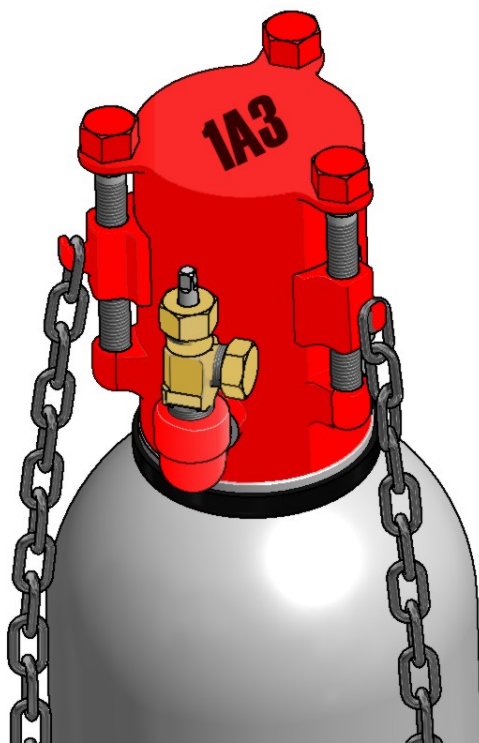
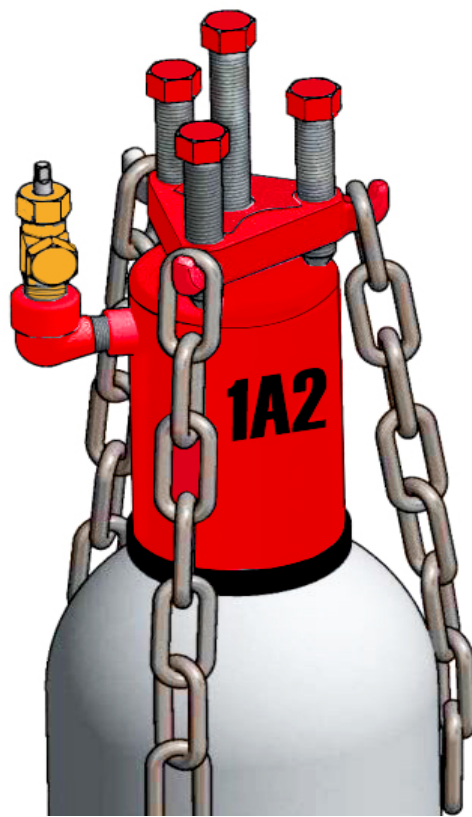


CHLORINE INSTITUTE EMERGENCY KIT “A” FOR 100-LB. & 150-LB. CHLORINE CYLINDERS

Edition 13
January 2021



Kits manufactured after Jan. 1, 2013



Kits manufactured before Dec. 31, 2012



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 (CI or the Institute) 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".

1.1.1 Two Generations of Emergency Kit "A"

On January 1, 2013, the design of Emergency Kit "A" was modified for ease of use. This booklet includes instructions on how to apply both the current and previous versions of the tools and devices in Emergency Kit "A". Previous generations of the Emergency Kit "A" kit will still fit most chlorine cylinders. Section 1.7 details which cylinders will fit the kits.

1.2 CHLORINE INSTITUTE STEWARDSHIP PROGRAM

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 chemicals¹.

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 13 of this instruction booklet on January 12, 2021.

¹ 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.

1.5 REVISIONS

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

1.5.1 Significant Revisions

Significant revisions in Edition 13 of this instruction booklet include:

- New section to emphasize instructions' applicability on the standard chlorine valves (Section 2.4);
- New section to further emphasize importance of Viton® gasket replacement (Section 2.5);
- Updated guidance on using aqua ammonia for leak detection (Section 2.6);
- Revised preferred instruction for leaks on valve inlet threads (Section 3.3);
- Revised preferred instruction for leaks on fusible plug threads (Section 3.7);
- Enhanced instruction cautions related to tightening of kit equipment (Sections 4 and 5);
- Enhanced guidance on handling chlorine remaining in containers (Section 6);
- Enhanced guidance on cleaning kit equipment after use (Section 7.1);
- New section providing caution if using kits for compressed gases other than chlorine (Section 8.2);
- New reference section (Section 9);
- Enhanced quality of various images throughout; and
- Minor editorial and formatting updates throughout.

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.

1.7 REVISION HISTORY AND COMPATIBILITY

The Chlorine Institute has published an instruction booklet for the Emergency Kit "A" beginning in 1969. Since then, the kit and booklet have gone through a series of changes. The table below details the updates through the years and device compatibility with current equipment.

Instruction Booklet Edition	Date	Revision Summary	Compatible with Current Cylinders?
Ed. 13	Jan. 2021	No Kit design change, Booklet updated	Yes
Ed.12, Rev. 2	July 2014	Added Device 400A in the "Optional Equipment" section, which replaced Device 400	Yes
Ed.12, Rev. 1	Sept. 2013	Added Revision History and Compatibility Summary	Yes
Ed.12	Jan. 2013	Modified Device 1 for valve leaks, Modified Device 8 for sidewall leaks	Yes
Ed. 11	Jan. 2009	No Kit design change, Booklet updated	Yes
Ed. 10	June 2003	No Kit design change, Booklet updated	Yes
Ed. 9	June 2000	No Kit design change, Booklet updated	Yes
Ed. 8	June 1996	No Kit design change, Booklet updated	Yes
Ed. 7	March 1993	Modified Device 1 to fit over cylinders with oversized neck-rings, radius gasket 1BRV added, adjustable base assembly 1EFP included	Yes
Ed. 6, Rev.1	Feb. 1992	Gasket 1FVG included in kit as temporary fix until kit is modified permanently to address cylinders with oversized neck-rings.	Yes
Ed. 6	April 1986	Modified Part 1C1 to 4 bolt design, Booklet updated	Yes (std. cyl.)
Ed. 5	May 1983	No Kit design change, Booklet updated	Yes (std. cyl.)
Ed. 4	July 1978	Included Molded Viton [®] gaskets 1BMV & 8EV	Yes (std. cyl.)
Ed. 3	1976	No Kit design change, Booklet updated	Yes (std. cyl.)
Ed. 2	1975	No Kit design change, Booklet updated	Yes (std. cyl.)
Ed. 1	1969	Booklet created	Yes (std. cyl.)
*Some cylinders have oversized neck-rings. Standard Cylinder (Std. cyl.) neck-rings have a maximum outside diameter of 4' 3/8"			

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.

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 the current edition of CI Pamphlet 65 for guidance on appropriate personal protective equipment (9.1).

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. For further details, see the current edition of CI Pamphlet 65 (9.1).

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. Inspection guidance can be found in CI Pamphlet 17 (9.1).

2.4 VALVE APPLICABILITY

The instructions included in this booklet are applicable to cylinders having a standard chlorine cylinder valve installed (CGA 820). If another type of valve is installed, consult your supplier or the kit manufacturer for additional instruction details.

2.5 GASKET REPLACEMENT

All Viton[®] gaskets for the emergency kit are stamped with the date of manufacture and should be removed and replaced every four years (see Section 7 for more details). For further guidelines concerning the Viton[®] gaskets, consult the manufacturer or The Chlorine Institute.

