

# CHLORINE CUSTOMERS GENERIC SAFETY AND SECURITY CHECKLIST

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Edition 2  
June 2007



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## 1. INTRODUCTION

### 1.1 Purpose and Use

This checklist has been prepared to help evaluate the capability of North American customers of bulk chlorine (larger than a one ton container) to safely unload and otherwise handle chlorine at the facility where the chlorine is used. The checklist is intended only to provide limited information to assist both the supplier of chlorine and its customer. The checklist emphasizes key chlorine specific recommendations as developed by the Chlorine Institute. The checklist is intended to supplement Institute publications, not replace them. It is not meant to incorporate regulatory or other requirements that may be applicable at the facility. In the United States, facilities using or otherwise handling chlorine may be affected by OSHA's Process Safety Management Rule for Highly Hazardous Chemicals (PSM) and/or EPA's Accidental Release Prevention Requirement; Risk Management Programs (RMP). Canadian and Mexican facilities may have similar or other regulatory requirements.

This checklist should be completed by either representative(s) of the chlorine customer facility or by representative(s) of the chlorine supplier. Both the customer and the supplier should agree in advance who will complete the checklist and how it will be used. The completed checklist should be kept confidential between the parties unless it is mutually agreed to release it to other parties. The chlorine supplier and customer should have a record retention policy for this checklist and should advise the other party what the policy is. The Institute recommends the checklist be completed and used as follows:

- (1) Complete the information as indicated in Section 2.
- (2) For Sections 3-11, answer each question with a yes, no, or not applicable (N/A) response. A N/A response is indicated, when the item is not applicable to the facility. For example, the facility may not have a vaporizing system (Section 9.1) or a storage system (Section 9.2).
- (3) Each item in Sections 3-11, includes a space for comments. It is not intended that each item in the completed checklist has a comment written in this section. It is expected that most answers will not require that comments be included. Comments should be included where necessary to clarify a response. Such clarification may be helpful to a subsequent reviewer if the response is negative. Comments should be fact-based.
- (4) Each item includes a reference where the item is discussed in more detail in specific Chlorine Institute publications. Section 12 provides a complete listing of such references. It is recommended that the pamphlets referenced be consulted when completing the checklist to insure the item is fully understood.
- (5) Upon completion of the checklist, the chlorine supplier and customer should discuss it and agree to any needed actions that would enhance the capability of the chlorine customer to safely unload and otherwise handle chlorine at the involved facility.

## 1.2 Chlorine Institute Stewardship Program

The Chlorine Institute, Inc. 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](http://www.chlorineinstitute.org).

## 1.3 Description of the Question Format

All items in this checklist are important for enhancing safety, health, environmental protection and security. To help facilitate continuous improvement, the Chlorine Institute's Customer Stewardship Issue Team wanted to provide guidance to checklist users by highlighting certain items to focus attention in the event deficiencies are found. **Checklist items marked with an asterisk (\*) are considered a higher priority because greater potential risk might exist for offsite impact or substantial loss if the item is not adequately addressed.** Any checklist item not marked with an asterisk is still important and as is good practice with all deficiencies, a time line for compliance with these items should be established by the bulk chlorine user.

## 1.4 Approval

The Institute's Customer Stewardship Issue Team approved this checklist on March 20, 2007.

## 1.5 Revisions

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

**2. GENERAL CUSTOMER INFORMATION**

Company Name: \_\_\_\_\_

Facility Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Contact Name: \_\_\_\_\_

Phone: \_\_\_\_\_

E-mail: \_\_\_\_\_

Checklist completed by: \_\_\_\_\_

Date: \_\_\_\_\_

1. Does this facility participate in Responsible Care ®?

\_\_\_\_\_

If not, list any comparable initiatives in which the facility participates.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Items 2.2, 2.3 and 2.4 are applicable only to facilities located in the United States.

2. Is this facility an OSHA, VPP Star, or Merit site? Has this facility received any other recognition for safety or environmental performance?

