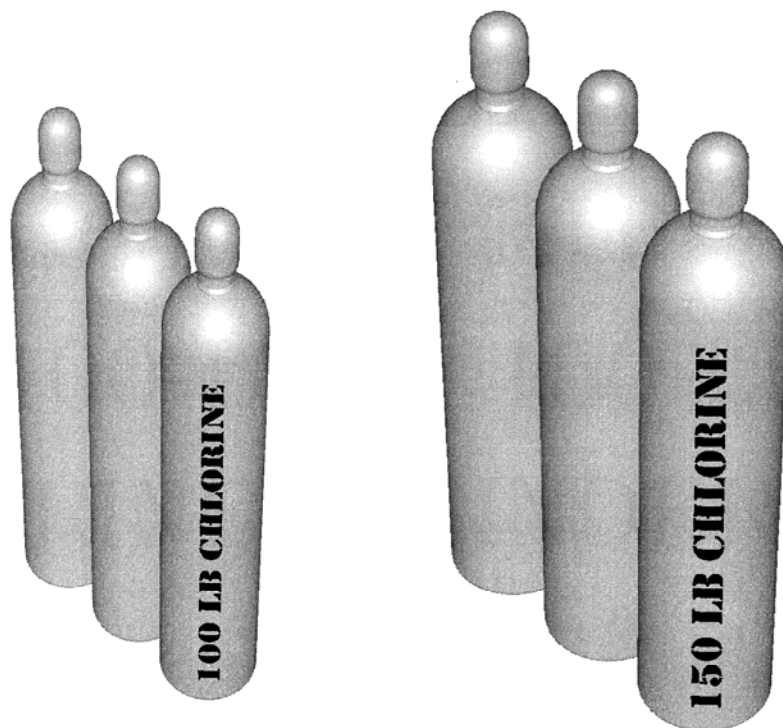


CHLORINE INSTITUTE EMERGENCY KIT "A" FOR 100 LB & 150 LB CHLORINE CYLINDERS

**Edition 11
January 2009**



INSTRUCTION BOOKLET

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1. INTRODUCTION

Leaks in chlorine cylinders rarely occur. When they do occur, however, prompt corrective action is required by trained competent personnel with special equipment. The Chlorine Institute Emergency Kit A and this instruction booklet are made available by The Chlorine Institute, Inc. in the belief that they will be helpful in handling such emergencies.

1.1 SCOPE

This instruction booklet provides information on the design and use of the Chlorine Institute Emergency Kit A.

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.

1.3 DISCLAIMER

The information in this booklet 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 may require changes in the recommendations contained herein. Appropriate steps should be taken to ensure that the information is current when used. These recommendations should not be confused with federal, state, provincial, municipal, or insurance requirements, or with national safety codes.

1.4 APPROVAL

The Institute's Emergency Preparedness Issue Team approved Edition 11 of this instruction booklet on January 13, 2009.

1.5 REVISIONS

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

1.5.1 Significant Revisions

In this new edition, a depiction of commonly used optional devices was added, and numerous editorial revisions were made.

1.6 REPRODUCTION

The contents of this instruction booklet are not to be copied for publication, in whole or in part, without prior permission from the Secretary of the Chlorine Institute.

2. GENERAL DESCRIPTION

The CI Emergency Kit A is designed for use with the standard DOT 3A480 or 3AA480, 100 and 150 pound capacity cylinders in chlorine service only. The cylinders have outside diameters between 8¼ and 10¾ inches and overall height from 39½ to 59 inches. The kit is designed for use with all configurations of standard chlorine cylinders. This kit should not be applied to a cylinder that is liquid full (See Section 9, Kit Limitations).

2.1 TRAINING AND SAFETY

Emergency Response and other personnel must be trained in the use of the devices and tools within the CI Emergency Kit A. Training must include the use of respiratory equipment and all other safety equipment. Knowledge of the properties of chlorine is a must.

Personnel safety is of primary importance. Emergency response should only be performed by authorized personnel who are trained in the procedures and are equipped with suitable respiratory and personal protective equipment.

See current CI Pamphlet 65, Personal Protective Equipment for Chlor-Alkali Chemicals.

2.2 RESPIRATORY EQUIPMENT

The type of respiratory equipment required will be determined by the severity of the leak and the potential for exposure to chlorine.

2.3 CHLORINE CYLINDER INSPECTION

Daily inspection of full cylinders is recommended whether or not they are connected to unloading lines. Through these means a leak usually can be detected in an early stage when it can be corrected or controlled by appropriate procedures.

2.4 LEAK DETECTION

As soon as there is an indication of the presence of chlorine in the air, **authorized, trained personnel equipped with suitable personal protective equipment should investigate promptly.** All other persons should be kept away from the affected area.

The location of a leak in a chlorine containing system can usually be detected by the reaction of ammonia vapor with the escaping chlorine. The reaction is a dense white cloud. The most convenient way is to use 26° Baumé aqua ammonia (ammonium hydroxide) solution in a squeeze bottle. Direct the vapors at the suspected leak. Efforts to detect the source of any leak should be carried out with an awareness of the potential hazards and use of necessary personal protective equipment.

