FLINN SCIENTIFIC, INC

Science Department Safety Training Notes

Discussion and Notes

Keep a copy of these safety training notes and a signed attendance sheet to verify regular safety training. Regulatory inspectors will usually request proof of safety training. A copy of the sign-up sheet that we suggest using may be found at www.flinnsci.com/media/412875/signup.pdf.

Electronic access to MSDS or SDS libraries is allowed as long as there are no barriers for employees to obtain and download the necessary documents.

Introducing New GHS Safety Data Sheets

Since the implementation of the OSHA "right-to-know" law—the Hazard Communication Standard—more than 30 years ago, Material Safety Data Sheets (MSDS) have served as the primary means for communicating the hazardous nature of chemicals. In March 2012 the Hazard Communication Standard was revised to incorporate GHS provisions for classifying and labeling chemical hazards. GHS stands for the Globally Harmonized System of Classification and Labeling of Chemicals. It establishes objective criteria for classifying and identifying chemical hazards, and also provides standard symbols and language for communicating those hazards on chemical labels and new Safety Data Sheets, or SDS. (The "M" in MSDS has been dropped.) Chemical manufacturers have until June 2015 to reclassify chemicals and produce GHS-formatted labels and SDS for all new products.

Safety Data Sheet Format

The revised Hazard Communication Standard requires new Safety Data Sheets to be in a uniform, 16-section format and to include specified section numbers, headings, and associated information. A sample Flinn Scientific Safety Data Sheet for *n*-butyl alcohol is provided on the following pages to illustrate the SDS format and explain the section requirements. The sample includes a convenient guide on how to read an SDS as well as answers to frequently asked questions.

Hazards Identification

GHS specifies the use of standard symbols and language elements to convey the hazard information on chemical labels and SDS. The physical and health hazards of chemicals are identified in Section 2 of the new SDS by means of pictograms and a signal word, if needed, and by specific hazard statements. Hazard or H-statements are coded on the SDS for easy reference. See, for example, "Flammable liquid and vapor (H226)," on the sample SDS for *n*-butyl alcohol.

Precautionary or P-statements provide further guidance to prevent accidents and avoid exposure to chemical hazards. P-statements are generally divided into four main categories, and are also coded on the SDS. Precautionary statements to help you prevent accidents, such as "Keep away from heat, sparks, and open flames (P210)" are included in Section 2. Additional precautionary statements may relate to and appear in the following sections:

- First aid measures (Section 4). *Example:* Call a POISON CENTER or physician if you feel unwell (P312).
- Fire fighting measures (Section 5). *Example:* **In case of fire:** Use triclass dry chemical fire extinguisher (P370+P378).
- Handling and storage (Section 7). *Example:* Keep container tightly closed (P233).
- Exposure controls and personal protection (Section 8). *Example:* Use only in a hood or well-ventilated area (P271).

Employer Safety Data Sheet Requirements

The Hazard Communication Standard and, by extension, the Laboratory Standard, which applies to most schools, requires employers to acquire, update, and maintain MSDS for all hazardous chemicals used or stored in the facility and to make those MSDS available to employees for informational purposes. *Renaming MSDS to SDS does not change this requirement.* According to the timeline for implementing GHS, chemical manufacturers must reclassify chemicals and ship chemicals with GHS-formatted labels and SDS by June 1, 2015. Employers and schools have until June 1, 2016 to be fully compliant with the GHS provisions, including maintaining an SDS library

Discussion and Notes

Current Flinn MSDS may be accessed and searched on the Flinn website at http://www.flinnsci.com/msds-search.aspx

When the Flinn SDS library is complete you will be able to access it in a similar manner. The MSDS link will re-direct you to the SDS site at that time.

and training employees to understand the GHS hazards of all chemicals to which they may be exposed. The interim period between now and 2016 is a source of some confusion to administrators and teachers. You are NOT required or expected to maintain "two sets of books," that is, MSDS as well as SDS, during this time. OSHA has stated that until the transition is complete you may have a mix of MSDS and SDS in your library, as long as you have a sheet for every chemical. Flinn Scientific has completed its transition to Safety Data Sheets, which will be available to teachers in early 2014.

Safety Data Sheets for Every Flinn Chemical

Beginning in February 2014 you will be able to access and search the entire Flinn Scientific collection of GHS-compliant Safety Data Sheets directly from the Flinn website. With your first chemical order after February 2014, Flinn Scientific will also provide customers with a CD containing all of our newly updated SDS for every chemical that we sell.