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3. Does this facility meet the requirements of OSHA Process Safety Management (PSM)? **Ci Pamphlet 85**

\_\_\_\_\_ YES      \_\_\_\_\_ NO      \_\_\_\_\_ N/A

Comments

4. Does this facility meet the requirements of the EPA Risk Management Plan (RMP) and section 313 SARA Title III release reporting?  
**Ci Pamphlets 64 & 162**

\_\_\_\_\_ YES      \_\_\_\_\_ NO      \_\_\_\_\_ N/A

Comments

<b>Checklist Items</b>	<b>CI Pamphlet #(s) Other References</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>Comments</b>
<b>3. Personnel Safety and Training</b>					
*1 <i>Does the facility have a chlorine specific training program on safe use and handling of chlorine that is documentation for employees, new hires, contractor.</i>	<b>Ci Pamphlet 1</b> Section 5: Employee Training & Safety <b>Ci Pamphlet 65</b> ,Section 12: Training in the use of personal protective equipment <b>Ci Pamphlet 151</b> Section 2: Training program development				
*2 <i>Are accidents and incidents investigated and reviewed with operating personnel?</i>	<b>Ci Pamphlet 85</b> Section 12: Incident Investigation				
*3 <i>Is a current MSDS available for chlorine?</i>	<b>Ci Pamphlet 1</b> Section 5: Employee Training & Safety				
4 <i>Are warning signs, Chlorine Wall Charts, and/or other safety information used and visible?</i>	<b>Ci Pamphlet 1</b> Section 5: Employee Training & Safety <b>Ci Pamphlet 85</b> Section 12: Incident Investigation				
*5 <i>Does the facility have a Personnel Protective Equipment (PPE) policy for chlorine loading and unloading?</i>	<b>Ci Pamphlet 1</b> Section 5: Employee Training & Safety <b>Ci Pamphlet 85</b> Section 12: Incident Investigation				
*6 <i>Does the facility have a policy for respiratory protection in all aspects of chlorine handling and emergency response?</i>	<b>Ci Pamphlet 1</b> Section 5: Employee Training & Safety <b>Ci Pamphlet 85</b> Section 12: Incident Investigation				
7 <i>Are safety showers and eyewash stations adequately located and easily accessible from all areas of the unloading site?</i>	<b>Ci Pamphlet 1</b> Section 5: Employee Training & Safety				
*8 <i>Are the safety showers and eyewash stations periodically inspected for proper operation?</i>	<b>Ci Pamphlet 1</b> Section 5: Employee Training & Safety				

<b>Checklist Items</b>	<b>CI Pamphlet #(s) Other References</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>Comments</b>
<b>4. Emergency Response</b>					
*1 <i>Is there a site emergency response plan (ERP) which includes chlorine that is up to date and reviewed annually?</i>	<b>Ci Pamphlet 1</b> Section 4: Emergency Measures <b>Ci Pamphlet 64</b> Section 2: Organizational planning				
*2 <i>Have emergency responders received training in accordance with local, state or provincial, and national requirements?</i>	<b>Ci Pamphlet 64</b> Section 3: Planning for handling the emergency				
*3 <i>Are periodic drills performed by emergency responders?</i>	<b>Ci Pamphlet 64</b> Section 3: Planning for handling the emergency				
*4 <i>Do some drills include the LEPC and other appropriate outside agencies?</i>	<b>Ci Pamphlet 64</b> Section 3: Planning for handling the emergency				
5 <i>Is the ERP coordinated with federal, state, and local emergency groups?</i>	<b>Ci Pamphlet 64</b> Section 4: Planning for coordination with outside agencies				
*6 <i>Are the appropriate emergency kit(s) on-site, complete, inspected, and located in an appropriate location?</i>	<b>Ci Pamphlet 1</b> Section 4: Emergency Measures <b>Ci pamphlet 17</b> Section 8: Chlorine Emergencies <b>Ci Pamphlet 49</b> Section 3: Emergency Response <b>Ci Pamphlet 66</b> Section 3: Emergency Response				
*7 <i>Is the emergency responder equipment (SCBA, suits, etc.) inspected regularly and maintained in suitable condition?</i>	<b>Ci Pamphlet 65</b> Section 11: Maintenance of Personal Protective Equipment				
*8 <i>Are wind socks or other means of determining wind direction appropriately located and easily visible from all areas of the plant?</i>	<b>Ci Pamphlet 1</b> Section 4: Emergency Measures <b>Ci Pamphlet 64</b> Section 3: Planning for handling the emergency				
9 <i>Does the ERP appropriately address communication with outside agencies, the media, and the general public?</i>	<b>Ci Pamphlet 64</b> Section 4: Planning for coordination with outside agencies				
*10 <i>Has the facility assessed the need for process and perimeter chlorine monitoring, and implemented as appropriate?</i>	<b>Ci Pamphlet 64</b> Section 3: Planning for handling the emergency				
11 <i>Has the facility installed chlorine monitoring equipment by the T.C unloading site?</i>	<b>Ci Pamphlet 64</b> Section 3: Planning for handling the emergency				

