

A Scientific Equipment & Furniture Association  
Standard

**SEFA 11-2026**

**Liquid Chemical Storage Cabinets**

**SEFA World Headquarters  
1320 Main Street - Ste 300  
Columbia, SC 29201**

**Fax: 516-294-2758  
[www.sefalabs.com](http://www.sefalabs.com)**



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# 1. Foreword

## 1.1. ABOUT SEFA

The Scientific Equipment and Furniture Association (SEFA) is an international trade association comprising manufacturers of laboratory furniture, casework, and fume hoods, as well as members of the design and installation professions. SEFA was founded to promote this industry and improve the quality, safety, and timeliness of the construction of laboratory facilities in accordance with customer requirements.

## 1.2. SEFA STANDARDS

SEFA and its committees actively develop and promote SEFA standards, which have domestic and international applications. Development of these standards considers the work of other standards organizations as well as information provided by government agencies.

SEFA standards are developed in and for the public interest. They are designed to promote a better understanding among designers, architects, manufacturers, purchasers, and end users and to assist the purchaser in selecting the proper product to meet the user's specific needs.

These standards are periodically updated via biannual public meetings of the SEFA committee. The SEFA 11 committee co-chairs are Sascha Kundel (asecos GmbH) and Christian Fromm (SCAT Americas, Inc.). SEFA welcomes input from all pertinent organizations at these meetings. Please contact SEFA at [info@sefalabs.com](mailto:info@sefalabs.com) with comments or questions concerning these standards.

### NOTE

To reference SEFA 11 for project specification purposes, we suggest the following: "Liquid Chemical Storage Cabinets shall conform to the latest version of SEFA 11."

## 1.3. GLOSSARY

SEFA-defined terms are frequently used in contracts and other documents that define the products to be furnished or the work involved. In an effort to provide uniformity for users of these terms, the association has developed a glossary (SEFA 4 – 2024). Terms in bold in SEFA standard text are included in SEFA 4, as well as at the end of the standard in which they appear. The definitions shall be used to help resolve disputes or incorporated into relevant contracts and related documents.

Where a specific standard contains a definition that differs from the one in SEFA 4, the definition in the standard should be used. SEFA encourages interested parties to submit additional terms or suggest changes to terms already defined by the association.

## 1.4. ADDITIONAL RESOURCES

The following resources provide a body of knowledge that augment SEFA 11:

- ANSI/AIHA/ASSE Z9.5 – Laboratory Ventilation Standard
- ASTM F1412-16 – Standard Specification for Polyolefin Pipe and Fittings for Corrosive Waste Drainage Systems
- ULC/ORD-C1275 – Guide for the Investigation of Storage Cabinets for Flammable Liquid Containers
- EN 14470-1 – Safety Cabinet Standard for Flammable Products
- FM 6050 – Examination Standard for Storage Cabinets for Ignitable Liquids
- International Building Code (IBC)
- International Fire Code (IFC)
- National Fire Code of Canada (NFC)
- NFPA – Fire Protection Guide to Hazardous Materials
- NFPA 1 – Fire Code
- NFPA 30 – Flammable and Combustible Liquids Code
- NFPA 45 – Standard on Fire Protection for Laboratories Using Chemicals
- NFPA 91 – Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids
- NFPA 400 – Hazardous Materials Code
- OSHA 29 CFR 1910.106 – Flammable Liquids
- UL 1275 – Flammable Liquid Storage Cabinets Standard
- University of California Berkeley, Office of Environment, Health & Safety – Safe Storage of Hazardous Chemicals Guide

### NOTE

Please refer to the latest edition of all materials referenced in SEFA standards.

## 1.5. DISCLAIMER

SEFA uses its best efforts to promulgate standards for the benefit of the public, considering available information and accepted industry practices. SEFA does not guarantee, certify, or assure the safety or performance of any products, components, or systems tested, installed, or operated in accordance with SEFA standards, or that any tests conducted under a SEFA standard will be non-hazardous or free from risk. SEFA encourages the use of third-party independent testing.

### NOTE

SEFA encourages testing as described in this document to be performed and documented by a SEFA-approved third-party testing facility. Visit [sefalabs.com](http://sefalabs.com) for a current list of SEFA-approved test labs.

## 2. Introduction to Liquid Chemical Storage Cabinets

SEFA 11 discusses liquid chemical storage cabinets located in laboratories, including flammable liquid storage cabinets, hazardous material storage cabinets, acid storage, base storage, and corrosives. It is intended to provide end users and planners with information on the type of storage cabinet required, the construction and installation of those cabinets, and basic factors to consider regarding which chemicals should or should not be stored together in them.