New Flinn Online Chemventory™ Includes SDS

Flinn Scientific has developed an all-new, cloud-based chemical inventory system to help you meet the GHS requirements of the revised Hazard Communication Standard. Flinn Online Chemventory™ will include GHS hazard information for all chemicals and will provide a convenient and easy way to manage your SDS library. Simply click on the "View SDS" button in the chemical listing screen to access a PDF of the Safety Data Sheet for the chemical. Online Chemventory will allow you to maintain an accurate inventory of laboratory chemicals while permitting multiple users to access the information in the database from multiple locations and multiple devices. Additional features include functionality to print chemical and solution labels, import data from previous Chemventory versions, and create purchase lists. Flinn Online Chemventory will be available in February 2014. For more information, visit the Flinn website at www.flinnsci.com/chemventory.

Thank You for Your Support

Please continue to support our efforts to improve safety in school science labs by ordering your laboratory chemicals and science supplies from Flinn Scientific.

Next Month's Topic

Inquiry Safety and the Next Generation Science Standards

FLINN SCIENTIFIC, INC
"Your Safer Source for Science Supplies"

How to Read a Safety Data Sheet (SDS)

What is the material and what do I need to know immediately in an emergency?

Sections 1–3.

Ⓐ It is important that the chemical name on the label match the name on the SDS. Many chemicals have similar names, but very different properties.

Ⓑ The most important section! Provides an overview of the physical and health hazard risks associated with using the material.

Ⓒ Signal words, either Danger or Warning, heighten the awareness of the relative risk when using certain chemicals. Danger is the more severe warning!

Ⓓ Eight pictograms exist in the GHS classification scheme to call attention to physical and health hazards.

Ⓔ This section includes the formula, formula weight, concentration and CAS#. The CAS# is the single identifying number for each specific substance. CAS# should match the CAS# on the bottle label.

What should I do if a hazardous situation occurs?

Sections 4–6.

Ⓕ Seek medical attention. These first-aid measures are only meant for immediate first aid and should always be followed up with professional medical care.

Ⓖ This section is written for the firefighter. Flash point (the lowest temperature at which enough vapor is present to form an ignitable mixture with air); upper and lower flammable limits; and the auto ignition temperature are common properties included in this section.

FLINN SCIENTIFIC, INC.
Safety Data Sheet (SDS)

SDS #: 181.00
Revision Date: December 13, 2013

SECTION 1 — CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

n-Butyl Alcohol Ⓐ

Flinn Scientific, Inc. P.O. Box 219 Batavia, IL 60510 (800) 452-1261
CHEMTREC Emergency Phone Number: (800) 424-9300

Ⓒ **Signal Word** **DANGER**

Ⓓ **Pictograms**

SECTION 2 — HAZARDS IDENTIFICATION

Hazard class: Flammable liquids (Category 3). Flammable liquid and vapor (H226). Keep away from heat, sparks, open flames, and hot surfaces. No smoking (P210). Ⓑ

Hazard class: Acute toxicity, oral (Category 4). Harmful if swallowed (H302). Do not eat, drink or smoke when using this product (P270).

Hazard class: Skin corrosion or irritation (Category 2). Causes skin irritation (H315).

Hazard class: Serious eye damage or irritation (Category 1). Causes serious eye damage (H318).

Hazard class: Specific target organ toxicity, single exposure; respiratory tract irritation (Category 3). May cause respiratory irritation (H335).

Hazard class: Specific target organ toxicity, single exposure; Narcotic effects (Category 3). May cause drowsiness or dizziness (H336). Avoid breathing mist, vapors or spray (P261).

SECTION 3 — COMPOSITION, INFORMATION ON INGREDIENTS

Component Name	CAS Number	Formula	Formula Weight	Concentration
n-Butyl alcohol Ⓔ	71-36-3	$CH_3(CH_2)_2CH_2OH$	74.12	
Synonyms: 1-Butanol; n-Butanol				

SECTION 4 — FIRST AID MEASURES

Call a POISON CENTER or physician if you feel unwell (P312). Ⓕ
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing (P304+P340).
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing (P305+P351+P338).
If on skin (or hair): Immediately remove all contaminated clothing. Rinse skin with water (P303+P361+P353).
If swallowed: Rinse mouth. Call a POISON CENTER or physician if you feel unwell (P302+P301+P312).

SECTION 5 — FIRE FIGHTING MEASURES

Class 1C flammable liquid. Ⓖ
Flash point: 37 °C Flammable limits: Lower: 1.4% Upper: 11.2% Autoignition Temperature: 343 °C
When heated to decomposition, may emit toxic fumes.
In case of fire: Use tri-class dry chemical fire extinguisher (P370+P378).

NFPA CODE Ⓗ
H-2
F-3
R-0

SECTION 6 — ACCIDENTAL RELEASE MEASURES

Remove all ignition sources and ventilate area. Contain the spill with sand or other inert absorbent material and deposit in a sealed bag or container. See Sections 8 and 13 for further information. Ⓘ

Ⓗ The NFPA code is a numerical code established by the National Fire Protection Association. It rates the substance *under fire conditions* in four categories. **H**ealth, **F**lammability, **R**eactivity, and unusual reactivity: 4 is a severe hazard, 0 is no hazard.