<b>Checklist Items</b>	<b>CI Pamphlet #(s) Other References</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>Comments</b>
<b>5. Security</b>					
*1 <i>Has the facility conducted a vulnerability assessment using the Sandia, CCPS, or other equivalent methodology?</i>	Vulnerability Assessment Methodology (VAM) for Chemical Facilities, Sandia Laboratories Guidelines for Analyzing and Managing the Security Vulnerabilities of Fixed Chemical Sites, Center for Chemical Process Safety (CCPS) of the American Institute of Chemical Engineers (AIChE) <b>Ci Publication</b> – Site Security Guidance for Chlorine Facilities				
*2 <i>Has the facility developed a security plan based on the vulnerability assessment? (49 CFR 772.800)</i>	Responsible Care® Value Chain Implementation Guidance: Transportation of PIH Materials by Rail; Ci's Security Management Plan for the Transportation and On-Site Storage and Use of Chlorine Cylinders, Ton Containers and Cargo Tanks; Ci's Chlorine Barge Security Management Plan				
*3 <i>Have employees had security awareness training?</i>	See references immediately above.				
<b>6. Bulk Containers Securement / Preparation</b>					
*1 <i>Are railcars protected by derails or locked switches that are located at least 50 feet from the car?</i>	<b>Ci Pamphlet 1</b> Section 3: Bulk Shipping Containers <b>Ci Pamphlet 66</b> Section 6: Tank Car Receiving & Spotting				
*2 <i>Are bulk container brakes set prior to connecting to the transfer piping?</i>	<b>Ci Pamphlet 1</b> Section 3: Bulk Shipping Containers <b>Ci Pamphlet 49</b> Section 9: Receiving and spotting chlorine tanks <b>Ci Pamphlet 66</b> Section 6: Tank Car Receiving & Spotting				
*3 <i>Are bulk container wheels chocked prior to connecting to the transfer piping?</i>	<b>Ci Pamphlet 1</b> Section 3: Bulk Shipping Containers <b>Ci Pamphlet 49</b> Section 9: Receiving and spotting chlorine tanks <b>Ci Pamphlet 66</b> Section 6: Tank Car Receiving & Spotting				
*4 <i>Are off-loading signs / lights utilized and placed at the derail?</i>	<b>Ci Pamphlet 1</b> Section 3: Bulk Shipping Containers <b>Ci Pamphlet 66</b> Section 6: Tank Car Receiving & Spotting				

