



THE CHLORINE INSTITUTE

Pamphlet 91

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

Edition 4



April 2014

Table of Contents

1.	INTRODUCTION.....	1
1.1	SCOPE	1
1.2	CHLORINE INSTITUTE STEWARDSHIP PROGRAM	1
1.3	GENERAL CONSIDERATIONS	1
1.4	DISCLAIMER.....	1
1.5	APPROVAL	2
1.6	REVISIONS.....	2
1.7	REPRODUCTION.....	2
2.	CHECKLIST.....	2
2.1	TRAINING PROGRAM	2
2.2	STORAGE (CYLINDERS AND CONTAINERS)	3
2.3	TRANSPORTATION AND HANDLING	4
2.4	PACKAGING AREA	4
2.5	PROCESS EQUIPMENT	5
2.6	BULK OPERATIONS	6
2.7	SECURITY	7
2.8	EMERGENCY PREPAREDNESS	7
2.9	PRODUCT STEWARDSHIP/COMMUNITY OUTREACH PROGRAM.....	9
2.10	REGULATORY REQUIREMENTS	9
2.11	INSPECTIONS	9
3.	References.....	10
3.1	CHLORINE INSTITUTE PUBLICATIONS.....	10

1. INTRODUCTION

1.1 SCOPE

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.

1.2 CHLORINE INSTITUTE STEWARDSHIP PROGRAM

The Chlorine Institute exists to support the chlor-alkali industry and serve the public by fostering continuous improvements to safety and the protection of human health and the environment connected with the production, distribution and use of chlorine, sodium and potassium hydroxides, and sodium hypochlorite; and the distribution and use of hydrogen chloride. This support extends to giving continued attention to the security of chlorine handling operations.

Chlorine Institute members are committed to adopting CI's safety and stewardship initiatives, including pamphlets, checklists, and incident sharing, that will assist members in achieving measurable improvement. For more information on the Institute's stewardship program, visit CI's website at www.chlorineinstitute.org.

1.3 GENERAL CONSIDERATIONS

It is intended that plant management use this form to survey their plant(s) and determine where current practices may need improvement, where training programs should be evaluated and where equipment may need to be added or upgraded.

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). Appropriate Chlorine Institute pamphlets are listed in Section 3 to serve as a resource for finding CI guidelines on a particular subject.

This self-audit checklist is not intended to replace the need for familiarity with regulations by U.S. DOT, OSHA, U.S. EPA, or state or local requirements. Current Chlorine Institute pamphlets are also needed as a guide.

1.4 DISCLAIMER

The information contained in this pamphlet is drawn from sources believed to be reliable. The Institute and its members, jointly and severally, make no guarantee and assume no liability in connection with any of this information. Moreover, it should not be assumed that every acceptable procedure is included or that special circumstances may not warrant modified or additional procedures. The user should be aware that changing technology or regulations might require a change in the recommendations herein. Appropriate steps should be taken to insure that the information is current when used. These suggestions should not be confused with federal, state, provincial, municipal or insurance requirements, or with national fire, building or safety codes.

1.5 APPROVAL

The fourth edition of this document received its final review and approval by the Chlorine Institute's Health and Safety Issue Team on April 14, 2014.

1.6 REVISIONS

Suggestions for revisions should be directed to the Secretary of the Institute.

1.6.1 Significant Revisions in Current Edition

This revision clarifies statements and requirements from the previous edition and adds additional requirements from a security standpoint.

1.7 REPRODUCTION

The contents of this pamphlet are not to be copied for publication, in whole or in part, without prior Institute permission.

2. **CHECKLIST**

2.1 TRAINING PROGRAM

A. Is there a written program which identifies:

1. Subjects
2. Number and type of training sessions: classroom, hands on, etc.
3. Attendance: Who must complete the training; In-plant employees, drivers, carriers, etc.
4. Time frames: When training must be completed by each class of employee
5. Documentation: Signed attendance sheets, tests, required recordkeeping, etc.