2.5 ASSISTANCE

Chlorine emergencies should be handled only by trained personnel at the use site. If assistance is required, promptly notify your supplier. If the supplier cannot be reached or respond immediately, then summon help by activating CHLOREP, The Chlorine Emergency Plan. Use the appropriate telephone number for the U.S. or Canada. CHLOREP can also be activated by calling CHEMTREC in the U.S. 1-800-424-9300 or CANUTEC in Canada 1-613-996-6666.

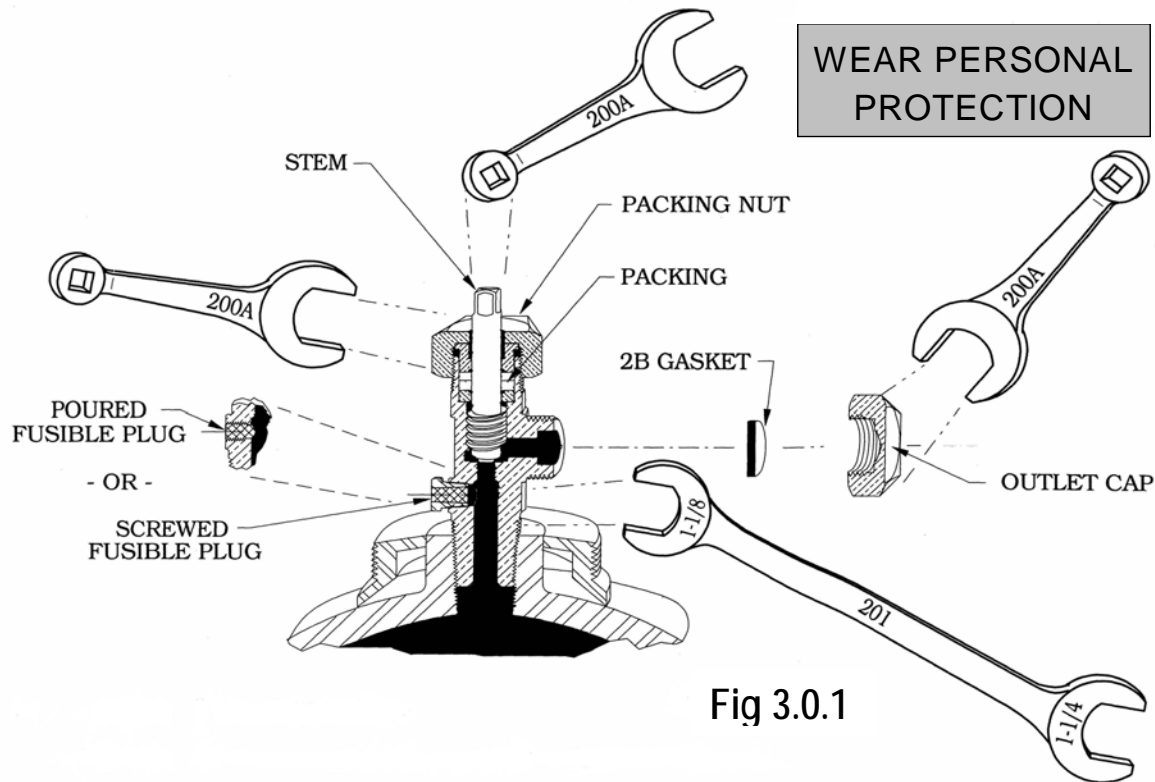
2.6 REPORTING REQUIREMENTS

There are Federal, State and local requirements for the reporting of chlorine releases that must be met.

2.7 EMERGENCY PLAN

It is recommended that users have an emergency plan that complies with Federal, State and local government requirements.

3. IDENTIFYING AND STOPPING LEAKS



3.1 LEAK: VALVE STEM PACKING (FIG. 3.0.1)

ACTION:

- Ensure valve stem is closed with WRENCH 200A
- Tighten packing nut with WRENCH 200A

3.2 LEAK: THROUGH VALVE SEAT (WILL NOT COMPLETELY CLOSE)

ACTION:

- If disconnecting from a process, reconnect and gently open and close valve stem to dislodge foreign matter from seat with WRENCH 200A, then disconnect and apply outlet cap and GASKET 2B with WRENCH 200A; or
- If the leak is from an unconnected cylinder, apply outlet cap and GASKET 2B, then tighten with WRENCH 200A.