<b>Checklist Items</b>	<b>CI Pamphlet #(s) Other References</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>Comments</b>
5 Do facility procedures verify that tank cars are properly placarded when received?	<b>Ci Pamphlet 66</b> Section 9: Tank Car Unloading				
6 Is adequate access and egress provided to the chlorine container for all anticipated activities including emergencies?	<b>Ci Pamphlet 1</b> Section 3: Bulk Shipping Containers <b>Ci Pamphlet 49</b> Section 8: Responsibilities <b>Ci Pamphlet 66</b> Section 6: Tank Car Receiving & Spotting				
7 Is lighting or emergency lighting provided to allow for safe operation and emergency response?	<b>Ci Pamphlet 1</b> Section 3: Bulk Shipping Containers <b>Ci Pamphlet 49</b> Section 8: Responsibilities <b>Ci Pamphlet 66</b> Section 6: Tank Car Receiving & Spotting				
<b>7. Bulk Containers Unloading System / Procedures</b>					
*1 Do facility procedures verify that the bulk container's protective housing cover is closed and sealed when received?	<b>Ci Pamphlet 66</b> Section 9: Tank Car Unloading				
*2 Is a checklist or other procedure used to assist with the performance of pre-unloading, post unloading, and pre-release inspections?	<b>Ci Pamphlet 49</b> Section 11 : Tank Unloading Procedures <b>Ci Pamphlet 66</b> Section 9: Tank Car Unloading				
*3 Are workers performing higher risk activities like line breaks or disconnections being appropriately monitored?	<b>Ci Pamphlet 85</b> Section 2: Management Commitment				
*4 Is respiratory protection used to connect and disconnect tank cars consistent with CI recommendations?	<b>Ci Pamphlet 65</b> Section 5: Personal Protective Equipment Selection - Chlorine				
*5 Are unloading lines and air padding lines purged, evacuated, disconnected, and capped immediately when not in use to minimize moisture entry into the piping system?	<b>Ci Pamphlet 1</b> Section 3: Bulk Shipping Containers <b>Ci Pamphlet 49</b> Section 11 : Tank Unloading Procedures <b>Ci Pamphlet 66</b> Section 9: Tank Car Unloading <b>Ci Pamphlet 79</b> Section: Chlorine Unloading Operation				

<b>Checklist Items</b>	<b>CI Pamphlet #(s) Other References</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>Comments</b>
*6 <i>Are piping leak checks conducted prior to unloading?</i>	<b>Ci Pamphlet 1</b> Section 3: Bulk Shipping Containers and Section 4: Emergency Measures <b>Ci Pamphlet 49</b> Section 11 : Tank Unloading Procedures <b>Ci Pamphlet 66</b> Section 9: Tank Car Unloading				
*7 <i>Do operating procedures require leaks to be repaired before allowing operations to begin or continue?</i>	<b>Ci Pamphlet 1</b> Section 4: Emergency Measures <b>Ci Pamphlet 49</b> Section 11 : Tank Unloading Procedures <b>Ci Pamphlet 66</b> Section 9: Tank Car Unloading				
*8 <i>Are liquid angle valves completely open when unloading is in progress?</i>	<b>Ci Pamphlet 1</b> Section 3: Bulk Shipping Containers <b>Ci Pamphlet 49</b> Section 11 : Tank Unloading Procedures <b>Ci Pamphlet 66</b> Section 9: Tank Car Unloading				
*9 <i>Is the tank car disconnected, lines capped, and protective housing cover closed and sealed after unloading has ceased for the day? If not, does the facility have a written procedure for shutting down and clearing chlorine from the lines and piping?</i>	<b>Ci Pamphlet 66</b> Section 9: Tank Car Unloading				
*10 <i>Are piping connections purged to a scrubber, process application, or containment prior to piping disconnection?</i>	<b>Ci Pamphlet 49</b> Section 11 : Tank Unloading Procedures <b>Ci Pamphlet 66</b> Section 9: Tank Car Unloading				
*11 <i>Are tank cars attended or monitored by another means during unloading?</i>	<b>Ci Pamphlet 1</b> Section 3: Bulk Shipping Containers <b>Ci Pamphlet 66</b> Section 9: Tank Car Unloading				
*12 <i>Are personnel who unload bulk containers trained per DOT requirements?</i>	<b>Ci Pamphlet 1</b> Section 3: Bulk Shipping Containers				
*13 <i>Is PTFE tape or non-reactive pipe dope used on threaded connections?</i>	<b>Ci Pamphlet 1</b> Section 3: Bulk Shipping Containers <b>Ci Pamphlet 6</b> Section 3: Pipe and Piping components				
*14 <i>Are procedures in place to prevent PTFE tape from interfering with angle valve closure?</i>					
*15 <i>Have lubricants being used in the chlorine supply system been confirmed to be compatible for chlorine use?</i>	<b>Ci Pamphlet 6</b> Section 3: Pipe and Piping components				