YES	NO

B. Does the program identify and/or provide for initial and refresher training for:

1. New employees
2. Existing employees
3. Trainers
4. Non-company personnel: contractors, carriers, etc.

YES	NO

C. Does the program provide training for:

1. Regulations
2. Operational Procedures and Emergency Operations
3. Supervised "hands-on" training
4. Kits and recovery vessel training

YES	NO

- | YES | NO |
|-----|----|
| | |
| | |
| | |
| | |

2.3 TRANSPORTATION AND HANDLING

- [illegible]

2.4 PACKAGING AREA

- [illegible]

- [illegible]

- [illegible]

- [illegible]

1. Built to CI recommendations as per CI Pamphlet 6 (3.1)
2. Clearly identified, marked with flow direction
3. Adequately supported
4. Protected from vehicular traffic
5. Closed to moisture
6. Routinely inspected and maintained
7. Equipped with safety and emergency shutdown systems
8. Are all system components maintained in good working condition

B. Are expansion chambers:

1. Properly sized based on your piping system
2. Properly located
3. Checked regularly to ensure rupture disc has not failed
4. Routinely inspected and maintained

YES	NO

C. Is the barometric loop:

1. Installed to the proper height
2. Manufactured using compatible materials
3. Adequately supported
4. Routinely inspected and maintained

YES	NO

D. Is compressed air padding system:

1. Equipped with a dryer and filters to provide air with a dew point of -40° F or below
2. Equipped with a system to prevent chlorine gas from flowing back into the air compressor
3. Manufactured using compatible materials
4. Routinely inspected and maintained
5. Dedicated for unloading chlorine tank cars only

YES	NO

E. Is the atmospheric monitoring equipment:

1. Located to detect a release
2. Installed per manufacturer's recommendations and at the correct height
3. Designed to automatically alarm (audible/visible)
4. Designed to perform emergency shutdown operations
5. Inspected and maintained per manufacturer's recommendations

YES	NO

F. Is a chlorine scrubber provided to capture fugitive emissions

YES	NO

2.6 BULK OPERATIONS

A. Do written operating procedures require:

1. Operator attendance and/or monitoring in accordance to regulatory requirements
2. Emergency shutdown devices
3. Lines capped immediately to prevent moisture from entering the piping system
4. Piping systems purged prior to disconnection
5. Documented area inspections on a routine basis

YES	NO

8	Response and mitigation procedures for a security incident involving a chemical of concern	YES	NO
9.	Reporting of security incidents internally and externally in a timely manner and coordination procedures with local, state, and/or federal emergency groups		

B. Does the company have a written policy that requires the:

	YES	NO
1.	Reporting of all incidents, internal/external, near miss and actual incidents, injuries, fatalities, chemical releases etc.	
2.	Investigation of, and documentation of, all incidents	
3.	Review of investigation results with applicable employees	
4.	Documentation of all findings	
5.	Documentation of, and implementation of, a corrective action plan	
6.	Maintenance of incident records	

C. Is the facility:

	YES	NO
1.	Equipped with windsock(s), appropriately located where visible from all areas	
2.	Equipped with or have readily available, the proper types of kits and/or recovery vessels	
3.	Equipped with, or have readily available, the proper types of and number of SCBAs	
4.	Equipped with emergency shutdown capabilities	

D. Are the chlorine emergency kits maintained in a state of readiness:

	YES	NO
1.	Located in strategic places or at an acceptable offsite location	
2.	Cleaned and inspected after each use or drill	
3.	Gaskets kept in good condition and replaced at correct time intervals	
4.	Items inventoried, kits sealed and dated	

E. Are the SCBAs maintained in a state of readiness:

	YES	NO
1.	Located in strategic places	
2.	Cleaned and inspected after each use or drill	
3.	Gaskets and other parts maintained in good working order	
4.	SCBA positive pressure cylinders are kept full of air, and maintained within retest dates	

F. Are drivers equipped with:

	YES	NO
1.	An emergency contact list including company, third party, and agency contacts	
2.	Emergency instructions	
3.	Security instructions	
4.	Personal protective gear, including respiratory protection	
5.	Emergency kits for cargo tanks	

