

# 2025



# SAFETY RESOURCE CATALOG

# The Chlorine Institute

## 2025 Safety Resource Catalog

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### HOW TO CONTACT CI

For more information about the Chlorine Institute’s technical resources and training programs, visit the Institute’s website at [www.chlorineinstitute.org](http://www.chlorineinstitute.org)

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# ABOUT CI

The Chlorine Institute (CI) was founded in 1924 to represent companies and other entities that are involved or interested in the safe production, distribution and use of its mission chemicals. CI's member companies represent the complete value chain-from chlorine producers to packagers, distributors, users and suppliers.

Today the Institute has approximately 190 member companies located in the U.S., Canada, Mexico, Central and South America, and overseas countries. Institute members account for a majority of the U.S. production of chlorine and related alkali chemicals - about 26 million tons of material annually. Because of chlorine's nature and its widespread and varied use, the promotion of its safe handling has long been an accepted responsibility of its producers, packagers, distributors and users. The Institute is the focal point for their joint efforts.

The Chlorine Institute exists to support the chlor-alkali industry in advancing safe, secure, environmentally compatible, and sustainable production, distribution, and use of its mission chemicals\*.

*\*CI's mission chemicals: chlorine, sodium and potassium hydroxides, sodium hypochlorite, the distribution of vinyl chloride monomer (VCM), and the distribution and use of hydrogen chloride.*

## Goals

The Chlorine Institute sets out to accomplish its mission by:

- I. Improving the performance of safety, human health and environmental protection programs for chlor-alkali producers, packagers, distributors and users.
- II. Fostering the development of regulations that support the achievement of continuous improvement and voluntary mechanisms that preclude the need for new government regulations.
- III. Positioning the Institute as an authoritative and credible source of technical, safety and security-related information and emergency response procedures to prevent and mitigate the release of chlorine and other mission chemicals.



## CORE VALUES

In all that we do we have an unwavering commitment to operate at the highest level. This commitment extends to:



### SAFETY

As an organization focused on safety we will keep safety first in all our actions and activities.



### MEMBER SYNERGY

Satisfied and engaged members are essential to our effectiveness as an organization. We will achieve member satisfaction by understanding what our members need and helping them to achieve it in a collaborative way that is aligned with the mission of the Institute.



### RESPECT

We will maintain an environment where all members and employees are treated with dignity. We will operate in an atmosphere that is free of offensive teasing or joking, bullying, harassment or discrimination of any kind.



### DIVERSITY

We value the contributions, strengths and perspectives of our diverse team. This fosters creativity and builds an atmosphere that encourages continual learning, the sharing of ideas, experiences, and knowledge among both employees and members.



### INTEGRITY

All interactions among members, employees, suppliers, regulatory agencies, and the public will be conducted in an honest and open way with the highest ethical standards.

## FREE PUBLICATIONS FOR MEMBERS!

In an effort to promote safety stewardship within the chlor-alkali industry, The Chlorine Institute offers free download access to pamphlets and videos for members through the online bookstore, Resource Library, and Members Only Portal. (CI Pamphlet 10 is not included in this program but is still available for purchase through the bookstore). **Government agencies, public first responders, and water utilities may access CI resources at no cost. Please email [CIFreeBookstore@CL2.com](mailto:CIFreeBookstore@CL2.com) with the publication(s) needed.**



# The Value of CI Membership

Check out our website using this QR code to scan or click the icon



<https://www.chlorineinstitute.org/>

## Company Membership Criteria

Any company engaged in the production, packaging, distribution or use of chlorine, caustic soda, caustic potash, sodium hypochlorite; the distribution of vinyl chloride monomer (VCM); the distribution and use of hydrogen chloride; or any company interested in the development and improvement of the chlor-alkali industry is eligible for membership. The four categories of membership are:

**North American Producer** membership is open to companies that produce chlorine, caustic soda or caustic potash in the United States, Canada and Mexico.

**Packager/Bleach Producer** membership is open to companies located in North America that produce bleach and package chlorine in 100- or 150-pound cylinders or one-ton containers or cargo tanks.

**Overseas Producer** membership is open to companies located outside the United States, Canada and Mexico that produce chlorine, caustic soda or caustic potash.

**Associate** membership is open to all other companies with an interest in the chlor-alkali industry, including makers of equipment for producing, handling, shipping and dispensing chlorine; salt suppliers; chlorine consumers; water and wastewater treatment facilities; emergency contractors; pool chlorinators; and designers and builders of chlorine plants.



Picture: 2024 Annual Meeting, Table-Top Expo and Technical Symposium Reception at Mardi Gras World (New Orleans, LA)

## Our Commitment to Chlorine Stewardship

All Chlorine Institute member companies that produce, distribute, or use chlorine must sign an annual commitment to implement and maintain safety and security practices.

Scan this QR code to link to our Stewardship Page or click the icon



<https://www.chlorineinstitute.org/stewardship-overview>

## Stay in the Loop!

Members can opt into our quarterly Pubs Report e-mail subscription for all the current updates on CI publications.

For more information on e-mail subscriptions see page 4.

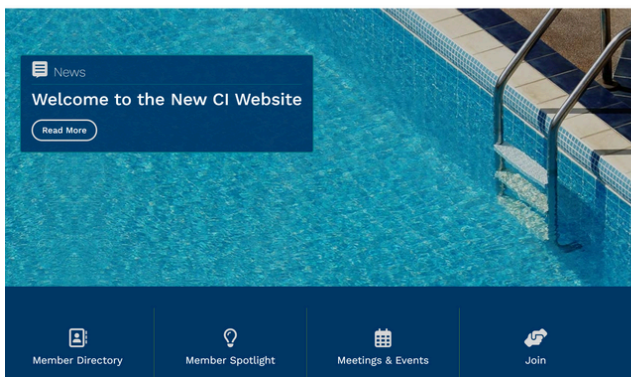
The most current editions will always be listed online in our Bookstore.