This standard is intended as a supplement to the knowledge of a trained, qualified professional. National, state, and local codes take precedence and shall be observed.

### 2.1. LOCATION

Liquid chemical storage cabinets shall be located in an area of the laboratory with low traffic, away from the main work area. Ignition sources such as open flames, hot surfaces, electrical equipment, and static electricity shall be eliminated from the storage area, and fire extinguishers and/or sprinkler systems shall be located in the area. An eyewash and safety shower must be readily accessible to areas where liquid chemicals are stored (per OSHA 1910.106(d)(3)(I)).

Chemicals shall be stored only in liquid chemical storage cabinets. Chemicals shall not be stored in fume hoods or under sinks, where there may be exposure to water, and they shall not be stored on bench tops, where they are vulnerable to accidental breakage by laboratory, housekeeping, or emergency response personnel. Chemicals shall not be stored on the floor.

### 2.2. INSTALLATION

Liquid chemical storage cabinet installation shall be performed by an experienced laboratory equipment installer.

Metal cabinets should be securely installed and grounded when necessary. If chemicals are being dispensed directly from a cabinet, then a method for grounding the container must also be provided.

### 2.3. VENTILATION RECOMMENDATIONS

Reference NFPA 45 for proper ventilation guidance when North American Concept or FM Global-approved storage cabinets are used.

## 3. Flammable Liquid Storage Cabinets

### 3.1. PURPOSE

Flammable liquid storage cabinets are used to store and organize flammable liquids in approved closed containers to prevent liquids from reaching their auto-ignition temperature in the event of a fire. Flammable liquid storage cabinets are often used to increase the maximum allowable quantities and to separate incompatible materials. They should be locked to prevent unauthorized access.

According to OSHA and GHS, the definition of flammable and combustible liquids has changed to flammable liquids. Flammable liquid storage cabinets are designed and constructed for flammable liquid storage only. They are not intended for the storage of small cylinders of compressed or liquefied gases, especially those that are flammable. Likewise, incompatible materials, whether liquid or solid, should not be stored in these cabinets.

### 3.2. CONSTRUCTION

There are three permissible concepts (see authority having jurisdiction) for flammable liquid storage cabinets: North American, Canadian, and European Performance Standards.

#### 3.2.1. NORTHAMERICAN PERFORMANCE STANDARDS

- Labor Law:
  - OSHA Flammable Liquids 1910.106(d)(3), (1)(2)
  - OSHA Safety and Health Regulations for Construction 1926.152(b)(2), (1)(2)
- Fire Code:
  - NFPA 30 Flammable and Combustible Liquids Code 9.5, (1)(2)
  - NFPA 1 Fire Code 66.9.5, (1)(2) IFC 5704.3.2 (2)(3)

Flammable liquid storage cabinets must have a label with the following warning: "FLAMMABLE – KEEP FIRE AWAY". Per OSHA, this label must be "in conspicuous lettering." Cabinets should be FM 6050 and/or UL 1275 approved. Some codes require cabinets to have self-close doors. Check with authority having jurisdiction (AHJ) for codes having jurisdiction.

#### 3.2.2. CANADIAN PERFORMANCE STANDARDS

National Fire Code of Canada Div. B Sec. 4.2.10.5 shall conform to ULC/ORD-C1275.

Storage cabinets shall be designed and constructed to limit the internal temperature to not more than 325°F (163°C) when subjected to a ten-minute fire test using the standard time-temperature curve as set forth in NFPA 251 – Standard Methods of Tests of Fire Resistance of Building Construction and Materials, which is incorporated by reference as specified in OSHA Section 1910.6. All joints and seams shall remain tight, and the door shall remain securely closed during the fire test. Cabinets shall be labeled in conspicuous letters: "FLAMMABLE – KEEP FIRE AWAY".

#### NOTE

Some provinces and localities in Canada will allow cabinets in compliance to NFPA 30 or FM 6050 to be approved. Check with AHJ.

### 3.2.3. EUROPEAN PERFORMANCE STANDARDS

Flammable liquid storage cabinets shall meet the requirements of EN 14470-1. Self-closing doors are mandatory. Cabinets must be marked according to section 8 of EN 14470-1 and must specifically indicate the fire resistance rating (type classification) of the cabinet (30, 60, or 90 minutes). Cabinets must be independently third-party tested by an accredited testing institute.

### 3.3. VENTING

Venting requirements are typically dictated by the AHJ. Cabinets are not required to be vented for fire protection purposes. If venting is required, however, the following shall apply.

