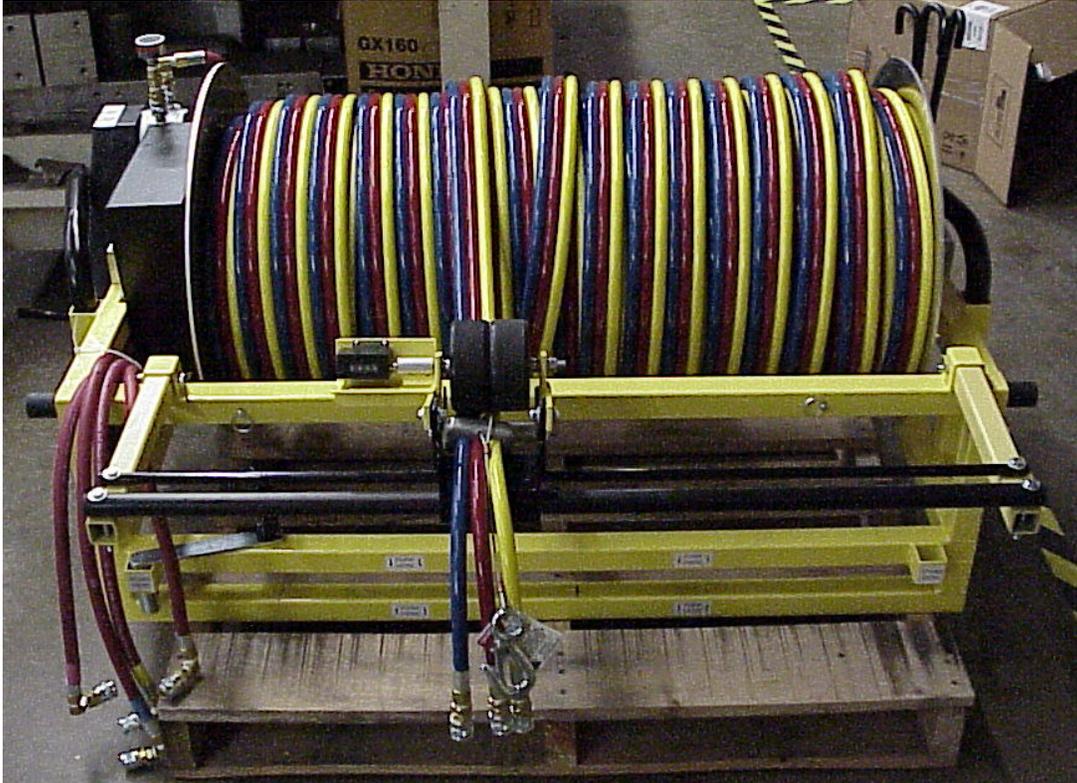


Air-Loc Reel usage instructions

Part Number 253-308



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LIMITED WARRANTY

Manufacturer warrants all products manufactured by it will be free from defects in material and workmanship for one (1) year following the date of manufacture. If any of the goods are found to be defective, such goods will, at manufacturer's option be replaced or repaired at manufacturer's cost. The parties hereto expressly agree that buyer's sole and exclusive remedy against the manufacturer shall be for repair or replacement of defective goods as provided herein. (The sole purpose of the stipulated exclusive remedy shall be to provide the buyer with free repair and replacement of defective goods in the manner provided herein. The exclusive remedy shall not be deemed to have failed of its essential purpose so long as the manufacturer is willing and able to repair or replace defective goods in the prescribed manner.) Goods which may be sold by manufacturer but are not manufactured by it are not warranted by manufacturer, but are sold only with the warranties, if any, of the original manufacturers thereof. (This warranty does not cover labor or other costs or expenses to remove or install any defective, repaired or replaced goods.) Manufacturer's warranty does not apply to any goods which have been subjected to misuse, mishandling, misapplication, neglect (including but not limited to use of unauthorized parts or attachments), or adjustment or repair performed by anyone other than manufacturer or one of manufacturer's authorized agents.

Any claim by buyer with reference to the goods sold hereunder shall be deemed waived by the buyer unless submitted in writing to manufacturer within the earlier of (1) thirty days (30) days following the date buyer discovered or by reasonable inspection should have discovered, any claimed breach of the foregoing warranty, or (2) thirteen (13) months following the date of manufacture. Any cause of action for breach of the foregoing warranty shall be brought within one year from the date the alleged breach was discovered or should have been discovered, whichever comes first.

LIMITATION OF LIABILITY. Manufacturer's liability (whether under the theories of breach of contract or warranty, negligence, or strict liability) for its goods shall be limited to repairing or replacing parts found by the manufacturer to be defective, or at manufacturer's option, to refunding the purchase price of such goods or parts thereof.

DISCLAIMER OF CONSEQUENTIAL DAMAGES. In no event shall manufacturer be liable for consequential damages arising out of or in connection with this agreement, including without limitation breach of any obligation imposed on manufacturer hereunder or in connection herewith. Consequential damages for purposes hereof shall include, without limitation (including death) to any person, or loss of or damage to property (including without limitation property handled or processed by the use of goods). Buyer shall indemnify manufacturer against all liability, cost or expense which may be sustained by manufacturer on account of any such loss, damage or injury.