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# The CI Website



About Membership Technical Committees Technical Service Questions



<https://www.chlorineinstitute.org/>

Have you noticed that the CI website looks a little different? CI Staff recently collaborated with Novi AMS to design a new website and a more user-friendly experience for both members and non-members of The Chlorine Institute. Check it out!

With a new website comes a new member portal, now referred to as your Member Compass™. The Member Compass™ is an area on the CI website where you can view a snapshot of your membership and member engagement.

## How to Create Your Account:

1. Go to the following link: <https://bit.ly/Login2CI>
2. Enter your email and follow the prompts.
  - o If the email entered is connected to your profile, you'll be prompted to set your new password.
  - o If we do not have the email on file in our new system, you'll be prompted to create a new account.
3. Once you've logged in, you'll be taken to your *Member Compass* - our new portal for you to update your profile, see events that you are registered for, pay invoices, and more. Be sure to update your profile!
4. Both members and non-members of CI can create login credentials. If you have any questions or require further assistance setting up your account, please contact us at [INFO@CL2.com](mailto:INFO@CL2.com). We hope that you enjoy the new look and feel!



## Members, Join CI's Monthly Newsletters!

Login to the CI website and go to your *Member Compass*. On the profile page, specifically the E-mail Communication section, you may opt in or out of CI's various newsletters:

- **The Insider** – CI's monthly newsletter with general information about CI activities including, training and event updates, news from CI's president, and member spotlights.
- **Fixed Facility Update** – highlights news affecting the chlor-alkali industry, including proposed rules, open comment periods, interpretations on existing rules, voluntary programs, newly published resources, training opportunities and agency directives.
- **Transportation Update** – highlights current topics related to regulations and industry transportation activity to help members stay on top of the issues.
- **Publications Report** – provides a high-level overview of CI publications that are currently in the review process or have been discontinued or suspended.
- **Production Estimates Report** – highlights industry production capacity for chlorine, and the quantity of chlorine produced each month.

## Membership Benefits!

### Technical Services:

- E-mail our Technical Services Department at [TECHSVC@CL2.com](mailto:TECHSVC@CL2.com) to receive guidance on technical inquiries regarding CI recommendations.

### Webinars:

- Webinars available in the Resource Library.
- Topics include:
  - o Moisture in Chlorine
  - o Chlorine Hydrite Hazards
  - o Bulk, Stationary Chlorine Storage
  - o More webinars to come!

### CI Resource Library:

- Your one stop shop for CI resources, including pamphlets, presentations, webinars, reports, Safety Alerts, and more.
- Handy websites that you may need at your fingertips.
- Spanish resources page.
- Easy downloads without having to use the bookstore.
- Search all resources at once.

*If you are affiliated with a CI member company & would like access to the new Resource Library, please send an e-mail to [ResourceLibrary@CL2.com](mailto:ResourceLibrary@CL2.com).*

### Network:

- Actively engaged with important regulatory authorities and standard settings organizations such as: EPA, DOT, TC, DHS, OSHA, AAR, AWWA, NSF

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**Over 100 years of chlor-alkali safety and stewardship!**  
Est. 1924

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## CI Membership = Bottom Line Benefits

***In addition to the many benefits of membership listed on page 10, new CI member companies enjoy immediate bottom-line value with:***

- Significant discounts on all hard copy publications.
- 6 FREE hard copy technical pamphlets of your choice from the most recent CI Catalog.
- ONE INDIVIDUAL COMPLIMENTARY meeting registration to the CI meeting of your choice.

# SUMMARIES

## Safe Production, Handling & Packaging

### Pamphlet 1)

#### Chlorine Basics

Edition 9, March 2023

Contains basic information including properties and physiological effects of chlorine, description and rules for handling chlorine containers, emergency measures and first aid, and chemical and physical characteristics. (67 pages)

### Pamphlet 5)

#### Bulk Storage of Liquid Chlorine

Edition 10, July 2022

This pamphlet is intended to assist in the design, construction, location, installation, and inspection of liquid chlorine storage systems. The recommendations are based on storage in horizontal, cylindrical tanks. This pamphlet does not apply to in-process pressure equipment (e.g., heat exchangers, vaporizers). (31 pages)

### Pamphlet 6)

#### Piping Systems for Dry Chlorine

Edition 17, April 2020

This publication is intended to provide useful information concerning chlorine piping for both permanent production and use facilities, as well as temporary transportation systems. It contains information on selected piping, valves, hoses, and fittings suitable for use with dry chlorine (gas or liquid) within the range of  $-150^{\circ}\text{F}$  ( $-101^{\circ}\text{C}$ ) and  $300^{\circ}\text{F}$  ( $9^{\circ}\text{C}$ ). There is also guidance on preparations for use and maintenance practices. (88 pages)

### Pamphlet 9)

#### Chlorine Vaporizing Systems

Edition 9, April 2024

This pamphlet is intended to assist in the selection, design, safe operation and maintenance of chlorine vaporizer systems. It is limited to those who receive liquid chlorine in cylinders, ton containers, via pipeline, in cargo tanks or tank cars and who will vaporize liquid for ultimate use of the chlorine as a gas. It is not intended for chlorine processing systems such as reboilers and complex distribution systems. (46 pages)

