

Section 2 — Unit 1

Introduction to Safety

Introduction

- Safety is the primary concern when working in any machining environment
- Different machining operations require different safety precautions
- Always stay alert and focused on the current task

General Safety Guidelines

- No horseplay
- Do not startle or distract workers
- Avoid injury; be aware of hazards
 - Never work with unfamiliar tools or material
 - Always stop machines before cleaning or making adjustments
 - Do not operate machinery under the influence of alcohol or medication

General Safety Guidelines

(cont'd.)

- Know where the first aid kit is and what to do in the event of an emergency
- OSHA (Occupational Health & Safety Administration) and NIOSH (National Institute for Occupational Safety and Health):
 - Federal agencies relating to workplace safety

General Clothing for a Machining Environment

- Wear appropriate clothing:
 - Long pants
 - Short-sleeved, close-fitting shirts
 - No hoods or drawstrings
 - Hard, flat-soled work shoes with slip-resistant soles
 - Secure long hair, avoid jewelry that can get caught in machines
 - No gloves except for specific tasks



FIGURE 2.1.1 Some examples of appropriate footwear for a machining environment. Different heights are available with either (A) soft toes, (B) safety toes, or (C) metatarsal shields, which help to protect the entire foot from heavy objects.



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FIGURE 2.1.2 Long hair should be secured safely in a machining environment.

Personal Protective Equipment (PPE)

- Safety equipment worn to protect from potential dangers
- Know what equipment you need in this situation
- Common types of equipment include eye protection, hearing protection, respirators, gloves, and hard hats



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FIGURE 2.1.3 (A) Safety glasses and goggles come in many different styles. Note that some can be worn over ordinary eyeglasses. Face shields (B) do not take the place of safety glasses, but are worn in addition to them when performing certain operations..



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FIGURE 2.1.4 Some examples of hearing protection.



Courtesy of Sentry Air Systems, Inc. Houston, TX USA www.sentryair.com

FIGURE 2.1.5 This hood provides ventilation by drawing harmful fumes out of the work area.



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FIGURE 2.1.6 These air purifying respirators use replaceable filters or cartridges that filter contaminants from the air.

FIGURE 2.1.7 This worker is wearing an atmosphere supplying respirator. Note the hose that would be connected to an external oxygen source.





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FIGURE 2.1.8 Different gloves are available for different uses. Note the different lengths. When handling chemicals, always follow the chemical manufacturer's recommendation for the proper type of glove.

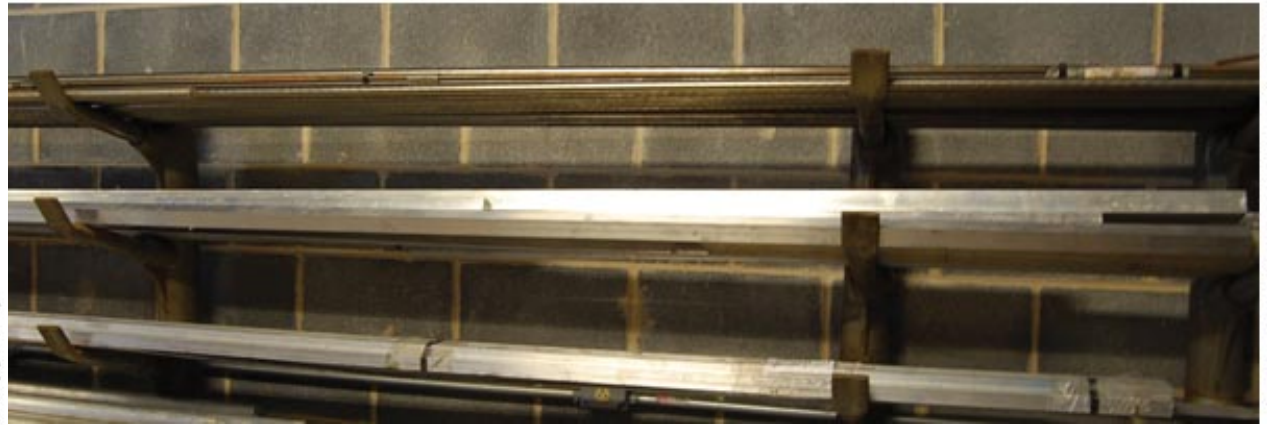
Housekeeping

- Keeping the work environment clean to prevent dangerous situations
 - Avoid clutter
 - Clean and store tools properly
 - Store materials neatly and safely dispose of waste
 - Clean up spills and debris



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FIGURE 2.1.9 Store material in proper racks like these for safety. Don't stack it on the floor, workbenches, or machinery.