The vent openings shall be ducted directly to a safe location outdoors or to a treatment device designed to control volatile organic compounds and ignitable vapors in a manner that will not compromise the specified performance or safety of the cabinet and in a manner that is acceptable to the AHJ.

For non-vented flammable storage cabinets, it is recommended that the vent openings be sealed with the bungs supplied with the cabinet or with bungs specified by the manufacturer of the cabinet. Vent bungs should accommodate a (US) 2 in. (5 cm) NPT (DN50) threaded rigid steel pipe.

Any blowers should be specified as safe for handling flammable fumes (explosion proof) and should be installed to evacuate fumes from the cabinet using negative pressure (suction) to avoid dispersing fumes into the room itself.

Cabinets made to European Standard EN 14470-1 come with self-closing vent openings and require no manual sealing. The self-closing is triggered at a temperature of approximately 158°F (70°C).

It is recommended to retain a professional engineer to design a vent system and follow the guidelines listed here. It is important that the engineer consult the local building codes, fire codes, and the AHJ to understand the laws and to look for recommendations/interpretations prior to making the investment.

#### NOTE

Venting voids the UL listing, if applicable, as site conditions cannot be verified by UL.

### 3.4. TESTING

Flammable liquid storage cabinets should be approved as being acceptable by the AHJ.

Cabinets should be independently tested by approved third-party testing facilities certifying that the cabinets meet one of the following performance standards:

- UL 1275
- FM 6050
- ULC 1275
- EN 14470-1

or the standards of an agency acceptable to the AHJ.

### 3.5. SHELF LOADS

Shelf loads shall not exceed the manufacturer's recommendation.

## 4. Hazardous Material Storage Cabinets

### 4.1. PURPOSE

The purpose of a hazardous material storage cabinet is to restrict access to chemicals that might be harmful or dangerous to students or other personnel unqualified to have access and/or to provide an appropriate corrosive-resistant environment for hazardous material storage. These chemicals include but are not limited to corrosives, acids, bases, oxidizers, poisons, and other chemicals that are not flammable or combustible.

### 4.2. CONSTRUCTION

The interior of the cabinet shall be treated, coated, or constructed of materials that are not reactive with the chemical being stored. The secondary containment trough shall be constructed with the same chemical resistance and with a minimum depth of 2 in. (5 cm). The use of metal fasteners and shelf supports inside the cabinet must have the same chemical resistance as the interior of the cabinet. Hazardous material storage cabinets shall be designed such that in case of an accidental spill, the cabinet will safely contain the spill.

Doors may be provided with a suitable means of locking and securing the cabinet. This locking mechanism must be compatible with the chemical being stored.

Hazardous material storage cabinets shall be designed such that no chemicals are stored above shoulder height, and the overall cabinet height is not more than 65 in. (165 cm). Special care shall be taken to secure tall cabinets to the wall, and special care shall be taken to provide seismic anchorage as required per local codes.

If vented, the cabinet should be vented from the bottom, since most hazardous vapors are heavier than air; lighter-than-air chemicals, however, should be vented at the top of the cabinet. This venting shall not compromise the ability of the cabinet to contain a spill, should one occur inside the cabinet. A mechanical exhaust ventilation is preferred, and it should comply with NFPA 91. Installation of the vent into the ductwork of a fume hood exhaust is preferred.

Cabinets should be clearly marked with the type of chemical stored therein (e.g., ACIDS, BASES, POISONS), with letters that are a minimum of 2 in. (5 cm) high.

### 4.3. VENTING

Venting is recommended to exhaust noxious fumes that may build up in an enclosed acid storage cabinet, causing discomfort to and/or compromising the respiratory health of laboratory personnel. When a plastic product for venting of cabinets is specified, it is recommended that polyolefin pipe be used (see ASTM 1412). PVC piping should not be used for venting, as it will burn black if ignited and produce chlorine gas.

### 4.4. TESTING

Hazardous storage cabinets should be approved as being acceptable by the AHJ.

### 4.5. SHELF LOADS

Shelf loads shall not exceed the manufacturer's recommendation.

## 5. Storage Recommendations

These storage recommendations are intended to help establish a chemical storage plan. In developing a chemical storage plan, several factors must be considered, including the types of materials to be stored, the quantities of materials to be stored, and their sensitivity to sunlight, moisture, and other chemicals.