DEFECTIVE PRODUCTS POLICY. To obtain performance under this warranty, any product suspected of having a manufacturing defect in materials or workmanship at manufacturers request must be returned to CHERNE INDUSTRIES INCORPORATED, freight prepaid, for inspection. A returned goods authorization must be obtained before shipping any product back to CHERNE. Call 1-800-843-7584 and ask for customer service.

CUSTOMER TRANSPORTATION REIMBURSEMENT. Whenever CHERNE repairs or replaces a product at CHERNE'S expense CHERNE will reimburse the distributor by credit memo, the surface freight amount it cost CHERNE to return the warranty items.

The foregoing warranty is in lieu of all other warranties express or implied, including those of merchantability or fitness for any purpose not expressly set forth herein. No affirmation of manufacturer, by words or action, other than as set forth in this language shall constitute a warranty.

SAFETY

1. Prior to using your Air-Loc testing equipment, the **SAFETY INSTRUCTION AND DATA BOOKLET** should be read. Additional copies can be obtained from Cherne Industries Incorporated by requesting form 103-586.
2. Always make sure that all valves and regulator control knobs on the Air-Loc control panel are in their OFF position, or turned fully counterclockwise before opening.
3. During testing, **do not** allow anyone in or near the danger zones (sewer line, manhole) until the test area has been vacated and the plugs are completely deflated.
4. **Do not** operate at an air inlet pressure greater than 120 PSIG (8.2 Bar).
5. **Do not** deflate the plugs before the test area has been completely exhausted. Air pressure within the test area may cause the balls to blow out of the sewer causing damage, **serious bodily injury or death.**
6. **Never** inflate a plug outside of pipe or inside of an unsupported (above ground) pipe; the pipe may burst, resulting in **serious bodily injury or death.**
7. Disconnect the air supply hose to the Air-Loc control panel and relieve all test pressure before servicing.
8. Do not over inflate the plugs. Refer to the **SAFETY INSTRUCTION AND DATA BOOKLET** for the proper inflation and air test pressure times.

MANHOLE SAFETY PROCEDURE

RECOMMENDED SAFETY PROCEDURE FOR ENTRANCE INTO MANHOLES OR CONFINED SPACES

WARNING: THESE RECOMMENDATIONS ARE TO BE USED AS A GENERAL GUIDELINE ONLY: ALTHOUGH CHERNE RECOMMENDS THESE FOLLOWING GUIDELINES, IT DOES NOT WARRANT, REPRESENT OR ASSUME ANY RESPONSIBILITY THAT THESE RECOMMENDATIONS WILL FULFILL ALL APPLICABLE FEDERAL, STATE OR LOCAL REQUIREMENTS. CHERNE ASSUMES NO LIABILITY FOR EITHER PERSONAL INJURY OR CONSEQUENTIAL DAMAGES THAT RESULT FROM THE RELIANCE ON THESE RECOMMENDATIONS.

WARNING: IT IS THE PRODUCT USER'S RESPONSIBILITY TO READ AND COMPLY WITH ALL APPLICABLE REGULATIONS. REFER TO THE *CODE OF FEDERAL REGULATIONS, "CFR" PART 1926* AND ALL OTHER PERTINENT FEDERAL, STATE, AND LOCAL REGULATIONS.

ALWAYS OUTFIT YOURSELF WITH THE NECESSARY SAFETY EQUIPMENT FOR ENTRANCE INTO A MANHOLE OR CONFINED SPACE. THIS MAY INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING ITEMS (REFER TO WARNING STATED IMMEDIATELY ABOVE):

Recommended equipment is as follows:

- | | |
|--|--|
| A. Safety Hat | G. Ear Protection |
| B. Safety Glasses | H. Hazardous Gas Detector and Oxygen Monitor |
| C. Respirator or self-contained Air Source | I. Manhole or Confined Space Ventilation |
| D. Safety Harness, Ropes, and Winch System | J. Protective Clothing |
| E. Safety Shoes or Boots | K. Safety Ladders |
| F. Protective Gloves | L. Any Other Recommended or Required Equipment |

ALWAYS ENSURE THAT ALL EQUIPMENT MEETS OR EXCEEDS THE MINIMUM REQUIREMENTS OF ALL APPLICABLE REGULATORY GUIDELINES. ALL EQUIPMENT SHOULD BE PROPERLY MAINTAINED, STORED, CALIBRATED IF NECESSARY, AND INSPECTED PRIOR TO EACH USE, IN COMPLIANCE WITH APPLICABLE REGULATIONS AND EQUIPMENT MANUFACTURER RECOMMENDATIONS.

ALWAYS PROPERLY VENTILATE MANHOLE OR CONFINED SPACE BEFORE ENTERING AND MAINTAIN VENTILATION WHILE IN MANHOLE OR CONFINED SPACE.

ALWAYS THOROUGHLY CHECK AT ALL LEVELS FOR HAZARDOUS GASES AND PROPER OXYGEN LEVELS (20% MINIMUM). CONTINUOUSLY MONITOR THESE LEVELS WHEN WORKERS ARE IN THE MANHOLE.