<b>Checklist Items</b>	<b>Ci Pamphlet #(s) Other References</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>Comments</b>
*16 <i>Is there a remotely operated or automatically actuated emergency shutoff valve system in place which can safely isolate both ends of transfer hoses / flexible piping?</i>	<b>Ci Pamphlet 1</b> Section 3: Bulk Shipping Containers <b>Ci Pamphlet 57</b> Section 3: System Description <b>Ci Pamphlet 66</b> Section 9: Tank Car Unloading				
*17 <i>Is the emergency shut-off system tested routinely?</i>	<b>Ci Pamphlet 57</b> Section 3: System Description				
*18 <i>Are there at least two remote emergency stop buttons strategically placed to close shutoff valves on both sides of transfer hoses?</i>	<b>Ci Pamphlet 57</b> Section 3: System Description				
*19 <i>Is there a tank car motion detector that closes shutoff valves on both sides of transfer hoses?</i>	<b>Ci Pamphlet 57</b> Section 3: System Description				
*20 <i>When bulk containers are padded, is either dry air or inert gas maintained at a dewpoint of -40° F (-40° C) or below?</i>	<b>Ci Pamphlet 1</b> Section 3: Bulk Shipping Containers <b>Ci Pamphlet 49</b> Section 7: Loading/Unloading/Facilities Issues				
*21 <i>Does the design of the padding gas system include backflow protection to prevent the backflow of chlorine into the padding gas?</i>	<b>Ci Pamphlet 49</b> Section 7: Loading/Unloading/Facilities Issues				
*22 <i>Is the padding gas pressure limited to prevent bulk container over-pressurization?</i>	<b>Ci Pamphlet 49</b> Section 7: Loading/Unloading/Facilities Issues				
*23 <i>Before releasing a tank car, are all angle valve plugs wrench tight? Note: DO NOT tighten excessively!</i>	<b>Ci Pamphlet 49</b> Section 11 : Tank Unloading Procedures <b>Ci Pamphlet 66</b> Section 9: Tank Car Unloading				
*24 <i>Are 4 intact placards on the tank cars before the car is released for shipment (UN #1017)?</i>	<b>Ci Pamphlet 66</b> Section 9: Tank Car Unloading				
*25 <i>Are empty tank car protective housing covers sealed prior to return shipment?</i>	<b>Ci Pamphlet 66</b> Section 9: Tank Car Unloading				

<b>Checklist Items</b>	<b>CI Pamphlet #(s) Other References</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>Comments</b>
<b>8. Process Piping (liquid &amp; gaseous service)</b>					
*1 Do piping and all components comply with recommendations of CI, such as metallurgy, schedule, welding requirements, etc?	<b>Ci Pamphlet 6</b> Section 2: General				
*2 Do the chlorine hoses used meet the CI recommendations, including the certification of materials of construction?	<b>Ci Pamphlet 6</b> Appendix A, A. Design, Construction, & Testing				
*3 Are chlorine hoses tested or replaced on a preventive maintenance basis?	<b>Ci Pamphlet 6</b> Appendix A, B. Installation & Maintenance				
*4 Is the piping system inspected routinely or piping replaced as recommended in CI Pamphlet #6.	<b>Ci Pamphlet 6</b> Section 12: Routine & Periodic Inspection & Maintenance				
5 Is the piping system well marked and clearly visible?	<b>Ci Pamphlet 6</b> Section 10: Piping Layout Design Considerations				
*6 Is the piping system adequately supported / braced with pipe shoes or other support?	<b>Ci Pamphlet 6</b> Section 10: Piping Layout Design Considerations				
*7 Is the piping system protected from vehicular traffic?	<b>Ci Pamphlet 6</b> Section 10: Piping Layout Design Considerations				
*8 Is new or replacement piping properly cleaned and inspected for chlorine service?	<b>Ci Pamphlet 6</b> Section 11: Preparation for Use				
*9 Are the gaskets used compatible with liquid and gaseous chlorine?	<b>Ci Pamphlet 95</b> Section 3: Acceptable Gasket Materials				
*10 Are there properly designed expansion chambers in place wherever liquid chlorine can be trapped between closed valves?	<b>Ci Pamphlet 6</b> Section 5: Other Components, and DWG. 136				
*11 Is the expansion chamber isolated from the pipe line with a rupture disk, and is it being monitored?	<b>Ci Pamphlet 6</b> Section 5: Other Components, and DWG. 136				
*12 Are valves for liquid chlorine service designed to prevent chlorine from being trapped in the valve body?	<b>Ci Pamphlet 6</b> Section 4: Valves				