### 5.1. GENERAL STORAGE GUIDELINES

- Only store chemicals together that are compatible and of the same hazard class (e.g., flammables should be stored with flammables and oxidizers with oxidizers).
- Do not expose chemicals to direct sunlight. Keep them away from area heaters or heat sources.
- Store corrosive chemicals in plastic trays large enough to contain spills and leaks.
- Label all chemicals by name and concentration. Include date received and date opened.
- Do not store hazardous chemicals higher than 60 in. (152 cm) above the finished floor.
- Separate solid chemicals from liquid chemicals.
- Do not store chemicals under sinks or in fume hoods.
- Do not store flammable liquids in refrigerators that are not fire-rated. These refrigerators contain ignition sources that may cause fires.
- Do not store chemicals and food in the same refrigerator.
- Explosion-proof refrigerators shall comply with NFPA 42 12.2.2 and NFPA 70 (NEC).
- Do not store flammables with corrosives (acids, bases).
- Review with the AHJ, university, or Environmental Health and Safety (EHS) professional with regard to allowable limits.

### 5.2. ACID STORAGE

- Store large bottles of acid on the lower shelves of acid storage cabinets.
- Store oxidizing acids separately from organic acids, flammables, and combustible materials.
- Store acids separately from bases and active metals like sodium, magnesium, and potassium.
- Keep acids separated from chemicals that can generate toxic gases on contact, such as sodium cyanide and iron sulfide.
- Store acids in chemical resistant trays that are capable of containing any spillage or leakage.
- Some acids are incompatible with each other and should be stored separately.
- Never store cyanides with acids or oxidizers.
- Return acids to the cabinet in approved, safe, closed containers that are free of harmful residues.

### 5.3. BASE STORAGE

- Store bases in chemical resistant trays that can contain any spillage or leakage.
- Large bottles of bases should be stored on lower shelves or in a corrosive cabinet.
- Some bases are incompatible with each other and should be stored separately.
- Return bases to the cabinet in approved, safe, closed containers that are free of harmful residues.
- Store bases and acids separately.

## 5.4. FLAMMABLE LIQUID STORAGE

- Store flammables in approved enclosures.
- Be aware of static electricity when transferring flammable liquids from one container to another, especially metal containers. Metal flammable liquid storage cabinets should be grounded.
- Make sure that all flammables stored together are compatible with each other.
- Review NFPA guidelines for flammable storage.

## 5.5. PEROXIDE-FORMING CHEMICAL STORAGE

- Peroxide-forming chemicals should be stored in airtight containers in a dark, cool, dry place.
- Peroxide-forming chemicals should be properly disposed of before the date of expected peroxide formation (six months after opening).
- Store all peroxide-forming chemicals by compatibility.
- Shock-sensitive and detonable materials (e.g., picric and perchloric acids) are to be stored in secondary containers large enough to hold the container contents in case of breakage.
- Picric, if dry, must remain dry, if wet, it must remain wet. Crystal formation on caps, etc., poses an imminent danger. Containers should be routinely inspected for peroxide formation.
- Chemicals should be labeled with date received, date opened, and disposal/expiration date.
- Suspicion of peroxide contamination should be immediately investigated.

## 5.6. WATER-REACTIVE CHEMICAL STORAGE

- Water-reactive chemicals should be stored in a cool, dry place.
- Store all water-reactive chemicals by compatibility.

## 5.7. OXIDIZER STORAGE

- Oxidizers should be stored away from flammables, combustibles, and reducing agents (e.g. zinc, alkaline metals).
- Store all oxidizers by compatibility.
- Do not store cyanides with acids or oxidizers.

## 5.8. TOXIC COMPOUND STORAGE

- Toxic compounds should be stored according to the nature of the chemical, with the appropriate security employed when necessary.
- Store all toxic compounds by compatibility.
- A Poison Control Center telephone number should be posted in the laboratory, along with Centers for Disease Control (CDC) contact information.

## Appendix A: Glossary

**acid** – Any of a class of compounds that in aqueous solution turns blue litmus red and red litmus blue. It reacts with bases and with certain metals to form salts. A compound that dissociates in a solvent to produce the positive (+) ion of the solvent.

**acid storage cabinets** – Cabinets in which acids are stored to avoid having large quantities of hazardous material in the laboratory work area. *See* hazardous material storage cabinets.

**approved** – Acceptable to the authority having jurisdiction.

**authority having jurisdiction (AHJ)** – An organization, office, or individual responsible for enforcing the requirements of a code or standard or for approving equipment, materials, and installation, or a procedure.

**auto-ignition temperature** – The auto-ignition temperature of a substance is the lowest temperature at which it will spontaneously ignite in a normal atmosphere without an external source of ignition. It is also the required temperature of a heat source to ignite an ignitable atmosphere.

