M.S.D.S Explanation by Section

Section No. I:

Manufacturer's name and address: This is self-explanatory; however, if sources of data are provided by other than that of the manufacturer on the substance of mixture, the actual source of data should be listed in this section.
Emergency telephone number: Entries herein include those telephone numbers that can be used to obtain further information about hazardous substance or mixture in the event of an emergency.
Chemical name and synonyms: This generally includes names that the product is sold by.
Chemical family: Listed will be the general class of compounds to which the hazardous substance or mixture belongs, i.e.; ethers, acids keytones, etc.
Formula: Entries here will generally include the chemical formula for the single elements and compounds, not the formulation of a mixture: examples of chemical formulas are sulfur dioxide (SO2), sulfuric acid H2 (SO4), formaldehyde (HCHO), etc.

Section No. II:

Hazardous Ingredient: By definition, a hazardous ingredient is a substance or form of substance in a mixture, in sufficient concentration to produce a flammable vapor or gas, or produce acute or chronic adverse effects on a person exposed to the product either in normal use or predictable misuse of it.

In this section the six categories under the heading are self-explanatory.

Note: TVL stands for the Threshold Limit Value, a term used to express the highest airborne concentration of substance to which all persons (usually adults) can be repeatedly exposed to, day after day without experiencing adverse effects.

TO'S may be expressed in parts of a material per million parts (PPM) of air by volume for gases and vapors or as milligrams of materials per cubic meter (mg/M^3) of air dust and mist as well as gases and vapors.

The percentage by volume column is intended to show the approximate percentage or volume each hazardous substance consists of when compared to the total weight or volume of the product. Normally, percentages will be listed to the nearest 5%. When the substance constitutes less than 5% of a product, it should be indicated as such.

Alloys and Metallic Coatings: Entries under this general heading include coatings such as painting, cladding and metalizing. Filler metal is any metal

added in making a brazed, soldered or welded joint. Filler metals will be considered with the ingredient of rod coatings and core fluxes as a single mixture.

Percentage: Exception for mixtures such as filler metals and air coatings and core fluxes, in which hazardous substance constitutes a very small portion of the mixture, the hazardous substance shall be stated to the nearest 0.5% and any ingredient constituting less than 0.5% should be indicated as such.

Section No. III - Physical Data

Boiling Point: This is the temperature at which a liquid changes to a vapor state at a given pressure. Usually stated in degrees Fahrenheit at sea level pressure of 760 millimeters of mercury. For mixtures, the initial boiling point or boiling range may be given.
Vapor Pressure: This is the pressure exerted by a saturated vapor above its own liquid in a closed container, usually in millimeters of mercury at 68 degrees Fahrenheit or 20 degrees Celsius.
Solubility in Water: In the percentage of material (by weight) that will dissolve and distill water at ambient temperature of 68 degrees Celsius.
Specific Gravity: The ratio of weight of the volume of material to the weight of an equal volume of water at 39.2 degrees Fahrenheit.
Percentage Volatile by Volume: Percentage of liquid or solid (by volume) that will evaporate at an ambient temperature of 70 degrees Fahrenheit.
Evaporation Rate: The rate at which a particular material will vaporize (evaporate) when compared to the rate of evaporation of a known material, usually butyl acetate. If another known material is used for comparison, that information should be provided.
Appearance and Odor: A brief description of the material by normal room temperature and atmospheric conditions, such as viscous, colorless liquid with aromatic hydrocarbon odor.

Section No. IV - Fire and Explosion Data

Flash-point Method Used: The lowest temperature in degrees Fahrenheit, at which a liquid will give off enough flammable vapors to readily ignite. Since flash-points vary according to how they obtain the method used must be listed. The methods most extensively include tag close cup (TCC), pinsky-Martins close cup (PMCC) and setaflash (SETA).
Flammable or Explosive Limit: The range of concentration over which a flammable vapor mixed with proper proportions of air that will flash or explode if an ignition source is present. The range extends between 2 points designated lower explosive limit (LEL) and the upper explosive limit (UEL), are expressed in percent of volume of vapor in air.

Extinguishing Media: The fire fighting substances determined to be suitable for use on the specific material that is burning. The fire fighting substance should be indicated by a generic name such as water, fog, foam, alcohol foam, carbon dioxide, dry chemical, etc.
Special Fire Fighting Procedures and Precautions: When certain fire fighting substances are determined to be unsuitable or unsafe if used to control a specific type of burning material, they should be listed. Special handling procedures and personnel protective equipment should also be listed in this area.
Unusual Fire and Explosive Hazards: Under this heading should be listed hazards which might occur as a result of overheating or burning of a specific material. This should include any chemical reactions or change in chemical form or decomposition. Also included should be any special hazards that may need to be considered while extinguishing a fire with one of the available types of extinguishing substances.

