Occupational Exposure to Formaldehyde

Presented by: The University of Pittsburgh
Department of Environmental Health & Safety
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OSHA Standard for Formaldehyde
29CFR 1910.1048
Employee Information and Training

Mandatory training for exposed workers:

- Hazard descriptions & controls
- Signs and symptoms of exposure
- How to limit exposures using safe work practices
- Purpose, proper use and limitations of PPE
- Handling emergencies and spill clean-up
- Employee access to training materials & MSDS
Physical Hazard

- Formaldehyde formula: HCHO
- Colorless gas with a pungent, suffocating odor (1 ppm)
- Formaldehyde gas is highly flammable
- Commonly found on campus as:
  - 37% formaldehyde solution in H₂O and methanol,
  - 10% buffered formalin (3.7% formaldehyde) or
  - Paraformaldehyde polymer (97% formaldehyde)
- Vapors may travel to ignition source & flash back
  - Containers of formaldehyde may burn or explode in a fire
Health Hazards

- Irritation to eyes, nose & throat (0.5-5 ppm)
- Tearing, cough & breathing difficulty (10-20 ppm)
- Headache, chest tightness, palpitations (50-100 ppm)
- Skin irritation (>5% solutions); burns & rash possible
- Allergic dermatitis (trace level sensitization)
- Ingesting 1oz. of 37% solution can be fatal
- Nasal cancer in lab rats
- Human carcinogen and mutagen (IARC Class 2)
- Corneal damage (splash of 25-44% solutions)
Permissible Exposure Limits

- 8-hour TWA - 0.75 PPM
- 15 minute STEL - 2 PPM
- 8-hour action level - 0.5 PPM
- training action level - 0.1 PPM
Engineering Controls

- General Dilution Ventilation
  - CFM “fresh” air person
  - Air changes per hour (6-10)

- Local Exhaust Ventilation
  - Chemical Fume Hoods
  - Slotted area ventilators
  - Downdraft tables
  - Articulating arm snorkels

- Fluid Suction/Drainage
  - Sinks traps to capture perfusate
  - Aspiration systems for body cavity
Standard Perfusion Tables

- Backdraft & downdraft hoods designed for local exhaust ventilation (TBJ Inc)
Snorkel Ventilation

- Local exhaust ventilation
- Articulating arm allows hood to be moved easily
- Locate hood close to source of formaldehyde vapors
- Swings out of the way for access
- Face velocity at 150 fpm
- Test frequently to assure adequate flow.
Work Practice Controls

- Substitute less hazardous fixative if possible
- Perform tasks in a well ventilated area
- Keep lids on formaldehyde containers
- Clean-up or neutralize spills immediately
- Limit splashing of formaldehyde solutions
- Avoid heating or mixing formaldehyde solutions outside chemical fume hoods.
- Prohibit food & drink from formaldehyde use areas
Personal Protective Equipment

- Lab coat or scrubs
- Safety glasses with side shields (minimum)
- Splash resistant goggles or face shields
- Butyl or nitrile gloves
- Lab aprons and sleeve covers
- Remove & dispose of contaminated PPE properly
- Launder lab coats & other PPE in-house
How EH&S Monitors Exposure

- An Assay Technology ChemDisk monitor for formaldehyde is worn on the lapel to represent the breathing zone.
- Monitor is worn for at least 15 minutes or the duration of the procedure.
- The monitor is collected and sent to an AIHA accredited laboratory for testing.
- A report of the results is distributed to the supervisor and the employee in 15 days.
Exposure Monitoring

- Workplace exposures monitored at Pitt
  - Animal perfusions
  - Tissue immersion / Cell fixing
  - Weighing paraformaldehyde powder
  - Northern blots / RNA gel preparation
  - Preserved specimen dissection
  - Gross Anatomy Lab
  - Chemical synthesis
Regulated Area

- Shall be established where airborne formaldehyde concentrations exceed the TWA or STEL
- Access limited to authorized persons
- Danger signs shall be posted at entrances. The sign shall read:

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Danger
Formaldehyde
Irritant and Potential
Cancer Hazard
Authorized Personnel Only
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Respiratory Protection

- May be required when PEL or STEL exceeded
- Provided at no cost to employees
- Used in conformance with a Respiratory Protection Program
- Selected to fit task and exposure potential
- Full face respirator best if eye irritation a concern
- Employee medical questionnaire and fit testing required
Hygiene Protection

- Eye wash facilities required if eyes may be splashed with formaldehyde solution.

- Safety shower or drench hose recommended if skin splash likely.
Spills & Emergencies

- Don appropriate PPE & clean up small spills if qualified
- Turn off or isolate ignition sources
- Turn on exhaust ventilation fans if possible
- Contain spill with towels or absorbent materials
- Collect all formaldehyde waste for disposal
- Do not flush or pour concentrated liquids into drains
- Absorb liquid spills and contact EH&S for disposal
- Evacuate labs & call EH&S or 412-624-2121 if spill too large
Formaldehyde Injuries

- **Splash to eye** - flush in eye wash for 15 minutes, then seek medical attention.
- **Skin contact** - drench the body area immediately then wash several times with soap and water.
- **Cuts** - Wash the wound with soap & water for 15 minutes, apply pressure to stop bleeding, seek medical attention.
- **Supervisor must file an accident report with Risk Management within 24 hours.**
University of Pittsburgh
Department of Environmental Health and Safety

http://www.ehs.pitt.edu

We are your Safety Net

VISIT US ON THE InterNET! Or CALL 624-9505