

FUME MINIMISATION GUIDELINES

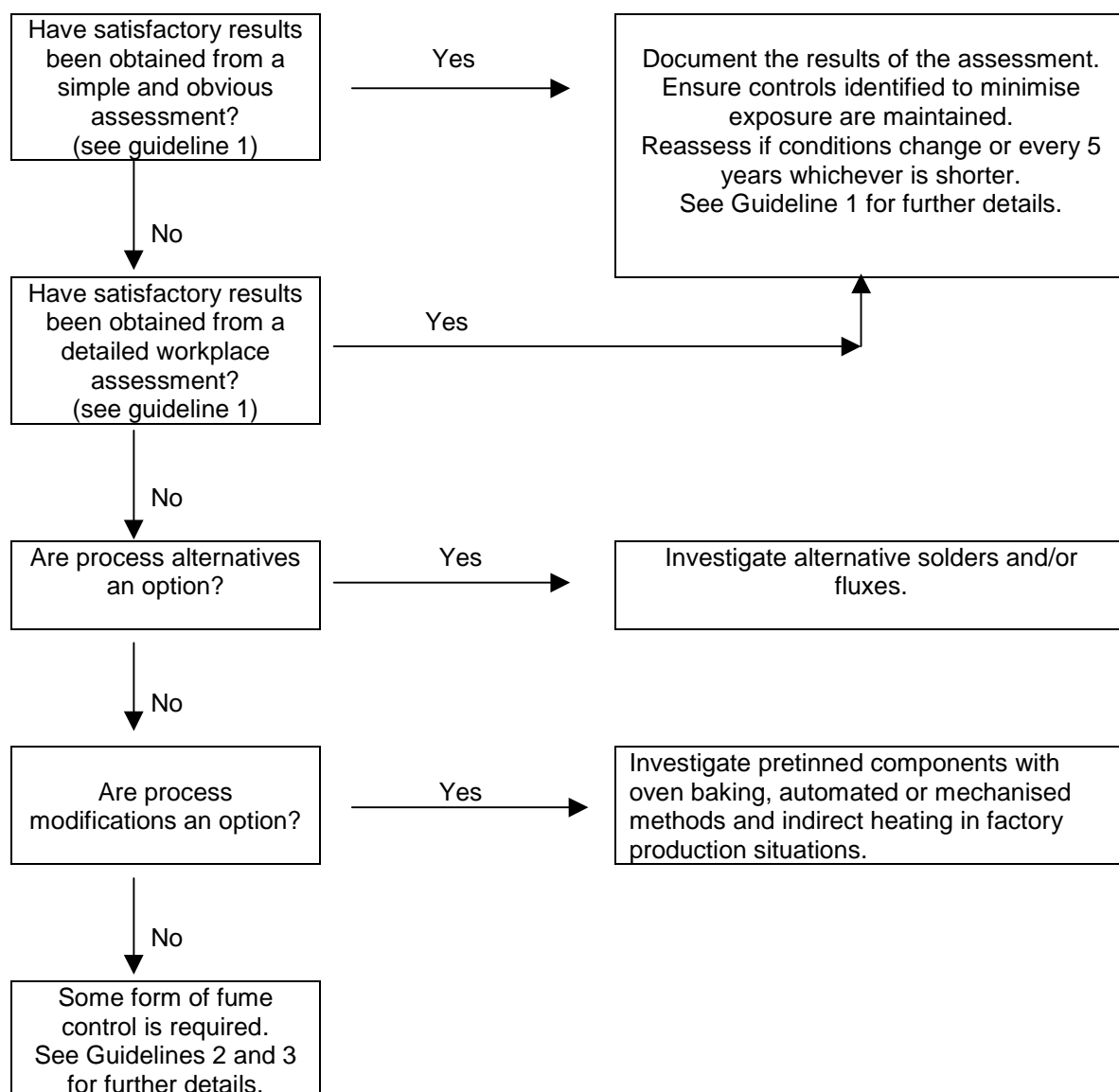
GUIDELINE 14:

GENERAL SOFT SOLDERING

An employer has a duty to ensure that a suitable and sufficient assessment is made where there is potential for exposure to hazardous substances.

For intermittent maintenance work, no special measures may be necessary to protect the operator.

For continuous production work, clean air movement exceeding 0.5 m/s across the operators breathing zone may be required. Accumulation of fumes in the workshop must be prevented by general ventilation. Solders containing zinc, cadmium or indium are not covered by this guideline. See Guideline 15. If using flux cored wire containing rosin (colophony) see Guideline 13.



Notes:

1. For some production operations one of the types of local exhaust may be required.
2. Under normal circumstances it should be possible to satisfy the regulatory requirements by process and work practice modifications. Known exceptions are still air, confined spaces (see AS 2865 "Safe Working in a Confined Space") or where particular hazards are identified in Material Safety Data Sheets.

SCOPE

Covers soft soldering in such industrial activities as electro-mechanical assembly, radiator manufacture and repair, battery manufacture, tool and die repair, also arts and crafts.

Materials

Solders

Most commonly, lead/tin solders from 95/5 to 50/50 (melting range 300–315°C to 183–212°C) also lead/silver, lead/silver/tin solders for high temperature strength and corrosion resistance (eg. in electric motors) melting range 296–370°C. Also 96/4 tin/silver for stainless steel and jewellery with good wetting (melting range 220-240°C).

Fluxes

Inorganic, corrosive, general purpose fluxes most commonly contain zinc chloride and ammonium chloride with hydrochloric acid activator but other halide salts and acids, including fluorides, are found in some fluxes. Organic fluxes cover a variety of organic acids also hydrazine hydro bromide, aniline hydrochloride and phosphate which decompose at soldering temperatures. Vehicles range from water to various organic carriers and wetting agents. It is clearly important to consult the manufacturers MSDS for the flux used.

Processes

Heating methods include soldering iron, torch flame, hot dip, induction, resistance, furnace (of assemblies) and infra red.

HEALTH EFFECTS

Metal Fume

Solder alloys containing lead give off negligible lead fume unless overheated (>450°C). Lead is very harmful if absorbed into the body but is not readily absorbed through intact skin. Avoid eating, drinking or smoking in work area and attend to personal hygiene to avoid lead entering by mouth.

Note: In radiator repair shops high blood lead levels are not uncommon due to the absence of local exhaust ventilation and poor hygiene practices.

Flux Fume

Consult relevant MSDS. Exposure to halides is highly irritating to eyes, skin and respiratory tract while chronic exposure to zinc halides can cause lung damage. Ammonium chloride is usually a mild irritant but repeated exposure can lead to occupational asthma. By comparison hydrogen fluoride, bromide and chloride have peak limitation exposure standards. These must not be exceeded even instantaneously.