Courtesy of Sentry Air Systems, Inc Houston, TX USA www.sentryair.com

FIGURE 2.1.10 Dispose of oil- and solvent-soaked rags in safety cans like these to avoid spontaneous combustion.





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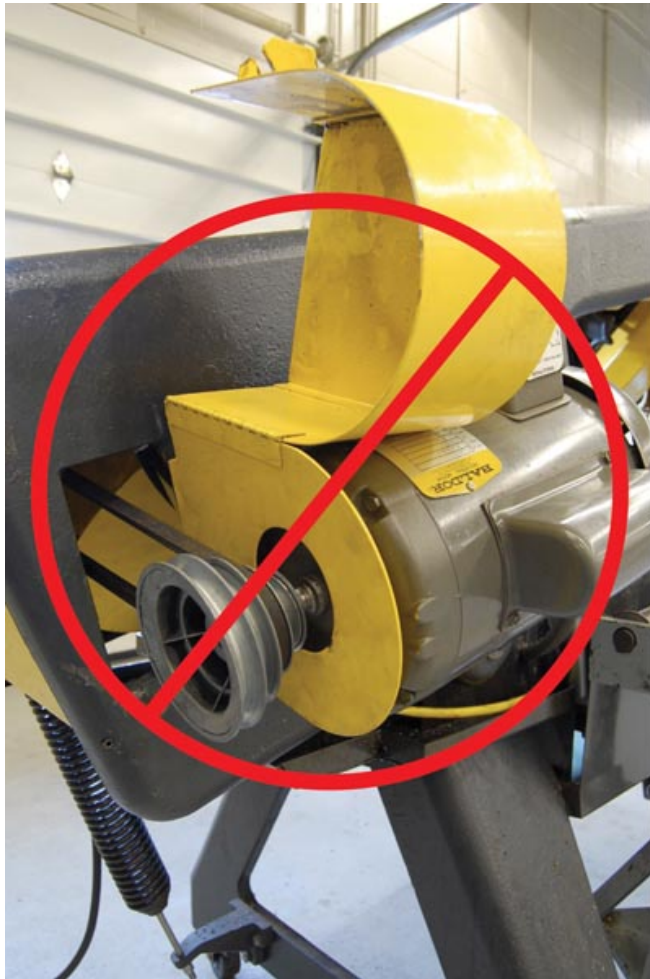


Courtesy of OIL-DRI Corporation of America

FIGURE 2.1.11 (A) Oil and solvent spills can be absorbed with granular absorbents, then the absorbent can be swept up. (B) Pads or “socks” can also be used to soak up spills.

Guards and Barriers

- Signs and barriers preventing entry to danger area
- Guards on machine tools around cutting areas/moving parts
- Light beam triggers disable machines