NEVER ENTER A MANHOLE OR CONFINED SPACE WITHOUT CO-WORKER ASSISTANCE. CO-WORKERS MUST BE PROPERLY TRAINED IN SAFETY REQUIREMENTS FOR ACCESS TO MANHOLES OR CONFINED SPACES.

IF YOU ENCOUNTER OR OBSERVE ANY CONDITIONS THAT ARE NOT EXPLAINED HERE OR NOT FULLY UNDERSTOOD BY YOU, NOTIFY YOUR SUPERVISOR OR SAFETY DIRECTOR BEFORE PROCEEDING.

!!DANGER!!

ALWAYS CONSULT WITH PROPER STATE, LOCAL, AND FEDERAL AGENCIES TO INSURE THAT ALL REQUIRED REGULATIONS ARE BEING FULFILLED.

FAILURE TO COMPLY WITH PROPER SAFETY REGULATIONS MAY RESULT IN SERIOUS BODILY INJURY OR DEATH!!

Parts list

Item	Description	Part #	qty
1	washer, 1/4 flat	000-027	28
2	washer, 3/8 flat	000-051	12
3	washer-lock, 5/16	000-140	3
4	bolt-mhh, 1/4-20 x 1.00	000-396	2
5	bolt-mhh, 5/16-18 x 1.00 lg	000-442	3
6	bolt-mhh, 3/8-16 x 1.00	000-507	12
7	nut, 3/8 lock	000-892	6
8	screw, 4-40 x 3/8 rhm	001-309	4
9	chain, #35 roller	001-686	5.83
10	connecting link	001-694	2
11	one pitch offset link	001-708	2
12	snap ring, 5/8 diameter shaft	001-848	2
13	elbow, 1/4 mpt x 3/8 poly tube	002-593	4
14	nipple, hex, 1/4 fpt	003-441	1
15	bushing, 1" od x .7/8 id	060-488	1
16	bearing	004-316	1
17	sprocket, 1/2" bore, 10T, #35	004-421	1
18	air motor with key	014-036	1
19	3/8" poly tubing	014-796	1.5
20	pin, long	025-298	1
21	screw, set, 10-32 x 1/4 cup point	033-888	2
22	nut, 1/4 lock	037-338	14
23	elbow, 45 degree street, 1/4 npt	039-098	2
24	pin, short	034-268	6
25	valve, 1/4 fpt, 3 way	028-548	2
26	screw, set, 3/8-16 x .5	046-531	2
27	nut, 7/16 lock, .328 high	059-088	3
28	counter	058-458	1
29	frame	058-628	1
30	spool end, bearing end	058-638	1
31	spool end, union end	058-648	1
32	spool spacer rod	058-658	6
33	main shaft	058-668	1
34	shaft support	058-678	2
35	air-loc panel mount	058-698	1
36	handle	058-708	4
38	wheel, machined	058-738	2
39	counter assembly mounting arm	058-748	2
40	counter assembly guide rod	058-758	1
41	Roller	058-768	1
42	arm, counter assembly wheel mounting, right	058-778	1
43	arm, counter assembly wheel mounting, left	058-788	1
44	slider, counter assembly	058-798	1
45	counter assembly support rod	058-808	1
46	arm, truck bed hold down	058-818	2
47	jack shaft	058-828	1
48	counter assembly adapter	058-838	1
49	air motor control panel	058-848	1
50	guard, inner	058-868	1
51	guard, outer	058-878	1
52	guard, plate	058-888	1

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53	wheel axle, 7/16-14 threaded rod, 6" lg	058-898	1
54	decal, air motor hook up	058-908	1
55	bolt-mhh, 1/4-20 x 1.50	059-018	2
56	sprocket, 5/8" bore, 10t, #35	058-928	1
57	sprocket, 5/8" bore, 60t, #35	058-938	1
58	flanged bearing, 5/8" bore	058-948	2
59	bushing, 9/16 od x 7/16 id	058-958	2
60	screw, 1/4-14 x .75, self drilling	058-968	12
61	bolt-mhh, 3/8-16 x 4.5	058-978	4
62	bolt-mhh, 1/4-20 x 3.00	058-988	2
63	bolt-mhh, 1/4-20 x 2.50	059-008	6
64	hose assembly, reel to panel, red	059-028	1
65	hose assembly, reel to panel, blue	059-038	1
66	hose assembly, reel to panel, yellow	059-058	1
67	hose assembly, air motor to motor control	059-068	1
68	hose assembly, motor control to a/l panel	059-078	1
69	bolt-mhh, 1/4-20 x 5	059-098	1
70	label, fork placement	059-108	4
71	label, stake placement	059-118	1
72	stake, air-loc reel	059-128	4
73	spring, 1.50oal, 3/8 od, .048 wire	059-138	2
74	nut, 4-40 lock	059-388	4
75	key, 3/16 sq x .719 lg	078-557	2
76	Bulkhead	104-132	1
77	plug, 1/4 mpt	251-607	1
78	nipple, 1/4 mpt x male QD	251-623	5
79	hose assembly, 500ft	060-498	1
80	crank, pinned	299-316	1
81	rotary union	299-510	1
82	coupling, 1/4 mpt x female QD	302-112	1
83	Washer, 3/8 lock	000-159	12
84	Bolt, 3/8-16 x 1.5	000-515	2
85	Label, danger	039-136	2
86	Label, warning, rotary union	028-894	1
87	Label, Cherne	115-363	1
88	11" tie-wrap	33851	2
89	Loctite 242	015-806	.06
90	Label, Metal, Model & Serial #	005-789	1
91	Tack, Metal, .072 Diameter x .187 lg	019-887	2
92	Label=BC, reel with counter	060-558	1
93	O&M, reel with counter	060-568	1
94	Tag, shipping, 3 x 6 with wire	081-191	1