### Pamphlet 17)

#### Packaging Plant Safety and Operational Guidelines

Edition 6, June 2023

The purpose of this pamphlet is primarily to provide both operational recommendations and safety information for employees at facilities that package 100 lb. (45 kg) and 150 lb. (68 kg) cylinders and ton containers (907 kg) of chlorine. It contains recommendations for receiving, inspecting, testing and reconditioning chlorine cylinders, ton containers, valves and fusible plugs at packaging plants. It also covers recommendations for filling these containers, personal protective equipment use, tank car receiving, emergency planning/response, and key regulations. (107 pages)

### Pamphlet 21)

#### Nitrogen Trichloride - A Collection of Reports and Papers

Edition 8, January 2023

This pamphlet is a compilation of largely unpublished information considered important to understand the formation of and associated hazards of nitrogen trichloride. (412 pages)

### Pamphlet 49)

#### Recommended Practices for Handling Chlorine Bulk Highway Transports

Edition 11, June 2022

Provides guidelines, recommended practices, and other useful information for the safe shipping, receiving, loading, unloading, maintenance, and emergency response relevant to handling cargo tank motor vehicles and portable tanks used to transport chlorine by highway. This pamphlet also refers to the applicable regulatory requirements. (88 pages)

### Pamphlet 57)

#### Emergency Shut-Off Systems for Bulk Transfer of Chlorine

Edition 7, November 2020

Recommends practices for emergency shut-off protection during chlorine transfers involving bulk containers. (13 pages)

### Pamphlet 60)

#### Chlorine Pipelines

Edition 8, September 2019

Provides recommendations on the design, construction, operation, and maintenance of carbon steel pipelines that transport chlorine liquid or gas. The recommendations are applicable to pipelines that terminate outside the chlorine shipper's property or crosses property not owned by the shipper or receiver of the chlorine. (24 pages)

### Pamphlet 65)

#### Personal Protective Equipment for Chlor-Alkali Chemicals

Edition 7, January 2021

This pamphlet provides information pertaining to personal protective equipment (including respiratory protection and equipment) used in the manufacture or handling of chlorine, sodium hydroxide, potassium hydroxide, sodium hypochlorite, hydrochloric acid, sulfuric acid, anhydrous hydrogen chloride, and vinyl chloride monomer. It contains PPE recommendations for initial line break, material sampling, loading, unloading, and emergency response. There is also a discussion on escape respirators. (73 pages)

### Pamphlet 66)

#### Recommended Practices For Handling Chlorine Tank Cars

Edition 6, October 2022

Provides guidelines, recommended practices and other useful information to personnel involved in the shipping, receiving, loading, unloading, maintenance, and emergency response relevant to chlorine tank cars. This pamphlet also refers to the applicable regulatory requirements and industry standards. (105 pages)

### Pamphlet 73)

#### Atmospheric Monitoring Equipment for Chlorine

Edition 9, March 2021

This pamphlet is intended to assist in the selection, installation, maintenance, calibration and safe operation of stationary chlorine monitors. Personal monitors are beyond the scope of this pamphlet. (26 pages)

### Pamphlet 74)

#### Guidance on Estimating the Area Affected by a Chlorine Release

Edition 7, October 2019

The intent of this pamphlet is to provide a simplified document to assist chlorine producers/users, local emergency planning committees, fire departments, and municipalities in estimating the area affected by a chlorine release for emergency planning and hazard assessment purposes, and to provide a general understanding of the expectations of chlorine cloud release scenarios. The Department of Homeland Security (DHS) Chemical Security Analysis Center (CSAC), part of the Science and Technology Directorate (S&T), collaborated with the Chlorine Institute to develop updated guidance in this version of Pamphlet 74, based upon new experimental research into chlorine releases and the associated chemical and physical phenomena. The Hazard Prediction and Assessment Capability (HPAC) model, developed and widely used by the U.S. Government, was used to simulate the release scenarios in this pamphlet to provide new modeling results. (189 pages)

### Pamphlet 76)

#### Guidelines for the Safe Motor Vehicular Transportation of Chlorine Cylinders and Ton Containers

Edition 7, March 2024

Provides guidelines, recommended practices and other useful information, including guidance on securement, segregation, driver training, emergency response and regulatory requirements, for shipping chlorine cylinders and ton containers on the highways. (29 pages)

### Pamphlet 80)

#### Recommended Practices for Handling Sodium Hydroxide Solution and Potassium Hydroxide Solution (Caustic) Barges

Edition 5, November 2019

Provides guidelines, recommended practices and other useful information for the safe shipping, receiving and handling of sodium hydroxide solution and potassium hydroxide solution in barges. This pamphlet also refers to the applicable regulatory requirements. (34 pages)

# SUMMARIES

## Pamphlet 82)

### **Recommendations for Using 100 and 150 Pound Chlorine Cylinders at Swimming Pools**

Edition 4, May 2024

Designed to provide basic information for the safe handling and use of chlorine cylinders kept on site at swimming pools. (44 pages)

## Pamphlet 86)

### **Recommendations to Facilities for the Prevention of Chlorine Releases**

Edition 7, July 2022

This pamphlet is intended to provide useful information to chlor-alkali manufacturing facilities to help prevent the occurrence, or minimize the consequences, of uncontrolled releases of chlorine. (83 pages)