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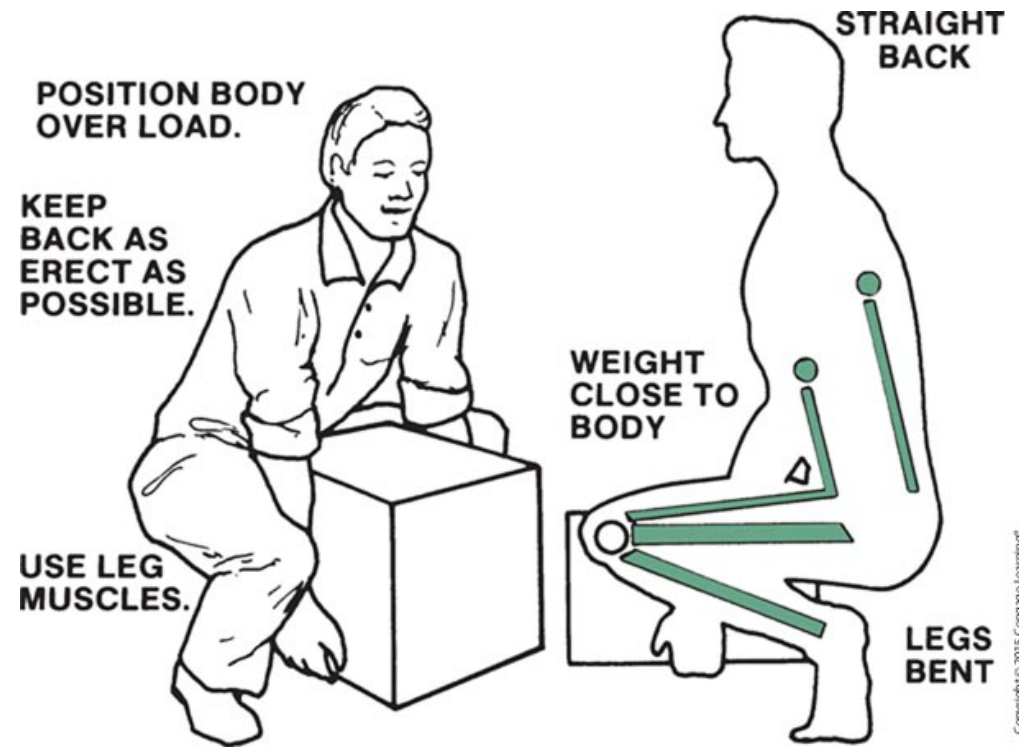


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FIGURE 2.1.12 Never operate machinery without all guards and covers properly in place.

Handling and Lifting

- Take care lifting heavy items
- Get help if needed
- Beware of sharp, slippery, or awkward objects
- Receive training before operating any lifting device



Compressed Air Safety

- Never use compressed air to clean up metal chips or chemicals; use a brush
- If air must be used, use a nozzle that limits pressure to 30 psi or less
- Never use compressed air to clean a person's body

Lockout/Tagout

- Prevents activating machine during maintenance/repair
 - Tagout: Use highly visible tag secured to machine
 - Lockout: More secure because it uses locks instead of/as well as tags





Courtesy of Baidy Corporation

FIGURE 2.1.15 A tagout device provides space for the person who placed the tag to write specific details. The tag is then secured through a machine's power switch with a wire or plastic tie.



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FIGURE 2.1.16 A lockout hasp allows several different people to lock out or tag out a piece of equipment. This machine has been locked out by two different people.

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Hazardous Materials

- Liquid, solid, or gas
- Systems of labeling:
 - NFPA (National Fire Protection Association)
 - Identifies hazards & levels of danger
 - HMIS (Hazardous Material Identification System)

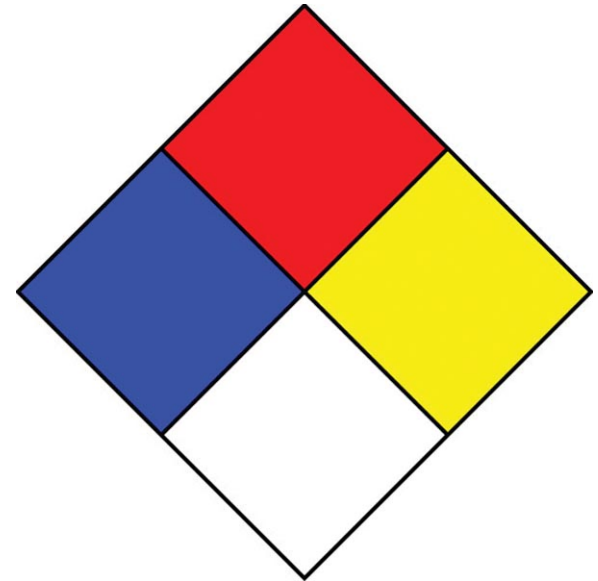


FIGURE 2.1.17 The NFPA (National Fire Protection Association) hazardous material label.