Set up.

1. Set the Air-Loc reel either in the bed of a pick up, or on a reasonably flat, solid section of ground.
2. Anchor the Air-loc reel with either the pocket stake arms, or the ground stakes. (see figure 1)
3. Remove the pin holding the front left handle in place and extend the handle. Reinsert the pin to secure the handle. (see figure 2)
4. On the rear of the unit, remove the long pin holding the Air Motor Control Panel to the frame.
5. Mount the Air Loc Panel to the Air Motor Control Panel by removing the bottom two screws, lifting the panel slightly and sliding the Air-Loc panel into position on the Air Motor Control Panel as shown. Then re-install the bottom two screws. (see figure 3)
6. Place the Air Motor Control Panel on to the extended front left handle and reinsert the long pin to secure the panel to the handle. (see figure 4)
7. Grease the Counter Assembly Guide Rod. (see figure 6)
8. Make sure all valves are in the off position.
9. Connect the hoses to the Air-Loc Panel and Air Motor Control Panel as shown. (see figure 5)
10. Refer to Line Acceptance Testing and Leak Location Testing Instructions to conduct tests.

Using the Air-Loc Reel, reeling hose out

1. Make sure all valves (Air-Loc Panel and Air Motor Control Panel) are in the off position.
2. Make all hose connections (except triple hose coming through counter assembly). Follow instructions on reel to make sure the hoses are set up to “reel out”.
3. Turn the selector valve to “Air Motor”.
4. Turn the Air Motor Control Valve on, starting slow and increasing to a comfortable speed. Pull the hose through the counter assembly until enough hose has been reeled out to conduct the test. Turn Air Motor Control Valve back to “off”.
5. Turn the selector valve to “Panel”.
6. Refer to Line Acceptance Testing and Leak Location Testing Instructions to conduct tests.
7. Follow the instructions above to reel out more hose as needed.

Using the Air-Loc Reel, reeling hose in

1. Make sure all valves (Air-Loc Panel and Air Motor Control Panel) are in the off position.
2. Make sure the void has been depressurized and all plugs deflated.
3. Follow instructions on reel to make sure the hoses are set up to “reel in”.
4. Turn the selector valve to “Air Motor”.
5. Turn the Air Motor Control Valve on, starting slow and increasing to a comfortable speed. Move the counter assembly back and forth to guide the hose onto the reel evenly. Turn the Air Motor Control Valve to “off” before the strain relief clamp on the triple hose reaches the counter assembly. (see figure 6)

Adjusting chain tension.

1. Remove the two screws securing the inner guard. (see figure 7)
2. Remove the four screws securing the outer guard. (see figure 8)
3. Loosen the nuts and bolts securing the air motor. (see figure 9)
4. Loosen the nuts and bolts securing the jack shaft. (see figure 10)
5. Adjust the union to jack shaft chain first. There should be no more than 1/8" side to side play on the chain. Tighten the jack shaft nuts and bolts. (see figure 11)
6. Adjust the jack shaft to air motor chain second. There should be no more the 1/8" side to side play on the chain. Tighten the air motor nuts and bolts. (see figure 11)
7. Re-install both guards.

TRIPLE CHAMBER ROTARY UNION QUAD RING REPLACEMENT

1. Disconnect the 500-foot triple hose from the Air-Loc ball and unwind all the triple hose from the Air-loc reel.
2. Disconnect the triple hose from the rotary union.
3. Remove the rotary union from the Air-Loc reel.
4. Pull the core of the rotary union out of the sleeve.
5. Remove the quad rings.
6. Thoroughly clean the core and the inside of the rotary union sleeve using a clean dry cloth.
7. Grease the replacement quad rings by hand using either Dow 44 or Molycoat 44. Using other greases may deteriorate the quad rings.
8. Install each quad ring by carefully working it into its core groove. Install the first quad ring into the first groove followed by working the second quad ring over the first and into the next groove, etc.

NOTE: Do not stretch the quad ring any more than is absolutely necessary.

NOTE: Install the quad ring as it would be in its normal position. Do not roll the ring on its side or inside out.

