

# **MATERIALS INFORMATION and TECHNICAL RESOURCE for ARTISTS**

## **Forum Topics and Sections: Health and Safety**

Health and safety in the art studio is dependent upon the artist's choice of materials, work habits, and studio conditions. The mitigation of health risks begins with knowledge of materials and of proper waste disposal procedures.

These are initial steps that an artist can take to ensure that the studio is a safe environment in which to work:

- Maintain an inventory of all chemicals in the studio. This inventory should include an estimate of quantities and a Safety Data Sheet (SDS) or Material Safety Data Sheet (MSDS) for each chemical. [NOTE: See section "How to read an SDS/MSDS sheet" for additional information]
- Properly label and date all containers [Note: See section "Appropriate methods for labeling" for additional information]
- Create a safe studio environment. This means being equipped with appropriate gloves for the materials used, eye protection if noxious chemicals are to be used for an extended period, appropriate face masks and/or respirators for both particulate matter and noxious fumes, proper cross-ventilation systems, and a local fume exhaust system if solvents are often used.
- Provide for waste disposal by considering the nature and quantity of waste that will be generated by a project, storing and separating waste containers and/or materials according to the Environmental Protection Agency's (EPA) recommendations [Note: see sections with EPA recommendations and tips on "Proper waste disposal" for additional information]
- Consider using alternate methods and techniques that limit the need for hazardous materials. Think about what quantities of hazardous materials are actually needed and whether material can be reused.

### **HOW TO READ AN "SDS/MSDS" SHEET**

In 2015, the Occupational Health and Safety Administration's (OSHA) Hazard Communication Standard (HCS) was revised to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)-- an international system created by the United Nations beginning in 1992 -- resulting in changes to the OSHA Material Safety Data Sheet (MSDS). An MSDS is a document that should be kept with a chemical at all times. It provides information about handling, disposal, and toxicology. A number of different MSDS styles and formats were used in the U.S. in the years before OSHA adopted the GHS which mandated the use of a single 16 section format for safety data sheets (SDS). This change brought about the renaming of the MSDS to SDS.

Safety Data Sheets provide information about the safe handling and storage of materials. Check that sections 1 and 3 of the SDS sheet match the information on the material's container. Section 3 contains the CAS (Chemical Abstracts Service) Registry Number which is a unique identification number for each specific substance.

The sixteen sections are grouped into four larger categories. Sections 1 - 3 address the question: What is the material and its composition what do I need to know immediately in an emergency. Sections 4 - 6 address the question: What measures should I take if a hazardous situation occurs. Sections 7 - 11 address the question: How can I prevent hazardous situations from occurring. Sections 12 - 16 provide useful information such as ecological information and considerations before disposing and transporting the chemical.

Of Sections 1-3, the most important section is Section 2 entitled "Hazards Identification," which provides an overview of the physical and health hazard risks of the material. The pictograms associated with Section 2 are easily recognizable signs (e.g., flame, exclamation point, exploding bomb) for distinct hazards.

Section 4 provides information about the measures that should be taken to provide immediate first aid. Section 5 is intended for firefighters. It provides suitable extinguishing techniques and includes the flash point of the material (the lowest temperature at which enough vapor is present to form an ignitable mixture with air). Section 6 provides information on how best to clean up a spill.

Sections 7 - 11 address the question "How can I prevent hazardous situations from occurring". They cover handling and storage, recommendations for personal protective equipment (PPE), physical and chemical properties, reactions and shelf life, and toxicological information for both short and long-term exposure.

## **APPROPRIATE METHODS FOR LABELING**

It is extremely important to label chemicals. OSHA requires that all hazardous chemicals be labeled with an appropriate warning that includes the identity of the chemical, the level of risk it poses (including target organs affected), special hazards it presents, and the PPE that should be used when handling the chemical.

