



Electrical, Mechanical & Plumbing Approvals for Chemical Dispensers

How to Ensure Success and Compliance with Your System

Based in Cincinnati, Ohio and with offices and support teams around the globe, Hydro Systems is a world leader in delivering chemical dispensing and dosing solutions including equipment, software and services. With strategic partnerships, innovative solutions and more than 50 years of experience, Hydro Systems is committed to enriching the lives of its customers by creating a cleaner, more sustainable world. Its products serve numerous dosing and dispensing applications within commercial cleaning, laundry, warewash, food service, industrial, irrigation, horticulture, animal health, and other industries. Hydro Systems helps its customers ensure dosing is always accurate, safe and cost effective, so that its customers can clean with confidence.

For more information, visit www.hydrosystemsco.com or contact **800.543.7184**.

TABLE OF CONTENTS

I. THE ROLE OF CHEMICAL DISPENSERS

A Variety of Applications.....Page 3

II. KEY STANDARDS TO KNOW

A Closer Look at ASSE 1055, UL, CSA, IEC and CE.....Page 4

III. ELECTRICAL, MECHANICAL AND FIRE SAFETY

How Testing Ensures Safety.....Page 5

IV. THE IMPORTANCE OF CHOOSING APPROVED PRODUCTS

Enhancing Peace of Mind.....Page 8

V. CORRECTLY INSTALLING YOUR DISPENSER

Guidance for Getting the Most Out of Your System.....Page 9

VI. COMPLIANCE WITH CERTIFICATIONS

Successful and Safe Dispensing.....Page 10



I. THE ROLE OF CHEMICAL DISPENSERS

A Variety of Applications

Chemical dispensers enable more efficient and effective facility operations, including cleaning, warewashing and laundering. Healthcare, hospitality and foodservice businesses all benefit from more accurate chemical usage, one of the many benefits that dispensers deliver. When dispensers dose the correct volume of cleaning chemical, they eliminate chemical, energy, and water waste associated with rewashing or recleaning. The highest quality dispensers are reliable, durable and precise to keep operations running smoothly and maximize return on investment.

In addition to creating resource and cost savings, dispensers can support the safety of facility employees and occupants. For example, cleaning products require proper dilution. If used at incorrect concentrations, solutions may fail to achieve manufacturers' pathogen kill claims. Additionally, dispensers connected to dishwashing machines distribute the proper volume of detergent to clean and sanitize dishes effectively in order to prevent foodborne illness outbreaks. Proper laundering of linens with the help of accurate chemical dispensers also helps to kill and inactivate germs that can cause healthcare-associated infections in hospitals and long-term care facilities. Easy-to-install and user-friendly dispensers from a trusted manufacturer reduce safety risks and provide peace of mind.

When working with dispensers, organizations need to make sure the products meet electrical, mechanical and plumbing standards to confirm compliance with local regulations, meet safety requirements and perform as intended. For example, in the United States, national and international plumbing codes require adherence to ASSE 1055, which tests dispensers to ensure they will not contaminate a potable water supply. Additionally, safety agencies such as the Underwriters Laboratory (UL) author standards to evaluate products based on electrical safety, mechanical safety and fire safety.

Other important standards include those developed by the Canadian Standards Association (CSA) and the International Electrotechnical Commission (IEC). Chemical dispensers certified for electrical, mechanical and fire safety undergo numerous tests to ensure they will not harm the user or the facility where they are installed.

With approved products, facility managers and chemical providers can be reassured that the dispensers are not putting employee, occupant or visitor safety at risk. Managers will also know that the equipment will not deteriorate and lose accuracy over time. By employing dispensers that meet the highest industry standards, and by following the correct installation steps, organizations can reap the many benefits of chemical dispensers.



II. KEY STANDARDS TO KNOW

A Closer Look at ASSE 1055, UL, CSA, IEC and CE

It is important to understand several industry standards. These include:

- **ASSE 1055** – “ASSE 1055 Chemical Dispensers: Use, Installation and Design” was developed by ASSE International in 1997 and includes testing and requirements to ensure performance, health and safety.¹ The standard is periodically updated, with the latest edition published in December 2020. National Plumbing Codes, the International Plumbing Code and the Uniform Plumbing Code require adherence to ASSE 1055 requirements.

