



Operator Sensitisation from Fibre Optic Epoxies

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Introduction

All epoxy resins are potential sensitisers, and they should be used and handled with this in mind. They may be the cause of allergic reactions due to sensitisation. A respiratory sensitiser is a substance which when breathed in can trigger an irreversible allergic reaction in the respiratory system. Once this sensitisation reaction has taken place, further exposure to the substance, even to the tiniest trace, can produce symptoms.

Sensitisation does not usually take place right away. It generally happens after several months or even years of breathing in the sensitiser. The symptoms can be attacks of coughing, wheezing and chest tightness, runny or stuffy nose and watery or prickly eyes.

Once a person is sensitised, symptoms can occur either immediately they are exposed to the sensitiser or several hours later. If the symptoms are delayed, they are often most severe in the evenings or during the night, so operators may not realise it is work that is causing the problem. Also, once a person is sensitised, they remain sensitised indefinitely.

Also, epoxy resins can cause allergic contact dermatitis, or eczema.

Fibre Optic Epoxies

Some fibre optic epoxies are strong sensitisers. Low viscosity epoxies contain diluents, and with high temperature curing materials, a reactive diluent is often used. These diluents have greater sensitisation potential than the epoxy resin itself. One which is often used is a mono-functional, high vapour pressure chemical like N-Butyl Glycidyl Ether; this has been shown to often give problems with operator handling due to sensitisation.

Opti-tec 5053-F-A, for example, uses a different kind of diluent, a di-functional, low vapour pressure material. For this reason, it presents a much lower tendency to cause sensitisation than products which use a mono-functional, high vapour pressure diluent.

Most of the hazard from epoxy sensitisation in fibre optic applications comes from vapour, and that vapour arises primarily from heating during cure. All vapours given off during heating of the epoxy should be vented away from operators; local exhaust might be considered at the mixing and dispensing area too. The vapour pressure of the diluent is a factor here, low vapour pressure being highly preferable.

Hazards from handling the liquid epoxy in ambient temperatures are much less as long as simple procedures are followed. Good housekeeping would ensure that operators wear skin protection (gloves) when handling any chemical, including epoxy. Handling is reduced by purchasing and mixing the two-part epoxy in a twinpack (no skin contact), pouring into a syringe or dispensing barrel and dispense to work wearing gloves.



An example of a twinpack for epoxy packaging.

Of course, some operators might be allergic or more sensitive to contact with chemicals than others. In any event, all operators should avoid any chemical contact by using the correct personal protective equipment (gloves), and practice good personal hygiene. Operators need to be adequately trained and understand the hazards.

On a final note, look at hardener chemistry too: **Opti-tec 5053-F-A**'s hardener does not contain acrylonitrile, a known chemical carcinogen.

Conclusion

Where the performance aspects of epoxy chemistry mandate its use, try to specify one with the least irritating hardeners and modifiers. Always read the manufacturer's safety data sheet.

Opti-tec 5053-F-A

- High surface energy and low viscosity allows it to readily wet and wick between optical fibres
- Excellent impact and thermal shock resistance
- High glass transition temperature results in excellent high temperature performance and creep resistance
- Resists moisture, vapours and most chemicals
- Colour change upon curing
- Low skin sensitivity
- Long pot life

Applications include: Fibre optic terminating, endoscope manufacture and repair, optoelectronics, high temperature/high performance bonding, electronic sealing. Suitable for metals, ceramics, glass, most plastics



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