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HAZARDOUS MATERIALS CLASSIFICATION

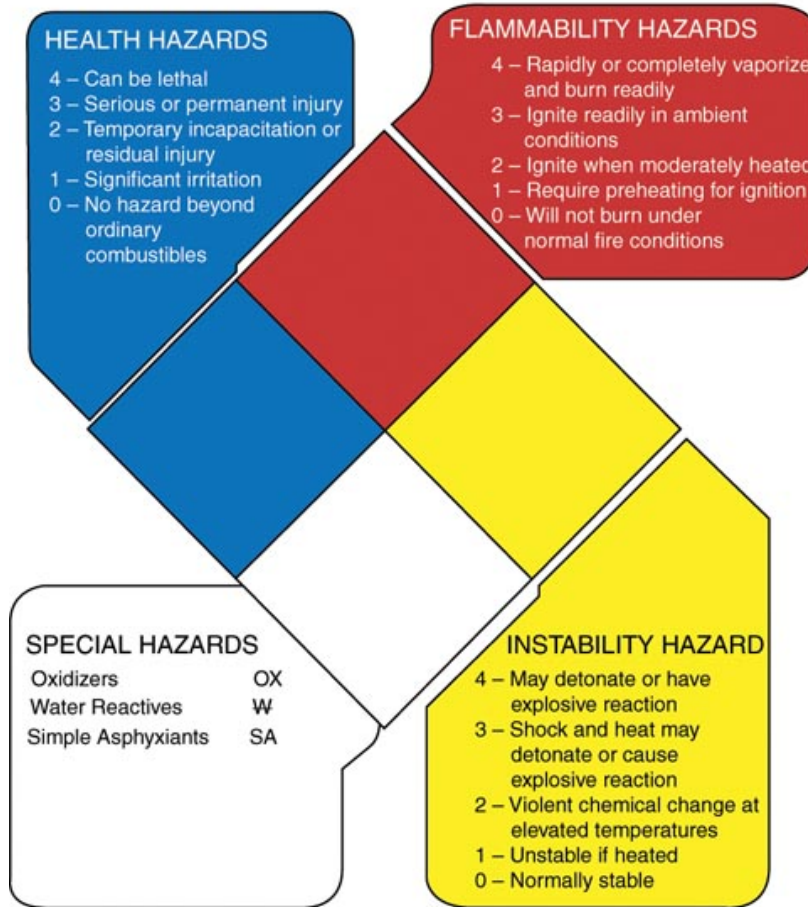
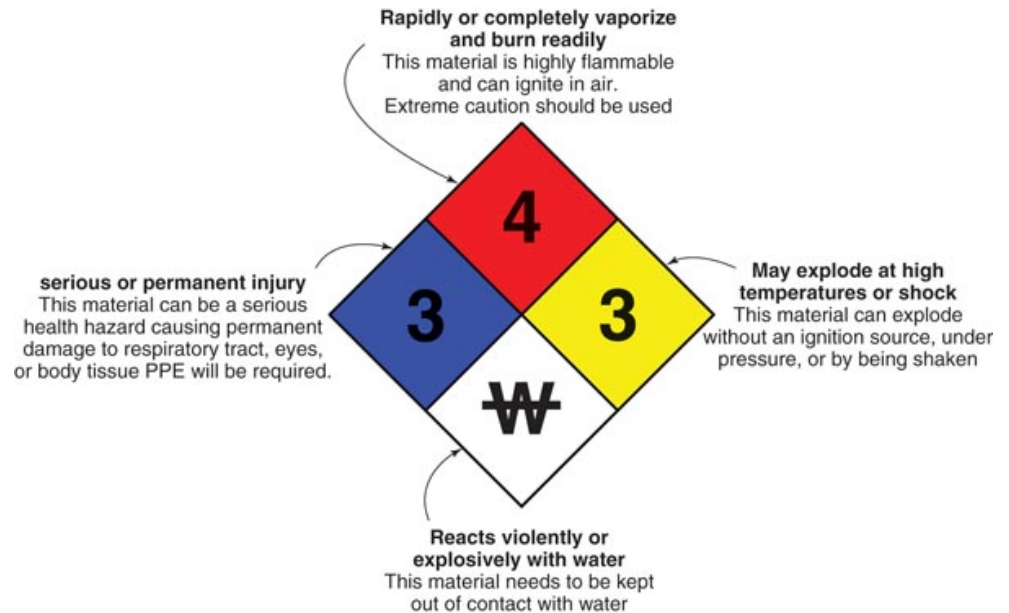
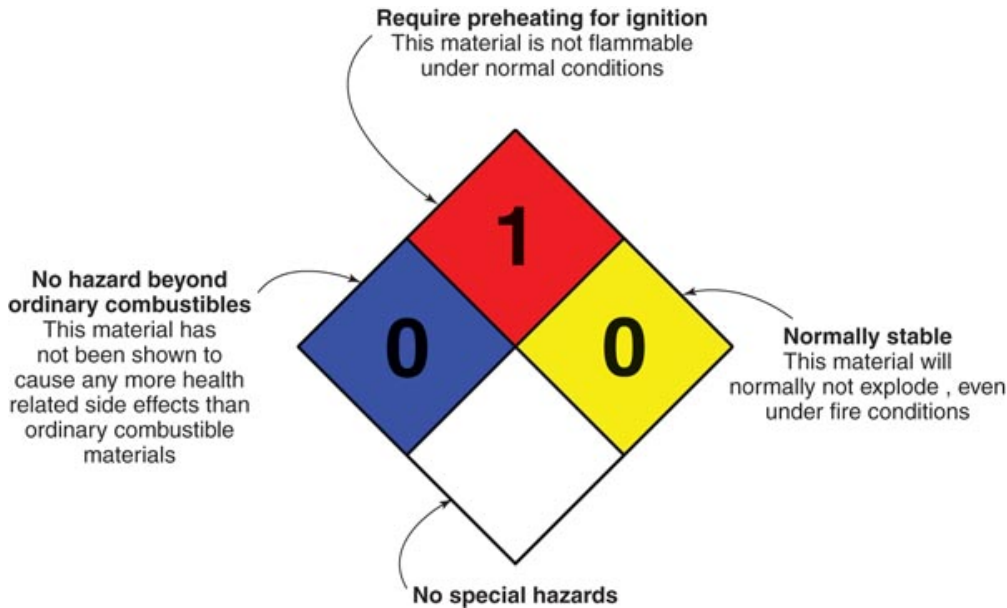