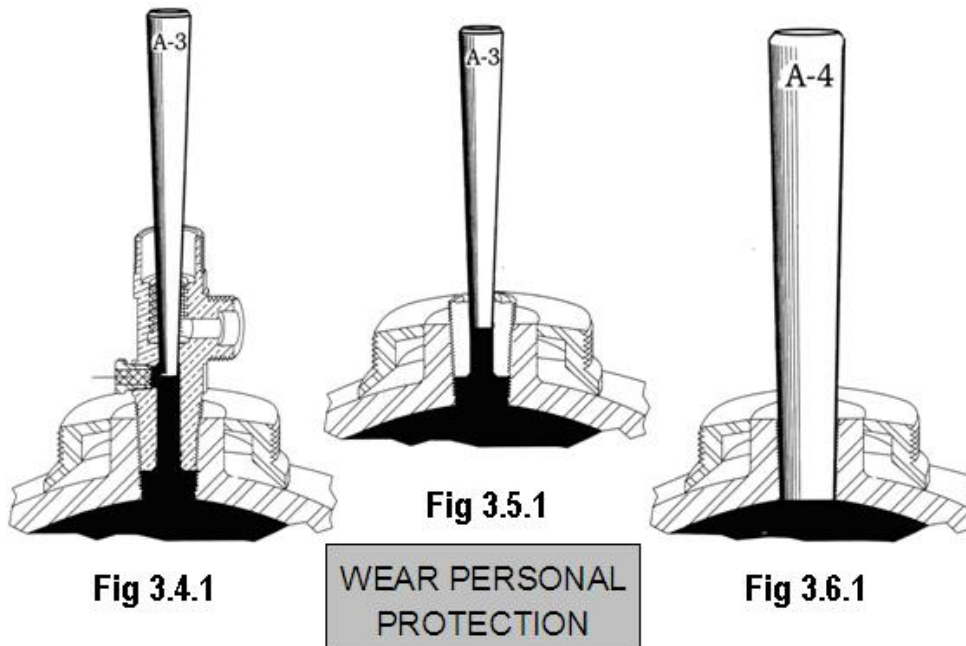
3.3 LEAK: VALVE INLET THREADS

ACTION:

- Tighten valve into cylinder slowly with steady pressure using WRENCH 201; or
- Apply DEVICE 1 (Hood Assembly) (See Section 4 for instructions).

NOTE:

The above mentioned leaks can also be corrected by applying DEVICE 1 (Hood Assembly) (See Section 4 for instructions)



3.4 LEAK: VALVE STEM ASSEMBLY BLOWN OUT

ACTION: Drive small DRIFT PIN A-3 (Fig 3.4.1) into valve body.

NOTE:

DEVICE 1 (Hood Assembly) will probably not fit over the DRIFT PIN A-3. Secure the cylinder in an isolated area and call your chlorine supplier.

3.5 LEAK: VALVE BROKEN OFF

ACTION: Drive small DRIFT PIN A-3 (Fig 3.5.1) into valve shank and apply DEVICE 1 (Hood Assembly) (See Section 4 for instructions).

3.6 LEAK: VALVE BLOWN OUT (DUE TO STRIPPED THREADS)

ACTION: Drive large DRIFT PIN A-4 (Fig 3.6.1) into valve opening and apply DEVICE 1 (Hood Assembly) (See Section 4 for instructions).

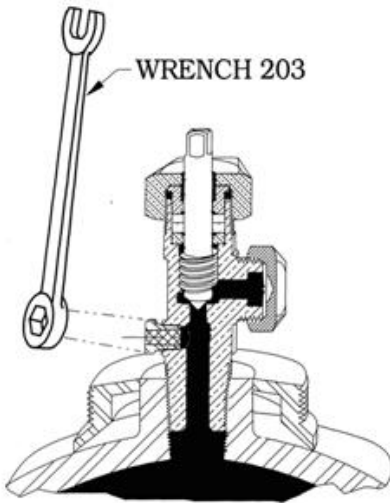


Fig 3.7.1

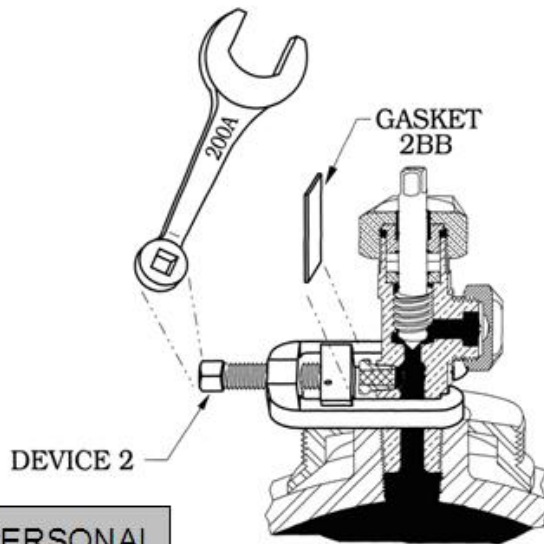


Fig 3.8.1

WEAR PERSONAL
PROTECTION

3.7 LEAK: FUSIBLE PLUG THREADS

ACTION:

- A) Tighten fusible plug slowly, using steady pressure with WRENCH 203 (Fig 3.7.1)
- B) Saw off fusible plug flush with valve body, file the surface smooth and apply DEVICE 2 (Clamp Assembly, Fig 3.8.1) (See Section 5 for instructions).

3.8 LEAK: FUSIBLE METAL OF PLUG OR Poured FUSIBLE PLUG

ACTION: Apply DEVICE 2 (Clamp Assembly, Fig 3.8.1) (See Section 5 for instructions).