Specifically, ASSE 1055 sets standards for chemical dispensing systems with integral backflow protection.² Systems with this capability connect to a potable water supply without contaminating it with potentially caustic chemicals.³

The standard details that chemical dispensers need to undergo testing to determine their performance related to tipping, pressure and temperature deterioration, hydrostatic pressure, backpressure and backsiphonage.⁴

- **Underwriters Laboratory (UL)** – Underwriters Laboratory is a global independent safety science company. UL is accredited in the United States and Canada and offers testing, inspection and certification standards. UL Standards encompass three key areas related to dispensing: electrical safety, mechanical safety and fire safety.
- **Canadian Standards Association (CSA)** – The CSA Group provides testing, inspection and certification standards for many areas including water and electrical safety. Their testing can often be to other global standards written by UL or IEC. The aim of CSA is to give customers confidence that a product or system prioritizes health and safety of the user and the environment. CSA also identifies the compatibility and interoperability of products.
- **International Electrotechnical Commission (IEC)** – The IEC develops and publishes international standards related to electrical, electronic and related technologies. These range from standards for power generation, transmission and distribution to home appliances to office equipment, and more. For example, Standard IEC 60730 defines the test and diagnostic methods that ensure the safe operation of embedded control hardware and software for household appliances. Reputable dispenser manufacturers will follow this standard for warewash and on-premise laundry dispensers.

- **Conformité Européenne (CE)** – CE means “European Conformity” in French. A product in one of the controlled product categories cannot legally be sold in the European Union unless it has passed the tests to receive the CE marking. Having a CE marking makes it much easier for manufacturers to sell their products because it means it can be sold anywhere in the EU. Most dispenser manufacturers are able to complete a self-certification, guaranteeing that they have run and documented conformance. CE can be viewed as less stringent because it does not require testing and a design review by a third party to mark or certify the product.



III. ELECTRICAL, MECHANICAL AND FIRE SAFETY

How Testing Ensures Safety

There are numerous tests that certified products typically undergo. These help ensure electrical, mechanical and fire safety.

- 1 Electrical Safety** – It’s important to understand several different concepts related to electrical safety. The first is electromagnetic compatibility (EMC). This is related to how the product handles being in an environment with electromagnetic fields, such as those created by electrical equipment in a facility.

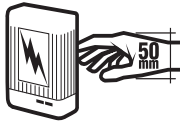

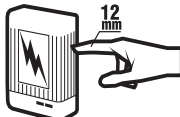

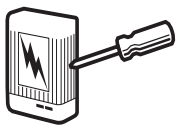

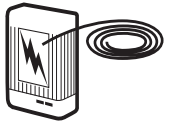



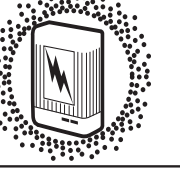



The second is electromagnetic interference (EMI), which concerns both radiated and conducted interference. Devices that pass the EMI test will not shut down or malfunction dangerously when exposed to strong electromagnetic fields.

It’s also necessary to review electrostatic discharge (ESD). This test confirms that the product can withstand large static discharges from a person touching the unit or even by lightning strikes.

Confirming electrical safety also requires a closer look at the unit’s critical components or any part of the unit carrying Voltage that can be harmful (over 50 Volts), such as power cables, to ensure they will not cause damage or harm. A review of the printed circuit board (PCB) is also essential to confirm conductor spacing. Creepage and clearance standards ensure that the distances between neighboring conductors on a PCB will not result in premature failure or fires. This is especially important for products that run at high voltage.

2 Mechanical Safety – Mechanical safety is analyzed through drop tests on enclosures, also known as impact tests. The goal is to make sure that they do not break apart and expose live electrical or dangerous parts to a user in the field. Ingress Protection (IP) of enclosures assures that the electrical enclosures keep fingers, tools, dust and moisture from getting into sensitive areas and causing malfunctions or injuries (see diagram below⁵). It's also important to evaluate pinch points and accessibility to dangerous parts.