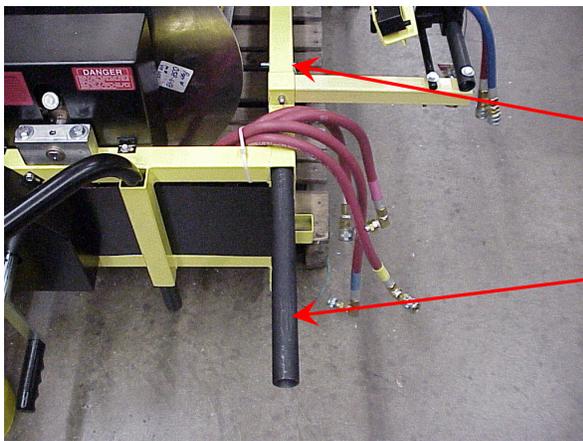
9. Insert the core of the triple chamber rotary union into the sleeve using extreme care not to damage the quad rings.
10. Reinstall the rotary union onto the drum shaft of the Air-Loc reel.
11. Refill the rotary union grease cup with Dow 44 or Molycoat 44.
12. Reconnect the 500-foot triple hose to the rotary union.



Ground Stakes

Pocket Stake arms, one per side

Figure 1



Pin

Handle

Figure 2



Remove these two screws

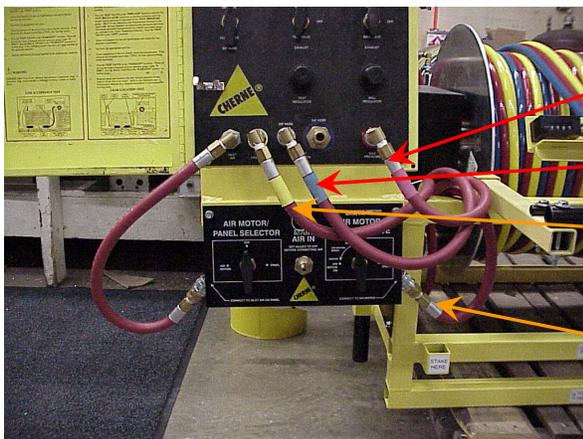
Push this assembly into place.

Figure 3 Shown assembled



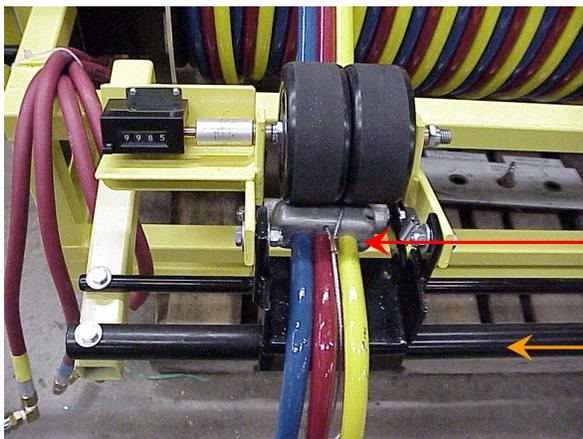
- Panel assembly
- Pin
- Handle

Figure 4



- Red
- Blue
- Yellow
- From air motor

Figure 5



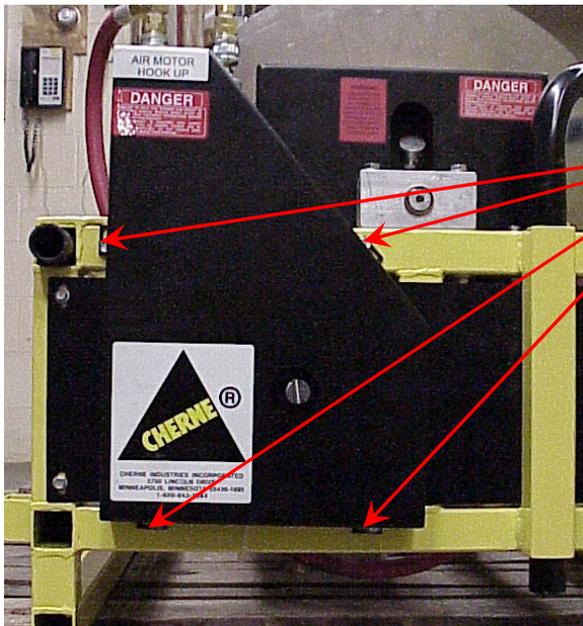
- Strain relief clamp
- Counter assembly guide rod