## Pamphlet 87)

### **Recommended Practices for Handling Sodium Hydroxide Solution and Potassium Hydroxide Solution (Caustic) Tank Cars**

Edition 5, July 2018

Provides guidelines, recommended practices and other useful information for the safe shipping, receiving, loading, unloading and maintenance relevant to handling sodium hydroxide solution and potassium hydroxide solution in tank cars. This pamphlet also refers to the applicable regulatory requirements and industry standards. (54 pages)

## Pamphlet 88)

### **Recommended Practices for Handling Sodium Hydroxide Solution and Potassium Hydroxide Solution (Caustic) in Bulk Highway Transports**

Edition 5, June 2022

Provides guidelines, recommended practices and other useful information for personnel involved in the safe shipping, loading, unloading, maintenance and emergency response relevant to handling cargo tanks used to transport sodium hydroxide solution and potassium hydroxide solution by highway. This pamphlet also refers to the applicable regulatory requirements. (65 pages)

## Pamphlet 89)

### **Chlorine Scrubbing Systems**

Edition 5, March 2021

This pamphlet intends to provide general guidance and source information for chlorine producers and consumers for the effective containment and treatment of their gaseous chlorine effluents. The information in this pamphlet is written primarily for sodium hydroxide solutions and their reactions with chlorine. However, selected properties of some other chemicals can be found in Appendix B. (47 pages)

## Pamphlet 91)

### **Checklist for Chlorine Packaging Plants, Chlorine Distributors, and Tank Car Users of Chlorine**

Edition 5, January 2020

This pamphlet is in a checklist format and is designed primarily for use by chlorine packagers. However, by skipping irrelevant sections it can be used as a tool for chlorine distributors, sodium hypochlorite manufacturers, and chlorine tank car users to evaluate the chlorine handling part of their processes. Not all items included in this checklist are Chlorine Institute guidelines or legal requirements. Some are provided to make the user aware of options they may not have considered until now and may wish to incorporate in their operations(s). (13 pages)

## Pamphlet 94)

### **Sodium Hydroxide Solution and Potassium Hydroxide Solution (Caustic) Storage Equipment and Piping Systems**

Edition 6, April 2024

This publication is intended to provide useful information concerning the storage and piping of sodium hydroxide and potassium hydroxide solutions. This pamphlet's objective is to offer practical suggestions in the design, construction and operation of systems suitable for up to 73 wt% solutions of sodium hydroxide and potassium hydroxide. The requirements of anhydrous sodium hydroxide and anhydrous potassium hydroxide have not been considered. (72 pages)

## Pamphlet 95)

### **Gaskets for Chlorine Service**

Edition 6, January 2021

This pamphlet is intended to provide manufacturers, packagers, and consumers of chlorine with practical information that can be used to improve safety and environmental performance by helping to prevent failures and minimize fugitive emissions from gasketed connections in dry and wet chlorine service. The pamphlet provides guidance for gasket material selection and gasket installation. This pamphlet lists gaskets that have found user acceptance in chlorine service. NOTE: The Chlorine Institute does not approve, rate, certify or endorse any gasket. The information on gaskets and gasket materials contained in this pamphlet reflects information obtained from member companies in their use and/or evaluation of the gasket or gasket material. (20 pages)

## Pamphlet 96)

### **Sodium Hypochlorite Manual**

Edition 5, September 2017

Contains information for the safe production, handling and use of both industrial and household strength bleach solutions. Provides basic information on useful physical and chemical properties, as well as compatible materials, handling systems and pertinent analytical procedures, emergency response, stability factors, and security issues. (118 pages)

## Pamphlet 98)

### **Recommended Practices for Handling Hydrochloric Acid in Tank Cars**

Edition 5, December 2019

Provides guidelines, recommended practices and other useful information for the safe shipping, receiving, loading, unloading, maintenance, and emergency response relevant to handling hydrochloric acid in tank cars. This pamphlet also refers to the applicable regulatory requirements and industry standards. (111 pages)

## Pamphlet 139)

### **Electrical Safety in Chlor-Alkali Cell Facilities**

Edition 7, July 2024

This pamphlet provides information regarding electrical safety, including identification of hazards, electrical health effects on the body, preventative measures, and first aid, for those responsible for operations and maintenance in chlor-alkali facilities. (47 pages)

## Pamphlet 150)

### **Recommended Practices for Handling Hydrochloric Acid in Bulk Highway Transports**

Edition 4, March 2020

Provides guidelines, recommended practices and other useful information for the safe shipping, receiving, loading, unloading, maintenance, and emergency response relevant to handling of hydrochloric acid in bulk highway transports. This pamphlet also refers to the applicable regulatory requirements. (68 pages)

## Pamphlet 152)

### **Safe Handling of Chlorine Containing Nitrogen Trichloride**

Edition 5, August 2024

This pamphlet provides useful information to producers, distributors, repackagers, and users of chlorine. It discusses nitrogen trichloride, a trace impurity commonly found in chlorine that could lead to the explosive decomposition of nitrogen trichloride in chlorine containing systems, including nitrogen trichloride properties, hazard awareness, controls, and formation prevention. (24 pages)

## Pamphlet 155)

### **Water and Wastewater Operators Chlorine Handbook**

Edition 4, June 2023

Provides basic information on chlorine safety and handling necessary for treatment plant personnel and other users of cylinders or ton containers. (54 pages)

## Pamphlet 163)

### **Hydrochloric Acid Storage and Piping Systems**

Edition 5, October 2024

Provides useful information concerning the storage and piping of hydrochloric acid solutions and offers practical suggestions in the design, construction and operation of these systems. (52 pages)