Ⓘ How to clean up a spill. Always remove unprotected personnel from area and make sure all students are safe. Contain the spill with sand or absorbent materials.

How to Read a Safety Data Sheet (SDS), continued

FLINN SCIENTIFIC, INC.
Safety Data Sheet **n-Butyl Alcohol**

SDS #: 181.00
Revision Date: December 13, 2013

SECTION 7 — HANDLING AND STORAGE

Flinn Suggested Chemical Storage Pattern: Organic #2. Store with alcohols, glycols, amines, and amides.
Store in a dedicated flammables cabinet. If a flammables cabinet is not available, store in Flinn Saf-Stor™ can.
Keep container tightly closed (P233). Keep cool (P235). Use only in a hood or in a well-ventilated area (P271). J

SECTION 8 — EXPOSURE CONTROLS, PERSONAL PROTECTION

Wear protective gloves, protective clothing, and eye protection (P280). Wash thoroughly after handling (P264). Use only in a hood or in a well-ventilated area (P271).
Exposure guidelines: PEL 100 ppm (OSHA) TLV 20 ppm (ACGIH) K

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

Clear colorless liquid. Wine-like odor.
Soluble: Water (20%). Miscible with alcohol and ether. L

Boiling point: 117.7 °C
Melting point: -89 °C
Refractive index: 1.3988
Specific gravity: 0.81

SECTION 10 — STABILITY AND REACTIVITY

Avoid contact with aluminum, chromium trioxide, and oxidizing materials.
Substance may develop explosive hydroperoxides. M
Shelf life: Fair, substance may oxidize. See Section 7 for further information.

SECTION 11 — TOXICOLOGICAL INFORMATION

Acute effects: Absorbed through skin. Eye, skin, respiratory tract irritation. Dizziness. CNS depression. N
Chronic effects: N.A.
Target organs: Eyes, skin, respiratory system, central nervous system.

ORL-RAT LD_{50}: 790 mg/kg
IHL-RAT LC_{50}: 8000 ppm/4H O
SKN-RBT LD_{50}: 3400 mg/kg

N.A. = Not available, not all health aspects of this substance have been fully investigated.

SECTION 12 — ECOLOGICAL INFORMATION

Data not yet available. P

SECTION 13 — DISPOSAL CONSIDERATIONS

Please review all federal, state and local regulations that may apply before proceeding.
Flinn Suggested Disposal Method #18b is one option. Q

SECTION 14 — TRANSPORT INFORMATION

Shipping name: Butanols. Hazard class: 3, Flammable liquid. UN number: UN1120.

N/A = Not applicable R

SECTION 15 — REGULATORY INFORMATION

TSCA-listed, EINECS-listed (200-751-6), RCRA code U031. S

SECTION 16 — OTHER INFORMATION

This Safety Data Sheet (SDS) is for guidance and is based upon information and tests believed to be reliable. Flinn Scientific, Inc. makes no guarantee of the accuracy or completeness of the data and shall not be liable for any damages relating thereto. The data is offered solely for your consideration, investigation, and verification. The data should not be confused with local, state, federal or insurance mandates, regulations, or requirements and CONSTITUTE NO WARRANTY. Any use of this data and information must be determined by the science instructor to be in accordance with applicable local, state or federal laws and regulations. The conditions or methods of handling, storage, use and disposal of the product(s) described are beyond the control of Flinn Scientific, Inc. and may be beyond our knowledge. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THIS PRODUCT(S). T

Consult your copy of the *Flinn Science Catalog/Reference Manual* for additional information about laboratory chemicals.

How can I prevent hazardous situations from occurring?

Sections 7–11.

J Use the Flinn Suggested Chemical Storage Pattern to prevent accidents and improve safety. Special storage and usage tips are also included.

K Wear personal protective equipment such as goggles, gloves, and an apron.

L Clear, concise, and useful physical and chemical properties help you learn more about the chemicals you use. The first part describes the material's appearance. If it doesn't look like this, STOP. Do not use it. It may be more or less hazardous.

M Describes the conditions or reactions to be avoided. Also provides some indication about anticipated shelf life.

N More detail on how the material may injure you. Acute (short exposure) and chronic (long-term) effects are listed along with their target organs.

O Oral (ORL), inhalation (IHL), and skin absorption (SKN) toxicity data on test animals is included.

Other useful information.

Sections 12–16.

P Ecological impact if large amounts (e.g., tank car) of the chemical spill near a river or lake.

Q Suggested disposal methods for laboratory quantities of chemicals.

R Department of Transportation shipping information is included for your school district, emergency responders, and transport/shipping departments.

S Regulatory information used by regulatory compliance personnel.

T Flinn Scientific has an ongoing program to update its SDS. As professional chemists, we try our best to provide science teachers with the most accurate and useful safety information. Call Flinn if you have any questions. We can help!