2.6 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 5-30% aqua ammonia (10.3 – 61.7% ammonium hydroxide solution) in a squeeze bottle. Direct the vapors at the suspected leak. To avoid corrosion, the ammonia solution (liquid) should not be directly sprayed onto the cylinder or its connections. 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. Note, a weaker solution such as household ammonia, which is typically 5%, may not be concentrated enough to detect minor leaks because the solution may degrade over time.

CAUTION

Once the leak is found and you can safely maneuver the container, rotate the container, if needed, so that the leak is coming out from the top of the container. Liquid will be on the bottom of the container and gas will be on top. Because chlorine liquid vaporizes and expands into gas by 460 times its volume, it is more manageable to have gas leaking from the cylinder instead of liquid.

2.7 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), an emergency response mutual aid network that can be accessed 24/7 for assistance. CHLOREP can be activated by calling CHEMTREC in the U.S. 1-800-424-9300 or CANUTEC in Canada 1-613-996-6666.

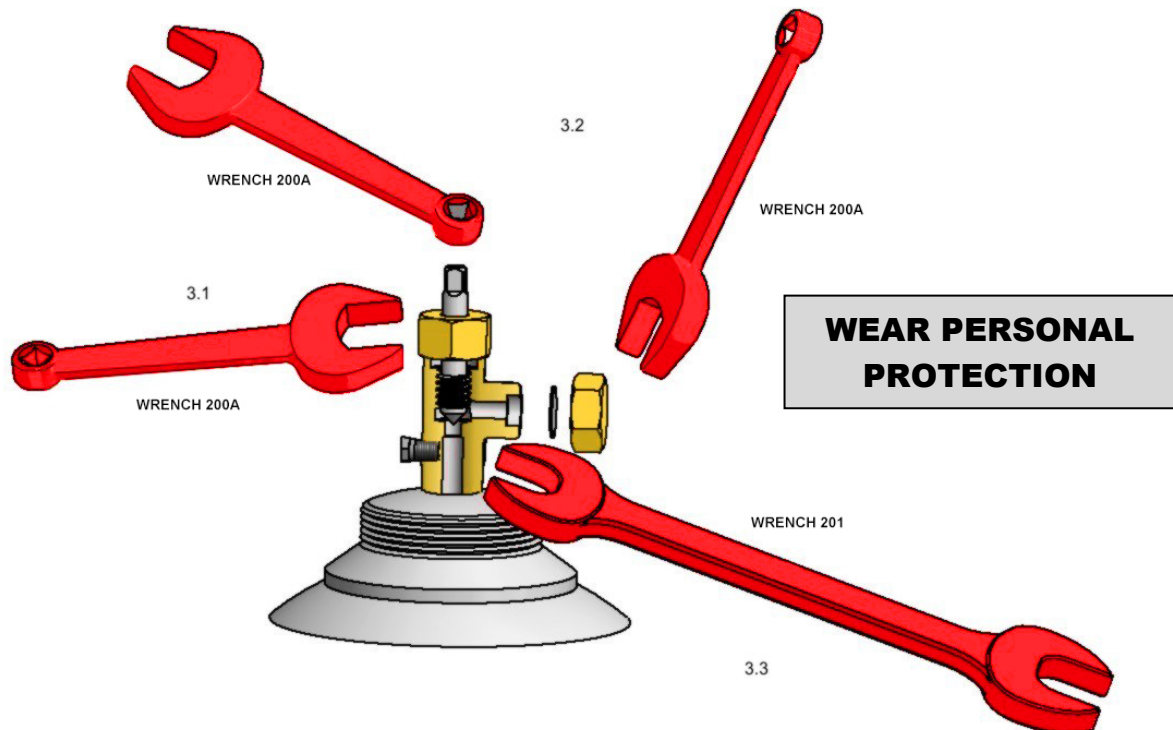
2.8 REPORTING REQUIREMENTS

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

2.9 EMERGENCY PLAN

It is recommended that users have an emergency plan that complies with federal, state and local government requirements. For further detail on emergency response plans, refer to CI Pamphlet 155 (9.1).

3. IDENTIFYING AND STOPPING LEAKS



Figures 3.1, 3.2, and 3.3

3.1 LEAK: VALVE STEM PACKING (FIGURE 3.1)**ACTION:**

1. Ensure valve stem is closed with WRENCH 200A.
2. Tighten packing nut with WRENCH 200A.
3. Test for leaks.

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

1. If disconnecting from a process, reconnect and firmly 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.

2. Test for leaks.

3.3 LEAK: VALVE INLET THREADS (FIGURE 3.3)**ACTION:**

1. Apply DEVICE 1 (Hood Assembly) (See Section 4 or 5 for instructions).
2. Test for leaks.

NOTE

Kit "A" contains WRENCH 201 that can be used to tighten the valve back into the cylinder to address this type of leak. **Extreme caution** should be used when attempting this to avoid making the leak worse by dislodging the valve. Only trained and knowledgeable personnel should ever attempt this procedure. Otherwise, use DEVICE 1.

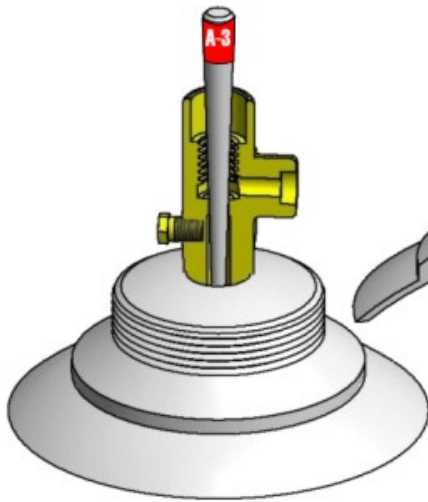


Figure 3.4

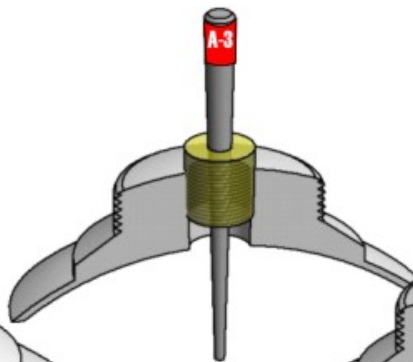


Figure 3.5

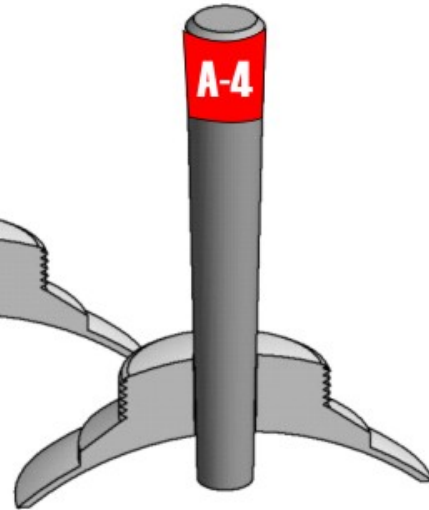


Figure 3.6

3.4 LEAK: VALVE STEM ASSEMBLY BLOWN OUT (FIGURE 3.4)

ACTION:

1. Drive small DRIFT PIN A-3 into valve body.
2. Test for leaks.

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. If the supplier is not immediately available, activate CHLOREP (see Section 2.7).

3.5 LEAK: VALVE BROKEN OFF (FIGURE 3.5)

ACTION:

1. Drive small DRIFT PIN A-3 into valve shank and apply DEVICE 1 (Hood Assembly) (See Section 4 or 5 for instructions).
2. Test for leaks.

