Resin Acids – Are Your Workers Protected?

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Introduction – What are Resin Acids

- Rosin - Derived from Pine Trees
- 3 types of Pine Rosin
  - Gum Rosin – from Tapping Live Pines
  - Tall Oil Rosin – Recovered from Pine Wood Kraft Pulping
  - Wood Rosin – Solvent extracted from Harvested Wood
Introduction – What are Resin Acids

• Rosin contains:

  • 90-95 % Resin Acids - diterpenic monocarboxylic acids – such as abietic acid
  • 5-10 % nonacidic compounds – ethyl chavicolé, stilbene derivatices, terpene dimers, aldehydes, and several hydrophenanthrene hydrocarbons
Resin Acids – Where are they found

Only Solder Fluxes?

What about:

Paper Mills Paper Sizing
Composites Polymers
Paints Printing Inks
Cosmetics Machine Coolants
Adhesive formulations (hot melt adhesives)
Resin Acids – Health Effects

Skin Sensitization
Contact dermatitis
Occupational Asthma (RSEN)
Eye and Respiratory Irritation
Occupation Exposure Levels – What to Sample For?

- Colophony
- 1- Abietic Acid – traditional way
- Total Resin Acids

- What about aldehyde exposure?
  - Proposed TLV says that aldehyde exposures need to be evaluated when colophony is used in hot processes.
Occupation Exposure Levels – How much is to much?

- UK HSE WEL – Resin Acids in Rosin (Colophony)
  - 0.05 mg/m$^3$ (8 hour TWA)
  - 0.15 mg/m$^3$ (15 min STEL)

- 2020 ACGIH TLV – TWA 0.001 mg/m$^3$, as total Resin Acids, Inhalable Particulate Matter; RSEN; DSEN
Resin Acids – How do we sample?

UK HSE Method – MDHS 83-3
GC FID – 13 mm Swinnex with MCE Filter
1–2 liters per minute (2 lpm STEL Samples)

Proposed TLV – Inhalable Particulate Matter
1. What filter media (MCE, GFF)
2. Need to do inhalable? Are all fumes generated respirable size?
3. How long do you need to sample to get to ½ the TLV? Detection Limit 0.3 –0.5 ug.
Resin Acids – How to protect your workers when soldering

Types of Ventilation

- Air Displacement Boxes (Not Recommended)
- On-Tip Extraction
- Local Exhaust Ventilation
Resin Acids – How to protect your workers from Resin Acids

• Hazard Communication to make employees aware of Hazards

• PPE to protect from contact

• Local exhaust ventilation to control vapors or fume at source
Questions?

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