Section No. V - Health Hazard Data

Threshold Limit Values: The most current figures of the American Conference of Government Industrial Hygienist (ACGH) used to express airborne concentration of material to which all persons can be exposed to day-after-day, without adverse effect. Threshold limit values (TVL) may be expressed in three ways: Time Weight Average (TWA) based on an allowable concentration exposure average of over a normal eight hour workday or 40 hour workweek. Short term exposure limit (STEL) or maximum concentration for continuous 15 minute exposure periods not to exceed four such periods per day and the ceiling exposure limit (CEL), the exposure which should not be exceeded under any circumstances.
Effects of Over-Exposure: This is a list of the most common sensations or symptoms a person could expect from over-exposure to a specific material or it components.
Emergency and First-Aid Procedures: The emergency instructions for treatment of a victim of an acute inhalation, ingestion in skin or eye contact with specific hazardous substances or its components. The listed items should be for emergency procedures only, as a doctor should examine the victim as soon after exposure as possible.

Section No. VI - Reactive Data

Stability: The checked box will indicate whether the subject material is stable or unstable under any reasonable foreseeable conditions of storage, handling or use/misuse. If checked unstable, those conditions that could result in a dangerous reaction or decomposition should be listed including temperature above 150 degrees Fahrenheit, etc.
Incompatibility: A list, if any, of those common materials or contaminants, with which the specific material could easily and reasonably be expected to come in contact with and produce a reaction or decomposition, which would release large amounts of energy, flammable vapor gas, or to produce toxic vapors or gas.

Conditions to avoid, if any, should also be listed, i.e., extreme temperatures, jarring, inappropriate storage, etc. If no common incompatible materials, contaminants or conditions are applicable, the boxes should indicate NONE.
Hazardous Decomposition Products: A list, if any, of hazardous materials that may be produced in dangerous amounts if the subject material is exposed to burning, oxidation, heating or allowed to react with other chemicals.
Hazardous Polymerization: This is a chemical reaction in which two or more molecules of a substance combined to form repeating structural units of the original molecule and resulting in an energy level change. A hazardous polymerization is a reaction, with an extremely high uncontrollable release of energy. The box should indicate whether or not a hazardous polymerization can occur and if so, the reasonable foreseeable condition, which could start the reaction, should be listed. The list should also include the expected time period in which inhibitors in the product may be used up.

Section No. VII - Spill or Leak Procedures

Steps to be taken in case of material being released or spilled: List should include the method to be used to control and clean-up spills and leaks, applicable precautions such as avoid breathing of gases and vapors; contact with liquids and solids; removing sources of ignition, etc. The list should also include the need, if any, for special equipment to be used for clean-up such as glass or plastic scoop, etc.
Waste Disposal Methods: This section should describe acceptable, as well as prohibitive methods for disposing of spills, solids or liquids, such as flushing with water, returning to the container, burning, etc. This section should also alert the user to any potential danger to the environment such as effects on general population, crops, water supplies, etc.

Section No. VIII - Special Protection Information

Respiratory Protection: Whenever respiratory protection devices may be needed during routine or unusual conditions to protect persons from over exposure to a specific substance, the class of the device acceptable for use and any specific condition of use or limitation should be listed.
Ventilation: Whenever ventilation is needed to capture or contain contaminants at their source as a means of controlling personnel exposure to a specific substance or to prevent the build up of an explosive atmosphere, the appropriate type of ventilation system should be listed along with any applicable conditions of use or limitations.
Protective Gloves: Many solvents can easily penetrate through rubber or neoprene, so whenever gloves are necessary to prevent skin exposure while handling a specific substance or material, special glove design, construction and material requirements should be listed, if appropriate.
Eye Protection: There are many types of eye and face protection devices on the market and for almost any type of hazard encountered, there is a suitable type

available. When eye and face protection beyond that as general use, industrial safety glasses are necessary, while handling or otherwise exposed to specific substances or mixtures, such special protective devices should be listed along with any conditions of their use or limitations.

Section No. IX - Special Precautions

Precautions to be taken in Handling or Storage: Any additional or special precautions not addressed elsewhere in the MSDS should be listed here. This list may include such items as handling or storage to avoid reactive hazards, safe storage life for the product in relation to reactivity, special packaging requirements, temperature control, etc.
For Other Precautions: This is a catch all category for all other precautions not covered elsewhere in the MSDS.