Figure 6



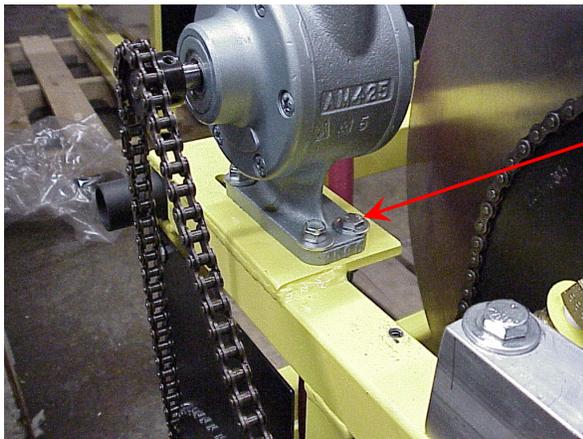
Remove these screws

Figure 7



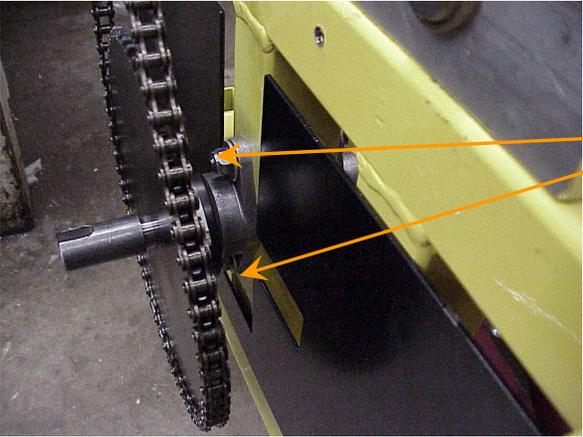
Remove these screws

Figure 8



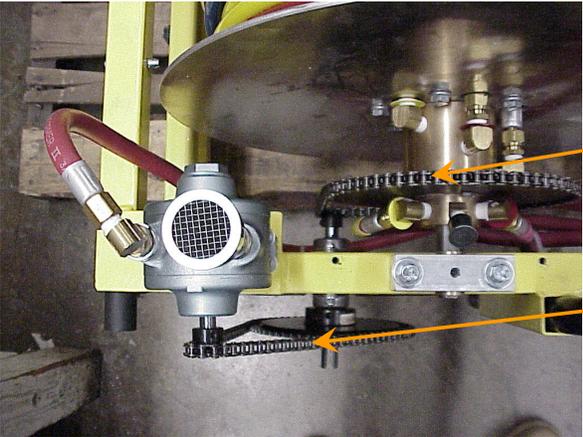
Loosen all four nuts and bolts

Figure 9



Loosen both nuts and bolts

Figure 10



Union to jack shaft chain

Jack shaft to air motor chain

Figure 11

LINE ACCEPTANCE TESTING

CAUTION: PRIOR TO BEGINNING LINE ACCEPTANCE TESTING, THE SAFETY INSTRUCTION AND DATA BOOKLET MUST BE READ. A BOOKLET IS INCLUDED WITH EACH CHERNE PLUG. ADDITIONAL COPIES CAN BE OBTAINED FROM CHERNE INDUSTRIES BY REQUESTING PART NO. 103-586.

Introduction

Line Acceptance Testing consists of low air pressure testing of sewer lines using two pipe plugs. One plug is placed in each end of a section of sewer line. The plugs are inflated to create an airtight seal and the test chamber between the two plugs is pressurized with air. A drop in air pressure beyond the municipality's specifications indicates a leak (refer to test engineers specs). Otherwise, the section passes. When the test is completed, the test chamber is depressurized; the plugs are deflated, and then moved to the next section of pipe to be tested.

PRESET TEST PRESSURE AND BALL PRESSURE FOR A – LINE ACCEPTANCE & LEAK LOCATION

NOTE: Before the triple hose can be attached to the front ball, the Air-Loc control panel test and ball regulators must be adjusted.

1. Unlatch and open the Air-Loc control panel. Connect each 50 or 500 foot triple hose quick disconnect to the fittings on the front of the control panel according to color code.

NOTE: Leak Location Procedures use the 500 foot triple hose. Line Acceptance Procedures use the 50 foot triple hose. This allows for faster inflation and deflation times, therefore, speeding up the testing procedure.

2. At the other end of the triple hose, connect the yellow and blue hoses together using two quick disconnect nipples and a hex coupling, if available. If these types of fittings are not available, you'll need to determine the best way to connect these two hoses.

NOTE: Use teflon tape on all pipe thread fittings.

3. Place the TEST VALVE in the EXHAUST position. Make sure the TEST REGULATOR and BALL REGULATOR control knobs are turned fully COUNTERCLOCKWISE.

NOTE: The Test Regulator as well as the Ball Regulator have spring loaded control knobs. Pull the control knob out, turn to adjust, then release to lock.

4. Connect the air compressor hose to the INLET AIR fitting on the control panel and place the TEST VALVE in the OFF position.
5. On the air compressor, relieve all residual backpressure. Start the compressor. Let it build to full pressure (approx. 110 PSIG) before adjusting the TEST REGULATOR.

CAUTION: DO NOT OPERATE AT AN AIR INLET PRESSURE GREATER THAN 120 PSIG (8.2 BAR).

6. Place the TEST VALVE in the INFLATE position and adjust the TEST REGULATOR control knob by turning it in a CLOCKWISE direction. Adjust the TEST REGULATOR to the correct "TEST PRESSURE" . Refer to your city/state municipal test requirements.
7. Return the TEST VALVE to the EXHAUST position.
8. Disconnect the blue and yellow hoses.
9. Place the BALL VALVE in the EXHAUST position. Make sure the BALL REGULATOR control knob is turned fully COUNTERCLOCKWISE.

