

## IV. Where to Find Information on the Chemicals You Just Purchased

### What is a Safety Data Sheet (SDS)?

The United States Department of Labor Occupational Safety and Health Administration (OSHA) are responsible for the *Hazard Communication Standard 29* Code of Federal Regulations (CFR) 1910.1200. The purpose of this standard is “to ensure that the hazards of all chemicals produced or imported are classified, and that information concerning the classified hazards is transmitted to employers and employees. The requirements of this section are intended to be consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS), Revision 3. The transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, safety data sheets and employee training”.

Effective June 1, 2015, OSHA required the adoption of Globally Harmonized System (GHS), the hazard communication system used worldwide for the classification and labels of chemicals. Safety Data Sheets (SDS's) replaced Material Safety Data Sheets (MSDS's) for all hazardous materials. Revisions transformed the *Hazard Communication Standard (HCS)*, commonly known as the *Right-to-Know Law*, into the *Right-to-Understand Law*, and specify the content that must be on an SDS. For American teachers this is a very applicable standard and Ward's Science suggests that any American chemistry teacher using SDS's referred to and understand the content and purpose of this standard.

In 2015, Canada, through Health Canada, updated the Workplace Hazardous Materials Information System (WHMIS) to comply with the Globally Harmonized System (GHS). WHMIS is a Canadian national system that provides information on hazardous materials used in the workplace, recognizing the interests of workers, employers, suppliers, and regulators, balancing workers' right-to-know with industry's right to protect confidential business information. A product which falls within any of the hazard criteria set out in the *Hazardous Products Regulations (HPR)* is a WHMIS “controlled product” and, unless exempt under the *Hazardous Products Act (HPA)*, is subject to the SDS and labeling requirements of the HPA.

Safety Data Sheets (SDS's) are designed to provide teachers, workers and emergency personnel with the proper procedures for handling or working with a particular substance. SDS's include important information such as the substance's physical data, melting point, boiling point, flash point, toxicity, health effects, first aid, reactivity, storage, disposal, required protective equipment, and spill/leak procedures.

### Where Can I Get SDS's?

There are numerous places you can get the required SDS's

- All chemicals ordered from Ward's Science have SDS's available on [wardsci.com/sds](http://wardsci.com/sds).
- There are commercial services that can be used to obtain printed, FAX, or online copies of SDS's.
- You can purchase software or Internet subscription services.

## What Chemicals Require a SDS?

OSHA requires SDS's for materials that a) meet the OSHA definition of *hazardous* and b) are "known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency".

## Hazardous Materials

**Health hazard** means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents that act on the hematopoietic system and agents which damage the lungs, skin, eyes, or mucous membranes.

**Physical hazard** means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

In Canada a product which falls within any of the hazard criteria set out in Part IV of the *Controlled Products Regulations (CPR)* is a WHMIS "controlled product" and, unless exempt under Section 12 of the *Hazardous Products Act (HPA)*, is subject to the SDS requirements of the HPA.

Ward's Science chemicals SDS's are available for download on its website at [wardsci.com/sds](http://wardsci.com/sds). You have the responsibility to understand the information on the applicable SDS's and keep them filed or in immediate proximity to the related material at all times.

## Are SDS's Copyrighted?


Manufacturers, distributors, etc., are required to give SDS's to end users at no charge. SDS's follow a standard 16-section OSHA standard heading format and language and are supplied as factual information on the material involved.

Ward's Science provides the SDS's in compliance with the applicable regulatory standards and for the safe transportation, handling, use, storage, emergency response, and disposal to protect the individuals and environments involved with these chemicals. The SDS's can be used as defined by their content and can be copied without modification.

## How Do I Use a SDS?

The formats of SDS's follow GHS requirements and are made up of 16 sections. There are a number of versions of each chemical's SDS; however, they typically convey the same basic information. In no instance, however, can an SDS have blank sections and/or missing information.


## SECTION 1 – Company and Product Identification

Section 1 Chemical Product and Company Information		Page E1 of E2
		<b>CHEMTREC 24 Hour Emergency</b> <b>Phone Number (800) 424-9300</b> For laboratory use only. Not for drug, food or household use.
5100 West Henrietta Rd PO Box 92912 Rochester, NY 14692-9012 Tel: (800) 962-2660		
<b>Product</b>	<b>ACETIC ACID, GLACIAL</b>	
<b>Synonyms</b>	Ethanoic Acid / Methanecarboxylic Acid / Glacial Acetic Acid	

Section 1 indicates the product's name, in this case Acetic Acid Glacial, as it appears on the container label. This section shall also have the name, address and telephone number of the manufacturer or distributor, along with an emergency phone number. In some cases, the SDS may include commonly used trade names, synonyms, and material uses.