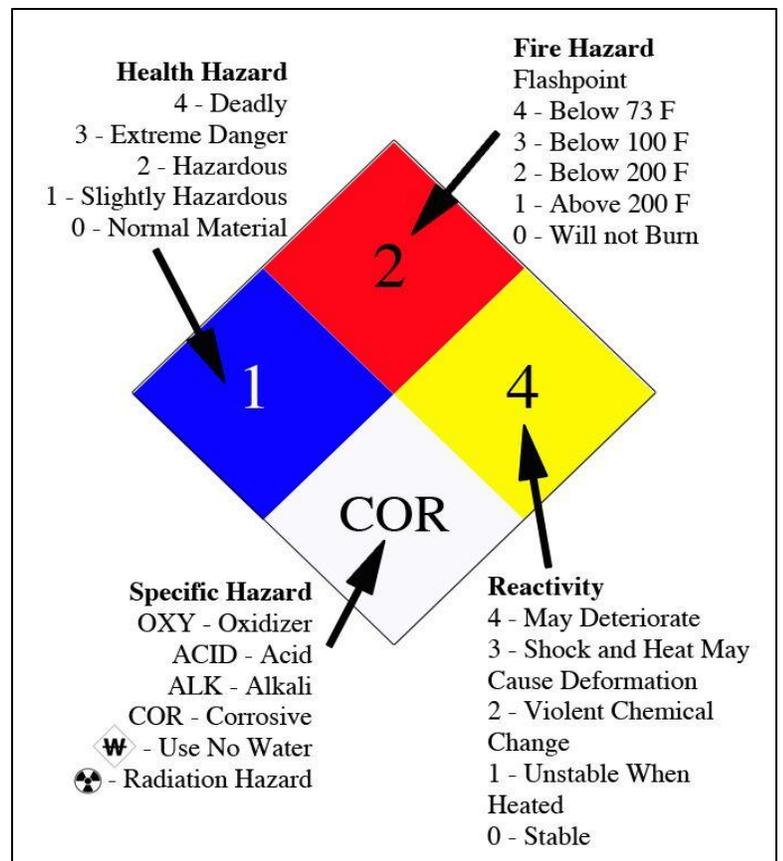
Labels produced by an electronic label maker or label center are sufficient, but they should be covered with a strip of clear polyester overlay or tape to protect them from splashes and/or water damage. In addition to labeling individual containers, it is recommended that there be in the studio a wall chart in view that explains the hazard identification system and provides other useful information.

While most artist materials manufacturers use the Art and Creative Materials institute (ACMI) Approved Product (AP) and Cautionary Label (CL) seals for their labels, some companies including

Golden Paints have their own labels that indicate whether a product is hazardous. One should be familiar with a manufacturer's labeling system prior to using and disposing of any of its products.

## Pictograms, Labels, and their Associated Hazards (Courtesy of the AIC Health and Safety Committee)

Health Hazard	Flame	Exclamation Mark
		
<ul style="list-style-type: none"> <li>• Carcinogen</li> <li>• Mutagenicity</li> <li>• Reproductive Toxicity</li> <li>• Respiratory Sensitizer</li> <li>• Target Organ Toxicity</li> <li>• Aspiration Toxicity</li> </ul>	<ul style="list-style-type: none"> <li>• Flammables</li> <li>• Pyrophorics</li> <li>• Self-Heating</li> <li>• Emits Flammable Gas</li> <li>• Self-Reactives</li> <li>• Organic Peroxides</li> </ul>	<ul style="list-style-type: none"> <li>• Irritant (skin and eye)</li> <li>• Skin Sensitizer</li> <li>• Acute Toxicity (harmful)</li> <li>• Narcotic Effects</li> <li>• Respiratory Tract Irritant</li> <li>• Hazardous to Ozone Layer (Non Mandatory)</li> </ul>
Gas Cylinder	Corrosion	Exploding Bomb
		
<ul style="list-style-type: none"> <li>• Gases under Pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Skin Corrosion/ burns</li> <li>• Eye Damage</li> <li>• Corrosive to Metals</li> </ul>	<ul style="list-style-type: none"> <li>• Explosives</li> <li>• Self-Reactives</li> <li>• Organic Peroxides</li> </ul>
Flame over Circle	Environment (Non Mandatory)	Skull and Crossbones
		
