



Pipe Fitter

HAZARDS AND RISKS

The assembly, installation and maintenance of pipe systems and related hydraulic and pneumatic equipment can expose pipe fitters to many different harmful substances through activities such as welding and soldering, using hand and power tools during pipe installation and cleaning and maintenance of pipe systems. The biggest respiratory health risks to pipe fitters are likely to be from inhaling silica and general construction dust and soldering fume. In certain situations these workers may also be at risk of exposure to asbestos fibres* and welding fume**.

Construction dust

Construction dust is a general term and includes dust from soil and building materials. Breathing in any dust over time can cause serious lung diseases such as chronic obstructive pulmonary disease (COPD), which includes conditions such as chronic bronchitis and emphysema.

Silica dust - respirable crystalline silica (RCS)

Silica occurs naturally in many types of stone and in concrete. It will be released as airborne dust during cutting or drilling. Inhaling fine silica dust (RCS) can lead to serious lung diseases, including fibrosis, silicosis, chronic obstructive pulmonary disease (COPD) and lung cancer: it is estimated that over 500 construction workers die every year from exposure to silica dust. .

Solder rosin fume (colophony)

During soldering, the heating of the flux containing rosin (or derivatives) produces fume, which is one of the most significant causes of occupational asthma. Once the asthma has developed, even small exposures to fume can lead to asthma attacks, and the condition is irreversible. The fumes can also act as an irritant to the upper respiratory tract.

Asbestos*

Pipe fitters may come into contact with or disturb a number of asbestos-containing materials (ACMs) particularly if the premises were built before 2000. 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 which take many years to manifest.

Welding fume**

The fume given off by welding is a mixture of airborne gases and very fine particles which can cause pneumonia, asthma, metal fume fever, throat and lung irritation and reduced lung function if inhaled. Certain metal gases can cause pulmonary oedema and lung/nasal cancers.

CONTROL OPTIONS

Elimination/prevention

Asbestos:

The aim is to avoid exposure completely. 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.]

Solder fume

- Use mechanical jointing, rosin-free or rosin reduced solder whenever possible.
- Use local exhaust ventilation (LEV) systems for soldering, such as an extraction booth or cabinet, or tip extraction on the soldering iron; a qualified occupational hygienist can advise on the best solution.
- Use soldering irons at the lowest temperature possible for an acceptable joint.
- Locate the work away from draughts to avoid them interfering with any extraction.

Dust

- Choose work methods that avoid or limit drilling and cutting of stone or concrete.
- Use water spray to damp down dust in the work area.
- Use vacuuming or wet cleaning techniques; avoid dry sweeping or compressed air to remove dust from clothes or work areas.

Welding fume

- Seek alternative joining methods such as cold jointing techniques, use of mechanical fasteners or newer adhesive technologies.
- Use LEV systems for welding such as an extraction booth or bench, a back-draught partial enclosure, or on-tool extraction.
- Locate the work away from draughts to avoid this interfering with the LEV.

PPE

- Where solder fume exposure cannot be controlled effectively using the methods above, disposable respiratory protective equipment (RPE), with protection rating FFP3 or re-usable half mask RPE with P3 filter and protection rating APF20 should be used.
- All staff required to use RPE should be subject to face fit testing to ensure the RPE selected provides each individual with the anticipated level of protection.
- For non-licensed asbestos work tasks refer to HSE's Asbestos Essentials HSG210 sheet EM6.
- A powered respirator (PAPR) of TH2 or higher classification with a visor combo may be required for extended periods of weld work.

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 some roofing materials, in particular insulation board and sprayed asbestos coatings; 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).	Dry work with high silica-content materials – such as sandstone - causes the highest risks. 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.
Solder rosin fume (colophony)	0.05 mg/m ³ (8 hour TWA) 0.15 mg/m ³ (15 min TWA).	Manual soldering with a hand-held iron poses the greatest risk of exposure as the operator's head is likely to be near or in the fume which rises vertically. Risk is greater if work is prolonged, frequent or in enclosed spaces.
Welding fume**	WELs are in place for individual metals used in filler wires. Refer to MSDS for the metals present and to HSE's Workplace Exposure Limits EH40/2005 for the limits: www.hse.gov.uk/pubns/priced/eh40.pdf	The risk to health depends on the composition of the fume as well as the 'arcing time'. Much of the welding work carried out by pipe fitters is likely to be sporadic, and lower arcing time means lower fume exposure.
Construction Dust		These levels are not workplace exposure limit but the level at which the dust becomes defined as a 'hazardous substance' and so it subject to the COSHH regulations. This does not apply to substances listed in Table 3.2 of part 3 of Annex VI of the CLP Regulation, substances specified with an indication of danger e.g. very toxic, toxic, harmful, corrosive or irritant, or substances for which the HSE has an approved WEL.

Further information

- Construction dust leaflet: www.hse.gov.uk/pubns/cis36.pdf
- Silica dust: www.hse.gov.uk/construction/healthrisks/cancer-and-construction/silica-dust.htm
- Controlling health risks from rosin based solder fluxes: www.hse.gov.uk/pubns/indg249.pdf
- COSHH Essentials guidance sheet on how to control exposure to hazards in construction: www.hse.gov.uk/pubns/guidance/cnseries.htm
- 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
- Welding essentials: <https://www.hse.gov.uk/coshh/essentials/direct-advice/welding.htm>