

Industrial Hygiene Part I Anticipation & Recognition

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Industrial Hygiene

Definition

Industrial hygiene is the science of

- Anticipating,
- Recognizing,
- Evaluating, and
- Controlling

Workplace conditions that may cause workers' injury or illness.



Anticipation

Chemicals Used By Contractors and Subcontractors



Anticipation

Item	Common Name	Chemical Name Primary Ingredient	Work Areas	CAS	NFPA 704 HMIS III
206	Standard Conductivity Solution, 1000 umhos	Sodium Chloride	Job Site/Fab	7647-14-5	0 0 0
207	Stargon	Mixture of Argon, Carbon Dioxide, and Oxygen or Nitrogen	Job Site/Fab	7440-37-1	1 0 0
208	Stay Clean Liquid Soldering Flux	Zinc Chloride	Job Site/Fab	7646-85-7	3 0 0
209	Stay Silv® White Brazing Flux	Boric Acid	Job Site/Fab	10043-35-3	2 0 0
210	Steel Sheet/Strip & Hot Rolled Skelp	Iron	Job Site/Fab	7439-89-6	2 0 0
211	Steel Sheet Long Terne	Iron	Job Site/Fab	7439-89-6	2 0 0
212	Stripe Red-Orange Fluorescent Inverted Tip	VM&P Maptha	Job Site/Fab	64742-89-8	1 3 3
213	Sulfurized Cutting Oil	Petroleum Hydrocarbons and Additives	Job Site/Fab	64742-53-6	1 1 0



Anticipation

On-Site Hazardous Materials Asbestos

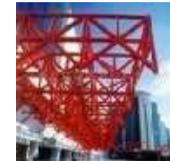
Cement Pipes	Elevator Brake Shoes
Cement Wallboard	HVAC Duct Insulation
Cement Siding	Boiler Insulation
Asphalt Floor Tile	Breaching Insulation
Vinyl Floor Tile	Ductwork Fabric Connections
Vinyl Sheet Flooring	Cooling Towers
Flooring Backing	Pipe Insulation
Construction Mastics	Heating and Electrical Ducts
Acoustical Plaster	Electrical Panel Partitions
Decorative Plaster	Electrical Cloth
Textured Paints/Coatings	Electric Wiring Insulation
Ceiling Tiles and Lay-in Panels	Chalkboards
Spray-Applied Insulation	Roofing Shingles
Blown-in Insulation	Roofing Felt
Fireproofing Materials	Base Flashing
Taping Compounds (thermal)	Thermal Paper Products
Packing Materials	Fire Doors
High Temperature Gaskets	Caulking/Putties
Laboratory Hoods/Table Tops	Adhesives
Laboratory Gloves	Wallboard
Fire Blankets	Joint Compounds
Fire Curtains	Vinyl Wall Coverings
Elevator Equipment Panels	Spackling Compounds



Anticipation

On-Site Hazardous Materials Lead

- Paint
- Flashing
- X-ray Room Lining
- Ceramic Glaze



Anticipation

On-Site Hazardous Materials Mercury



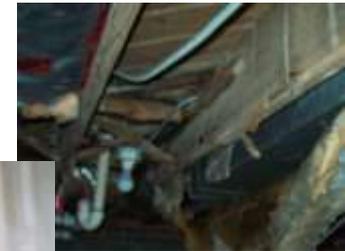
1.0 2x4x4 Mercury Floodlight



- Fluorescent & HID Lamps
- Thermostats
- Thermometers
- Dental Office
- Laboratories

