

Case Study - Fibrous Glass - Surface Dust Contamination

Project Description: Contact Dermatitis/Skin Rashes (Office Renovation)

Scope of Services: AET was contracted to evaluate the source/cause of skin rashes on the forearms of office staff in a commercial office building. Interviews with affected personnel found their symptoms coincided with recent office renovations involving the drop ceiling system.

AET's Experience: Acoustical ceiling tiles contain fiberglass, mineral wool and other manufactured fibers. Ceiling tiles have open, unprotected edges which abrade during movement and result in glass fibers/particulates becoming airborne and settling on surfaces below. Ceiling tile movement can be caused by normal building vibrations, sudden changes in building air pressures or by a greater extent from lifting of the tiles during building maintenance or renovation activities. Fibrous glass exposure are exacerbated when fiberglass insulation batting is lying on top of the tiles or debris from fireproofing is present in the ceiling space. Fiberglass is also used to insulate HVAC ductwork or as soundproofing inside ventilation systems. In buildings with open plenum design, air containing fibrous glass and other particulates can be drawn from the top of the ceiling tiles back to the air handler and re-circulated through the occupied space. Office/cubicle dividers and other office furniture may also be constructed to include fibrous glass.

Glass fibers once airborne can take several hours to settle depending upon fiber size. Small fibers (<500 microns in length) can cause dry-irritated eyes, sore throat and sinus congestion. Long fibers (>500 microns) can cause contact dermatitis.

AET's Evaluation Protocol/Tools:

1. **Site Inspection:** Suspect fibrous glass sources and the condition of each were evaluated. Surface cleanliness and cleaning frequency was also investigated.
2. **Tape Lift Sampling/PLM Analysis:** Representative samples were collected from the tops of desks, tables, stored items as well as hard-to-reach infrequently cleaned areas. Samples were analyzed by Polarized Light Microscopy (PLM) using oblique illumination. Results were reported in glass fibers per square inch. There are no federal or state standards for glass fibers in surface dust. Background levels have been reported at 1 fiber per square inch. Complaints of contact dermatitis have been reported as low as 4 glass fibers per square inch.
3. **Limited Air Sampling:** Background air samples compared complaint to non-complaint locations. Exposures exceeding the OSHA PEL standards for respirable nuisance dust of 5.0 mg/m³ and total nuisance dust of 15.0 mg/m³ are extremely unlikely. Highest concentrations of airborne fibrous glass are expected during ceiling tile movement or during cleaning/housekeeping activities which disturb and re-entrain the surface dust into the air.

Conclusion: Sources of glass fiber occur in almost every office, school, residence, etc. Problems rarely are reported as the frequency of cleaning exceeds the rate of dust accumulation. Symptoms of upper respiratory tract irritation are relatively non-specific and can be confused with other IAQ problems or common illnesses. Evidence of contact dermatitis requires immediate cleaning prior to area reoccupancy. Prevention requires strict controls of ceiling tile movement during building maintenance and renovation activities, repair of damaged material, and training of building maintenance/housekeeping staff in proper cleaning regiments.

When you need professional help or advice, email Alan Sutherland, CIH, CHMM at a.sutherland@aetinc.biz or call 610-891-0114. We provide nationwide services; phone consultations are free. Check out the full range of environmental contracting/consulting services we provide at our website www.aetinc.biz.

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