IP (Ingress Protection) Ratings Guide

SOLIDS		WATER	
1	 <p>Protected against a solid object greater than 50 mm such as a hand.</p>	1	 <p>Protected against vertically falling drops of water. Limited ingress permitted.</p>
2	 <p>Protected against a solid object greater than 12.5 mm such as a finger.</p>	2	 <p>Protected against vertically falling drops of water with enclosure tilted up to 15 degrees from the vertical. Limited ingress permitted.</p>
3	 <p>Protected against a solid object greater than 2.5 mm such as a screwdriver.</p>	3	 <p>Protected against sprays of water up to 60 degrees from the vertical. Limited ingress permitted for three minutes.</p>
4	 <p>Protected against a solid object greater than 1 mm such as a wire.</p>	4	 <p>Protected against water splashed from all directions. Limited ingress permitted.</p>
5	 <p>Dust Protected. Limited ingress of dust permitted. Will not interfere with operation of the equipment. Two to eight hours.</p>	5	 <p>Protected against jets of water. Limited ingress permitted.</p>
6	 <p>Dust tight. No Ingress of dust. Two to eight hours.</p>	6	 <p>Water from heavy seas or water projected in powerful jets shall not enter the enclosure in harmful quantities.</p>
<p>Rating Example:</p> <p>IP65</p> <p>INGRESS PROTECTION</p>		7	 <p>Protection against the effects of immersion in water between 15 cm and 1 m for 30 minutes.</p>
		8	 <p>Protection against the effects of immersion in water under pressure for long periods.</p>

3 Fire Safety – There are numerous ways to confirm whether a dispenser is fire safe. A glow wire test determines if the plastics that enclose the electronics will refrain from catching fire under normal operation or abnormal conditions like electrical short circuits. Testing is done to determine the response when fires start inside the enclosure and from the outside. Consider looking for dispensers that use plastics that meet a vertical burn rating of V0 fire retardancy. This means the fire will self-extinguish in both of these scenarios.

UL requires that they or an organization they have certified conducts all flammability testing to eliminate the risk of bias that can occur when manufacturers self-certify. One such third-party testing and certification organization is Intertek. Products that pass its tests can adopt an ETL Mark. The C on the left side of the mark means that testing confirmed compliance with CSA (or Canada) and the US designation on the right means that testing confirmed compliance with UL.⁶ Today, the ETL Mark is the fastest growing safety certification in North America, with millions of products carrying this important proof of product compliance.



In addition to third-party testing, safety agencies such as UL require on-site audits at least once per year at the manufacturer's production facility. This ensures the product is continuously being produced to meet the original design testing. If there have been any engineering changes to the product's design, these must be reviewed and approved to ensure that the product still complies with the standards.





IV. THE IMPORTANCE OF CHOOSING APPROVED PRODUCTS

Enhancing Peace of Mind

Approved products offer numerous advantages to the facilities where they are installed, their employees and their guests. They provide facility managers peace of mind that the product is compliant with regulations and minimizes the risk of safety incidents or costly insurance claims. Functioning equipment also helps operations avoid downtime that can impact the bottom line.

Often, third-party chemical companies are responsible for installing dispensers in facilities. Building managers and owners may be unaware whether the equipment being installed in their facilities meets the necessary industry standards. It's best practice for facility managers to review their systems to ensure they have undergone safety testing to protect end users—many of the dispensing systems installed in North America today unfortunately have not.

Equipment that does not meet UL or other critical standards could break down more easily over time, potentially resulting in a fire, floods, water poisoning, health risks due to poor cleaning efficacy, electromagnetic interference with other critical equipment or an unsafe component shocking or pinching someone. These kinds of incidents could lead to costly lawsuits and reputational damage. It is in every facility manager's best interest to take an interest in their dispensing equipment to ensure that it meets proven safety guidelines.

Facilities also need to ensure their equipment complies with government regulations. The National Electrical Code (NEC) requires the use of UL listed products when multiple options are available. Several international electrical codes also require UL certification. If a facility's dispensers do not carry the UL mark, the facility is likely risking penalties for failing to meet regulations.

Since tested products are likely to last longer and require less maintenance, they will have less downtime than inferior quality equipment. Meeting industry standards ensures a dispenser is constructed with reliability and durability in mind. This equipment will save time and money on unnecessary maintenance and interrupted operations.