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

ACTION:

1. Drive large DRIFT PIN A-4 into valve opening and apply DEVICE 1 (Hood Assembly) (See Section 4 or 5 for instructions).
2. Test for leaks.

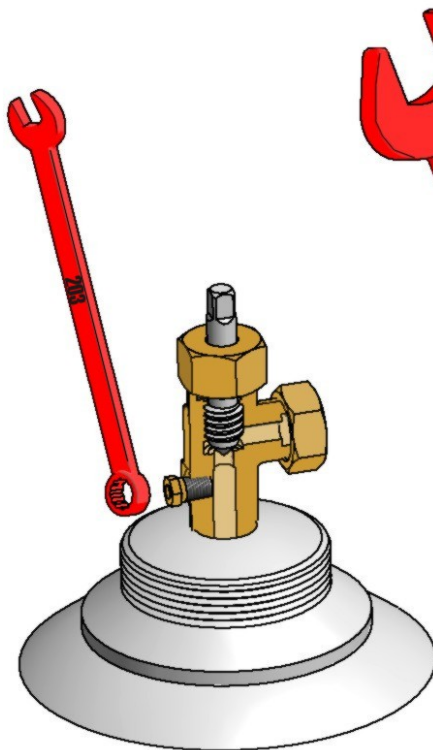


Figure 3.7

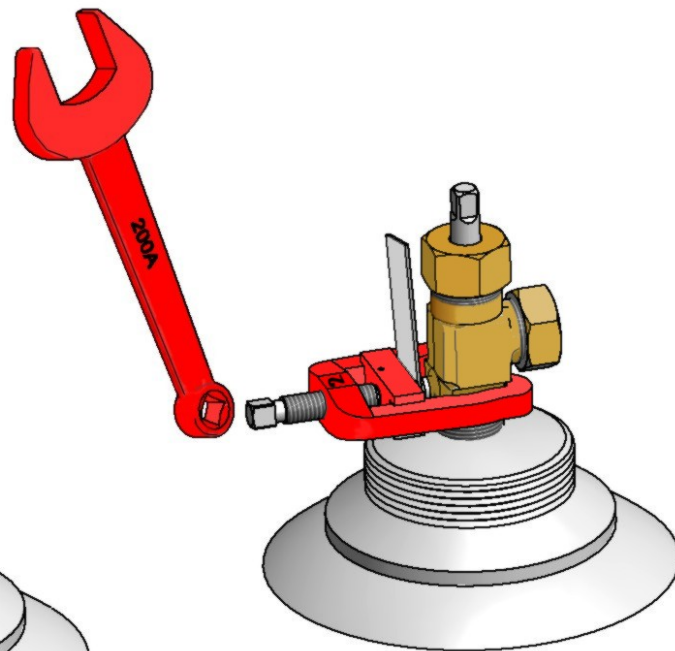


Figure 3.8

3.7 LEAK: FUSIBLE PLUG THREADS

ACTION:

1. Apply DEVICE 1 (Hood Assembly) (See Section 4 or 5 for instructions);

- or -

Saw off fusible plug flush with valve body, file the surface smooth and apply DEVICE 2 (Clamp Assembly, Figure 3.8) (See Section 4 or 5 for instructions).

2. Test for leaks.

NOTE

Kit "A" contains WRENCH 203 that can be used to tighten the fusible plug back into the valve to address this type of leak (Figure 3.7). **Extreme caution** should be used when attempting this to avoid making the leak worse by dislodging the fusible plug. Only trained and knowledgeable personnel should ever attempt this procedure. Otherwise, use DEVICE 1 or 2.

3.8 LEAK: FUSIBLE METAL OF PLUG OR POURED FUSIBLE PLUG (FIGURE 3.8)

ACTION:

1. Apply DEVICE 2 (Clamp Assembly) (See Section 4 or 5 for instructions).
2. Test for leaks.

NOTE

The abovementioned leaks can also be corrected by applying DEVICE 1 (Hood Assembly) (See Section 4 or 5 for instructions).



Figure 3.9

3.9 LEAK: SIDE WALL OF CYLINDER (FIGURE 3.9)

ACTION: Apply DEVICE 8 (Patch Assembly) (See Section 4 or 5 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 4 or 5).

4. EMERGENCY KIT "A" MANUFACTURED AFTER 1/1/2013

4.1 HOOD ASSEMBLY FOR VALVE – DEVICE 1

STEPS – See Figure 4.1	Equipment
<p>1. Position cylinder so that the valve is in the uppermost position. Remove valve protective housing if in place.</p> <p>- If unable to remove valve protective housing, the HOOD (1A3) should fit over it.</p> <p>2. Remove outlet cap from VENT VALVE (1V) on HOOD (1A3) and open VALVE.</p> <p>3. Prepare BASE ASSEMBLY (1EFP1) with CHAINS (1F1) set in outer most position.</p> <p>4. Roll upright cylinder and center in position on BASE ASSEMBLY (1EFP1).</p> <p>5. Clean shoulder of cylinder: Use SCRAPER (A-8) if paint is loose or uneven.</p> <p>6. Inspect condition of GASKET (1BRV). Place GASKET (1BRV) on HOOD (1A3). Center HOOD (1A3) with GASKET (1BRV) over leaking valve.</p> <p>7. Attach chains from base (1EFP1) to corresponding hooks on HOOD (1A3). Hooks should be in lowest position by turning CAP SCREWS (1K2). Ensure that CHAINS (1F1) are straight and not twisted. Attach CHAINS (1F1) to hook with appropriate link to avoid slack in chains. Base of CHAINS (1F1) should be flush with bottom of cylinder.</p> <p>8. Hand tighten CAP SCREWS (1K2). Tighten CAP SCREWS (1K2) equally, forcing the HOOD (1A3) and GASKET (1BRV) against the shoulder of cylinder.</p> <p>CAUTION: Tighten only enough to stop the leak. Overtightening may damage gasket. Wait a short amount of time (allowing cylinder to come back ambient temperature/pressure) to ensure the leak has stopped and the cap screws do not need additional tightening.</p> <p>If leak persists, tighten CAP SCREW (1K2) further in area of leak.</p> <p>CAUTION: Check the foot-ring on base of cylinder for possible deterioration under extreme pressure conditions. Ensure that CHAINS (1F1) are against side of cylinder at base.</p> <p>9. Close VENT VALVE (1V) on HOOD (1A3).</p> <p>10. Test for leaks around GASKET (1BRV). Tighten CAP SCREW(s) (1K2) if necessary.</p>	<p>WRENCH 200A</p> <p>BASE ASSY. 1EFP1</p> <p>SCRAPER A-8</p> <p>HOOD 1A3 GASKET 1BRV</p> <p>HOOD 1A3 inc. CAP SCREWS (3) 1K2, CHAINS (3), BASE ASSY 1EFP1</p> <p>WRENCH 201</p> <p>WRENCH 200A</p> <p>WRENCH 201</p>
<p>DEVICE 1 INCLUDES: HOOD 1A3 including (3) CAP SCREW SCREWS – 1K2 GASKET – 1BRV BASE ASSEMBLY – 1EFP1</p>	<p>WEAR PERSONAL PROTECTION</p>