NOTE: The above mentioned leaks can also be corrected by applying DEVICE 1 (Hood Assembly) (See Section 4 for instructions).

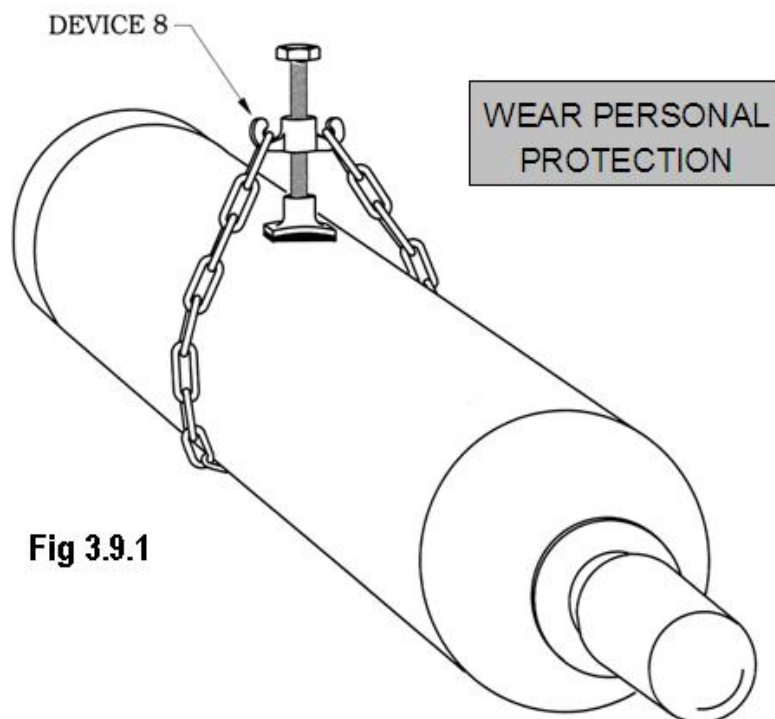


Fig 3.9.1

3.9 LEAK: SIDE WALL OF CYLINDER

ACTION: Apply DEVICE 8 (Patch Assembly, Fig 3.9.1) (See Section 6 for instructions).

NOTE: At all times, before and after application of emergency devices, position cylinder so that the source of the leak is in the gas phase (See Section 6).

4. HOOD ASSEMBLY FOR VALVE – DEVICE 1

STEPS - See Fig 4.1	Equipment
1. Remove valve protective housing if in place. Position cylinder so that the valve is in the uppermost position. If unable to remove valve protective housing, the HOOD (1A2) should fit over it.	
2. Remove outlet cap from VENT VALVE (1V) on HOOD (1A2) and open VALVE.	WRENCH 200A
3. Prepare BASE ASSEMBLY (1EFP) to insure proper position and stability of base segments. Secure RAMP (1R) between two base segments by means of hook attached to center spacer slot to prevent sliding of BASE ASSEMBLY while cylinder is being positioned.	BASE ASSY. 1EFP RAMP 1R
4. Roll upright cylinder up RAMP (1R) and center in position on BASE ASSEMBLY (1EFP).	
5. Clean shoulder of cylinder: Use SCRAPER (A-8) if paint is loose or uneven.	SCRAPER A-8
6. Inspect condition of GASKET (1BRV). (See Section 8, Kit Maintenance). Place GASKET (1BRV) on HOOD (1A2). Place HOOD (1A2) with GASKET (1BRV) over leaking valve.	HOOD 1A2 & GASKET 1BRV
7. Adjust CAP SCREWS (1D1) and (1K1) in YOKE (1C1) so that the points of the screws extend only slightly below YOKE (1C1).	CAP SCREWS (1)1D1, (3)1K1, YOKE 1C1
8. Place YOKE (1C1) in position on top of HOOD (1A2), with screw positioned in the dimples on top of HOOD (1A2). Insure that CHAINS (1F) are straight and not twisted. Hook CHAINS (1F) over ears of YOKE (1C1) using appropriate link to avoid slack in CHAINS (1F).	CHAINS IF WRENCH 201, (WITH 1EFP ASSY) HOOD 1A2 YOKE 1C1
9. Hand tighten CAP SCREWS (1D1) and (1K1). Tighten CAP SCREWS (1K1) equally forcing the HOOD (1A2) and GASKET (1BRV) against the shoulder of cylinder. Do Not Overtighten. May Damage Gasket. Keep CAP SCREW (1D1) hand tightened against center of HOOD (1A2). If leak persists tighten CAP SCREW (1K1) further in area of leak.	WRENCH 201
CAUTION: <i>Check the foot-ring on base of cylinder for possible deterioration under extreme pressure conditions. Insure that CHAINS (1F) are against side of cylinder at base.</i>	
10. Close VENT VALVE (1V) on HOOD (1A2).	WRENCH NCH 200A
11. Test for leaks around GASKET (1BRV). Tighten CAP SCREW(S) (1K1) if necessary.	WRENCH 201