FIGURE 2.1.18 Explanation of the NFPA hazardous material rating system.

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FIGURE 2.1.19 Details of two sample NFPA hazard labels.

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Hazardous Materials (cont'd.)

- HMIS III
 - Like NFPA system
 - Uses colored bars and numbers from 0 (minimal hazard) to 4 (severe hazard)

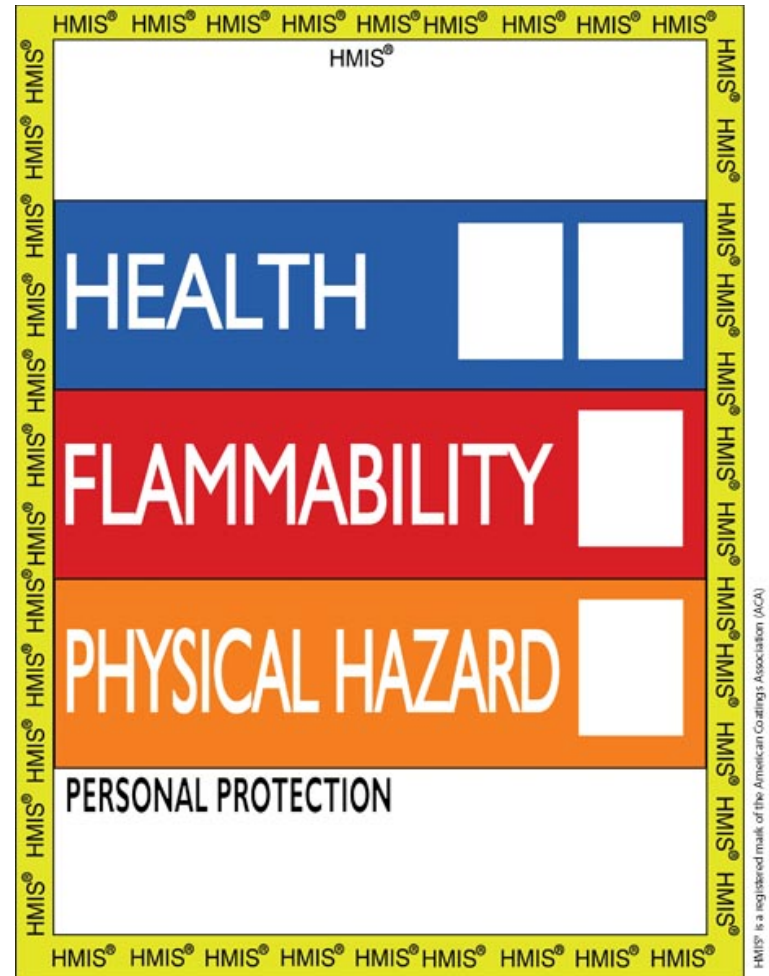


FIGURE 2.1.20 The HMIS III hazard label.

Hazardous Materials (cont'd.)

- SDS
 - Safety Data Sheet
 - OSHA requirement
 - Documents hazardous materials
 - Follows a specific 16-section format
 - Internationally recognized format

