

Table 4-9 MSDS and Explanatory Material**Hazardous Material Data Sheet****Hazardous Material:**

Shipping Name _____ DOT Hazard Class _____
Chemical Name _____ ID Number _____ STCC Number _____

Physical Description:

Normal Physical Form: Solid ___ Liquid ___ Gas ___
Color _____ Odor _____
Other _____

Chemical Properties:

Specific Gravity _____ Vapor Density _____
Boiling Point _____ °F Melting Point _____ °F
Vapor Pressure _____ psi or mmHg at _____ °F Expansion Ratio _____
Solubility: In water: Yes No Degree of solubility _____
Other _____

Health Hazards:

☐ Yes Inhalation Hazard: Yes No TLV/TWA _____ ppm (mg/m³) LC₅₀ _____ ppm/hr.
☐ No Ingestion Hazard: Yes No LD₅₀ _____ mg/kg
Absorption Hazard: Yes No Skin: Yes No Eyes: Yes No
IDLH Value _____ ppm/air(mg/m³) STEL Value _____ ppm/air(mg/m³)
Chronic Hazard: Carcinogen: Yes No Mutagen: Yes No Teratogen: Yes No
Hazardous to Aquatic Life: Yes No
Other _____
Decontamination Procedures: _____
First Aid Procedures: _____

Fire Hazards:

☐ Yes Flash Point _____ °F Ignition (Autoignition) Temperature _____ °F
☐ No Flammable (Explosive) Range: LFL (LEL) _____ % UFL (UEL) _____ %
Toxic Products of Combustion: _____
Other _____
Possible Extinguishing Agents: _____

Reactivity Hazards:

☐ Yes Reactive with what _____
☐ No Other _____

Corrosivity Hazards:

☐ Yes pH _____ Corrosive to what: Skin: Yes No Steel: Yes No Other _____
☐ No Other _____
Neutralizing Agents _____

Radioactivity Hazards:

☐ Yes Type Radiation Emitted: Alpha Particles _____ Beta Particles _____ Gamma Radiation _____
☐ No Other _____

Recommended Protection:

For Public (Evacuation distance _____, for _____ (quantity)) _____
For Response Personnel (Level of protection required _____) _____
For Environment _____

Table 4-9 MSDS and Explanatory Material—*cont'd*

HAZARDOUS MATERIAL

Shipping Name—the proper shipping name or other common name for the material; also any synonyms for the material.

DOT Hazard Class—the hazard class designation for the material as found in the Department of Transportation regulations.

Chemical Name—the chemical name of the material and its chemical formula.

ID Number—the four digit identification number assigned to a hazardous material by the Department of Transportation; also include the prefix “UN” or “NA.”

STCC Number—the Standard Transportation Commodity Code number used in the rail industry; a seven-digit number assigned to a specific material or group of materials and used in determination of rates; for a hazardous material, the STCC number will begin with the digits 49.

PHYSICAL DESCRIPTION

Normal Physical State—physical state or form of the material at normal ambient temperatures (68°F-77°F).

Color—the color of the material under normal conditions.

Odor—the odor of the material upon its release.

CHEMICAL PROPERTIES

Specific Gravity—the weight of a material is compared with the weight of an equal volume of water; if the specific gravity is less than 1, the material is lighter than water and will float; if the specific gravity is greater than 1, the material is heavier than water and will sink.

Vapor Density—the weight of a pure vapor or gas compared with the weight of an equal volume of dry air at the same temperature and pressure; if the vapor density is less than 1, the material is lighter than air and may rise; if the vapor density is greater than 1, the material is heavier than air and will stay low to the ground.

Boiling Point—the temperature at which a liquid changes its phase to a vapor or gas, i.e., it is the temperature where the pressure of the liquid equals atmospheric pressure.

Melting Point—the temperature at which a solid changes phase to a liquid; this temperature is also the freezing point depending on the direction of the change.

Vapor Pressure—the pressure exerted by the vapor within the container against the sides of a container; this pressure is temperature dependent; as the temperature increases, so does the vapor pressure, thus, more of the liquid evaporates or vaporizes; the lower the boiling point of a liquid, the greater vapor pressure it will exert at a given pressure.

Solubility—the ability of a solid, liquid, gas or vapor to dissolve in water; the ability of one material to blend uniformly with another, like a solid in liquid, liquid in liquid, gas in liquid, or gas in gas.

Degree of Solubility—indication of the solubility of the material

Other—any additional pertinent information or data found.

HEALTH HAZARDS

Are there any health hazards associated with the material? Mark “yes” or “no” as appropriate. If yes, then complete this section.

Inhalation Hazard—is there any hazard from breathing this material?

TLV/TWA—Threshold Limit Value/Time Weighted Average—the concentration of a material to which an average, healthy person may be repeatedly exposed for 8 hours each day, 40 hours per week, without suffering adverse health effects.