DEVICE 1 INCLUDES:

(3) CAP SCREWS – 1K1
CAP SCREW - 1D1
HOOD - 1A2
YOKE - 1C1

GASKET - 1BRV
RAMP - 1R
BASE ASSEMBLY - 1EFP

**WEAR PERSONAL
PROTECTION**

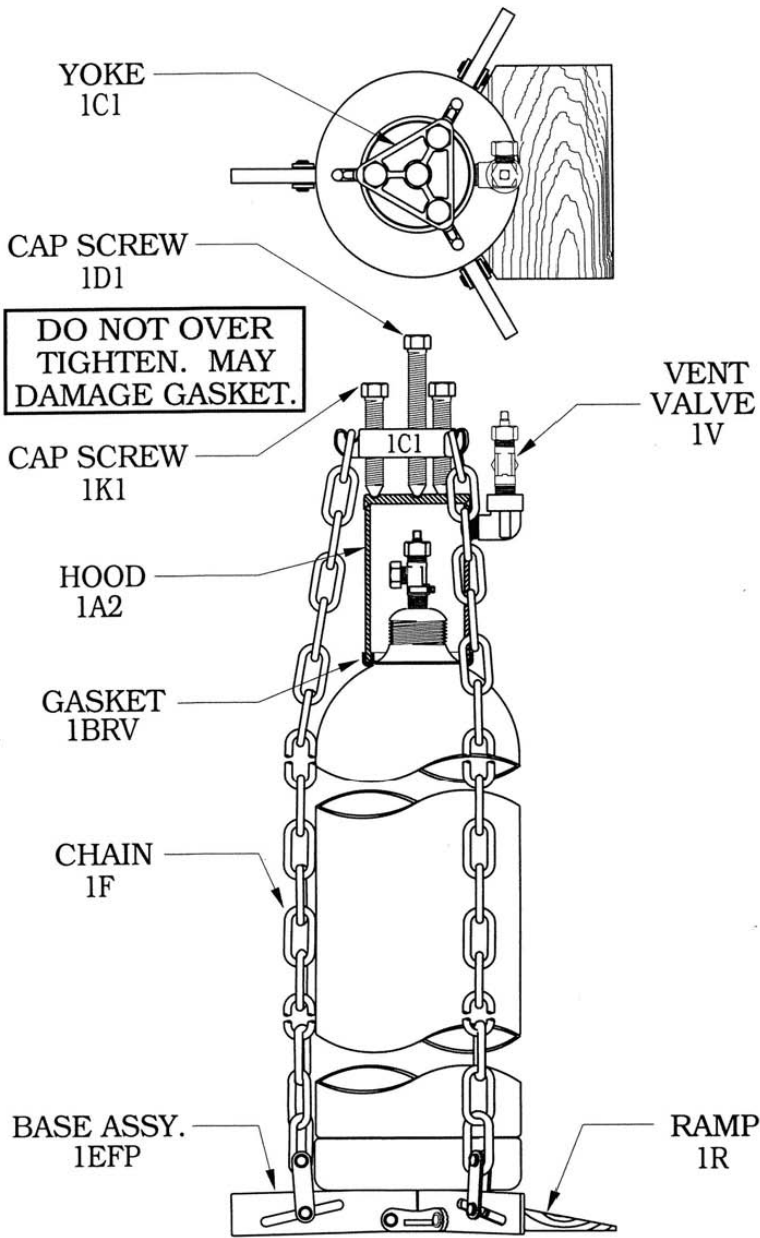


Fig 4.1

D
E
V
I
C
E
1

5. CLAMP FOR FUSIBLE PLUG – DEVICE 2

STEPS - See Fig 5.1	Equipment
<p>NOTE: <i>Remove valve protective housing if in place. Position cylinder so that the valve is in the uppermost position.</i></p> <p><u>If leak is at threads of fusible plug:</u></p> <ol style="list-style-type: none"> 1. Saw off fusible plug flush with valve body, filing the surface smooth. 2. Loosen SET SCREW (2D) and place CLAMP (2C) over leaking valve. <p>NOTE: <i>It is not necessary to remove valve outlet cap.</i></p> <ol style="list-style-type: none"> 3. Place GASKET (2BB) between leaking fusible plug and BLOCK (2A). 4. Tighten SET SCREW (2D) until leak stops. 5. Test for leaks. Tighten SET SCREW (2D) further if necessary. <p><u>If leak is in fusible material:</u></p> <ol style="list-style-type: none"> 1. If face of fusible plug is badly pitted or corroded, saw off fusible plug flush with valve body, filing the surface smooth. <p>NOTE: <i>Some valves have the fusible metal poured directly into the valve body. In such cases, be sure gasket seating surface is clean and free from pitting.</i></p> <ol style="list-style-type: none"> 2. Loosen SET SCREW (2D) and place CLAMP (2C) over leaking valve. <p>NOTE: <i>It is not necessary to remove valve outlet cap.</i></p> <ol style="list-style-type: none"> 3. Place GASKET (2BB) between leaking fusible plug and BLOCK (2A). 4. Tighten SET SCREW (2D) until leak stops. 5. Test for leaks. Tighten SET SCREW (2D) further if necessary. <p>NOTE: <i>The above mentioned leaks can also be corrected by applying DEVICE 1 (Hood ASSEMBLY) (See Section 4 for instructions).</i></p>	<p>HACKSAW A-2 FILE A-14</p> <p>WRENCH 200A & CLAMP 2C</p> <p>GASKET 2BB</p> <p>WRENCH 200A</p> <p>WRENCH 200A</p> <p>HACKSAW A-2 FILE 1-14</p> <p>WRENCH 200A & CLAMP 2C</p> <p>GASKET 2BB</p> <p>WRENCH 200A</p> <p>WRENCH 200A</p>