<ul style="list-style-type: none"> <li>• Oxidizers</li> </ul>	<ul style="list-style-type: none"> <li>• Aquatic Toxicity</li> </ul>	<ul style="list-style-type: none"> <li>• Acute Toxicity (fatal or toxic)</li> </ul>



## GLOVES, MASKS, AND VENTILATION SYSTEMS

### *Gloves*

When skin will be exposed to paint and solvents, gloves and long sleeves should be worn. While a number of barrier creams exist (such as Kerodex 71, Marianne's SkinSafer Barrier Cream, Gloves in A Bottle, or EZ Air Invisible Care) please note that gloves provide a greater degree of protection, particularly for those who intend to use solvents and/or work over an extended period.

Gloves are available in a variety of materials including nitrile, latex, neoprene, and butyl. No single type of glove is appropriate for all chemicals. Non-disposable gloves usually provide good chemical barriers and can withstand more stress than disposable gloves. However, they need to be cleaned after each use. Even when using gloves, artists should take measures to prevent splashes and inhalation of chemicals.

### **Glove Recommendations for Common Chemicals**

<b>Chemical</b>	<b>Recommended gloves for 8 or more hours of protection</b>	<b>Recommended gloves for 4 or more hours of protection</b>
<b>Acetone</b>	Butyl, North Silver Shield	Butyl, North Silver Shield
<b>Ammonium hydroxide (30-70%)</b>	Butyl	Neoprene, Nitrile
<b>Benzene</b>	Polyvinyl alcohol, North Silver Shield	Polyvinyl alcohol, North Silver Shield
<b>Benzyl alcohol</b>	Butyl, North Silver Shield	Nitrile
<b>Ethanol (ethyl alcohol)</b>	Butyl, North Silver Shield	Neoprene
<b>Hydrogen peroxide (30-70%)</b>	Butyl, Rubber, Neoprene, Nitrile, Polyethylene	Polyvinyl alcohol, North Silver Shield

<b>Isopropanol</b>	Butyl, Neoprene, Nitrile, North Silver Shield	Neoprene, Nitrile, North Silver Shield
<b>Mineral Spirits</b>	Nitrile, North Silver Shield	Polyvinyl alcohol
<b>Toluene</b>	Polyvinyl alcohol, North Silver Shield	Polyvinyl alcohol, North Silver Shield
<b>Turpentine</b>	North Silver Shield	Polyvinyl alcohol

### ***Face Mask Protection***

The N95 respirator is the most common of the seven types of particulate filtering face masks. The “N” means that the mask is not resistant to oil and “95” is the percentage of particulate matter the mask blocks one from inhaling. Thus, when working with oils, one should use a mask that is labeled “R95”-- resistant to oils and blocks 95% of airborne particles.

Both masks and respirator filters are labeled according to this system. A dust mask does not offer protection from vapors, so one who works with materials that give off fumes and vapors might need to use a respirator with a cartridge and filters. Details about specific respirators and filters can be found in the fact sheet produced by the American Institute for Conservation (AIC) Health and Safety Committee. A general guideline is to use N100 or HEPA (High-efficiency particulate arrestance) cartridges when working with asthmagens or carcinogens.

A respirator must be fit to the individual who will be using it. If it doesn't fit properly, contaminated air can leak in. There are three components to a fitting: a medical evaluation conducted by a health care provider, a training lecture, and the actual fit test.

To reduce exposure to harmful dust particles, a vacuum with a HEPA filter or a wet mop should be used to clean studio floors. Sweeping is not recommended as it moves dust around and increases the risk of inhaling materials that are considered unsafe to breathe.