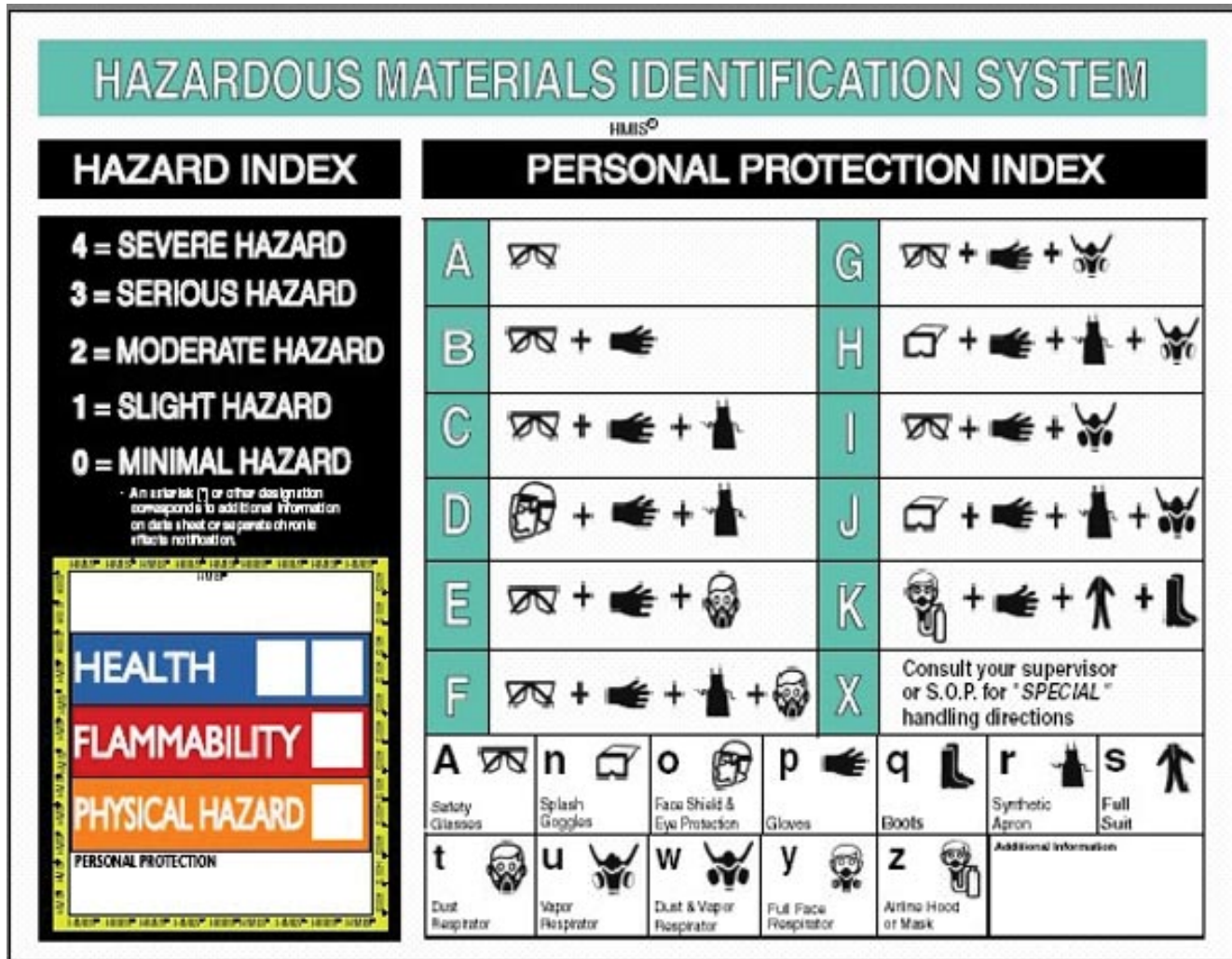


FIGURE 2.1.21 Explanation of the HMIS III rating system.

FIGURE 2.1.22 Explanation of two sample HMIS hazard labels.



Severe, possibly deadly hazard. Long-term health hazard shown by *.

Highly flammable material.

Material is very stable.

Requires use of splash goggles, gloves, protective apron, and vapor respirator during use.

HMIS® is a registered mark of the American Coatings Association (ACA)



Slight health hazard from exposure to this material. No long-term hazard.

Material will not burn.

Material is very stable.

Safety glasses required during use.

HMIS® is a registered mark of the American Coatings Association (ACA)

Fire Safety

- First goal is prevention
 - Know the factors needed for a fire