V. CORRECTLY INSTALLING YOUR DISPENSER

Guidance for Getting the Most Out of Your System

When installing dispensing equipment, there are several factors to keep in mind. First, in terms of plumbing, it's best to connect dispensers to a dedicated water supply line which can be easily isolated with an inline valve. Dedicated connections use a branch of the water supply that is only used for the chemical dispenser.⁷ Backflow prevention in the dispensing unit will protect the water supply from cross-contamination with potentially harmful chemicals.

When facilities install dispensers in custodial closets or commercial kitchens, they often connect to a faucet. A problem occurs when the faucet contains an atmospheric vacuum breaker (AVB) as the faucet's backflow protection. An AVB is a non-testable backflow prevention device that should not be put under constant pressure. In order to avoid this, it is often recommended to add a pressure bleed device (also known as a wasting tee) to relieve this pressure. Pressure bleed devices prevent the AVB from being under constant pressure by allowing a small amount of water to continuously "bleed" from the line.

Dispensers may be connected to a faucet that has two handles for hot and cold water. If both the hot and cold valves are opened, and the faucet is connected to a chemical dispensing system, a path is created to allow hot water to migrate to the cold water line. This could result in hot water going to a location where it is not desired, such as a drinking fountain. New faucets will contain a check valve to prevent this migration. While the pressure bleed device will not eliminate hot/cold migration, it will make it obvious so the user can take the appropriate action.

Operators also need to ensure that all electrical equipment meets the NEC and any local codes. Additionally, high-voltage equipment over 120VAC should be run in an approved conduit that will protect the wires from exposure. To avoid having to perform time-consuming and potentially dangerous wiring on site, use dispensers that come pre-wired.



V. COMPLIANCE WITH CERTIFICATIONS

Successful and Safe Dispensing

With reliable, certified dispensers in place, organizations have peace of mind that their chemical dilutions are accurate and their commitment to cleanliness is being fulfilled. Prior to purchase and installation, facility managers should review dispensers to ensure they meet electrical, mechanical and plumbing standards to comply with local and national regulations. In addition to adhering to certifications, approved products offer additional benefits. They reduce the risk of facility fires, electrical mishaps and other dangerous accidents caused by faulty equipment. Use certified dispensers and proper installation procedures to ensure compliance, uphold your cleanliness standards and protect the health and safety of staff and guests.

At Hydro Systems, we are committed to delivering reliable, accurate and safe chemical dispensers that enable organizations to greatly minimize risks, improve cleaning results and enhance the triple bottom line to protect people, profits and the planet. While there is a real cost to certifying products, we recognize it is the right thing to do for our customers, end users and the occupants and visitors of the facilities where our dispensers are trusted to operate.

We typically test equipment according to harmonized IEC standards. We work with Intertek to conduct third-party testing for UL and CSA. Additionally, our systems are constructed with built-in Air Gap or E-Gap eductors to meet ASSE 1055 Performance Requirements and are listed with the ASSE.⁸ Our newest connected products that harness the power of the Internet of Things (IoT) meet Federal Communications Commission (FCC) requirements.⁹

These are just some of the ways we prioritize quality and safety. For more information about dispensing equipment, visit [hydrosystemsco.com](https://www.hydrosystemsco.com) or contact **800.543.7184**.

SOURCES

- 1 <https://www.asse-plumbing.org/asse/standards/product/current-standards>
- 2 <https://www.assewebstore.com/ansi-can-asse-iapmo-1055-2020-download/>
- 3 <https://www.asse-plumbing.org/asse/standards/product/current-standards>
- 4 <https://www.workingpressuremag.com/asse-1055-chemical-dispensers/>
- 5 https://www.bluesea.com/support/reference/117/IP_%5BIngress_Protection%5D_Ratings
- 6 <https://www.intertek.com/marks/et/>
- 7 <https://www.pengineer.com/articles/92750-tech-topic-chemical-dispensers>
- 8 <https://hydrosystemsco.com/support/regulatory-info/>
- 9 <https://www.cooleygo.com/fcc-equipment-authorization-rules/>



Hydro Systems

Americas
Europe
Asia Pacific

+1 513-271-8800
+49 (0) 2065 89205-0
+86 21-6187-1030

contact-hydro@hydrosystemsco.com
info@hydrosystemseurope.com
sales.hydro@hydrosystemschina.com

www.hydrosystemsco.com
www.hydrosystemseurope.com
www.hydrosystemschina.com