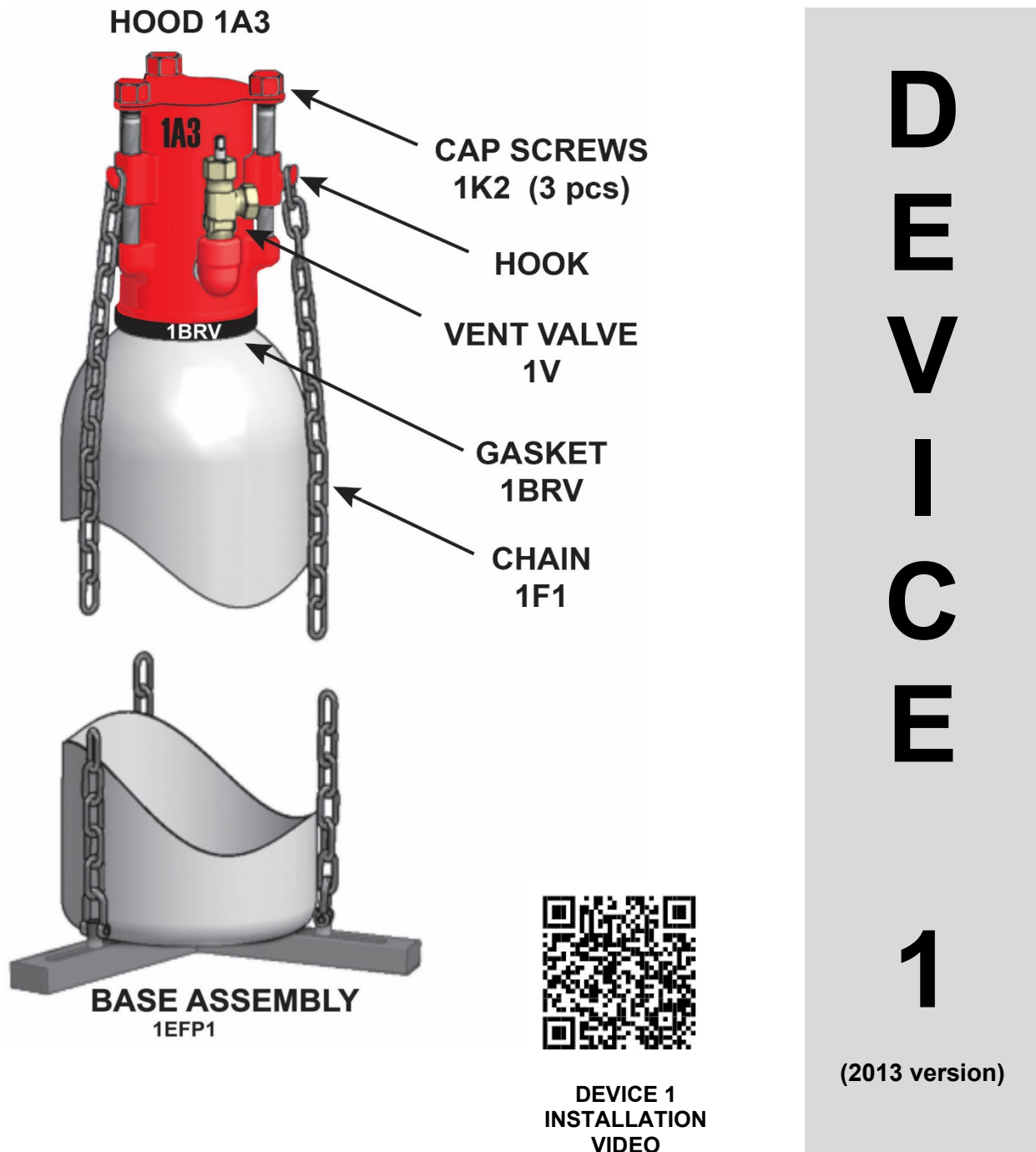
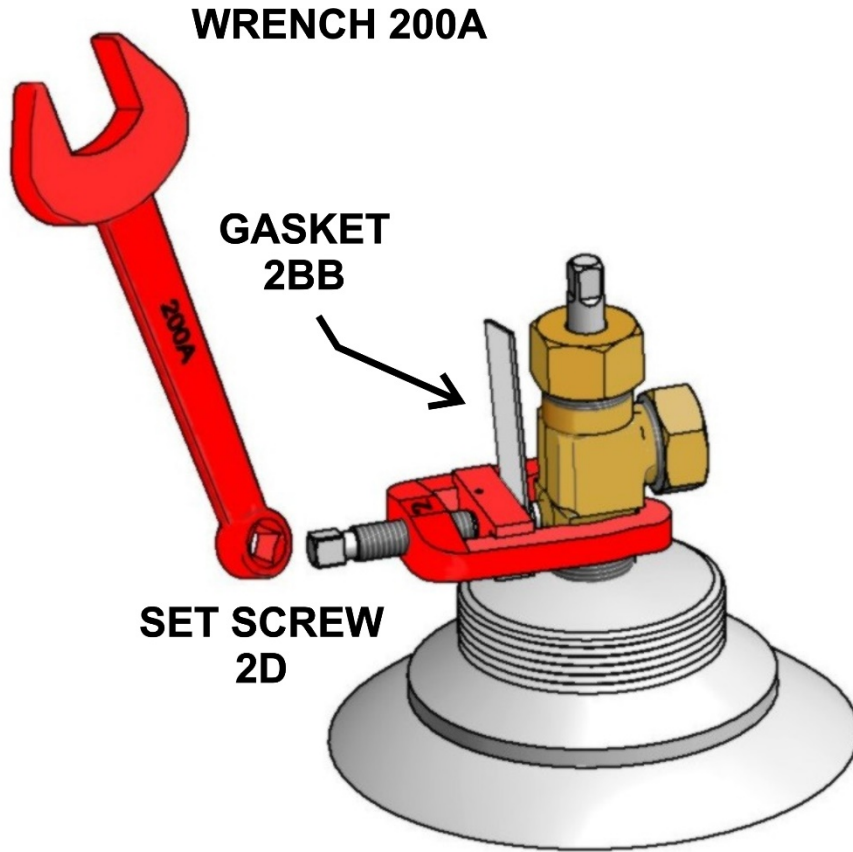


Figure 4.1

4.2 CLAMP FOR FUSIBLE PLUG – DEVICE 2

STEPS - See Figure 4.2	Equipment
<p>1. Position cylinder so that the valve is in the uppermost position. Remove valve protective housing if in place.</p> <p>NOTE: <i>If face of fusible plug is badly pitted or corroded, or if the leak is at the threads of the fusible plug, saw off fusible plug flush with valve body, filing the surface smooth.</i></p> <p>2. Loosen SET SCREW (2D) and place CLAMP (2C) over leaking valve.</p> <p>NOTE: <i>It is not necessary to remove valve outlet cap.</i></p> <p>3. Place GASKET (2BB) between leaking fusible plug and BLOCK (2A).</p> <p>4. Tighten SET SCREW (2D) until leak stops.</p> <p>CAUTION: <i>Tighten only enough to stop the leak. Overtightening may damage gasket. Wait a short amount of time (allowing cylinder to come back ambient temperature/pressure) to ensure the leak has stopped and the cap screws do not need additional tightening.</i></p> <p>5. Test for leaks. Tighten SET SCREW (2D) further if necessary.</p> <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> <p>NOTE: <i>The abovementioned leaks can also be corrected by applying DEVICE 1 (HOOD ASSEMBLY) (See Section 4.1 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>DEVICE 2 INCLUDES: BLOCK - 2A CLAMP - 2C SCREW - 2D GASKET - 2BB</p>	<p>WEAR PERSONAL PROTECTION</p>