<b>Checklist Items</b>	<b>Ci Pamphlet #(s) Other References</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>Comments</b>
*13 <i>Is a barometric loop or other backflow protection used to prevent backflow of liquid process materials?</i>	<b>Ci Pamphlet 9</b> Section 4: Controls & Indicators, and Section 5: Safety				
<b>If an underground chlorine piping system is in use, please answer Section 8, questions 14-15. Otherwise skip to Section #9.</b>					
*14 <i>Is underground piping system continuously monitored for leaks? How?</i>	<b>Ci Pamphlet 60</b> Section 3: Design				
15 Has cathodic protection, used for underground piping, been considered?	<b>Ci Pamphlet 60</b> Section 3: Design				
<b>9. Process Equipment</b>					
<b>9.1 Vaporizing System</b>					
*1 <i>Is the vaporizer heating medium non-organic based?</i>	<b>Ci Pamphlet 9</b> Section 3 : Design				
*2 <i>Is the vaporizer heating medium limited to less than 250° F (121° C)?</i>	<b>Ci Pamphlet 9</b> Section 3 : Design				
*3 <i>Is the heating medium pressure lower than the chlorine supply pressure?</i>	<b>Ci Pamphlet 9</b> Section 3 : Design				
4 Is the vaporizer designed with a low temperature alarm/shut down at -40° F (-40° C)?	<b>Ci Pamphlet 9</b> Section 3 : Design				
*5 <i>Is the vaporizer outlet equipped with a pressure relief valve?</i>	<b>Ci Pamphlet 9</b> Section 4 : Controls and Indicators				
*6 <i>Has the facility investigated the potential for nitrogen trichloride to accumulate?</i>	<b>Ci Pamphlet 9</b> Section 5 : Safety <b>Ci Pamphlet 152</b> Section 5: Control and monitoring of NCl <sub>3</sub> and NCl <sub>3</sub> sources; Section 7: Limiting Levels of Nitrogen Trichloride; and Section 8: Design/Operating Concerns and considerations				