### **Chart Summarizing Specifications Associated with Certain Types of Respirators/Air Filters**

<b>Face Respirators Model/Type (Number indicates % of particulate matter that is blocked)</b>	<b>Types of Contaminants</b>	<b>Effective Period of Use</b>
<b>N-Series</b>	<b>Non-Oil Aerosols</b>	

<b>N-95</b>	Solid and water-born particles (e.g. mold, frass, animal excrement, metallic dust, some insecticides)	Dependent on hygiene, external damage/wear of respirator, and breathing resistance.
<b>N-99</b>		
<b>N-100</b>		
<b>R-Series</b>	<b>Oil and Non-Oil Aerosols</b>	
<b>R-95</b>	Oil mists (e.g. lubricants, glycerin, wood finishing oils) and non-oil aerosols (e.g. solvent-based sprays)	Approximately 8 hours. If non-oil aerosols are present, similar limits apply as with the N-series.
<b>R-99</b>		
<b>R-100</b>		
<b>P-Series</b>	<b>Oil and Non-Oil Aerosols</b>	
<b>P-95</b>	Oil mists (e.g. lubricants, glycerin, wood finishing oils) and non-oil aerosols (e.g. solvent-based sprays)	Check with manufacturer. If non-oil aerosols are present, similar limits apply as with the N-series.
<b>P-99</b>		
<b>P-100</b>		
	<b>Oil and Non-Oil Aerosols</b>	
<b>Powered High Efficiency Particulate Air Filter (HEPA)</b>	Oil mists (e.g. lubricants, glycerin, wood finishing oils) and non-oil aerosols (e.g. solvent-based sprays)	Dependent on hygiene, external damage/wear of respirator, and maintaining the proper air flow as indicated by the flow meter/low air flow alarm.

### ***Studio Ventilation Systems***

Proper extraction involves a displacement system. Window fans, air conditioners, and portable filter-based fume extracts may not always provide sufficient ventilation from certain noxious and/or hazardous materials. Filter-based fume extractors can be a more effective option at reducing the accumulation of vapors but typically only clean an immediate working space as opposed to an entire studio. Filters are specifically manufactured depending on the types of materials that are being extracted from the environment and also need to be replaced over time. (consult your manufacturer for more information). It is recommended that artists work in an environment that possesses a directional air flow (with the airflow carrying noxious fumes away from the immediate working space) possibly in combination with a portable fume-extractor. Portable spray booths are also available and recommended for artists who routinely varnish their works.

## WASTE DISPOSAL

Considerations about waste disposal should begin when products are purchased. It is beneficial for our environment and for those who inhabit it when the byproducts of creative endeavors are kept to a minimum.

### Tips on how to reduce waste

- Purchase products in the optimal container size. If you buy too small a container, you will have to purchase more resulting in more packaging wastes. If you buy too large a container, you risk having more than can be used or having the product fail during storage.
- Use work practices that minimize the waste of paint. For acrylics, use a moisturizing palette and keep the paint covered as much of the time as possible.
- Store products to maximize shelf life. Avoid extremes of temperature especially freeze-thaw cycles. Make sure lids are tightly closed. Clean dried paint from the threads of jars and lids before closing to help get a better seal.
- If products are usable but are no longer needed, give them to someone who can use them. Many nonprofit organizations with art and craft programs would appreciate a donation of properly labeled nontoxic materials.
- Recycle old acrylic paintings. Apply a new gesso ground and use them for studies or to practice varnishing techniques.

Waste should be disposed in the manner that has the least negative impact on our environment. However, it is necessary to consider the legal requirements for disposal. These depend on the nature of the waste, where it originates, and who is responsible for it. Household waste generally has less strict restrictions on disposal than manufacturing or commercial waste. Questions about whether a material should be considered “hazardous waste” and the best method for its disposal should be directed first to the manufacturer and then to state or local waste management authorities.

The Environmental Protection Agency (EPA) categorizes hazardous wastes as Ignitable, Corrosive, Reactive, or Toxic.

**Ignitable waste** is material that burns readily. This category includes liquids with specific flash points, oxidizers, materials that can cause spontaneous chemical change, ignitable compressed gases.

**Corrosive waste** is material of a specified acidic or basic nature or liquid that can corrode steel at a particular rate

**Reactive waste** is material that is normally unstable and undergoes violent chemical changes, can react violently with water to form potentially explosive mixtures, or can generate dangerous or lethal gases.

**Toxic waste** is material that has toxic, carcinogenic, mutagenic, or teratogenic effects on humans or other life forms. This category contains heavy metals, organic toxicants, or pesticides at a particular level determined by EPA established methods.