2.9 PRODUCT STEWARDSHIP/COMMUNITY OUTREACH PROGRAM

- A. Does the company have a written policy that provides for:
1. Supplying/offering new and existing accounts with CI Pamphlet 65, Safety Data Sheet (SDS), Wall Charts, and other safety materials (3.1)
 2. Conducting seminars where attendance is recorded, and topics are documented and maintained
 3. Screening new accounts; inspections, discussions, surveys and other written correspondence
 4. Outreach training; knowledge of chemical, regulatory awareness, etc.
 5. Interaction with the LEPC or the local fire service

YES	NO

2.10 REGULATORY REQUIREMENTS

- A. Does the company have a method/system that:
1. Identifies applicable regulations
 2. Provides for staying current with the regulations
 3. Includes local requirements such as building and fire codes
 4. Tracks and maintains compliance with these regulations
 5. Uses an internal or third party auditing process

YES	NO

2.11 INSPECTIONS

- A. Is there a written inspection program:
1. That defines inspections for all chlorine operations
 2. Requires documentation to support compliance with the program including:
 - a. Emergency shutdown system testing and documentation
 - b. Flexible hoses – materials and replacement criterion
 - c. Scrubber systems
 3. Includes a Mechanical Integrity Program

YES	NO

3. REFERENCES

The following publications are specifically referenced or pertain to the topics addressed in CI Pamphlet 91. The latest editions of CI publications may be obtained at <http://www.chlorineinstitute.org>.

3.1 CHLORINE INSTITUTE PUBLICATIONS

<u>Pamphlet, WC, & DVD #</u>	<u>Title</u>
1	<i>Chlorine Basics</i> , ed. 8; Pamphlet 1; The Chlorine Institute: Arlington, VA, 2014 .
6	<i>Piping Systems for Dry Chlorine</i> , ed. 16; Pamphlet 6; The Chlorine Institute: Arlington, VA, 2013 .
17	<i>Packaging Plant Safety and Operational Guidelines</i> , ed. 4, Rev. 2; Pamphlet 17; The Chlorine Institute: Arlington, VA, 2011 .
60	<i>Chlorine Pipelines</i> , ed. 7; Pamphlet 60; The Chlorine Institute: Arlington, VA, 2013 .
64	<i>Emergency Response Plans for Chlor-Alkali, Sodium Hypochlorite, and Hydrogen Chloride Facilities</i> , ed. 6, Rev. 1; Pamphlet 64; The Chlorine Institute: Arlington, VA, 2008 .
65	<i>Personal Protective Equipment for Chlor-Alkali Chemicals</i> , ed. 5; Pamphlet 65; The Chlorine Institute: Arlington, VA, 2008 .
66	<i>Recommended Practices for Handling Chlorine Tank Cars</i> , ed. 4, Rev. 1; Pamphlet 66; The Chlorine Institute: Arlington, VA, 2009 .
73	<i>Atmospheric Monitoring Equipment for Chlorine</i> , ed. 7; Pamphlet 73; The Chlorine Institute: Arlington, VA, 2003 .
74	<i>Guidance on Complying with EPA Requirements Under the Clean Air Act by Estimating the Area Affected by a Chlorine Release</i> , ed. 5, Pamphlet 74; The Chlorine Institute: Arlington, VA, 2012 .
76	<i>Guidelines for the Safe Motor Vehicular Transportation of Chlorine Cylinders and Ton Containers</i> , ed. 5, Pamphlet 76; The Chlorine Institute: Arlington, VA, 2012 .
P-DVD	<i>Packager Training Program</i> , P-DVD; The Chlorine Institute: Arlington, VA, 2001 .
W-DVD	<i>Chlorine Safety for Water and Wastewater Operators</i> , W-DVD, The Chlorine Institute: Arlington, VA, 2009 .
WC-1	Wall Chart: <i>Handling Chlorine Cylinders and Ton Containers</i> , ed. 3, WC-1; The Chlorine Institute: Arlington, VA, 2011 .
WC-2	Wall Chart: <i>Handling Sodium Hypochlorite</i> , ed. 1, WC-2; The Chlorine Institute: Arlington, VA, 2010 .



1300 Wilson Boulevard « Suite 525 « Arlington, VA 22209
Telephone: (703) 894-4140 « Fax: (703) 894-4130
Email: pubs@CL2.com « Website: www.chlorineinstitute.org
Technical inquiries: techsvc@cl2.com

©The Chlorine Institute all rights reserved.