**base** – An alkali. A compound that is capable of so uniting with an acid as to neutralize its acid properties and form a salt. A compound that yields hydroxyl (-) ions in solution.

**base storage cabinets** – Cabinets in which bases are stored to avoid having large quantities of hazardous material in the laboratory work area.

**chemical storage plan** – A documented procedure outlining how chemicals are safely stored, labeled, and managed within a facility.

**EN 14470-1 fire resistance rating** – The duration for which a passive fire protection system can withstand a fire resistance test.

**NFPA 30 fire resistance rating** – A cabinet's ability to keep the inside temperature below 325°F (163°C) during a 10-minute fire test per NFPA 251. 325°F (163°C) is a conservative temperature well below the auto-ignition temperature of 99% of flammable liquids that could be stored.

**FM Global (FM)** – A nationally recognized independent testing laboratory established by the insurance industry to which manufacturers submit their products for evaluation of their ability to meet safety requirements under intended use. Products meeting these requirements are "FM approved."

**flammable liquids** – Per OSHA/GHS, any liquid having a flashpoint at or below 199.4°F (93°C).

- Category 1 shall include liquids having flashpoints below 73.4°F (23°C) and having a boiling point at or below 95°F (35°C).
- Category 2 shall include liquids having flashpoints below 73.4°F (23°C) and having a boiling point above 95°F (35°C).
- Category 3 shall include liquids having flashpoints at or above 73.4°F (23°C) and at or below 140°F (60°C).
- Category 4 shall include liquids having flashpoints between 140°F (60°C) and 199.4°F (93°C).

**flammable liquid storage cabinet** – A cabinet used to store and organize flammable liquids in approved closed containers. Used to prevent liquids from reaching their auto-ignition temperature in the event of a fire.

**GHS** – Globally Harmonized System of Classification and Labeling of Chemicals

hazardous material storage cabinet – A cabinet designed to safely store hazardous substances such as corrosive, toxic, or reactive chemicals, but not flammable or combustible materials.

oxidizer – A chemical substance that readily release oxygen or another oxidizing element, thereby supporting combustion and increasing the intensity of a fire. Oxidizers do not burn but can cause or enhance the burning of other materials.

poison – A chemical that can injure or kill by ingestion or contact.

toxic compound – A compound that can injure if inhaled, swallowed, or absorbed through the skin.

vent – A ducting or piping system designed to remove or change the air in an enclosed space, such as a storage cabinet.

## Appendix B: Relevant Organizations

SEFA acknowledges the importance of government agencies that produce documents concerning laboratory ventilation, laboratory fume hoods, and laboratory safety. This appendix includes an incomplete list of these organizations for reference.

Name	Initialism	Address	Website	Phone Number
American National Standards Institute	ANSI	11 West 42nd Street 13th Floor New York, NY 10036-8002	<a href="http://www.ansi.org">www.ansi.org</a>	(888) 267-4683 (212) 642-4900
California Air Resources Board	CARB	4001 Iowa Ave Riverside, CA 92507	<a href="http://ww2.arb.ca.gov">ww2.arb.ca.gov</a>	(800) 242-4450
FM Global	FM	270 Central Avenue Johnston, Rhode Island 02919	<a href="http://www.fm.com">www.fm.com</a>	(401) 275-3000
International Code Council	ICC	781 Elmgrove Road Rochester, New York 14624	<a href="http://www.iccsafe.org">www.iccsafe.org</a>	(888) 422-7233
National Fire Protection Association	NFPA	1 Batterymarch Park Quincy, Massachusetts 02169	<a href="http://www.nfpa.org">www.nfpa.org</a>	(800) 344-3555
National Institute for Occupational Safety & Health	NIOSH	400 7th St. SW Suite 5W Washington, DC 20024	<a href="http://www.cdc.gov/niosh">www.cdc.gov/niosh</a>	(800) 232-4636
Occupational Safety and Health Administration	OSHA	200 Constitution Ave NW Washington, DC 20210	<a href="http://www.osha.gov">www.osha.gov</a>	(800) 321-6742
Underwriters Laboratories Inc.	UL	333 Pfingsten Road Northbrook, IL 60062	<a href="http://www.ul.com">www.ul.com</a>	(800) 704-4050 (847) 272-8800
Underwriters Laboratories of Canada	ULC	7 Underwriters Rd, Scarborough, ON M1R 5P8, Canada	<a href="http://www.ulc.ca">www.ulc.ca</a>	(416) 757-3611