10. Place the BALL VALVE in the INFLATE position and adjust the BALL REGULATOR control knob by turning it in a CLOCKWISE direction. Adjust the BALL REGULATOR to the correct Ball Inflation Pressure as indicated on the plug and/or in the SAFETY INSTRUCTION AND DATA BOOKLET.

NOTE: The quick disconnect coupler on the red hose does not need to be plugged to set the ball pressure.

11. Return the BALL VALVE to the EXHAUST position.
12. Attach the 50 or 500 foot triple hose with cable restraint to the Air-Loc plug according to the color coding of the hoses.

*Triple hose color codes: Red - Ball Inflation

Blue - Pressurizes the test area

Yellow - Monitors test pressure (on large gauge)

13. Attach the cable from the strain relief on the triple hose to the eye bolt using the snap hook.

When line acceptance testing is completed, this cable assists in the removal of the ball from the manhole.

14. Lower the converted ball into the upstream manhole and insert fully into the pipe. Make sure that the area within the pipe where the ball will be seated is cleaned of all debris or matter that may cause an improper seal.

Line Acceptance Testing

See front inside cover of the Air-Loc Panel for operating instructions.

Leak Location Testing

Prior to beginning Leak Location Testing, the SAFETY INSTRUCTION AND DATA BOOKLET must be read. A copy is supplied with all plugs. Additional copies can be obtained from Cherne Industries Incorporated by requesting form No. 103-586.

Introduction

Leak Location Testing is a reliable method of pinpointing the exact location of a leak to within a few feet using pipe plugs. A series of low pressure air tests are conducted in 20 foot increments. Low pressure air is introduced into the test chamber between the two plugs. A significant drop in air pressure indicates that there is a leak in that section. By maneuvering the plugs back and forth and recording their position, the leak is isolated.

Recording Leak Location Results

If a section of line does not pass the air test, the exact location of the leak should be found. This is accomplished by using the Leak Location Charts (Item 8).

1. Refer to FIGURE 2. Notice that the first three 20 foot sections on this job passed (indicated by straight lines), but the fourth section shows a leak (indicated by a wavy line).

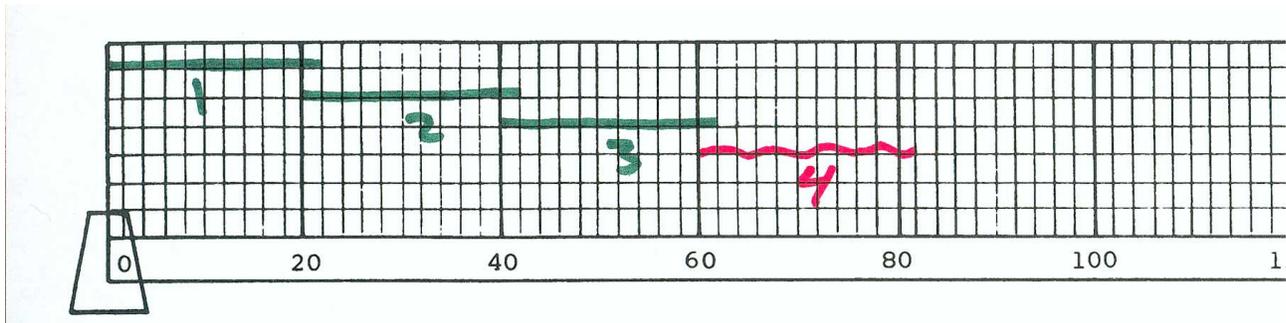


FIGURE 2

2. To isolate the leak, deflate and move the Air-Loc plug backwards 10 feet or half the previous test. Inflate the plug and conduct another test (Test #5).

NOTE: Use the hand crank on the triple hose reel to move the balls backward.

3. Refer to FIGURE 3. As shown, Test #5 passes. We now know that a leak is somewhere between 72 feet (21.94 meters) and 82 feet (29.00 meters).

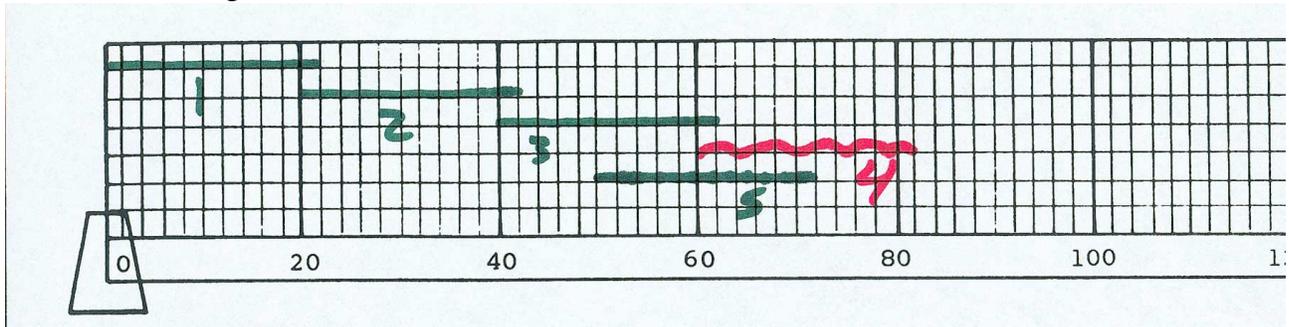


FIGURE 3

4. Refer to FIGURE 4. Move ahead 5 feet or 1/2 of the previous test and conduct another test (Test #6). As shown, this section has passed, so the leak is between 77 feet and 82 feet.