DEVICE 2
INSTALLATION
VIDEO

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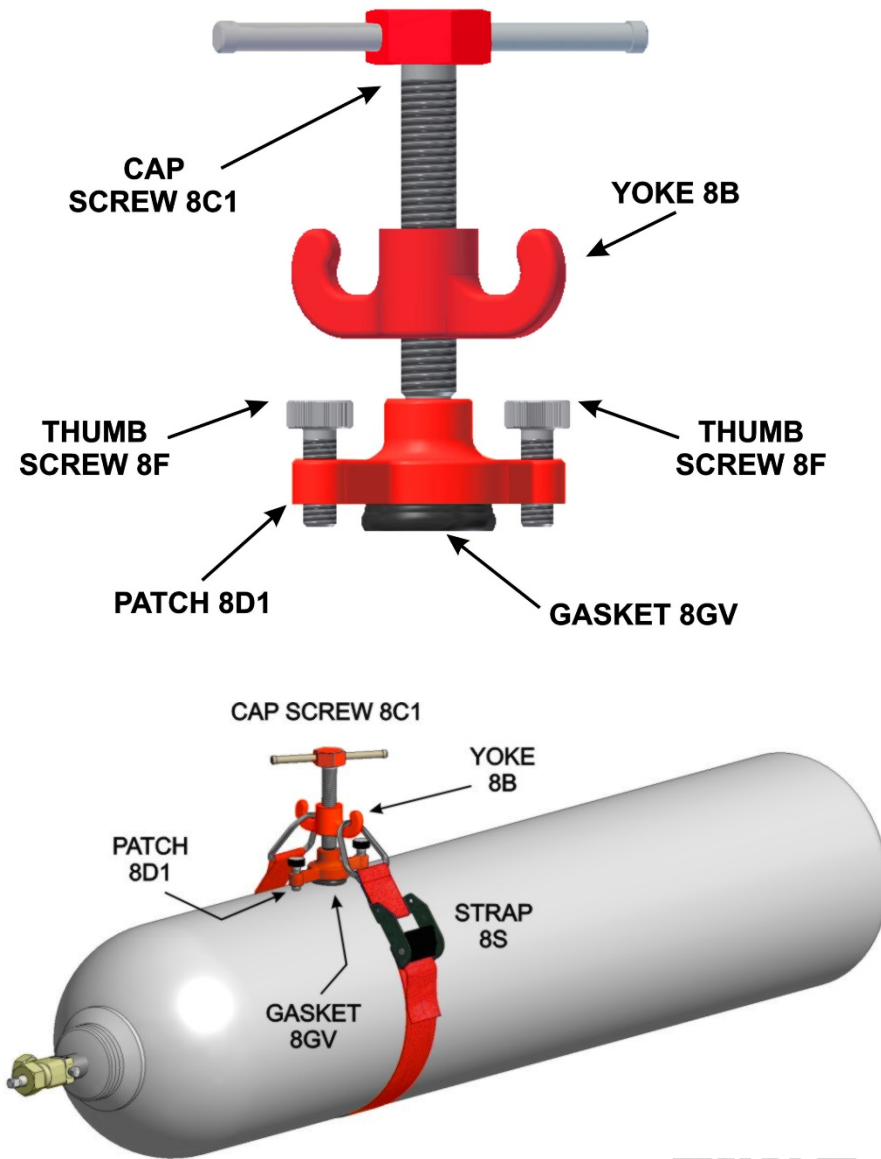
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(2013 version)

Figure 4.2

4.3 PATCH FOR SIDE LEAKS – DEVICE 8

STEPS - See Figure 4.3	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 (8C1) in YOKE (8B) until point of screw extends slightly below YOKE (8B). 3. Slip one end of STRAP (8S) under cylinder and pull it through until it reaches the approximate area of leak. Note: inspect strap after each use for wear and replace as necessary. 4. Place BUTTON GASKET (8GV) inside of PATCH (8D1). Ensure THUMB SCREWS (8F) are fully retracted into PATCH (8D1). Center CAP SCREW (8C1) in YOKE (8B) and then into PATCH (8D1) depression. 5. Hook free ends of STRAP (8S) to ears on each side of YOKE (8B). 6. Use SCRAPER (A-8) if paint is loose or uneven. Slide PATCH (8D1) with GASKET (8GV) and STRAP (8S) over leak. 7. Hand tighten CAP SCREW (8C1) until leak stops. Tighten THUMB SCREWS (8F) until touching cylinder – do not over tighten. <p>CAUTION: Tighten only enough to stop the leak. Overtightening may damage gasket. Wait a short amount of time (allowing cylinder to come back ambient temperature/pressure) to ensure the leak has stopped and the cap screws do not need additional tightening.</p> <p>CAUTION: If there is any evidence of weakening of the cylinder wall, immediately discontinue tightening CAP SCREW (8C1).</p> <ol style="list-style-type: none"> 8. Test for leaks. Tighten CAP SCREW (8C1) further, if necessary. <p>NOTE: THUMB SCREWS (8F) can be adjusted independently to apply pressure on the opposite sides of gasket to stop leak.</p>	<p>YOKE 8B & CAP SCREW 8C1</p> <p>STRAP 8S</p> <p>CAP SCREW 8C1, BUTTON GASKET 8GV & PATCH 8D1</p> <p>PATCH 8D1, STRAP 8S & SCRAPER A-8</p>
<p>DEVICE 8 INCLUDES: YOKE - 8B CAP SCREW - 8C1 PATCH - 8D1 THUMB SCREWS - 8F GASKET – 8GV STRAP – 8S</p>	<p>WEAR PERSONAL PROTECTION</p>