LC50—the concentration in ppm that kills 50% of the laboratory animals in a given length of time.

Ingestion Hazard—is there any hazard from ingesting (eating) this material?

LD50—the dose that kills 50% of the test animals; called “lethal dose.”

Absorption Hazard—is there any hazard from absorbing this material into the body?

Skin Absorption Hazard—can material be absorbed through the skin?

Eye Absorption Hazard—can material be absorbed through the eye?

IDLH Value—Immediately Dangerous to Life and Health Value—an indication of atmospheres which are immediately dangerous to life and health; atmospheres that within 30 minutes of exposure, death or irre-

Table 4-9 MSDS and Explanatory Material—*cont'd*

versible health implications to the person exposed are expected.

STEL Value—Short Term Exposure Limit—maximum allowable concentration, or ceiling, not to be exceeded during a 15 minute period.

Chronic Hazard—are there any chronic hazards associated with this material?

Carcinogen—a material that can cause cancer in an organism.

Mutagen—a material that creates a gene structure which is potentially capable of being transmitted to the offspring.

Teratogen—a material that affects the offspring when the embryo or fetus is exposed to that material.

Hazardous to Aquatic Life—is the material harmful to aquatic life?

Other—any additional pertinent information or data found.

Decontamination Procedures—“decontamination is the removal of hazardous materials from the skin, clothing, equipment, etc . . .”; the purpose of decontamination is to prevent or reduce the physical transfer of any contaminants by people or equipment from on-site to off-site locations. List methods available for decontamination for this material.

First Aid Procedures—what procedures should be followed for someone contaminated with this material?

FIRE HAZARD

Fire Hazard—will the material burn or support the combustion process of other materials? Mark “yes” or “no.” If yes, complete this section.

Flash Point—the minimum temperature at which a liquid gives off enough vapors that can be ignited and flash over but will not continue to burn without the addition of more heat.

Ignition (Autoignition) Temperature—the minimum temperature required to ignite gas or vapor without a spark or flame being present.

Flammable (Explosive) Range—the range of a gas or vapor concentration (percentage by volume in air) that will burn or explode if an ignition source is present. Limiting concentrations are commonly called the “**lower flammable (explosive) limit**” and the “**upper flammable (explosive) limit**.” Below the lower flammable limit, the mixture is too lean to burn; above the upper flammable limit, the mixture is too rich to burn.

Toxic Products of Combustion—the toxic byproducts of the combustion process. List them.

Other—any additional pertinent information or data found.

Possible Extinguishing Agents—what extinguishing agents are suitable for control extinguishment of a fire involving this material?

REACTIVITY

Reactivity—will the material react with any other materials? Mark “yes” or “no.” If yes, complete this section.

With what—what is the material reactive with and in what ways?

Other—any additional pertinent information or data found.

CORROSIVITY HAZARDS

Corrosivity Hazards—is the material corrosive to other materials? Mark “yes” or “no.” If yes, complete this section.

pH—acidic or basic corrosives are measured to one another by their ability to dissociate in solution; those that form the greatest number of hydrogen ions are the strongest acids, while those that form the hydroxide ion are the most potent bases; the measurement of the hydrogen ion concentration in solution is called the pH of the compound in solution; strong acids have low pH values and strong bases have high pH values; the pH scale ranges from 0-14.

Corrosive to What—materials with which the material is corrosive, particularly skin and steel.

Other—any additional pertinent information or data found.

RADIOACTIVITY HAZARDS

Radioactivity Hazards—will the material emit radiation? Mark “yes” or “no.” If yes, complete this section.

Type of Radiation Emitted—indicate the type of radiation emitted, either alpha particles, beta particles or gamma radiation.

Other—any additional pertinent information or data found.

Table 4-9 MSDS and Explanatory Material—*cont'd*

RECOMMENDED PROTECTION

For Public—recommended action to protect public health and safety; indicate evacuation distances for various amounts of the material.

For Response Personnel—level of protection required for emergency response personnel working in danger zone.

Level A—requires the highest level of respiratory, skin eye protection; that is, a fully encapsulating protective suit with its own self-contained breathing apparatus.

Level B—requires the highest level of respiratory protection, but a lower level of skin protection; it is the minimum level recommended on initial entries until the hazards have been further identified and defined by complete monitoring, sampling and chemical analysis.

Level C—requires air purifying respirators with adequate protection factors. Coveralls and other protective equipment may be required; this level is selected when types and concentrations of respirable materials are known to have adequate warning properties.

Level D—requires no respiratory protection; basic work clothing should be worn when sites are positively identified as having no toxic hazards.

For Environment—potential mitigation schemes to protect the environment.

Source: Recognizing and Identifying Hazardous Materials, Participant Manual, 2nd ed, Federal Emergency Management Agency, U.S. Fire Administration, Nation Fire Academy, U.S. Government Printing Office, Washington, D.C., 1995.