

SAFETY DATA SHEETS (SDS)



Chemical
Safety LLC

Safety Data Sheet

Composition, Information on Ingredients

Component: Boron Trichloride (BCL₃)

CAS Number: 10294-34-5

Percent: 100.0%

Hazard Classification: Corrosive

Unit Overview

To work safely in a facility that manufactures MEMS devices, you must understand the purpose of a SDS. You must also be able to extract information about a specific chemical from its SDS. This unit provides information on how to locate and interpret a SDS.

Allow at least 15 minutes to review this material.

Learning Module Objectives

- ❖ Interpret the contents of at least three SDSs for specific chemicals.
- ❖ Identify the applications of at least three chemicals in microtechnology fabrication processes.
- ❖ Define the basic terms used by a SDS to describe a chemical's hazards

Introduction

A Safety Data Sheet (SDS) is a document that provides the necessary information about a chemical to all personnel that

- ▣ use it,
- ▣ transport it,
- ▣ store it, or
- ▣ work around it in any manner.



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Product and Company Information

Boron Trichloride

Product ID: Boron Trichloride

Date of SDS: 01/10/2014

Technical Review Date: 08/1/2014

Manufacturer: Chemical Safety LLC
555 Our Chemical St.
Safety, NC 00099-3333

Emergency Phone #: (111) 000-2222

Trade Names/Synonyms: BCL3, Boron Chloride,
TriChloroboron

Chemical Family: non-metallic, halides

SDS Section 1

Availability Requirement

- ❖ A SDS is required by Federal law to be prepared for each chemical imported or produced in this country.
- ❖ It is the chemical manufacturer's responsibility to prepare the SDS.
- ❖ It is the responsibility of the employer to maintain an updated SDS for all chemicals on the premises and to make them readily accessible to all employees.

What is in a SDS?

Examples of information contained in a SDS

- ❖ Hazards associated with a chemical
- ❖ Physical properties
- ❖ Handling information
- ❖ Emergency procedures for spills or human contact
- ❖ Flammability and reactivity properties
- ❖ Toxicity

When should you review a SDS?

Before storing, handling or working with a chemical in any manner, you should become familiar with the information provided in the chemical's SDS.



Working with Chemicals

OSHA Requirements

OSHA's* Hazardous Communication Standard ([29 CFR 1910.1200](#)) requires sixteen (16) sections that must be on a SDS.

These sections are explored in this learning module.

Additional sections are optional.

*U.S. Occupational Health and Safety Administration (OSHA), an agency of the U.S. Department of Labor.

SDS Terminology

Much of the terminology found on a SDS is related to hazardous material, such as toxicity, flashpoint, and reactivity.

There are SDS glossaries that provide definitions for many of these terms.

The [SDS Hyperglossary](#) is a great reference.

A few SDS Acronyms

LEL and UEL (Lower and upper explosive limits) –

The minimum/maximum concentration of a liquid's vapor in air above which a flame does not occur.

TLV (Threshold Limit Value) –

The airborne concentration of a chemical.

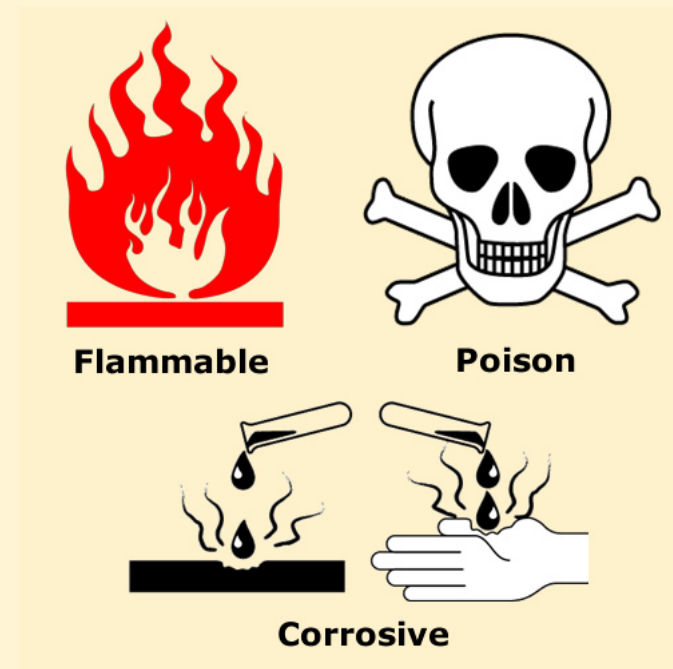
PEL (Permissible Exposure Limit) –

Similar to TLV, but set by OSHA

PPE – *Personal Protective Equipment*

Requirements of a SDS

- ❖ Product Identification
- ❖ Hazards(s) Identification
- ❖ Composition / information on ingredients
- ❖ First-aid measures
- ❖ Fire-fighting measures
- ❖ Accidental Release measures
- ❖ Handling and storage
- ❖ Exposure controls/personal protection



