

FUME MINIMISATION GUIDELINES

GUIDELINE 12:

BRAZING AND SOLDERING – PLUMBING INDUSTRY

SCOPE

Covers the brazing and soldering of copper and brass tube for plumbing, drainage, gas fitting, air conditioning, refrigeration, fire and mechanical services.

MATERIALS

Brass and copper tube made from phosphorus deoxidised copper, high residual phosphorus alloy C12200 and 70/30DR arsenical brass alloy C26130 (alloy 259).

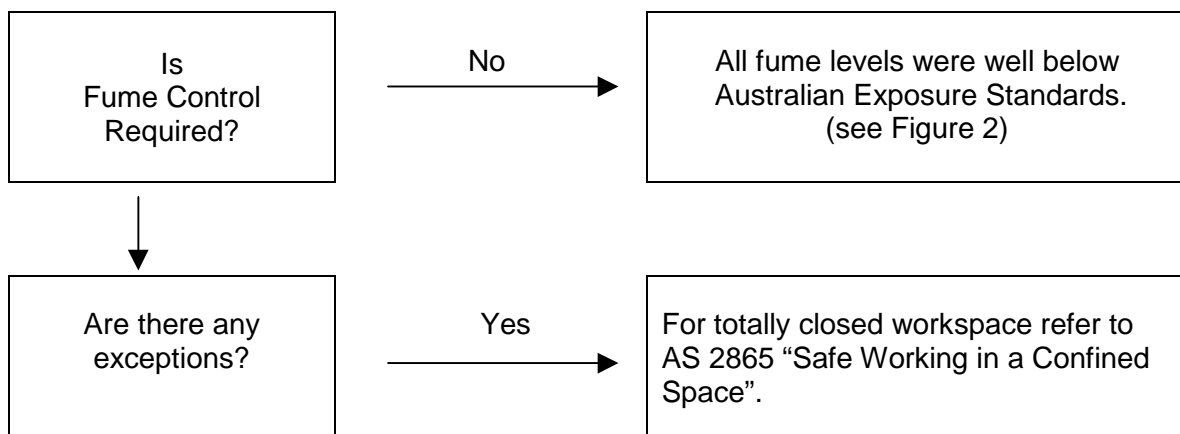
Covers solder and silver brazing alloys which comply with Joint Australian/New Zealand Plumbing Code AS/NZS3500 1.2 Water Supply. Soft solder must be “lead free”, i.e. containing not more than 0.1% lead. Silver brazing alloys must be “cadmium free”, i.e. containing not more than 0.05% cadmium and a minimum of 1.8% silver.

OVERVIEW

This guideline is based on a two stage research program.

Initial testing was performed by Bakkham Pty Ltd in conjunction with the CDAA. It involved copper/copper, copper/brass, brass/brass, copper/gunmetal in a range of common pipe and fitting sizes, eg. DN15 to DN100. 2% silver solder, 15% silver solder and Aquasafe soft solder (99% tin) were used and where fluxes were required Eziweld, Laco, Yorkshire and Tenacity brands were employed. Further tests were done by CSIRO in conjunction with CRC, WTIA and CDAA using heavy wall large diameter pipe to represent the worst case scenario. Tube sizes were: AS1432 Copper: DN150 Type B (152.40x2.03mm); AS3795 Brass DN100 type D (101.60x1.22mm). All work was conducted at waist level in an enclosed booth 2m x 2m with open top and minimum air movements. Operators kept their head out of the visible plume and samples were taken from the breathing zone for periods over 30 minutes (see Figure 1).

RESULTS



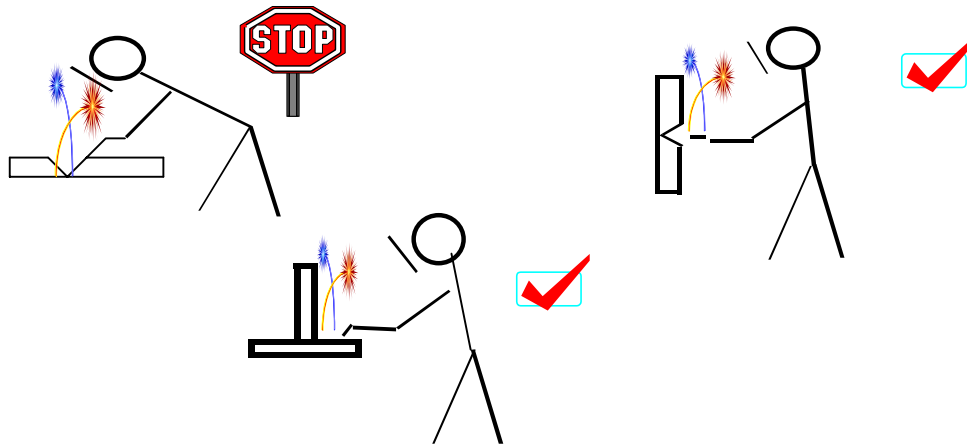


Figure 1. The operator's head should not enter the visible fume plume.

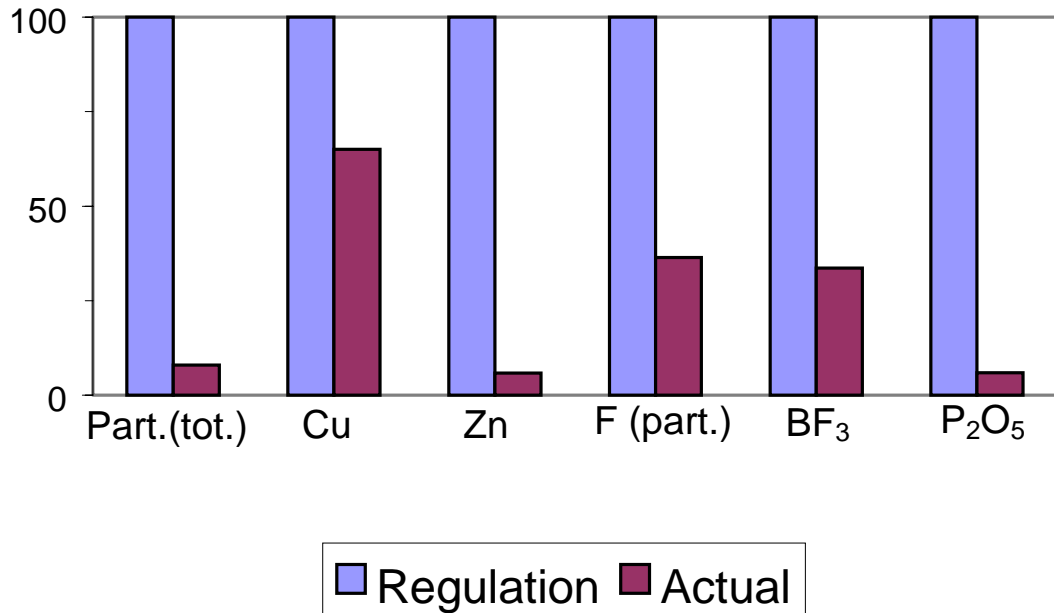


Figure 2. Plumbing fume production and analysis at the breathing zone as a percentage of Australian Exposure Standard limits.