

Hazardous Materials: Flammable Solids Safe Handling Guideline

Department: Industrial Hygiene and Information Management

Program: Hazardous Materials

Owner: Program Manager

Authority: ES&H Manual, Chapter 40, Hazardous Materials¹

**Chemical
Name/Class**

Flammable solids

Synonyms

Will vary depending upon specific chemicals

Reactivity and Physical Concerns

Many flammable solids may react violently or explosively on contact with water and may also be ignited with friction, heat, sparks or flame. Some of these materials will burn with intense heat. Dusts or fumes may form explosive mixtures in air. Containers may explode when heated. Materials may re-ignite after fire is extinguished. Fires may produce irritating, corrosive and/or toxic gases. Some of these materials may also be pyrophoric – spontaneously reacting with oxygen in air to ignite.

For metallic flammable solids (e.g., phosphorus, sodium, lithium, magnesium) **do not use water, foam or carbon dioxide as a fire suppressant**. Dousing metallic fires with water may generate hydrogen gas, an extremely dangerous explosion hazard, particularly if fire is in a confined environment. Additionally, fires involving flammable metals (lithium, sodium, potassium etc.) or flammable metal compounds (butyllithium, diethylzinc etc.) can be fueled by using water or carbon dioxide fire extinguishers. You must have a class D extinguisher on hand if you are using these materials

Exposure Hazards

Routes of Exposure

Inhalation, ingestion, skin and eye contact

The health hazards associated with flammable solids will vary depending upon the individual chemical's hazards, the manufacturers MSDS should be consulted for each chemical in use. Many flammable solids are metals, oxides from metallic fires are a severe health hazard, inhalation or contact with substance or decomposition products may cause severe injury or death.

Chronic Exposure

Chronic exposure hazards associated with flammable solids will vary greatly. Consult the individual chemical's MSDS for specific chronic hazards.

First Aid

First aid measures will vary greatly based on the individual chemicals hazard properties. Consult the specific chemical's manufacturers MSDS and when necessary, a medical professional for the appropriate first aid procedures.

1 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 40, "Hazardous Materials", http://www-group.slac.stanford.edu/esh/hazardous_substances/haz_materials/policies.htm

Exposure Limits

Exposure limits will vary based on individual chemical hazards, consult the manufacturers MSDS for established exposure limits.

Exposure Controls

Engineering Controls

Local exhaust ventilation or breathing protection is generally required. Depending upon the level of flammability involved with specific chemicals, engineering control requirements may increase (e.g., use of inert atmospheres, glove boxes, special detection and/or extinguishing systems, etc.). Consult the MSDS for hazardous properties and your local jurisdictional authority for specific requirements.

Administrative Controls

Administrative controls will vary based on individual chemical hazards. Personnel working with the materials must receive detailed training on the hazards, safe use, and emergency procedures.

Personal Protective Equipment

Avoid breathing dusts, vapors or fumes. Follow individual chemical's MSDS recommendations for the appropriate PPE. In general, prevent skin/eye contact through the use of impervious gloves, clothing, boots, apron, and eye goggles or full face shield. If the airborne concentrations are elevated and engineering controls are not feasible wear a NIOSH-approved self-contained breathing apparatus with full face-piece operated in the pressure demand or other positive pressure mode

Disposal

In general, flammable solids are regulated as hazardous waste. Regulatory requirements will vary depending on the individual chemical. Contact the Waste Management Group for specific disposal requirements and procedures.

Medical Monitoring (if applicable)

Medical and exposure monitoring will vary depending on the individual chemical hazards. Consult the MSDS or industrial hygiene program manager for the appropriate monitoring for the chemical of concern.

Emergency Response

In the event of a significant release that poses a threat to employees and/or the environment, immediately evacuate the area and notify the emergency operator (911). The Palo Alto Fire Department will respond. Then call Incident Notification (ext. 5555) and notify your supervisor.

Small spills can be cleaned up with appropriate spill response supplies by trained employees who have this task authorized in their JHAM.

Standards/Regulations

- OSHA: PEL: 29 CFR 1910.1000, Table Z-1; Respiratory Protection: 29 CFR 1910.134
- EPA: Release: 40 CFR 355.40, 302, 116.4; Waste: 40 CFR 261.21-261.24
- *California Fire Code*: Chapters 27 through 41

Other References

- Safety Emporium, "The MSDS HyperGlossary: Flammable Solid", <http://www.ilpi.com/msds/ref/flammablesolid.html>