Anticipation

On-Site Hazardous Materials Mold



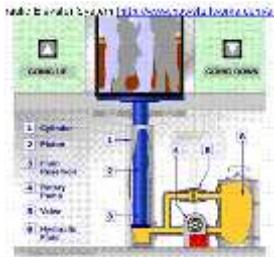
- Look for water intrusion



Anticipation

On-Site Hazardous Materials PCBs

- Transformers
- Light Ballasts



- Hydraulic Fluid
- Non-liquid PCBs

Anticipation

On-Site Hazardous Materials Crystalline Silica

- Concrete
- Sand
- Quartz
- Granite



Anticipation

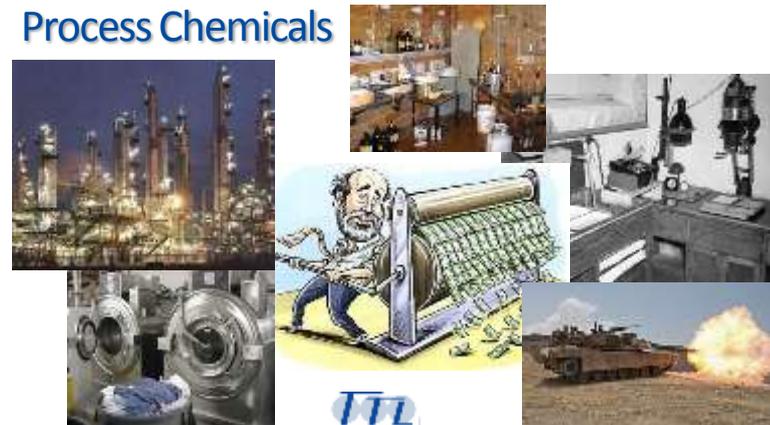
On-Site Hazardous Materials Petroleum

- Aboveground Tanks
- Underground Storage Tanks
- Subsurface Contamination



Anticipation

On-Site Hazardous Materials Process Chemicals



Anticipation

Environmental Hazards

- Noise
- Solar UV
- Heat / Cold
- RF Fields
- Biological



Recognition

Chemicals Used by Subcontractor

- Who does this?
- Did your subcontractor actually evaluate the MSDS?
- Example MSDS sheets
 - Concrete Sealer
 - Joint Compound
 - Liquid Nails



Recognition

Chemicals Used by Subcontractor

9. Physical and Chemical Properties

Appearance: Clear liquid of low viscosity
Odor: Mineral spirits odor
Boiling Point: 300-350°F
Melting Point: Not applicable
Vapor Pressure (mmHg): 16 @ 100°F*
Vapor Density (Air = 1): 4.8*
Solubility in Water: Negligible (<5%)
Specific Gravity (H₂O = 1): 0.8
Evaporation Rate (n-Butyl Acetate = 1): <0.1*
 *estimated

- Vapor Pressure is 16 mm Hg
- This converts to $(16/760) \times 1,000,000 = 21,000$ ppm
- Compared to 100 ppm PEL, this is high risk
- Ventilation may be important



Recognition

Chemicals Used by Subcontractor Joint Compound

Section 2: Composition and Ingredient Information

Chemical Name	CAS No.	Wt. %
Calcium Carbonate, Limestone	1317-65-3	50 - 80
Mica	12001-26-2	1 - 5
Attapulgite Clay	12174-11-7	1 - 5
Vinyl acetate homopolymer	9003-20-7	0.5 - 1.5
Crylatine S80a	14808-60-7	0.1 - 1

Note:

See Section 8 of this MSDS for exposure limit data for these ingredients.

- Where are the exposure limits?



Recognition

Chemicals Used by Subcontractor Joint Compound

- Irritation
- Long-term Effects

Section 3: Hazards Identification	
Chemical Hazards and Classification:	This product is a hazardous material as defined by 29 CFR 1910.1201 (GHS) Hazard Communication Subsection.
Assessment, Signs and Symptoms:	Skin/eye/neck/irritation
Common Routes of Exposure:	Ingestion, Eye contact, Skin contact
Chronic Health Effects:	ACUTE (short term) see Section 4 for the hazard controls. High concentrations of dust may cause irritation of the upper respiratory tract with symptoms such as sneezing, soreness and irritation of throat. Caution: Use of respirator levels of occupational exposure. If respiratory issues occur, avoid further exposure. Irritation may result. Eye: May cause slight irritation. Skin: May cause irritation as a foreign object in the skin. Tearing, stinging and mild soreness pain may result as the material is rubbed from the eye to skin. CHRONIC (long term): see Section 11 for additional toxicological data. In general, long-term exposure to high concentrations of dust may cause irritated mucous membranes in the nose and respiratory system. The condition usually improves after exposure stops. Prolonged and repeated exposure to airborne free respirable crystalline silica can result in lung disease (i.e. silicosis) and/or lung cancer. The development of disease may increase the risk of additional health effects. The risk of developing silicosis is dependent upon the exposure intensity and duration. Prolonged and repeated breathing of dust may cause lung disease (pneumoconiosis). The extent and severity of lung injury correlates with the length of exposure and dust concentration. Prolonged or repeated skin contact may dry the skin, causing cracking or dermatitis. Medical Conditions: Prevalent or Exacerbated: Preexisting upper respiratory and lung diseases such as, but not limited to, asthma, emphysema and chronic obstructive pulmonary disease (COPD) may be aggravated by dust exposure. Preexisting skin-related such as, eczema and dermatitis will be aggravated by skin exposure.