# SUMMARIES

## Pamphlet 164)

### **Reactivity and Compatibility of Chlorine, Sodium Hydroxide, and Potassium Hydroxide with Various Materials**

Edition 4, January 2023

This pamphlet is intended to provide information to producers, users, and handlers of chlorine and/or 50% sodium and potassium hydroxides concerning the compatibility of these two substances with a variety of materials and their reactivity with other chemicals. The information considers only those materials and chemicals typically found in facilities producing, using, or otherwise handling chlorine and/or sodium and potassium hydroxide and is not meant to be an exhaustive list. This pamphlet is not intended to provide detailed technical information needed by process engineers nor is it intended to provide economic evaluations of compatible materials. While the information provided should be of help to emergency responders, this pamphlet is not intended to provide technical guidance to the first persons on the scene in an emergency response. This pamphlet does not address nitrogen trichloride. (47 pages)

## Pamphlet 165)

### **Instrumentation for Chlorine Service**

Edition 4, January 2023

This pamphlet is intended to assist the chlor-alkali industry in management of instrumentation systems. It includes information on the design as well as the maintenance of the instrumentation systems. It provides guidance on the selection of materials, the selection of primary elements and control devices, and the design and installation of instrumentation, including the sensing lines for wet and dry chlorine gas and dry liquid chlorine service. Only critical instrumentation issues related to chlorine applications are addressed. The recommendations of this pamphlet are based on the experience of chlorine producers and consumers and represent current industry practices. It is not the intent of this pamphlet to limit the use of specific materials or instruments, provided they have been engineered for the specific design conditions and the particular requirements of chlorine service. This pamphlet does not address sample collection equipment, chlorine analysis equipment, or general instrumentation practices. However, operators of chlorine systems should consider the need for on-line (continuous) analysis of the chlorine for impurities such as nitrogen trichloride, water, or hydrogen, and follow up with research of the various analyzer manufacturers available. It also includes information on the elements of an effective maintenance program. (25 pages)

## Pamphlet 166)

### **Guidelines for Traditional Service Equipment Design for Chlorine Bulk Transport**

Edition 2, September 2024

Provides performance/selection criteria for traditional angle valves installed on bulk chlorine transportation equipment. An appendix includes information and drawings on valves that meet these criteria. (33 pages)

## Pamphlet 167)

### **Learning From Experience**

Edition 4, April 2020

This pamphlet summarizes several incidents that have occurred in chlorine production, chlorine packaging, sodium hypochlorite production and user facilities pertaining to the chlor-alkali industry. The pamphlet now includes incident information on accidental mixing and downstream chlorine inhalation incidents. No nitrogen trichloride incidents are included. (41 pages)

## Pamphlet 168)

### **Guidelines for Dual Valve Systems for Bulk Chlorine Transport**

Edition 3, April 2024

Provides performance/selection criteria for dual valve systems installed on bulk chlorine transportation equipment. An appendix includes information and drawings on valves that meet these criteria. (36 pages)

## Pamphlet 170)

### **Hydrogen Chloride, Anhydrous (AHCL), Refrigerated Liquid (UN2186), Tank Car and Cargo Tank Handling Manual**

Edition 3, April 2024

Provides guidelines, recommended practices and other useful information for the safe shipping, receiving, loading, unloading, maintenance, and emergency response relevant to Anhydrous Hydrogen Chloride (AHCL), refrigerated liquid (UN 2186), in rail tank cars and highway cargo tanks. This pamphlet also refers to applicable regulatory requirements and industry standards. (60 pages)

## Pamphlet 171)

### **Vinyl Chloride Monomer (VCM) Tank Car and Cargo Tank Handling Manual**

Edition 1, July 2018

Provides guidelines, recommended practices and other useful information for the safe shipping, receiving, loading, unloading, maintenance, and emergency response relevant to Vinyl Chloride Monomer (VCM) transported in rail tank cars and highway cargo tanks. This pamphlet also refers to the applicable regulatory requirements and industry standards. While this pamphlet is focused on the transport of VCM (a compressed liquefied flammable gas), it also considers guidance for vinyl chloride (the gaseous state of VCM), also known as chloroethylene or chloroethane. This pamphlet was developed in coordination with the Vinyl Institute. (58 pages)

## Pamphlet 172)

### **Liquid Vinyl Chloride Monomer (VCM) Pipelines**

Edition 1, May 2021

Provides recommendations on the design, construction, operation, and maintenance of carbon steel pipelines that transport liquid Vinyl Chloride Monomer (VCM). The recommendations are applicable to pipelines that terminate outside the VCM shipper's property or crosses property not owned by the shipper or receiver of the VCM. This pamphlet was developed in coordination with the Vinyl Institute. (26 pages)

## Pamphlet 173)

### **Hydrogen Handling in Chlor-Alkali Facilities**

Edition 1, September 2021

The primary purpose of this pamphlet is to provide a consolidated repository of Chlorine Institute materials pertaining to hydrogen systems found in chlor-alkali production facilities. This document will give guidance about hydrogen in a gaseous state, liquefaction and liquefied hydrogen fall outside the scope of this document. (25 pages)

## Pamphlet 174)

### **Guidelines on Tank Car Owner Responsibilities in Qualification and Maintenance**

Edition 1, September 2024

This pamphlet provides guidelines and other useful information about tank car owner responsibilities as it relates to tank car qualification and maintenance requirements. This guidance covers the regulatory and industry standard requirements for tank cars, service equipment, and coatings/linings. (24 pages)

## Pamphlet 176)

### **Guidelines for Conducting Root Cause Analysis of Transportation Incidents**

Edition 1, November 2024

This pamphlet provides guidance to aid in transportation incident investigations, including conducting proper root cause analysis and developing effective corrective and preventive actions (34 pages).