DEVICE 8
INSTALLATION
VIDEO

D E V I C E 8

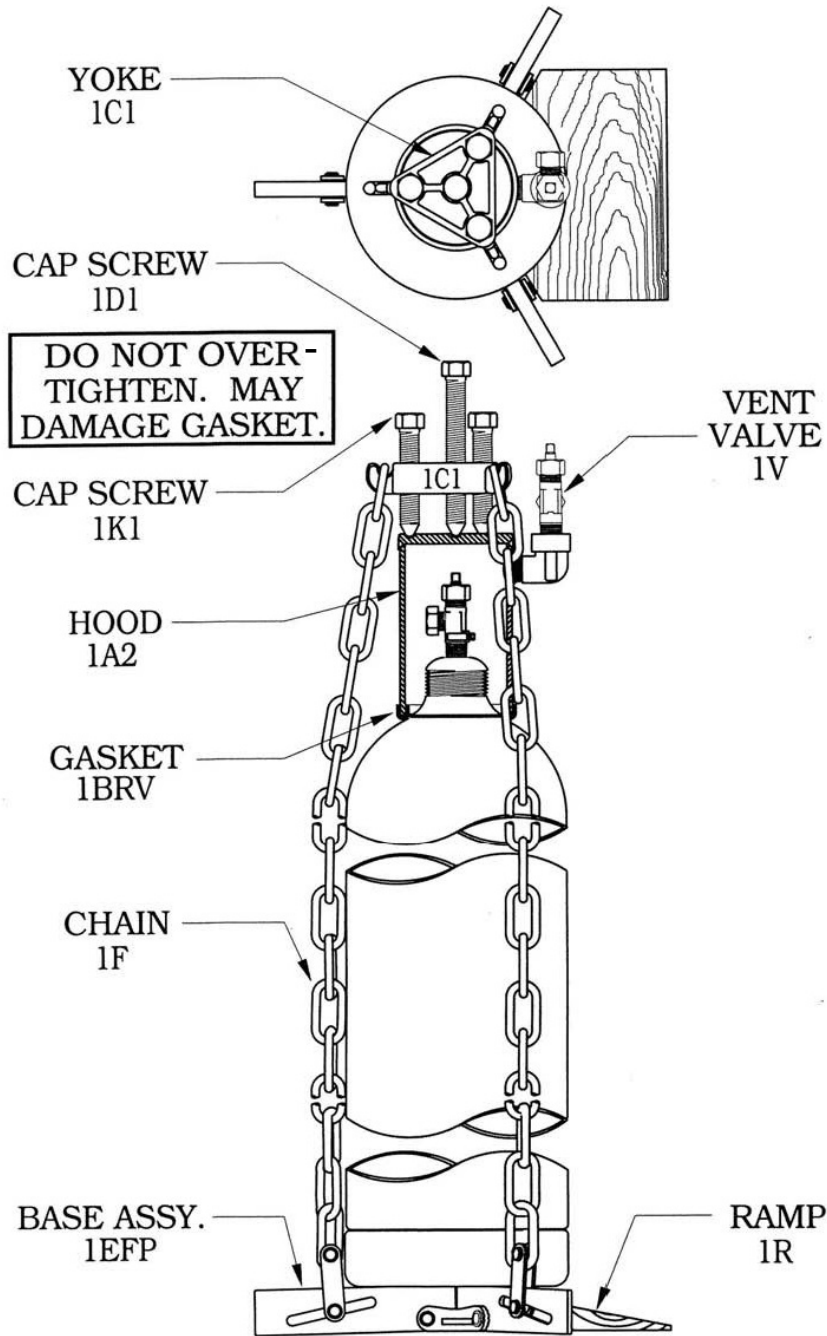
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Figure 4.3

5. EMERGENCY KIT "A" MANUFACTURED BEFORE 12/31/2012

5.1 HOOD ASSEMBLY FOR VALVE – DEVICE 1

STEPS - See Figure 5.1	Equipment
<p>1. Remove valve protective housing if in place. Position cylinder so that the valve is in the uppermost position.</p> <p style="padding-left: 40px;">- If unable to remove valve protective housing, the HOOD (1A2) should fit over it.</p> <p>2. Remove outlet cap from VENT VALVE (1V) on HOOD (1A2) and open VALVE.</p> <p>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.</p> <p>4. Roll upright cylinder up RAMP (1R) and center in position on BASE ASSEMBLY (1EFP).</p> <p>5. Clean shoulder of cylinder: Use SCRAPER (A-8) if paint is loose or uneven.</p> <p>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.</p> <p>7. Adjust CAP SCREWS (1D1) and (1K1) in YOKE (1C1) so that the points of the screws extend only slightly below YOKE (1C1).</p> <p>8. Place YOKE (1C1) in position on top of HOOD (1A2), with screw positioned in the dimples on top of HOOD (1A2). Ensure 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).</p> <p>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. Keep CAP SCREW (1D1) hand tightened against center of HOOD (1A2). If leak persists, tighten CAP SCREW (1K1) further in area of leak.</p> <p>CAUTION: Check the foot-ring on base of cylinder for possible deterioration under extreme pressure conditions. Ensure that CHAINS (1F) are against side of cylinder at base.</p> <p>CAUTION: Tighten only enough to stop the leak. Overtightening may damage gasket. Wait a short amount of time (allowing cylinder to come back ambient temperature/pressure) to ensure the leak has stopped and the cap screws do not need additional tightening.</p> <p>10. Close VENT VALVE (1V) on HOOD (1A2).</p> <p>11. Test for leaks around GASKET (1BRV). Tighten CAP SCREW(s) (1K1) if necessary.</p>	<p>WRENCH 200A</p> <p>BASE ASSY. 1EFP RAMP 1R</p> <p>SCRAPER A-8</p> <p>HOOD 1A2 & GASKET 1BRV</p> <p>CAP SCREWS (1)1D1, (3)1K1, YOKE 1C1</p> <p>CHAINS IF WRENCH 201, (WITH 1EFP ASSY) HOOD 1A2 YOKE 1C1</p> <p>WRENCH 201</p> <p>WRENCH NCH 200A</p> <p>WRENCH 201</p>
<p>DEVICE 1 INCLUDES: HOOD 1A2 & GASKET 1BRV YOKE ASSEMBLY 1C1 with BOLTS 1K1 (3) & 1D1 (1) CHAIN AND BASE ASSEMBLY 1 EFP & RAMP 1R</p>	<p>WEAR PERSONAL PROTECTION</p>



D E V I C E 1

(pre-2013 version)

Figure 5.1

5.2 CLAMP FOR FUSIBLE PLUG – DEVICE 2

STEPS - See Figure 5.2	Equipment
<p>NOTE: Remove valve protective housing if in place. Position cylinder so that the valve is in the uppermost position.</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: It is not necessary to remove valve outlet cap.</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: 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.</p> <ol style="list-style-type: none"> 2. Loosen SET SCREW (2D) and place CLAMP (2C) over leaking valve. <p>NOTE: It is not necessary to remove valve outlet cap.</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: The abovementioned leaks can also be corrected by applying DEVICE 1 (HOOD ASSEMBLY) (See Section 5.1 for instructions).</p>	<p>HACKSAW A-2 FILE A-14</p> <p>WRENCH 200A & CLAMP 2C</p> <p>GASKET 2BB WRENCH 200A WRENCH 200A</p> <p>HACKSAW A-2 FILE A-14</p> <p>WRENCH 200A & CLAMP 2C</p> <p>GASKET 2BB WRENCH 200A WRENCH 200A</p>
<p>DEVICE 2 INCLUDES: BLOCK - 2A CLAMP - 2C SCREW - 2D GASKET - 2BB</p>	<p>WEAR PERSONAL PROTECTION</p>