<b>Checklist Items</b>	<b>CI Pamphlet #(s) Other References</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>Comments</b>
7 Does the facility have a program in place to monitor nitrogen trichloride levels in areas where it can accumulate?	<b>Ci Pamphlet 9</b> Section 5 : Safety <b>Ci Pamphlet 152</b> Section 5: Control and monitoring of NCl <sub>3</sub> and NCl <sub>3</sub> sources; Section 7: Limiting Levels of Nitrogen Trichloride; and Section 8: Design/Operating Concerns and considerations				
*8 <i>Is there adequate backflow protection for the vaporizer?</i>	<b>Ci Pamphlet 9</b> Section 5: Safety				
*9 <i>Does the facility have a scheduled and routine inspection program for the vaporizer?</i>	<b>Ci Pamphlet 9</b> Section 8: Maintenance				
<b>9.2 Storage Systems</b>					
*1 <i>Is the chlorine storage tank protected with a pressure relief device?</i>	<b>Ci Pamphlet 5</b> Section 5 : Tank Appurtenances				
*2 <i>Has an emergency shut-off device been installed on the liquid lines of the chlorine storage tank?</i>	<b>Ci Pamphlet 5</b> Section 5 : Tank Appurtenances				
*3 <i>Is the chlorine storage tank scheduled for periodic inspection?</i>	<b>Ci Pamphlet 5</b> Section 8 : Commissioning and Maintenance				
*4 <i>Has a pressure sensing device been installed on every chlorine storage tank?</i>	<b>Ci Pamphlet 5</b> Section 5 : Tank Appurtenances				
*5 <i>Are pressure relief devices scheduled for periodic inspection?</i>	<b>Ci Pamphlet 5</b> Section 9 : Inspection and Test of Appurtenances				
*6 <i>Is there a reliable measurement to ensure the storage tank is not overfilled (95% full by volume at a chlorine temperature of 122°F (50°C)).</i>	<b>Ci Pamphlet 5</b> Section 5 : Tank Appurtenances				
*7 <i>Are all tank openings (nozzles) on the top of the storage tanks?</i>	<b>Ci Pamphlet 5</b> Section 4 : Tank Design and Construction				
8 Do the storage tanks have suitable spill containment	<b>Ci Pamphlet 5</b> Section 6 : Spill Containment				
<b>9.3 Process Area Considerations / Other Equipment</b>					
*1 <i>Are process areas, especially buildings, routinely monitored for chlorine-in-air (e.g. alarms, warning lights)?</i>	<b>Ci Pamphlet 1</b> Section 7: Engineering Design & Maintenance				

<b>Checklist Items</b>	<b>CI Pamphlet #(s) Other References</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>Comments</b>
*2 <i>Are indoor chlorine use and handling areas properly ventilated?</i>	<b>Ci Pamphlet 1</b> Section 7: Engineering Design & Maintenance				
*3 <i>Are process vessels equipped with relief devices (prevent excessive pressure build-up and backflow into the chlorine piping system)?</i>	<b>Ci Pamphlet 9</b> Section 5 : Safety				
<b>9.4 Scrubbing Equipment</b>					
1 Is there a means available to process vent gases and the emergency evacuation of equipment containing chlorine?	<b>Ci Pamphlet 89</b> Section 1: Introduction; and section 4: System Design				
<b>If the system utilizes a scrubber, complete section 9.4 #2 to #8. A scrubber is defined as “a device for removal of chlorine from a stream via reaction adsorption or absorption.</b>					
*2 <i>Is the scrubber capacity designed to process the facility’s most probable release scenario?</i>	<b>Ci Pamphlet 89</b> Section 3: Process Considerations				
*3 <i>Does the scrubber have ‘passive’ scrubbing capability or is it equipped with emergency stand-by power sources?</i>	<b>Ci Pamphlet 89</b> Section 4: System Design				
*4 <i>Are the materials of construction adequate?</i>	<b>Ci Pamphlet 89</b> Section 4: System Design; and Appendix C Typical Materials used for scrubbing system				
*5 <i>Are adequate scrubbing media used? Identify.</i>	<b>Ci Pamphlet 89</b> Section 2: Chemical Considerations; and Appendix B Alternative Scrubbing Media				
*6 <i>Is the scrubbing solution either designed or monitored / analyzed to confirm required minimum capability?</i>	<b>Ci Pamphlet 89</b> Section 2: Chemical Considerations; and Section 4: System Design				
7 Is the scrubbing vent monitored to detect chlorine breakthrough?	<b>Ci Pamphlet 89</b> Section 4: System Design				
*8 <i>Is there adequate backflow prevention?</i>	<b>Ci Pamphlet 89</b> Section 4: System Design				