**CI Annual Meeting**

March 17 - 20, 2025

**CHLOREP Team Training**

April 28 - May 2, 2025

**CI Fall Meeting**

September 15 - 20, 2025

# SUMMARIES (Wall Charts)

WC-1)

## Wall Chart: Handling Chlorine Cylinders and Ton Containers\*

Edition 5, January 2025

Contains recommendations for safe handling of chlorine cylinders and ton containers, emergency procedures and applicable principles of first aid.

*\*Available in Spanish*

WC-2)

## Wall Chart: Handling Sodium Hypochlorite\*

Edition 2, September 2014

Designed to serve as general references for end users of sodium hypochlorite, this chart contains recommendations for safe handling of sodium hypochlorite, emergency procedures and applicable principles of first aid.

WC-3)

## Wall Chart: Handling Hydrochloric Acid\*

Edition 2, January 2025

Contains recommendations for safe handling of hydrochloric acid, emergency procedures and applicable principles of first aid.

*\*Available in Spanish*

WC-4)

## Handling Caustic Soda and Caustic Potash

Edition 1, April 2016

Contains recommendations for safe handling of caustic soda and caustic potash, emergency procedures and applicable principles of first aid.

WC-5)

## Wall Chart: Accidental Mixing

Edition 1, July 2018

Designed to increase awareness of drivers, customers and suppliers about their shared responsibility of preventing an accidental mixing incident involving sodium hypochlorite.

WC-6)

## Wall Chart: Preventing Accidental Mixing

Edition 1, January 2025

Contains best practices for carrier management and drivers to implement in an effort to prevent accidental mixing events at delivery, as well as practices for reducing consequences such as PPE and ER actions.

### Did You Know?

CI Wallcharts are available for purchase from the bookstore. The hardcopy versions are life-size at 3x2 ft! They are great for displaying at the workplace.

# SUMMARIES

## Health and the Environment

Pamphlet 137)

### Guidelines: Asbestos Handling for the Chlor-Alkali Industry

Edition 8, September 2021

This pamphlet provides guidance on the safe asbestos handling practices for the chlor-alkali industry and highlights North American regulatory requirements. (24 pages)

## Emergency Planning and Response

Pamphlet 63)

### First Aid, Medical Management/Medical Evaluation and Occupational Hygiene Monitoring Practices for Chlorine

Edition 10, January 2023

This pamphlet provides information for the administration of first aid and medical treatment for anyone who has been exposed to gaseous or liquid chlorine. In addition, this pamphlet provides information pertaining to the administration of medical evaluation programs, exposure assessment programs, and industrial hygiene practices for persons who may be potentially exposed to chlorine. (26 pages)

Pamphlet 64)

### Emergency Response Plans for Chlor-Alkali, Sodium Hypochlorite, and Hydrogen Chloride Facilities

Edition 8, January 2020

This pamphlet contains information essential to the preparation or updating of formal, written emergency response which would be utilized during an accidental release or potential accidental release of chlor-alkali products. (46 pages)

IB/A) Instruction Booklet

### Chlorine Institute Emergency Kit "A" for 100-lb. and 150-lb. Chlorine Cylinders

Edition 13, Revision 1, May 2023

Provides guidance on troubleshooting chlorine leaks from 100-lb and 150-lb cylinders and instructions on how to apply the A-Kit. Includes complete parts list for both generations. (37 pages)

IB/B) Instruction Booklet

### Instruction Booklet: Chlorine Institute Emergency Kit "B" for Chlorine Ton Containers

Edition 12, Revision 1, May 2023

Provides guidance on troubleshooting chlorine leaks from ton containers and instructions on how to apply the B-Kit. Includes complete parts list for both generations. (38 pages)

IB/C) Instruction Booklet

### Instruction Booklet: Chlorine Institute Emergency Kit "C" for Chlorine Tank Cars and Tank Trucks

Edition 10, Revision 1, January 2017

Provides instructions and illustrates the use of the Chlorine Institute Emergency Kit "C", including instructions for application on different valve styles. Includes complete parts list. (25 pages)

IB/RV) Instruction Booklet

### Instruction Booklet: Chlorine Institute Recovery Vessel (Salvage Cylinder) for 100-lb. & 150-lb. Chlorine Cylinders

Edition 3, September 2021

Provides instructions and illustrates the use of Chlorine Institute Recovery Vessel. Includes complete parts list. (14 pages)

# SUMMARIES

## Properties of Chemicals and Analytical Techniques

### Pamphlet 72)

#### Properties of Chlorine in SI Units

Edition 4, January 2019

This pamphlet is based on research dating back to 1900. It is a unique pamphlet in The Chlorine Institute's library because it contains thermodynamic data and does not contain safety recommendations, including density, volume, vapor pressure, heat capacity ratio, compressibility, enthalpy, entropy, fugacity coefficient, Joule Thompson coefficient, velocity of sound, surface tension, thermal conductivity, and viscosity of chlorine. (90 pages)

