SOLDERING

(See also: Respiratory Sensitisers(67); Electrical Testing(23); COSHH(19))

INTRODUCTION

Exposure to solder fume from resin-based fluxes containing colophony (or rosin) can give rise to respiratory irritation and in some people it may also cause respiratory sensitisation. Sensitisation means that after an initial period of exposure, breathing problems such as asthma may occur which are triggered by very low levels of colophony or its degradation products produced during heating or soldering. Exposure of skin to colophony can also result in the development of allergic contact dermatitis. The main use of colophony is in the electrical/electronics industries where colophony-based solder fluxes are used to aid the soldering process.

Manual soldering with a hand-held soldering iron poses the greatest risk of fume exposure because the operator's head is likely to be near or actually in the fume arising from the iron or workpiece. Even intermittent work can lead to high, short-term exposures, particularly if carried out in an enclosed space, or at an awkward angle.

LEGAL REQUIREMENTS

1. S.2 of the **Health and Safety etc. at Work Act 1974** requires employers to ensure so far as is reasonably practicable the health and safety at work of their employees and any others who may be affected by their work activities.

2. The **Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995** require employers to report cases of occupational asthma following work involving exposure to fumes arising from the use of rosin (colophony) as a soldering flux.

3. There is currently a Maximum Exposure Levels (MELs) for total resin acids of:-

   - 0.05mg/m^3 as an 8-hour time weighted average ;and
   - 0.15mg/m^3 over a 15-minute reference period

   A MEL is set for substances which may cause the most serious health effects, and for which 'safe' levels of exposure cannot be determined.

CONTROLLING ANY IDENTIFIED RISK

- **Substitution**

Where reasonably practicable, use a flux that does not contain colophony or is rosin-reduced. Be aware that rosin-free fluxes may still present other health and safety risks requiring adequate controls. There may also be other alternatives to soldering including mechanical jointing, conductive adhesives or processes using new technical developments. Where rosin-based fluxes are used the following precautions should be considered:-

- **Control**

1. **Fume Control**, achieved by means of effective local exhaust ventilation(LEV). It is important that the exhaust hood or nozzle is correctly positioned. The LEV system must not only capture the fumes but it must also dispose of them safely.

   Leaflet IND(G)249L lists possible control measures in manual soldering processes. Their selection and use will be influenced by the type of process, the level and nature of the fume and local conditions in the workplace. Advice on all three factors is included in the leaflet.

   Various types of exhaust ventilation system can be used including:

   (a) exhaust nozzle fitted to the iron
   (b) captor hood
   (c) individual fume control units
   (d) exhaust ventilated benches

   Each system has both advantages and drawbacks. Advice can be sought from suppliers, industry associations or your local enforcing authority for health and safety.

2. **Personal protective equipment** - which should be used only as an additional measure when prevention or adequate control by other means is not reasonably practicable. Respiratory protective equipment must be suitable for the purpose, capable of controlling adequately the exposure to colophony fumes and be of a type approved by HSE or conform to a standard approved by HSE.

3. **Other precautions** - such as washing facilities, prohibition of smoking, eating or drinking in the working area

4. **Maintenance** of exhaust systems and respiratory protective equipment needs to be formalised and suitable records kept.

MONITORING EXPOSURE

Advice on a new standard method for sampling is available (MDHS 83 - Rosin acids in rosin (colophony) solder flux fume). General advice on monitoring is also contained in Engineering Sheet no. 17 - Assessing exposure to rosin (colophony) based solder flux fume.

HEALTH SURVEILLANCE

The need for any health surveillance will depend on the COSHH assessment. Where there is a likelihood of symptoms occurring in the individual workplace, a health surveillance programme should be established in consultation with an occupational health physician.

INFORMATION, INSTRUCTION & TRAINING

Suitable & sufficient information, instruction and training should be provided for all workers who may be exposed to colophony. It should cover hazards, symptoms (asthma, dermatitis), precautions, procedures and employees' responsibilities.

CHECKLIST - SOLDERING

1.	Do you carry out any soldering?	YES	NO
2.	Is your solder flux resin-based and contain colophony (rosin)?	YES	NO
3.	If so, has a COSHH assessment been carried out by a competent person?	YES	NO
4.	Were any risks identified in the COSHH assessment?	YES	NO
5.	Have precautions and procedures been established to control any identified risk?	YES	NO
6.	Has a maintenance system been established, with records?	YES	NO
7.	Have you established whether health surveillance is required and, if so, implemented procedures?	YES	NO
8.	Have workers who may be exposed to colophony received appropriate information, instruction and training?	YES	NO

REFERENCES/FURTHER DETAILS

Publications

*1. Leaflet IND(G) 248L - Solder fume and you (HSE) www.hse.gov.uk/pubns/indg248.pdf

*2. Leaflet IND(G) 249L - Controlling health risks from rosin (colophony) based solder fluxes (HSE).

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* Available to view by prior arrangement at Nuneaton and Bedworth Borough Council, Environmental Health Services, Council House, Coton Road, Nuneaton. CV11 5AA

** Free copy available from Nuneaton and Bedworth Borough Council at the above address.