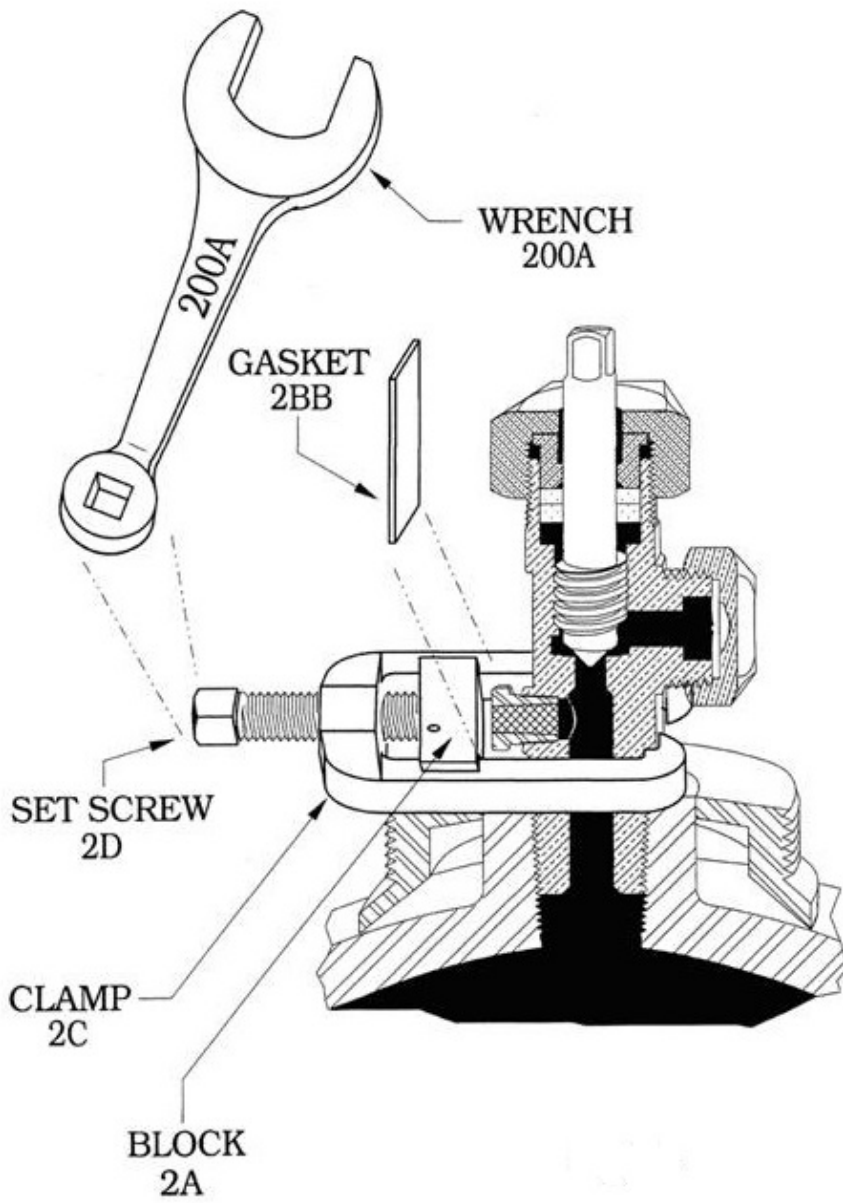


Figure 5.2

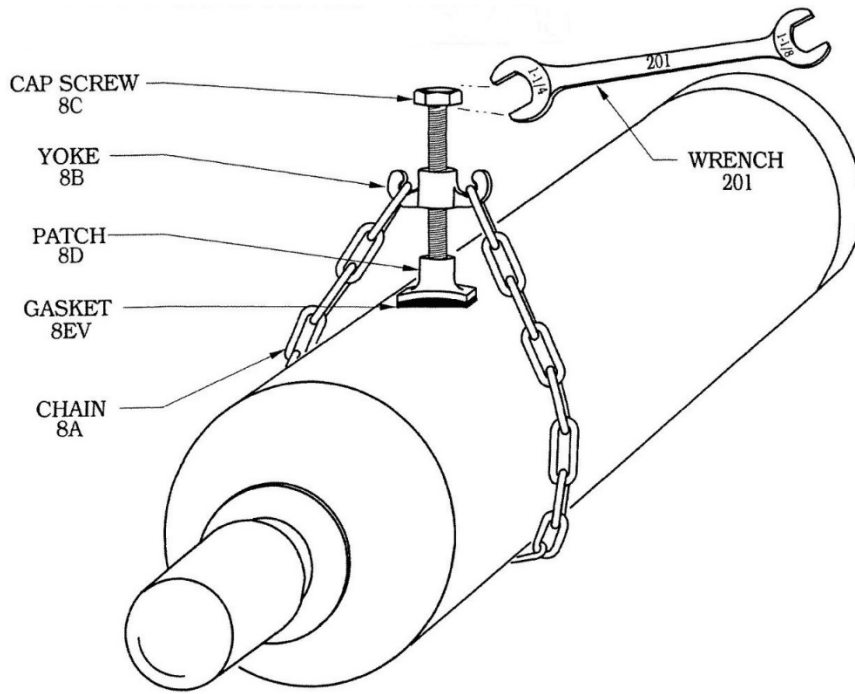
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(pre-2013 version)

5.3 PATCH FOR SIDE LEAKS – DEVICE 8

STEPS - See Figure 5.3	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. NOTE: Ensure CHAIN (8A) is straight and not twisted. 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. 6. Use SCRAPER (A-8) if paint is loose or uneven. Place GASKET (8EV) and PATCH (8D) over leak. NOTE: Two GASKETS (8EV) may be required on slender cylinders (about 8 inches in diameter). 7. Tighten CAP SCREW (8C). CAUTION: Use extreme caution if leak is due to internal corrosion. CAUTION: If there is any evidence of weakening of the cylinder wall, immediately discontinue tightening CAP SCREW (8C). 8. Test for leaks. Tighten CAP SCREW (8C) further, if necessary. 	<p>YOKE 8B & CAP SCREW 8C</p> <p>CHAIN 8A</p> <p>YOKE 8B CAP SCREW 8C & PATCH 8D</p> <p>GASKET 8EV PATCH 8D & SCRAPER A-8</p> <p>WRENCH 201</p>
<p>DEVICE 8 INCLUDES: CHAIN - 8A YOKE - 8B CAP SCREW - 8C PATCH - 8D GASKET - 8EV</p>	<p>WEAR PERSONAL PROTECTION</p>



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(pre-2013 version)

Figure 5.3

6. HANDLING OF CHLORINE REMAINING IN CYLINDER

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

If the leaking cylinder is located at a consuming plant, the cylinder can be connected to the consuming process to eliminate the remaining chlorine prior to disposition of the damaged cylinder. The leaking cylinder may also be connected to vent lines for disposal into the scrubbing system. VALVE YOKE (A-9) AND VALVE ADAPTER (A-10) are included in this kit for use in these processes. These procedures should be attempted by experienced personnel only.

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

If the supplier is unknown, see Section 2.5 for instructions to contact CHLOREP for immediate assistance.

If the cylinder requires transport to another facility for disposal, it is important to be familiar with applicable transportation regulations. If the cylinder is safe for transport, it may be transported in the U.S. with Kit “A” devices applied (see 49 CFR §173.3(e)(1)). However, in Canada, transport requires an approved Temporary Certificate from Transport Canada (9.2).

7. KIT MAINTENANCE

NOTE

All parts of the CI Emergency Kit “A” should be maintained in a ready-to-use condition.

7.1 AFTER USE

Inspect all parts for damage, wear and corrosion. Wash all parts used with approximately 5% solution of caustic soda or soda ash to neutralize any residual chlorine. After washing, rinse parts with water until they are free of cleaning solution. Dry all parts once free of cleaning solution.

Lubricate moveable parts with a lubricant that is non-reactive to chlorine. Refer to CI Pamphlet 164 for information on lubricant materials that are compatible with chlorine (9.1).

Replace all gaskets used. Inspect side patch strap after use for wear and replace as necessary.

7.2 ROUTINE

The kit should be frequently inspected by the person responsible for the equipment and checked with the contents list to ensure 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.

7.3 SPARE PARTS

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

8. KIT LIMITATIONS

8.1 CYLINDER DESIGN

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.

8.2 OTHER COMPRESSED GASES

The CI Emergency Kit "A" is designed for use on chlorine cylinders. Contact the kit manufacturer before considering applying on other compressed gas cylinders.

CAUTION

Using Emergency Kit "A" for other compressed gas cylinders can result in a worsening incident due to incompatibility of materials provided in the kit.

Different gasket materials may be required for other compressed gases. When used with compressed gases other than chlorine, the Viton® gasket included with this kit may result in rapid deterioration and continued release.