### Pamphlet 100)

#### Behavior and Measurement of Moisture in Chlorine

Edition 6, February 2024

The primary purpose of this pamphlet is to provide practical temperature and pressure criteria which can be used to define chlorine as non-corrosive, which we refer to as "DRY" chlorine for use in carbon steel equipment. Chlorine that does not meet the criteria of "DRY" will be considered "WET" and will have a moisture content that can cause a rapid corrosion of steel. The criteria corresponding to "DRY" chlorine must be determined for each chlorine facility. There isn't one value of "Dryness" applicable over the entire range of use of chlorine in production and commerce. The pamphlet provides a basis for facilities to determine acceptable moisture limits. This pamphlet also presents the methods for measuring moisture in chlorine and discusses sources of contamination during sampling and analysis. Appendix B provides additional information on chlorine sampling. Appendices C, D, and E provide additional technical information and the basis on the definition of "DRY" chlorine and its effect on corrosion. (48 pages)

### Pamphlet 121)

#### Explosive Properties of Gaseous Mixtures Containing Hydrogen and Chlorine: Operational Guidance and Research References

Edition 5, Revision 1 January 2025

This pamphlet brings together in a single source all known pertinent, published references on explosive properties of gaseous mixtures containing hydrogen and chlorine. The reaction characteristics of hydrogen mixed with chlorine, oxygen and inert gases information is based on the literature review of reaction characteristics of hydrogen with chlorine and with mixtures of chlorine and oxygen, and represents an attempt to graphically show ignition and detonation zones for the systems hydrogen-chlorine-oxygen and hydrogen-chlorine-air. It also provides guidance on how to practically apply insights from the data and literature to safely operate chlorine liquefaction and other chlor-alkali processes. (33 pages)

*ASTM Analytical Methods should be ordered directly through the ASTM in Conshohocken PA.*

Phone: (610) 832-9500

Fax: (610) 832-9555

Web: www.ASTM.org

## Chlorine Manufacturing and Industry Data

### Pamphlet 10)

#### North American Chlor-Alkali Industry Facilities and Production Data Report 2023e Edition December 2024

Lists location of chlor-alkali plants, chlorine packaging facilities, and sodium hypochlorite production facilities with types of cells and shipping containers loaded at each location. A table lists Sodium Hypochlorite Production facilities in North America. Includes annual data on chlorine capacity, production and shipments in the U.S., Canada and Mexico, some by geographical distribution. Updated annually. (21 pages)

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## Audio-Visual Materials

### A-VIDEO)

#### The Chlorine Institute Emergency Kit "A" and Recovery Vessel Instructional Video

Edition 5, January 2025

This video provides guidance on troubleshooting chlorine leaks from 100-lb and 150-lb cylinders and instructions on how to apply the A-Kit and recovery vessel. (28 minutes)

### ACCIMIX-VIDEO)

#### Accidental Mixing Video

Edition 1, June 2018

This video is designed to increase awareness about the risks of accidentally mixing sodium hypochlorite with other incompatible materials. The training video topics include: Basic Properties of Sodium Hypochlorite; Sodium Hypochlorite Reactions and Unintended Consequences; Two Case Studies (Atchison, Kansas and Kitchener, Ontario); Common Contributing Factors; and Safeguards for Drivers, Customers, and Suppliers; and additional resources. (22 minutes)

### B-VIDEO)

#### The Chlorine Institute Emergency Kit "B" for Chlorine Ton Containers

Edition 4, January 2025

This video provides guidance on troubleshooting chlorine leaks from one-ton containers and instructions on how to apply the B-Kit. (28 minutes)

### C-VIDEO)

#### The Chlorine Institute Emergency Kit "C" for Chlorine Tank Cars and Tank Trucks

Edition 4, January 2014

This video provides guidance on troubleshooting chlorine leaks from tank cars and tank truck and instructions on how to apply the C-Kit. (13 minutes)

### CAUS-VIDEO)

#### Preventing Non-Accident Releases by Properly Securing Caustic Tank Cars

Edition 2 Revision 1, April 2024

This video provides guidance for reducing non-accident releases (NARs) from tanks car shipments of caustic (sodium hydroxide (NaOH) and potassium hydroxide (KOH)). Topics covered include the definition of an NAR, U.S. Department of Transportation incident reporting requirements, loader and unloader responsibilities, best practices to reduce caustic tank car NARs and available guidance and resources, such as additional Chlorine Institute guidance.

# SUMMARIES

## CLS-VIDEO)

### **Preventing Non-Accident Releases (NARs) from Chlorine Railcars by Properly Securing Return Shipments** Edition 3, Revision 1 December 2024

This video provides guidance for reducing non-accident releases (NARs) from chlorine residue tank car shipments. Topics covered include the definition of an NAR, U.S. Department of Transportation incident reporting requirements, shipper responsibilities, best practices to reduce chlorine residue tank car NARs and available guidance and resources, such as additional CI guidance. (17 minutes)

## CST-VIDEO)

### **Chlorine Safety Tour: A Training Guide for Chlorine Emergency Response**

Edition 2, September 2017

This video is a training guide for chlorine emergency response. Presentation topics include: chlorine properties and emergency response; chlorine tank cars and rail safety; and the proper use of Emergency Kits A, B and C to mitigate leaks from chlorine cylinders, ton containers and tank car valves. (3 hours)

## CTS-VIDEO)

### **Preventing Chlor-Alkali Releases During Cargo Tank Operations**

Edition 1, December 2020

This video provides an overview of best practices to prevent releases during cargo tank shipments of certain CI mission chemicals, namely sodium hydroxide, potassium hydroxide, hydrochloric acid, and sodium hypochlorite. Viewers, including plant operators and drivers, will learn requirements for reporting hazmat transportation releases to DOT, review related DOT-reported cargo tank incident data, understand the sources and cause of common releases during cargo tank transport and operations, and learn best practices for preventing these types of releases. (35 minutes)