Requirements of a SDS (continued)

- ❖ Physical and chemical properties
- ❖ Stability and reactivity
- ❖ Toxicological information
- ❖ Ecological information
- ❖ Disposal considerations
- ❖ Transport information
- ❖ Regulatory information
- ❖ Other information including date of preparation

Product Identification

- ❖ Date of SDS
- ❖ Chemical Manufacturer's Name, address, and emergency telephone numbers
- ❖ Product Name
- ❖ Chemical Name
- ❖ Generic Name, Synonyms
- ❖ Hazard Classification



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Question

Which of the following would be considered a product name?

- a. Isopropyl Alcohol
- b. Fingernail polish remover
- c. Acetone
- d. Chlorine

Hazard(s) Identification

- ❖ Classification
- ❖ Hazard statement/
symbol, precautionary
statement
- ❖ Potential Hazards



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Safety Data Sheet – BCL3

Hazard(s) Identification

NFPA Ratings: Health 3 Fire 0 Reactivity 2

Color: colorless

Physical Form: fuming liquid, gas

Odor: pungent odor

May cause respiratory tract burns, skin burns, eye burns, mucous membrane burns.

Containers may rupture or explode if exposed to heat.

Releases toxic, corrosive, flammable or explosive gas

Exposure Controls/Personal Protection

- ❖ Significant animal studies which determine the chemical's toxicity
- ❖ Toxicity data
- ❖ Legal Exposure Limits (PEL, TLV)
- ❖ Appropriate engineering controls (*e.g., eye wash – top image*)
- ❖ Individual protection measures (PPE) (*e.g., acid gloves*)



Physical and Chemical Properties

- ❖ Appearance and Odor
- ❖ Boiling Point and Freezing Point
- ❖ Melting Point
- ❖ Vapor Pressure
- ❖ Vapor Density
- ❖ Solubility in Water
- ❖ Evaporation Rate
- ❖ Specific Gravity

Vapor Pressure = 760 mmhg@13 C

Pungent Odor

Colorless

Boiling Point = 54.5 F (12.5 C)

Physical Properties of BCl_3

Fire and Explosion Data

- ❖ Flammability Data
- ❖ Flashpoint
- ❖ LEL (Lower Explosive Limit)
- ❖ UEL (Upper Explosive Limit)
- ❖ Fire Fighting Comments
- ❖ Fire fighting procedures
- ❖ Extinguishing media
- ❖ Unusual fire hazards

Negligible Fire Hazard

Extinguishing Media:
Carbon dioxide, dry chemical

Flashpoint: Not Flammable

Fire / Explosion Hazards of BCl₃

Stability and Reactivity

- ❖ Chemical stability
- ❖ Reactivity
- ❖ Possibility of hazardous reactions
- ❖ Conditions to avoid
- ❖ Incompatible materials
- ❖ Hazardous decomposition byproducts

May react with evolution of heat on contact with water

Incompatibilities:
Combustible Materials

Reactivity Data of BCl_3

Question

What are LEL and UEL?

Question

What are LEL and UEL?

- *Answer: The LEL and the UEL are the lower and upper explosive limits. Permissible exposure limits are the PEL and TLV. Both are legal limits expressed in ppm.*

Other Information on SDSs

- ❖ Precautions for handling this chemical
- ❖ Conditions for safe storage, including any incompatibles
- ❖ Toxicological Information
 - Routes of exposure
 - Delayed and immediate effects of exposure
 - Measures of toxicity
- ❖ Disposal considerations (non-mandatory)
- ❖ Transport information (non-mandatory)

Summary

A SDS is your information source about a chemical. Before working with or around a chemical, you should always study the appropriate SDS. Know where the SDS notebook or resource is located.

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