Making Sense of Material Safety Data Sheets
OSHA’s Most Frequently Cited Standards - Right to Know

One of the requirements of OSHA’s Hazard Communication standard (or in Minnesota, the Right to Know law) is maintaining material safety data sheets (MSDS). Every time you order a new chemical, your supplier sends you the MSDS for that product. If you’re like many business owners, you shove the data sheet into a file drawer, hoping never to need it and wondering what you would ever use it for. Believe it or not, these things can be useful.

The MSDS is supposed to be a simple summary of the hazards and handling precautions for any product that contains a hazardous ingredient. It is prepared by the manufacturer. Although the MSDS must contain certain information, it can be in any format. OSHA has a suggested format, but it is not mandatory, so MSDSs will vary in length and content.

Data sheets are meant to provide technical information to safety and health professionals, such as industrial hygienists or occupational physicians, as well as information to product users. Because of that, they can seem too technical, unless you know what to look for. What’s actually useful? How can you use the information the MSDS provides? Grab a data sheet for a product you use and follow along:

**Product Identification**
The MSDS will give the manufacturer’s name for the product, which may not be what your employees usually call the stuff. For instance, toluene could be called paint thinner or toly at your shop. The data sheet will also give the manufacturer’s name and address. Because you may need more information if the material spills, or if it is splashed into an eye or swallowed, an emergency telephone number must be provided.

**Ingredients**
The ingredients section may list all ingredients or only those that are hazardous. A hazardous ingredient is one found to cause harmful effects in one study. So even ingredients not likely to cause any harm in this product could be listed, if they make up at least 1% of the product (or 0.1% if they are suspected of causing cancer). Manufacturers are not required to list percentages, but many do. They may also include a CAS number, the Chemical Abstracts Services number, which is a unique identifier for each chemical. Chemicals could be known by different names (for instance, toluene and toluol are the same chemical), but each chemical will have only one CAS number.
Exposure limits will be included. The OSHA PELs (Permissible Exposure Limits) are the highest air concentrations to which employees may be exposed. ACGIH TLVs (Threshold Limit Values) are not mandatory limits, but are recommended limits set by a private organization of industrial hygienists, ACGIH. Both PELs and TLVs are usually given as eight hour time weighted average exposures, TWAs. If you have air monitoring done, the industrial hygienist would compare the concentrations found in your shop to these legal or recommended exposure limits.

You can use this information about ingredients to see what products contain the same chemicals. Those that do are likely to have the same hazards. A physician or industrial hygienist will need this information when looking at a health problem blamed on chemical exposure. The industrial hygienist will also use this information when doing Right to Know training, to group products by chemical type (similar chemicals will have similar hazards).

**Physical Data**
Physical data about the product describes what it looks like and how it behaves. What is its vapor pressure? The closer that is to 760 mmHg, the more the substance will act like a gas. If it has a vapor pressure less than 1 mmHg, it will not evaporate readily. That means breathing it in is less likely to be a problem. Will it dissolve in or mix with water? If not, you’ll know that water can’t be used to clean it up. Will it float on top of water or sink? If it has a specific gravity less than one, it is lighter than water. Is a pH listed? Less than 2, and the product is very acidic; more than 12, and it is very alkaline. Burns could be a problem then.

**Fire and Explosion Hazard Data**
Do you need to worry about the flammability of the product? The flash point is the lowest temperature at which the product will even momentarily ignite. If it is less than 100 °F, the product is flammable. The upper and lower flammable or explosive limits (UFL/LFL or UEL/LEL) provide the air concentration range capable of supporting fire. If air concentrations are in this range, even a small spark could cause an explosion. That is most likely in a tank or pit with limited ventilation or right at the surface of a spill of the material.

The MSDS will tell you how to deal with a fire involving this product, such as what type of fire extinguisher to use and if there certain things you do not want to do in a fire An example: if a product is lighter than water and does not mix with water, spraying water on it would scatter the flames.

**Reactivity**
Nearly all products found in body shops and service stations are stable. They do not blow up easily when dropped, exposed to air, or mixed with water. The reactivity section will tell you if you do need to worry about that or if there are other substances, if mixed with this product, that could cause a violent reaction. You would not want to store the product near a substance with which it could react. Any harmful gases produced in a fire or from a reaction with an incompatible material will be listed as hazardous decomposition products. A welder, burning off paint before making a weld, would be exposed to the hazardous decomposition products of the paint.
Health Hazards
What harm can the product do, from short term (acute) or long term (chronic) exposure? What happens if some gets in the eye? What first aid should you provide? Just because a hazard is listed here, it does not mean that anyone who works with the product will be harmed. But these will be the harmful effects that could occur if the product is misused or if your controls are not effective.

Spill Response
The MSDS probably will say little about disposal other than to do it legally. That is because hazardous waste rules differ from one state to another. The data sheet will tell you what to do in case the material spills. Review this when you first receive the product, so you are prepared, in advance, to handle a spill. It is easier to handle a small spill, quickly contained, than one that has entered the sewer or forced a building evacuation.

Special Protection/Personal Protective Equipment
MSDSs are supposed to list the protective equipment needed to work safely with the product, but manufacturers don’t know your exact conditions. Some manufacturers are good enough to list specific types of gloves that they know are resistant against their products (no glove will protect against all chemicals). That could be the only really useful information in this section. Use it as a rough guideline to the protective measures required, but remember that it is rarely specific enough for your workplace.

Special Precautions
Any special handling precautions or storage precautions will also be included on the MSDS.

Other
Data sheets often will give environmental hazard information, too. For instance, the product could contain materials that must be reported under Community Right to Know laws (although that applies only if you have more than the threshold amounts).

Look at the new material safety data sheets you receive, especially for new products. If it is a new MSDS for an old product, discard the obsolete data sheet. Check what the product fire, reactivity, and health hazards could be. Be prepared for a spill. Make sure the product is stored correctly. And be sure you can find the MSDS in an emergency, for instance, if one of your workers is injured by the material.

This article is intended to provide general information (not advice) about current safety topics. To discuss your specific concerns and how CHESS may help, please contact CHESS at 651-481-9787 or at chess@chess-safety.com.