A 24-hour emergency assistance Chemical Transportation Emergency Center (CHEMTREC) phone number is listed for the purpose of reporting significant emergency spills where chemicals are being transported.

## SECTION 2 – Hazard(s) Identification

Section 2 Hazards Identification	
<b>Signal word:</b> DANGER <b>Pictograms:</b> GHS02 / GHS05 <b>Target organs:</b> Respiratory system, Eyes, Skin, Teeth	<b>Precautionary statement:</b> P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking. P233: Keep container tightly closed. P241: Use explosion-proof electrical/ventilating/lighting equipment. P242: Use only non-sparking tools. P243: Take precautionary measures against static discharge. P260: Do not breathe mist/vapours/spray. P264: Wash hands thoroughly after handling. P280: Wear protective gloves/protective clothing/eye protection/face protection. P301+P330+P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P303+P361+P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. P363: Wash contaminated clothing before reuse. P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P310: Immediately call a POISON CENTER or doctor. P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P370+P378: In case of fire: Use dry chemical, alcohol foam, carbon dioxide or water spray to extinguish. P403+P235: Store in a well-ventilated place. Keep cool. P405: Store locked up. P501: Dispose of contents/container to a licensed chemical disposal agency in accordance with local/regional/national regulations.
 <b>GHS Classification:</b> Flammable liquid (Category 3) Skin corrosion (Category 1A) Eye damage (Category 1)	
<b>GHS Label information: Hazard statement:</b> H226: Flammable liquid and vapour. H314: Causes severe skin burns and eye damage.	

Ca Prop 65 - This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

Section 2 identifies hazards associated with the listed chemical, along with any necessary warnings for those hazards. GHS requires Hazard Communication Standard (HCS) pictograms be used to convey a chemical's distinct hazards. HCS pictograms consist of a symbol on a white background framed by a red border. The nine pictograms and hazards, as described by OSHA, are as follows:



Exploding Bomb: explosives, self-reactives, and organic peroxides



Flame: flammables, pyrophorics, self-heating, emits flammable gas, self-reactives, organic peroxides



Flame Over Circle: oxidizers



Gas Cylinder: gases under pressure



Corrosion: skin corrosion/burns, eye damage, corrosive to metals



Skull and Crossbones: acute toxicity (fatal or toxic)



Exclamation Mark: irritant (skin and eye), skin sensitizer, acute toxicity (harmful), narcotic effects, respiratory tract irritant, hazardous to ozone layer (non-mandatory)





Health Hazard: carcinogen, mutagenicity, reproductive toxicity, respiratory sensitizer, target organ toxicity, aspiration toxicity



Environment (non-mandatory): aquatic toxicity

A SDS is required to list:

- Chemical hazard GHS classification, such as flammable liquid
- Hazard word, such as Danger
- Pictograms, symbols that represent present hazards, such as  for flammable and  for corrosive.
- Precautionary statements relative to the chemical, as seen listed in the above figure of Section 2 on the right hand side.
- Description of any additional hazards not covered by GHS classification system
- For mixtures containing ingredients with unknown toxicity: a statement describing the percentage of the ingredient in the mixture (not present in example).

## SECTION 3 – Composition/Information on Ingredients

Section 3 Composition / Information on Ingredients			
Chemical Name	CAS #	%	EINECS
Acetic acid	64-19-7	99.8%	200-580-7

Section 3 identifies the ingredients of chemicals, substances, and mixtures contained in the item indicated on the SDS. Information found in Section 3 includes, chemical/substance/mixture name, synonyms, Chemical Abstract Service (CAS) number, impurities, additives, and concentration.