DEVICE 2 INCLUDES:

CLAMP ASSEMBLY BLOCK - 2A
 CLAMP - 2C
 SCREW - 2D
 GASKET - 2BB

**WEAR PERSONAL
PROTECTION**

CLAMP ASSEMBLY DEVICE 2

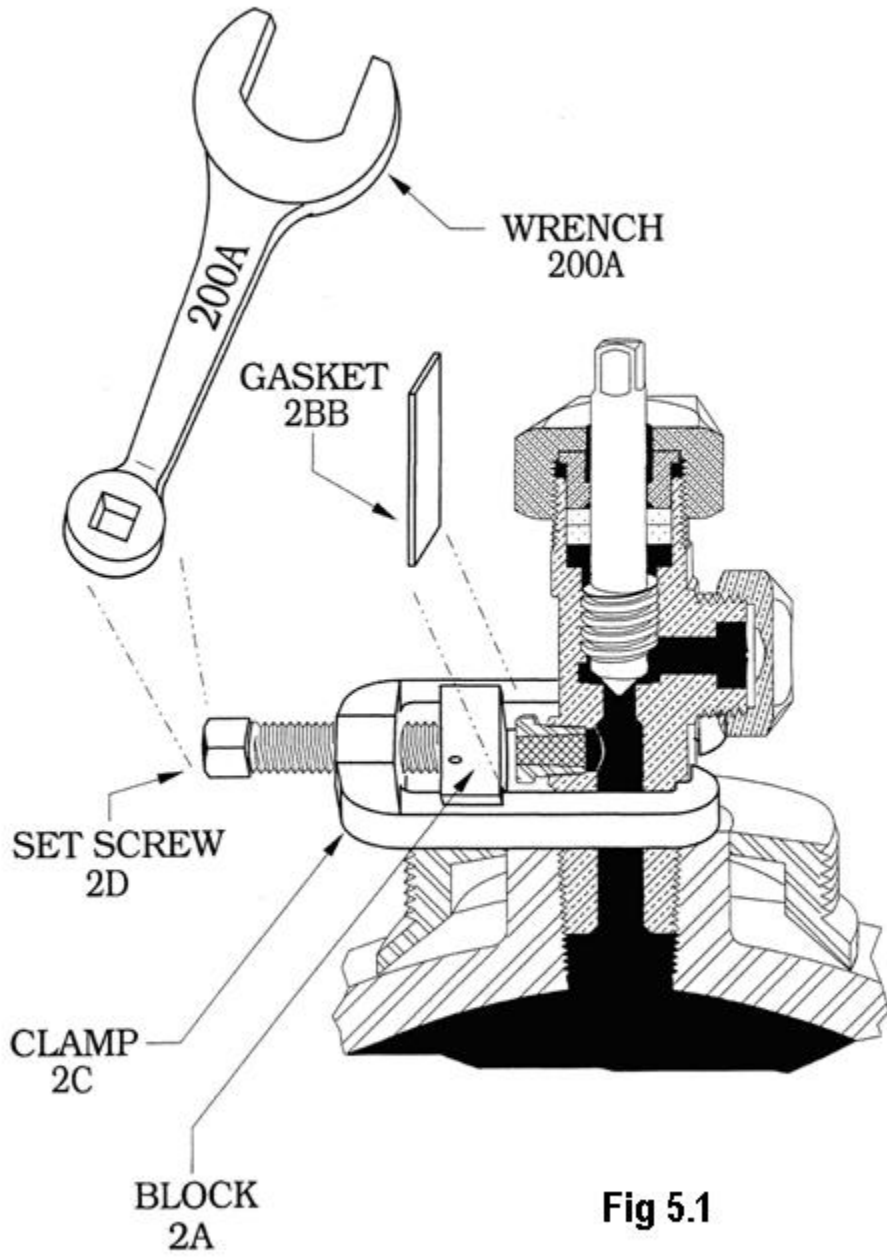


Fig 5.1

D
E
V
I
C
E

2

6. PATCH FOR SIDE LEAKS – DEVICE 8

STEPS - See Fig 6.1	EQUIPMENT
<ol style="list-style-type: none"> 1. Roll cylinder so that leak is in uppermost position. Be sure cylinder wall around leak is sound before proceeding with application of device. 2. Adjust CAP SCREW (8C) in YOKE (8B) until point of screw extends only slightly below YOKE (8B). 3. Slip one end of CHAIN (8A) under cylinder and pull it through until it reaches the approximate area of leak. 	<p>YOKE 8B & CAP SCREW 8C</p> <p>CHAIN 8A</p>
<p>NOTE: <i>Insure CHAIN (8A) is straight and not twisted.</i></p>	
<ol style="list-style-type: none"> 4. Center CAP SCREW (8C) in YOKE (8B) in PATCH (8D) depression. 5. Hook free ends of CHAIN (8A) to ears on each side of YOKE (8B), keeping CHAIN (8A) as short as possible. 	<p>YOKE 8B CAP SCREW 8C & PATCH 8D</p>