The category into which a waste falls determines the method of disposal. When disposing of potentially hazardous materials read the SDS or MSDS sheets (if the newer SDS sheets are not yet available), consult the EPA website, and use your best judgment.

It is illegal to pour hazardous waste materials such as the paint thinners, turpentine, mineral spirits, and other solvents down a sink drain or toilet. Solvents can corrode plumbing, build up in pipes leading to prolonged off-gassing, and contribute to the build-up of hazardous environmental waste in local groundwater or bodies of water.

Artists should use caution when disposing of chemicals. On a label which states that a product is “non-hazardous”, it is “non-hazardous” only when the material is used as directed. Some chemicals will continue to off-gas after disposal and may react with other chemicals. Two chemicals which are individually labeled as “non-hazardous” can react and create a very hazardous material. An example of this is the explosion that occurred when toilet bowl cleaner and latex paint were mixed together at a waste disposal company.

**The following materials should not be poured down the drain or thrown into a landfill:**

**AEROSOL CANS:**

Full or partially full aerosol cans contain hazardous substances and should not be thrown away, recycled, or composted. Aerosol cans should be taken to a Hazardous Waste Collection Center or donated for reuse. Only if they are completely discharged, may they be recycled.

**RINSE WATER:**

Rinse water from water based-paints can contain can (depending on the pigments) contain toxic elements. Residues left behind by certain binders (i.e. acrylics) should also be considered.

**BRUSH WASH/SOLVENT WASTE:**

Solvent and/or oil-based materials used to clean oil, alkyd, or other non-aqueous based paints can (depending on the pigments) contain toxic elements. Solvents obviously need to be properly disposed of as well following the guidelines cited above.

**PAINTS AND PIGMENTS:**

Both water and oil based paints contain ingredients such as heavy metals, preservatives, oils, and toxic chemicals which require special methods of disposal.

**RAGS AND CLOTHS:**

Rags and cloths stained with chemicals and/or paint should not be thrown away, recycled, or composted. It is recommended that they be immersed in water in a closed container or sealed

plastic bag. Rags or tarps that are soaked with solvents are very flammable and should be placed in a metal, flame-proof container and allowed to dry in an open or well ventilated space.

### **What is the reaction that causes piles of paint rags to catch fire?**

Cloth materials such as towels, rags, and chemical drop-cloths that have been stained with paints, chemicals, mediums or solvents have the potential to catch fire because drying oils (e.g. linseed, walnut, poppy seed), some animal-based oil products, essential oils (e.g. citrus oils), and even some non-drying oils undergo oxidation reactions that generate heat. It is very difficult to clean cloths and rags thoroughly enough to remove oil and chemical residues. Cleaning with lukewarm water does not work. Hot water and detergent or dry cleaning are the recommended cleaning methods. Even if thoroughly cleaned, stained cloths and rags should not be placed in mechanical dryers, as the prolonged exposure to high levels of heat that occurs within dryers can lead to combustion.

### **Tips on best disposal practices for paints**

- Liquid paint should not be taken to a landfill.
- Paint is best disposed of as solid waste. Film-forming paints should be left to dry in the container and then disposed of as is or if the container is to be reused, peeled away for disposal.
- Some solvent based products can be allowed to evaporate and then the container be disposed of.
- Significant quantities of paints are considered to be hazardous waste and should be taken to a Hazardous Waste Collection Center for disposal.
- Etching acids, aerosol cans, and certain highly toxic pigments are among the other art materials that are considered hazardous and must be taken to a Hazardous Waste Collection Center for disposal.

### **What can you do to protect yourself, those around you, and the environment from hazardous art materials?**

- Be well informed about the products used in the studio and purchase products from companies that disclose full ingredient lists.
- Find (and use) the least toxic alternative for any type of material that may pose a health risk to you and/or the environment. If you choose to continue using materials that are potentially or known to be hazardous, then ensure that you properly dispose of your waste products and implement appropriate methods of protection.
- When using hazardous materials, ensure that you have a proper extraction method in place.