- Aim extinguisher at fuel, not flames
- If fire is beyond control, evacuate and notify emergency services

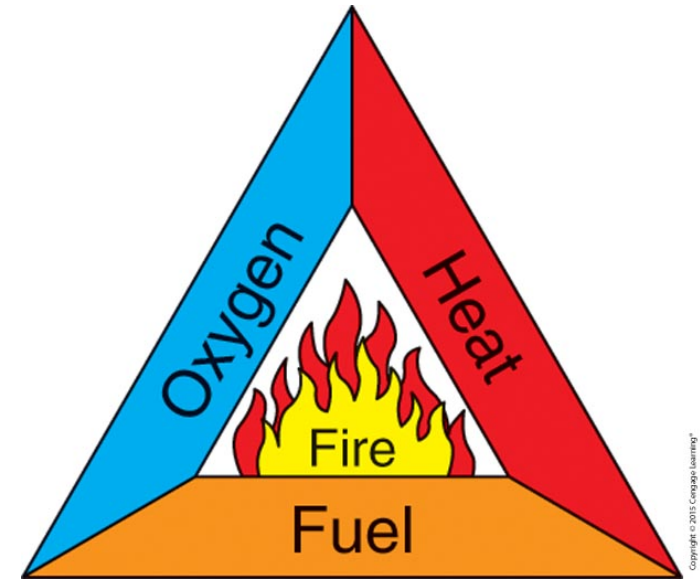


FIGURE 2.1.24 The fire triangle. All three sides must exist for a fire to burn. The job of a fire extinguisher is to remove one of those three elements..

Fire Safety (cont'd.)

- Five types of fires/extinguishers
 - Use the correct extinguisher type
 - Always check extinguisher labels



Common materials such as paper, wood, or most other combustibles



Flammable liquids such as gasoline, paint remover, or grease



Electrical fires



Combustible metals usually found in industry

Safety Documentation

- Different items are inspected at daily, weekly, monthly, and yearly intervals
- Checklists help inspections