## SECTION 4 – First Aid Measures

### Section 4 First Aid Measures

**INGESTION:** HARMFUL IF SWALLOWED. Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

**INHALATION:** HARMFUL IF INHALED. MAY CAUSE RESPIRATORY TRACT IRRITATION. Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**EYE CONTACT:** MAY CAUSE CORNEAL BURNS. Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

**SKIN ABSORPTION:** MAY CAUSE SKIN IRRITATION AND/OR BURNS. Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 4 gives instructions for untrained responders to provide immediate care in case of an accident. First-aid instructions are given for each possible route of exposure, along with immediate, acute and delayed symptoms. Recommendations for further treatment are given when necessary.

## SECTION 5 – Fire Fighting Measures

### Section 5 Fire Fighting Measures

**Suitable Extinguishing Media:** Carbon dioxide, dry chemical, dry sand, alcohol foam.

**Protective Actions for Fire-fighters:** In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. Use water spray to keep fire-exposed containers cool.

**Specific Hazards:** During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This chemical reacts violently with strong oxidizers, generating a fire and explosion hazard. Reacts violently with strong bases, strong acids and many other compounds.

Section 5 provides information about how to fight a potential fire. Recommendations for suitable extinguishing equipment are provided, along with information about any equipment that should NOT be used to fight the fire. This section also provides information about any specific hazards that may occur, such as hazardous combustion, and protective equipment that should be worn while fighting the fire.

## SECTION 6 – Accidental Release Measures

### Section 6 Accidental Release Measures

**Personal Precautions:** Evacuate personnel to safe area. Use proper personal protective equipment as indicated in Section 8. Provide adequate ventilation.

**Environmental Precautions:** Avoid runoff into storm sewers and ditches which lead to waterways.

**Containment and Cleanup:** Remove all sources of ignition. Absorb with inert dry material, sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water.

Section 6 provides information for responding to spills, leaks, and releases to minimize exposure to people, the environment, and property. Information will include:

- any personal precautions one should take.
- any protective clothing or equipment that should be worn/used.
- emergency procedures, including evacuation if necessary.
- information on how to contain spill, leak, or release including methods and materials.
- Clean-up procedures and techniques.

## SECTION 7 – Handling and Storage

### Section 7 Handling & Storage

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**Precautions for Safe Handling:** Read label on container before using. Do not wear contact lenses when working with chemicals. Keep out of reach of children. Avoid contact with eyes, skin and clothing. Do not inhale vapors, spray or mist. Use with adequate ventilation. Avoid ingestion. Wash thoroughly after handling. Remove and wash clothing before reuse.

**Conditions for Safe Storage:** Store in a cool, well-ventilated area away from incompatible substances. Keep away from ignition sources.

Section 7 contains tips for the safe handling and storage of chemicals. Safe handling recommendations include storage and handling of incompatible chemicals, how to minimize risk of spills, leaks, or releases into environment, and hygiene tips. Safe storage recommendations include chemical incompatibility and special storage instructions, such as ventilation.

## SECTION 8 – Exposure Controls / Personal Protection

### Section 8 Exposure Controls / Personal Protection

Exposure Limits:	Chemical Name	ACGIH (TLV)	OSHA (PEL)	NIOSH (REL)
	Acetic acid	TWA: 25 mg/m <sup>3</sup> STEL: 37 mg/m <sup>3</sup>	TWA: 25 mg/m <sup>3</sup>	TWA: 25 mg/m <sup>3</sup> STEL: 37 mg/m <sup>3</sup>

**Engineering controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or face shield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

**Respiratory protection:** None should be needed in normal laboratory handling at room temperatures. If misty conditions prevail, work in fume hood or wear a NIOSH/MSHA-approved respirator.

Section 8 explains exposure limits and how to protect yourself while handling the chemical. OSHA Permissible Exposure Limits (PELs) and any other appropriate exposure limit information are provided. This section lists any personal protective equipment (PPE) recommendations, along with equipment specifications and limitations. There will also be a list of any necessary engineering controls, such as the need for ventilation.