<ol style="list-style-type: none"> 6. Use SCRAPER (A-8) if paint is loose or uneven. Place GASKET (8EV) and PATCH (8D) over leak. 	<p>GASKET 8EV PATCH 8D & SCRAPER A-8</p>
<p>NOTE: <i>Two GASKETS (8EV) may be required on slender cylinders (about 8 inches in diameter).</i></p>	
<ol style="list-style-type: none"> 7. Tighten CAP SCREW (8C). CAUTION: <i>Use extreme caution if leak is due to internal corrosion.</i> <p>CAUTION: <i>If there is any evidence of weakening of the cylinder wall, immediately discontinue tightening CAP SCREW (8C).</i></p> <ol style="list-style-type: none"> 8. Test for leaks. Tighten CAP SCREW (8C) further, if necessary. 	<p>WRENCH 201</p>

DEVICE 8 INCLUDES:

CHAIN - 8A

YOKE - 8B

CAP SCREW - 8C

PATCH - 8D

GASKET - 8EV

**WEAR PERSONAL
PROTECTION**

DEVICE 8

PATCH FOR SIDE LEAKS DEVICE 8

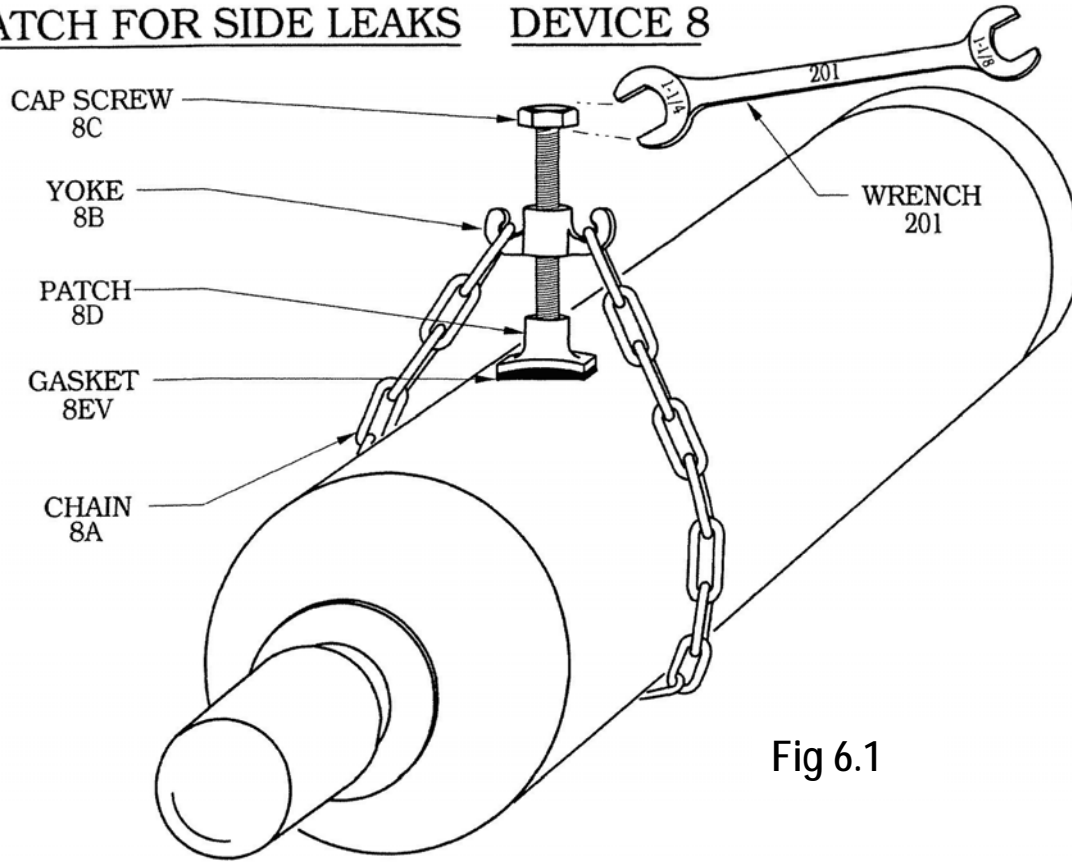


Fig 6.1

CHLORINE INSTITUTE EMERGENCY KIT A



Fig 6.2

7. HANDLING OF CHLORINE REMAINING IN CYLINDER

The containment of leaks by the CI Emergency Kit A devices is only an interim measure.