9. REFERENCES

9.1 INSTITUTE PUBLICATIONS

The following publications are specifically referenced in the CHLOREP Handbook. The latest editions of CI publications may be obtained at www.chlorineinstitute.org.

<u>Pamphlet #</u>	<u>Title</u>
1	<i>Chlorine Basics</i> (Formerly <i>The Chlorine Manual</i>), ed. 8; Pamphlet 1; The Chlorine Institute: Arlington, VA, 2014 .
17	<i>Packaging Plant Safety and Operational Guidelines</i> , ed. 5; Pamphlet 17; The Chlorine Institute: Arlington, VA, 2017 .
65	<i>Personal Protective Equipment for Chlor-Alkali Chemicals</i> , ed. 6; Pamphlet 65; The Chlorine Institute: Arlington, VA, 2015 .
155	<i>Water and Wastewater Operators Chlorine Handbook</i> , ed. 3; Pamphlet 155; The Chlorine Institute: Arlington, VA, 2014 .
164	<i>Reactivity and Compatibility of Chlorine and Sodium Hydroxide with Various Materials</i> , ed. 3; Pamphlet 164; The Chlorine Institute: Arlington, VA, 2017 .

9.2 REGULATIONS

- 9.2.1 *Code of Federal Regulations*. Title 49. Chapter 1. Parts 190-192 & 195. Office of the Federal Register National Archives and Records Administration. U.S. Government Printing Office: Washington, DC, (revised annually).
- 9.2.2 *Canadian Transportation of Dangerous Goods Act and Regulations*; Transport Canada: Ottawa, Ontario, 2009. Website: <http://www.tc.gc.ca/tdg>.

APPENDICES

Appendix A: Parts List

Appendix B: Optional Equipment

Appendix C: Emergency Contacts

APPENDIX A: PARTS LIST

**Chlorine Institute Emergency Kit "A"
Kits Manufactured After 1/1/2013**

Part Number	Description	Quantity Per Kit
1A3	Hood Assembly (with Vent Valve 1V)	1
1BRV	Gasket, Molded Viton®	2
1K2	Cap Screw	3
1EFP1	Chain and Base Assembly	1
2	Clamping Device (with Block 2A, Yoke 2C, Set Screw 2D)	1
2B	Gasket, $\frac{15}{16}$ " diameter x $\frac{1}{16}$ " thick	5
2BB	Gasket, 1" x 3" x $\frac{1}{16}$ " thick	5
8B	Yoke	1
8C1	Cap Screw	1
8D1	Side Patch (with 8F thumb screws)	1
8GV	Gasket, Viton® 1 $\frac{7}{16}$ " diameter $\frac{3}{4}$ " thick	2
8S	Strap and Buckle Assembly	1
200A	Wrench, $\frac{3}{8}$ " sq. box, 1 $\frac{1}{4}$ " open end x 7 $\frac{1}{4}$ " long	1
201	Wrench, straight open end, 1 $\frac{1}{4}$ " x 1 $\frac{1}{8}$ " x 12 $\frac{3}{8}$ " long	1
203	Wrench, combination, $\frac{7}{16}$ " 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, $\frac{9}{64}$ " x $\frac{1}{2}$ " x 6" long	2
A-4	Drift Pin, $\frac{7}{8}$ " x 1 $\frac{1}{4}$ " x 8" long	2
A-5	Ring, vent valve packing, $\frac{7}{8}$ " OD x $\frac{15}{32}$ " ID x $\frac{1}{4}$ " thick	5
A-6	Kit Box Seal	15
A-7	Gasket Sack	1
A-8	Paint Scraper, 1 $\frac{1}{4}$ " blade	1
A-9	Valve Yoke	1
A-10	Valve Yoke Adapter (820 - Hose)	1
A-12	Washer, valve outlet, $\frac{9}{16}$ " ID x $\frac{15}{16}$ " OD x $\frac{1}{16}$ " thick	5
A-13	Plastic Gasket Box	1
A-14	File	1
144	Tool Roll	1
151A	Kit Box, 34" L x 16 $\frac{1}{4}$ " W x 16 $\frac{1}{2}$ " H	1
	Instruction Booklet	2
	CI Pamphlet 1, <i>Chlorine Basics</i>	1

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CHLORINE INSTITUTE EMERGENCY KIT "A"
Kits Manufactured after 1/1/2013

Figure A-1

Chlorine Institute Emergency Kit "A" Kits Manufactured Before 12/31/2012

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, $1\frac{5}{16}$ " dia x $\frac{1}{16}$ " thick	5
2BB	Gasket, 1" x 3" x $\frac{1}{16}$ " thick	5
8A	Side Chain	1
8B	Yoke	1
8C	Cap Screw	1
8D	Side Patch	1
8EV	Gasket, Viton® 2 $\frac{1}{2}$ " square x $\frac{1}{8}$ " thick	2
200A	Wrench, $\frac{3}{8}$ " sq. box, 1 $\frac{1}{4}$ " open end x 7 $\frac{1}{4}$ " long	1
201	Wrench, straight open end, 1- $\frac{1}{4}$ " x 1- $\frac{1}{8}$ " x 12- $\frac{3}{8}$ " long	1
203	Wrench, combination, $\frac{7}{16}$ " 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, $\frac{9}{64}$ " x $\frac{1}{2}$ " x 6" long	2
A-4	Drift Pin, $\frac{7}{8}$ " x 1 $\frac{1}{4}$ " x 8" long	2
A-5	Ring, vent valve packing, $\frac{7}{8}$ " OD x $\frac{15}{32}$ " ID x $\frac{1}{4}$ " thick	5
A-6	Kit Box Seal	15
A-7	Gasket Sack	1
A-8	Paint Scraper, 1 $\frac{1}{4}$ " blade	1
A-9	Valve Yoke	1
A-10	Valve Yoke Adapter (820 - Hose)	1
A-12	Washer, valve outlet, $\frac{9}{16}$ " ID x $\frac{15}{16}$ " OD x $\frac{1}{16}$ " thick	5
A-13	Plastic Gasket Box	1
A-14	File	1
144	Tool Roll	1
151A	Kit Box, 34" L x 16 $\frac{1}{4}$ " W x 16 $\frac{1}{2}$ " H	1
	Instruction Booklet	2
	CI Pamphlet 1, <i>Chlorine Basics</i>	1

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CHLORINE INSTITUTE EMERGENCY KIT "A"
Kits Manufactured before 12/31/2012

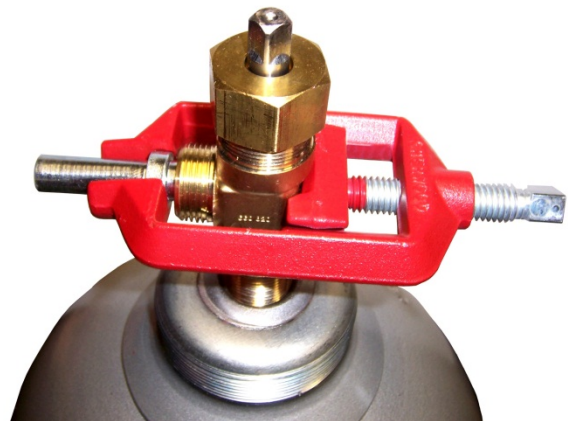
Figure A-2

APPENDIX B: OPTIONAL EQUIPMENT

If the optional equipment shown here is used, consult the kit manufacturer for instruction details.

Device Part #400A

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.

APPENDIX C: 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



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