<b>10. Packaging/ Processing</b>					
*1	<i>Are chlorine detectors present in packaging and process areas that are interfaced into an alarm system with appropriate detection limits being utilized for the alarm set points?</i>	<b>Ci Pamphlet 1</b> Section 7: Engineering Design and maintenance			
2	Are cylinders and ton containers segregated between full and empty?	<b>Ci Pamphlet 17</b> Section 2: Packaging Plant Design and Maintenance			
*3	<i>Are cylinders and ton containers segregated as defined in the applicable fire and building codes from other chemicals and gases?</i>	<b>Ci Pamphlet 17</b> Section 2: Packaging Plant Design and Maintenance			
*4	<i>Are full ton containers stored so that each end is accessible in case a Kit B is needed?</i>	<b>Ci Pamphlet 17</b> Section 2: Packaging Plant Design and Maintenance			
*5	<i>Are cylinders properly secured?</i>	<b>Ci Pamphlet 17</b> Section 2: Packaging Plant Design and Maintenance			
*6	<i>Are written operating procedures available and being utilized by employees that address the appropriate steps for evacuating and filling cylinder and ton containers?</i>	<b>Ci Pamphlet 162</b> Section 6: Prevention Program (Program 3)			
*7	<i>Do procedures exist for testing for leaks prior to filling each cylinder and ton container?</i>	<b>Ci Pamphlet 17</b> Section 3: Cylinder and Ton Containers			
*8	<i>Do procedures exist for proper evacuation of lines before disconnecting?</i>	<b>Ci Pamphlet 17</b> Section 3: Cylinder and Ton Containers			
*9	<i>Do procedures exist for inspection of cylinders and ton containers?</i>	<b>Ci Pamphlet 17</b> Section 3: Cylinder and Ton Containers			
*10	<i>Do procedures exist for inspection and change out of valves?</i>	<b>Ci Pamphlet 17</b> Section 4: Valves			
*11	<i>Do procedures exist for appropriate torque settings of valves and packing nuts?</i>	<b>Ci Pamphlet 17</b> Section 4: Valves			

*12 Do procedures exist for proper labeling and marking of cylinders and ton containers?	<b>Ci Pamphlet 17</b> Section 3 : Cylinder and Ton Containers				
*13 Are written operating procedures available and being utilized by employees that address the appropriate steps for handling chlorine in facilities that produce sodium hypochlorite?	<b>Ci Pamphlet 162</b> Section 6 :Prevention Program (Program 3)				
*14 Do the materials of construction of the sodium hypochlorite process piping conform to the Ci recommendations?	<b>Ci Pamphlet 96</b> Section 4 : Overview of Production Methods for Sodium Hypochlorite				
<b>11. Warehousing/ Storage Areas</b>					
1 Does the facility include a warehouse/storage area(s) wholly or partially dedicated to the storage of chlorine cylinders and/or ton containers?	<b>Ci Pamphlet 1</b> Section 2 : Cylinders and Ton Containers <b>Ci Pamphlet 17</b> Section 2 : Packaging Plant Design and Maintenance				
*2 Does the warehouse/storage area segregate as defined in the applicable fire and building codes chlorine from other chemicals stored?	<b>Ci Pamphlet 17</b> Section 2 : Packaging Plant Design and Maintenance				
*3 Is the warehouse storage area free from debris and flammable materials?	<b>Ci Pamphlet 1</b> Section 2 : Cylinders and Ton Containers <b>Ci Pamphlet 17</b> Section 2 : Packaging Plant Design and Maintenance				
4 Are safety showers and eye wash stations readily available?	<b>Ci Pamphlet 1</b> Section 5: Employee Safety and Training				
*5 Are chlorine detectors present in the area that are interfaced into an alarm system with appropriate detection limits being utilized for the alarm set points?	<b>Ci Pamphlet 1</b> Section 7 : Engineering Design and Maintenance				
*6 Are stored cylinders secured?	<b>Ci Pamphlet 1</b> Section 2 : Cylinders and Ton Containers <b>Ci Pamphlet 17</b> Section 2 : Packaging Plant Design and Maintenance				
*7 Are ton containers secured to prevent them from rolling?	<b>Ci Pamphlet 1</b> Section 2 : Cylinders and Ton Containers <b>Ci Pamphlet 17</b> Section 2 : Packaging Plant Design and Maintenance				

*8 Are appropriate lifting devices being utilized to move ton containers?	<b>Ci Pamphlet 1</b> Section 2 : Cylinders and Ton Containers <b>Ci Pamphlet 17</b> Section 2 : Packaging Plant Design and Maintenance				
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## 12. REFERENCES

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