VALVE YOKE (A-9) AND VALVE ADAPTER (A-10) are included in this kit for use in disposing of remaining chlorine in a capped cylinder. This procedure should be attempted by experienced personnel only.

**CONSULT WITH THE CHLORINE SUPPLIER
IMMEDIATELY AND ARRANGE FOR ULTIMATE DISPOSAL**

If supplier is unknown, see Section 2.5, Assistance, for instructions.

8. KIT MAINTENANCE

NOTE: All parts of the CI Emergency Kit A should be maintained in a ready to use condition.

8.1 AFTER USE

Inspect all parts for damage, wear and corrosion. Clean and dry all parts used. Lubricate moveable parts with a lubricant that is non-reactive to chlorine. Replace all gaskets used.

8.2 ROUTINE

The kit should be frequently inspected by the person responsible for the equipment and checked with the contents list to insure that equipment is complete and ready for use. The box should be sealed after each inspection and such seals should be broken only by authorized persons or in case of accidents. Many owners coordinate routine inspection with training drills.

All Viton[®] gaskets are stamped with the date of manufacture and should be removed from emergency use after a four-year shelf life. For further guidelines concerning the Viton[®] gaskets, consult the manufacturer or the Chlorine Institute.

8.3 SPARE PARTS

Spare parts may be purchased by owners of this kit or the Solvay Emergency Kit A from the manufacturer. For information on ordering procedures consult the manufacturer or the Chlorine Institute.

9. KIT LIMITATIONS

Some 100-lb and 150-lb chlorine cylinders in current use are of such design that application of the CI Emergency Kit A devices might be difficult or impossible. Among these are those having oversize neck-rings (precluding proper placement of DEVICE 1). The kit devices also are unsuitable for stopping leaks around the cylinder neck, base and foot-ring areas. In these cases the Chlorine Institute Recovery Vessel may be used.

10. PARTS LIST**Chlorine Institute Emergency Kit A**

Part Number	Description	Quantity Per Kit
1A2	Hood Assembly (with Vent Valve 1V)	1
1BRV	Gasket, Molded Viton®	2
1C1	Yoke	1
1D1	Cap Screw	1
1K1	Cap Screw	3
1EFP	Chain and Base Assembly	1
1R	Ramp	1
2	Clamping Device (with Block 2A, Yoke 2C, Set Screw 2D)	1
2B	Gasket, 15/16 dia x 1/16 thick	5
2BB	Gasket, 1 x 3 x 1/16 thick	5
8A	Side Chain	1
8B	Yoke	1
8C	Cap Screw	1
8D	Side Patch	1
8EV	Gasket, Viton® 2-1/2 square x 1/8 thick	2
200A	Wrench, 3/8 sq. box, 1-1/4 open end x 7-1/4 long	1
201	Wrench, straight open end, 1-1/4 x 1-1/8 x 12-3/8 long	1
203	Wrench, Combination, 7/16 open end, 6pt. Box End	1
A-1	Hammer, machinist, 48 oz	1
A-2	Hacksaw, 10" and 3 blades	1
A-3	Drift Pin, 9/64 x 1/2 x 6 long	2
A-4	Drift Pin, 7/8 x 1-1/4 x 8 long	2
A-5	Ring, vent valve packing, 7/8 OD x 15/32 ID x 1/4 thick	5
A-6	Railroad Car Seal	15
A-7	Gasket Sack	1
A-8	Paint Scraper, 1-1/4 blade	1
A-9	Valve Yoke	1
A-10	Valve Yoke Adapter (820 - Hose)	1
A-12	Washer, valve outlet, 9/16 ID x 15/16 OD x 1/16 thick	5
A-13	Plastic Gasket Box	1
A-14	File	1
144	Tool Roll	1
151A	Kit Box, 34"L x 16.25"W x 16.5"H	1
	Instruction Booklet	2
	CI Pamphlet 1, Chlorine Basics	1

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OPTIONAL EQUIPMENT**Device Part #400**

Stripped Valve Stem Clamping Device:
Designed to close cylinder and ton valves with
stripped valve stem threads.

Device Part #405

Valve Plugging Device:
Designed to seal leaks in valves with stripped
outlet threads or corroded outlet face.

Emergency Contacts

Chlorine Supplier: _____

Address: _____

Phone: _____

CHEMTREC* **800-424-9300**

CANUTEC** **613-996-6666**

Nearest Chlorine
Producer or
Packager: _____

Address: _____

Phone: _____

Police Department: _____

Fire Department: _____

First Aid: _____

* In the UNITED STATES, summon help through CHEMTREC, the Chemical Transportation Emergency Center at the American Chemistry Council in Arlington, VA.

(toll free)

800-424-9300

** In CANADA, summon help through CANUTEC, the Canadian Transport Emergency Centre in Ottawa.

CANADA, All provinces (call collect)

613-996-6666