woodworking.htm
- HSE Health and Safety in roof work: www.hse.gov.uk/pubns/priced/hsg33.pdf