## SECTION 9 – Physical and Chemical Properties

Section 9 Physical & Chemical Properties		
<b>Appearance:</b> Clear, colorless liquid. <b>Odor:</b> Strong, acrid, vinegar-like odor. <b>Odor threshold:</b> Data not available. <b>pH:</b> <2 <b>Melting / Freezing point:</b> 16.7°C (62°F) <b>Boiling point:</b> 118.1°C (244°F) <b>Flash point:</b> 39°C (102.2°F) TCC ASTM D 56	<b>Evaporation rate ( Butyl acetate = 1):</b> 0.97 <b>Flammability (solid/gas):</b> Data not available. <b>Explosion limits: Lower / Upper:</b> 4.0% / 19.9% <b>Vapor pressure (mm Hg):</b> 11.4 @ 20°C <b>Vapor density (Air = 1):</b> 2.07 <b>Relative density (Specific gravity):</b> 1.049 @ 20/4°C <b>Solubility(ies):</b> Soluble in water.	<b>Partition coefficient:</b> Data not available <b>Auto-ignition temperature:</b> 464°C (869°F) <b>Decomposition temperature:</b> Data not available. <b>Viscosity:</b> Data not available. <b>Molecular formula:</b> CH <sub>3</sub> COOH <b>Molecular weight:</b> 60.05

Section 9 provides information on physical and chemical properties of the listed chemical. A SDS must contain the following information:

- Appearance (physical state, color, etc.)
- Odor
- Odor threshold
- pH
- Melting/Freezing point
- Boiling point
- Flash point
- Evaporation rate
- Flammability (solid/gas)
- Explosion limits: Lower/Upper
- Vapor pressure
- Vapor density
- Relative density (Specific gravity)
- Solubility(ies)
- Partition coefficient
- Autoignition temperature
- Decomposition temperature
- Viscosity

If any of these items do not apply to or are not available for the chemical in question, a notation must be made. See viscosity as an example in the above figure. Manufacturers may also include any other relevant information. Ward's Science SDS's also include:

- Molecular formula
- Molecular weight

## SECTION 10 – Stability and Reactivity

Section 10 Stability & Reactivity	
<b>Chemical stability:</b> Stable	<b>Hazardous polymerization:</b> Will not occur.
<b>Conditions to avoid:</b> Excessive temperatures, heat, sparks, open flame and other sources of ignition.	
<b>Incompatible materials:</b> Bases, strong oxidizers, chromic acid, nitric acid, sodium peroxide, carbonates, hydroxides, phosphates. Corrosive to some metals. Potentially violent reaction with acetaldehyde and acetic anhydride. Ignites on contact with potassium-tert-butoxide.	
<b>Hazardous decomposition products:</b> Carbon monoxide, hydrogen sulfide and other harmful gases or vapors including oxides and/or other compounds of sulfur and sodium.	

Section 10 identifies chemical stability, reactivity and other hazard information. Chemical stability information is provided for ambient conditions while a chemical is being stored or handled. If a chemical stabilizer is necessary or if changes in physical appearance indicate a hazard, this information will also be provided. Reactivity information will include incompatible chemicals and conditions that could potentially cause a hazardous reaction.

## SECTION 11 – Toxicological Information

### Section 11 Toxicological Information

**Acute toxicity:** Oral-rat LD50: 3,310 mg/kg ; Inhalation-rat LC50: 11.4 mg/L/4 hours ; Dermal-rabbit LD50: 1,060 mg/kg  
**Skin corrosion/irritation:** Skin-rabbit - Severe irritant.  
**Serious eye damage/irritation:** Eyes-rabbit - Severe irritant.  
**Respiratory or skin sensitization:** Data not available  
**Germ cell mutagenicity:** Data not available  
**Carcinogenicity:** Data not available  
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.  
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.  
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.  
**Reproductive toxicity:** Data not available  
**STOT-single exposure:** Data not available  
**STOT-repeated exposure:** Data not available  
**Aspiration hazard:** Data not available  
**Potential health effects:**  
Inhalation: Exposure to vapor may cause irritation of the eyes, nose, and respiratory tract. May cause asthma-like symptoms, including coughing, wheezing, tightness of chest, shortness of breath, and headache.  
Ingestion: May cause burns of the mouth, throat, esophagus, and stomach. Signs and symptoms may include pain, nausea, vomiting, diarrhea, dizziness, drowsiness, faintness, weakness, collapse and coma.  
Skin: Contact with skin causes pain, redness, burns, and blisters.  
Eyes: Contact with eyes may cause redness, pain, corneal burns, and loss of vision.  
**Signs and symptoms of exposure:** See Potential health effects above. Exercise appropriate procedures to minimize potential hazards.  
**Additional information:** RTECS #: AF1225000

Section 11 explains toxicological and health effects that could if chemical exposure occurs. This section is required to reveal:

- likely exposure routes (inhalation, ingestion, skin contact, eye contact) or notification that the information is unknown.
- results of short- and long-term exposure, including immediate, delayed, acute, and chronic effects.
- description of symptoms for a range of exposure levels.
- numerical measures of toxicity, such as median lethal dose.
- whether or not the chemical is a known carcinogen.