## FR-VIDEO)

### **Chlorine Emergencies: An Overview for First Responders\***

Edition 3, January 2019

This program was developed to help first responders prepare to act in those critical first 15 minutes of a chlorine emergency – what to do when the call comes in, what to expect on-scene, and where to find the resources needed to contain a release. This video provides a general overview of chlorine and covers specific topics such as: uses, chemical and physical properties, site safety plans, community awareness and public protective actions, personal protective equipment, response to exposures, transport, disposal options, leak mitigation, dispersion and ecological effects, and shelter-in-place considerations. (1 hour, 15 minutes)

*\*Available in Spanish*

## H-VIDEO)

### **First Response to Chlorine Exposures\***

Edition 2, September 2018

First Response to Chlorine Exposures provides an overview of medical symptoms and treatment of chlorine exposure. The video is 12 minutes long. (12 minutes)

*\*Available in Spanish*

## HCL-VIDEO)

### **Handling Hydrochloric Acid Safely**

Edition 2, July 2015

Provides guidelines, recommended practices and other information for the safe handling, loading and unloading of hydrochloric acid tank cars and tank trucks. This video also includes hydrochloric acid properties, reactivity, suitable materials of construction and common uses. (33 minutes)

## HCLS-VIDEO)

### **Preventing Non-Accident Releases by Properly Securing Hydrochloric Acid Railcars**

Edition 1, December 2014

This video provides guidance for reducing non-accident releases (NARs) from tank car shipments of hydrochloric acid (HCl). Topics covered include the definition of an NAR, U.S. Department of Transportation incident reporting requirements, shipper responsibilities, best practices to reduce HCl tank car NARs and available guidance and resources, such as additional Chlorine Institute guidance. (32 minutes)

## HCS-VIDEO)

### **Handling Caustic Safely**

Edition 1, March 2020

This video covers the following topics: basic properties and uses of NaOH and KOH, personal protective equipment, safety equipment and first aid, materials of construction, spill control and mitigation, and tank car and tank truck unloading. (52 minutes)

## HYP0-VIDEO)

### **Handling Sodium Hypochlorite Safely**

Edition 2, July 2015

Provides guidelines, recommended practices and other information for the safe handling, storage, loading and unloading of sodium hypochlorite tank cars and tank trucks. This video also includes sodium hypochlorite properties, health effects, reactivity, suitable materials of construction, and common uses. (25 minutes)

## JRCL2-VIDEO)

### **Jack Rabbit: Chlorine Properties\***

Edition 1, August 2019

Jack Rabbit: Chlorine Properties is a 28-minute video that uses footage from the Department of Homeland Security's Jack Rabbit release trials to demonstrate chlorine's dispersion properties. The video covers the following topics: dispersion, pressure differentials, phase changes, and thermal considerations, density, and different atmospheric/land conditions.

(28 minutes)

*\*Available in Spanish*

## PCS-VIDEO)

### **Pool Chemical Safety**

Edition 2, 2018

This online video details basic safe chemical handling techniques for pool operators. Topics include chemical safe handling, storage, and emergency/accident response. (13 minutes)

## SAMP-VIDEO)

### **Bleach Sampling Video**

Edition 1, June 2018

The Chlorine Institute in partnership with NSF International, UL, and the Water Quality Association developed this training video that covers the following topics: pulling the sample; handling the sample; quenching the sample; and logging and shipping. (14 minutes)

## W-VIDEO)

### **Chlorine Safety for Water and Wastewater Operators**

Edition 3, June 2016

Although produced with water and wastewater operators in mind, this video provides information about chlorine useful to everyone handling the chemical and especially for end users of cylinders and ton containers. (51 minutes)

## Discounts

A quantity discount of 10% is available to CI member companies for hard copy orders of 20 or more of the same title.

Non-profit emergency response organizations and water and wastewater municipalities may order hard copy pamphlets & wall charts at the Institute's member prices. Emergency response organizations include fire, police and sheriff's departments, civil defense and medical authorities who need to train responders and use Institute materials on-site during chlorine incidents. Government agencies, public first responders, and water utilities may access CI resources online at no cost. Please email CIFreeBookstore@CL2.com with the publication(s) needed.

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The Chlorine Institute takes a holistic approach to chlorine safety and stewardship by maintaining relationships across the chlor-alkali industry to develop its technical resources. All technical pamphlets and resources are developed and reviewed by a team of experienced industry leaders from CI's member companies who serve on CI's four issue teams and various advisory groups.

### The issue teams are listed below:

#### Emergency Preparedness

Serves as a forum for CI's members who strive to minimize the impact of a chlorine, AHCl, or VCM release by enabling the first responders to react in an effective manner. This team is responsible for ensuring that CHLOREP remains an effective emergency response tool.

#### Health, Environment, Safety and Security

Serves as a forum for members who work to achieve zero incidents, releases and injuries with a focus on process safety and security.

#### Product Stewardship

Strives to educate end users on safe handling and use practices for CI Mission Chemicals to prevent chemical accidents, personnel injuries, and environmental insults.

#### Transportation

Strives to maintain the ability to transport chlorine and other mission chemicals in a safe and secure manner. This team focuses on various facets of chlorine transportation by rail and highway. The ultimate goal is to eliminate transportation accidents and releases.

[www.chlorineinstitute.org](http://www.chlorineinstitute.org)





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