Recognition

Chemicals Used by Subcontractor Joint Compound

Section 8: Exposure Controls and Personal Protection		
Exposures	ACGIH TLV (8hr TWA)	U.S. OSHA PEL (8hr TWA)
Calcium Carbonate, Limestone	10	10 (Total Dust)
Silica	1 (respirable)	10 (total dust) 10 (respirable silica)
Styrene Monomer	Not established	Not established
Tri-n-butylamine	Not established	Not established
Cyanuric Acid	0.05 (respirable)	0.05 (total dust) 0.05 (respirable) 0.05 (total dust) 0.05 (respirable)

Engineering Controls: Local exhaust ventilation is the preferred method to minimize dust. General Ventilation should also be used if needed.

Housekeeping: Wash tanks thoroughly after handling the material. Maintain good housekeeping.

Personal Protective Equipment:

Respiratory Protection: Wear a NIOSH approved respirator when spraying and when handling the product. Wear a NIOSH approved respirator equipped with particulate cartridges when duty in poorly ventilated areas, and if exposure levels are unknown. A respiratory program that meets OSHA 29 CFR 1910.134 and ANSI Z98.2 requirements must be followed whenever multiple conditions warrant a respirator's use.

Skin Protection: Wear gloves and protective clothing to prevent irritation or poisoning skin contact.

Eye Protection: Wear safety glasses or screen goggles to avoid eye irritation.



Recognition

Chemicals Used by Subcontractor Joint Compound

- Dust may cause irritation
- Crystalline silica may cause long-term health effects



Recognition

Chemicals Used by Subcontractor Liquid Nails

- Vapor Pressure – Not Available
- Flash Point 1° F

Cyclohexane	1-5	300	ppm
Limestone	10-20	5	mg/m3
Kaolin	20-30	5	mg/m3
Titanium Oxide	0.1 to 1	10	mg/m3
Heptane	1-5	500	ppm
Cristobalite	0.1 to 1	0.025	mg/m3
Quartz	1-5	0.025	mg/m3
Polymer	2-10		
Heptane	5-10	500	ppm
Naphtha	1-5	300	ppm
Petroleum Distillates	10-20	500	ppm



Recognition

Chemicals Used by Subcontractor Liquid Nails

- Initial respiratory irritation
- Prolonged exposure causes:
 - Loss of appetite
 - Fatigue
 - Drowsiness
 - Dizziness and/or lightheadedness
 - Headache
- Uncoordination
- Nausea
- Vomiting
- Diarrhea
- CNS depression
- Intoxication
- Anesthetic effect
- Convulsions
- Loss of consciousness
- Asphyxiation



Recognition

Chemicals Used by Subcontractor Liquid Nails

- Quantity Used
- Ventilation
- Skin Contact



Recognition

On-Site Hazards

- Hazardous materials survey by a qualified inspection firm.
- Specification for survey must identify which hazards are of concern.



Recognition

Environmental Hazards

- Noise – Sound level monitor
- Solar UV – Always there if you are outdoors
- Heat / Cold – Thermometer / WBGT
- RF Radiation – RF Survey Meter
- Naturally Occurring Minerals -



Recognition

Environmental Hazards

- Naturally Occurring Asbestos