## SECTION 12 – Ecological Information

### Section 12 Ecological Information

**Toxicity to fish:** *Gambusia affinis* (fish, fresh water), LC50 = 251 mg/L/24 hours  
**Toxicity to daphnia and other aquatic invertebrates:** *Daphnia magna* (Crustacea), EC50 = 95 mg/L/24 hours  
**Toxicity to algae:** *Euglena gracilis* (Algae), EC100 = 720 mg/L  
**Persistence and degradability:** Easily biodegradable      **Bioaccumulative potential:** Not expected to bioaccumulate  
**Mobility in soil:** No data available      **PBT and vPvB assessment:** No data available  
**Other adverse effects:** An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Section 12 contains environmental impact information should the chemical be released into the environment. The data given may include:

- toxicity test data on both aquatic and terrestrial organisms.
- potential for chemical to persist in the environment.
- bioaccumulation/bioconcentration potential.
- potential for groundwater contamination.
- other potential adverse effects such as ozone depletion, etc.

Section 12 is a non-mandatory section.

## SECTION 13 – Disposal Considerations

### Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 13 provides chemical disposal, recycling and reclamation guidance for the chemical and its container. This may include proper disposal container use, appropriate disposal methods, any physical or chemical properties that may affect disposal, discouragement of sewage disposal, and special precautions for landfill or



incarnation disposal methods. This section may refer to Section 8 of the SDS (Exposure Control / Personal Protection). Section 13 is a non-mandatory section.

## SECTION 14 – Transport Information (US DOT / CANADA TGD)

Section 14 Transport Information (US DOT / CANADA TGD)			
UN/NA number: UN2789	Shipping name: Acetic acid, glacial		
Hazard class: 8, (3)	Packing group: II	Reportable Quantity: 5,000 lbs (2270 kg)	Marine pollutant: No
Exceptions: Limited quantity equal to or less than 1 L		2012 ERG Guide # 132	

Section 14 includes classifications for shipping and transporting the chemical provided by USDOT and Transport Canada, along with any special precautions that should be taken when shipping the chemical.

## SECTION 15 – Regulatory Information

Section 15 Regulatory Information						
A chemical is considered to be listed if the CAS number for the anhydrous form is on the Inventory list.						
Component	TSCA	CERLCA (RQ)	RCRA code	DSL	NDSL	WHMIS Classification
Acetic acid, glacial	Listed	5,000 lbs (2270 kg)	D001, D002	Listed	Not listed	  B3; E

Section 15 provides information about safety, health, and environmental regulations not located in other sections of the SDS. This will include national and regional regulations that apply to the chemical.

## SECTION 16 – Additional Information

Section 16 Additional Information	
<small>The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. NTP: National Toxicology Program, IARC: International Agency for Research on Cancer, OSHA: Occupational Safety and Health Administration, STOT: Specific Target Organ Toxicity, SE: Single Exposure, RE: Repeated Exposure, ERG: Emergency Response Guidebook.</small>	
Revision Date: September 18, 2013	Supersedes: January 5, 2011

Section 16 provides information on when the SDS was created and/or the date of the last revision. There may also be details on what has changed since the previous version was released. Any other information the manufacturer wishes to convey that does not fit into other sections will be included in this section.

### When Must a Supplier Revise a SDS?

When new information becomes available for a controlled product or an ingredient in that product, the supplier must revise the SDS and the date thereof. Such revisions must be made prior to sale of the product subsequent to the new information's availability. A supplier is not obliged to send a revised SDS to a previous customer in the absence of a subsequent sale to that customer.

Suppliers are prohibited from supplying SDS's that have a preparation date exceeding three years (3 X 365 days) prior to the sale or importation of the controlled product. Thus, if a supplier has not changed any information on its SDS for three years, it must review that information to ensure its continued accuracy and that there is no new information to be disclosed. In absence of new information, the SDS must be revised to reflect the review date.

Ward's Science SDS's meet date of preparation requirements. The latest SDS is always available online for viewing or download at [wardsci.com/sds](http://wardsci.com/sds).