- Do not leave solvent containers open! Use self-closing solvent dispensers to cut down on evaporation.
- Clean brushes in used solvent rather than new solvent. Better yet consider soaking/cleaning your brushes in vegetable oil (be sure the oil does not contain vitamin E) and then wash with soap.

## **ADDITIONAL RESOURCES AND REFERENCES**

American Institute for Conservation – Health and Safety Wiki  
[http://www.conservation-wiki.com/wiki/Health\\_%26\\_Safety](http://www.conservation-wiki.com/wiki/Health_%26_Safety)

Golden Artists Colors – Environment, Health, and Safety  
[http://www.goldenpaints.com/healthsafety\\_health\\_index](http://www.goldenpaints.com/healthsafety_health_index)

Gamblin – Studio Safety  
<https://www.gamblincolors.com/studio-safety/studio-safety-create-without-compromise/>

University of North Carolina – Greensboro -Painting Clean-Up Procedures  
[https://vpa.uncg.edu/documents/ehs/brush\\_washing.pdf](https://vpa.uncg.edu/documents/ehs/brush_washing.pdf)

SFEnvironment - General Health and Safety Studio Practices  
<http://sfenvironment.org/article/business/art-products-practices>

“A Conservator’s Guide to Respirator Protection,” by Craig E. Colton  
[http://www.conservation-wiki.com/w/images/c/c3/H%26S\\_A\\_Conservator%27s\\_Guide\\_to\\_Respiratory\\_Protection\\_2016.pdf](http://www.conservation-wiki.com/w/images/c/c3/H%26S_A_Conservator%27s_Guide_to_Respiratory_Protection_2016.pdf)

Information on Labeling, SDS/MSDS, and other Health and Safety Topics – AIC’s News 37 (2012), pp. 19-20  
<http://www.conservation-us.org/docs/default-source/aic-news/July2012AICNews.pdf>

Flinn Scientific – How to Read a Safety Data Sheet (SDS)  
[https://www.flinnsci.com/media/1041084/how\\_to\\_read\\_an\\_sds.pdf](https://www.flinnsci.com/media/1041084/how_to_read_an_sds.pdf)

Information on Glove Selection – AIC’s News 38 (2013), pp. 14-16  
[http://www.conservation-us.org/docs/default-source/periodicals/2013\\_july\\_aicnews.pdf](http://www.conservation-us.org/docs/default-source/periodicals/2013_july_aicnews.pdf)

AIC Wiki – Chemical Protective Gloves  
[http://www.conservation-wiki.com/wiki/Health\\_%26\\_Safety:\\_Chemical\\_Protective\\_Gloves](http://www.conservation-wiki.com/wiki/Health_%26_Safety:_Chemical_Protective_Gloves)

“A Conservator’s Guide to Labeling Hazardous Chemicals” by Judith Bischoff

<http://www.conservation-us.org/docs/default-source/resource-guides/a-conservator's-guide-to-labeling-hazardous-chemicals-nbsp-.pdf?sfvrsn=1>

Golden Artists Colors – Health and Safety Labeling

<http://www.goldenpaints.com/health-safety-labeling>

Golden Artists Colors – Waste Disposal

<http://www.goldenpaints.com/waste-disposal>

SFEnvironment – Art Material Disposal

<http://sfenvironment.org/art-material-disposal>

Martin/F. Weber – Solvent Health and Safety Information

<http://www.weberart.com/assets/asafertstudio.pdf>

South Australian Metropolitan Fire Service – Self Heating and Spontaneous Combustion

[http://www.mfs.sa.gov.au/site/community\\_safety/home\\_fire\\_and\\_life\\_safety\\_information\\_sheets\\_domestic/self\\_heating\\_and\\_spontaneous\\_combustion.jsp](http://www.mfs.sa.gov.au/site/community_safety/home_fire_and_life_safety_information_sheets_domestic/self_heating_and_spontaneous_combustion.jsp)

Arts, Crafts & Theater Safety (ACTS) – Newsletter and Additional Information

<http://artscraftstheatersafety.org/newsletter.html>

*The Artist’s Complete Health and Safety Guide* by Monona Rossol (New York: Allworth Press, 2001).