NOTE: If test #5 had failed, the leak would be between 60 and 72 feet. The plugs would then have to be moved backwards.

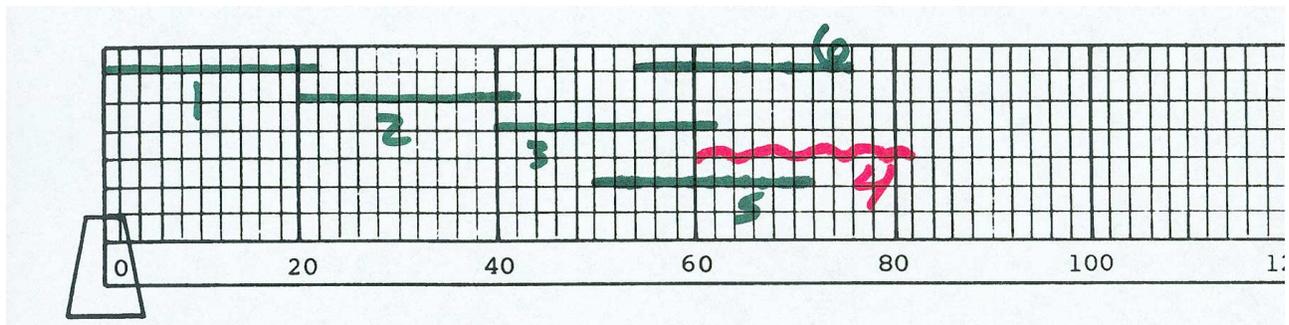


FIGURE 4

5. Refer to FIGURE 5. Move the balls ahead 3 feet or 1/2 of the previous test section and run Test #7.

6. Test #7 has failed, so now it is evident that the leak is between 80 feet (24.38 meters) and 77 feet (23.47 meters).

7. By maneuvering the balls back and forth, the location of the leak can be found to within 2 feet (0.61 meter).

NOTE: To locate all leaks in the line, the total line length should be tested.

8. After completing the leak location tests, place the TEST VALVE and BALL VALVE in their EXHAUST position. When all pressures are exhausted, return the valves to their OFF positions. The TEST PRESSURE GAUGE should now register zero. If it does not, repeat procedure until the gauge reads zero with the TEST VALVE in the OFF position.

9. Shut off the air compressor.

10. Rewind the manual winch cable as far to the downstream manhole as possible.
11. Remove the cable manhole roller from the downstream manhole.
12. Enter the manhole and disconnect the 500 foot triple hose from the Air-Loc plug.
13. Exit the downstream manhole and continue to rewind the manual winch cable until both plugs arrive above ground.
14. Rewind the 500 foot triple hose using the hand crank. To assure the triple hose of fitting comfortably onto the reel, make sure the hose rewinds evenly.

NOTE: The triple hose should be inspected for damage or leaks at the end of each days use. Clean off any debris that may have built up.

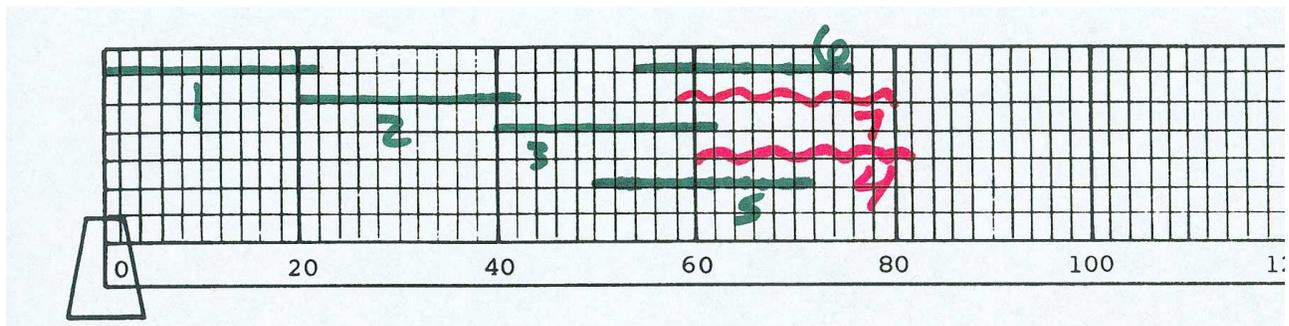


FIGURE 5

16. Remove the hose manhole roller from the upstream manhole.
17. Move to the next test site and repeat procedure.

Air Line System Leaks

When a leak is suspected within the air line system, all air testing must cease. To check for a leak, the entire system must be pressurized.

Ball Pressure Testing

NOTE: The quick disconnect coupler on the red hose does not need to be plugged to set the ball pressure.

NOTE: Use teflon tape on pipe fittings.

1. Set the BALL REGULATOR to 40 PSIG.
2. Turn the BALL VALVE to the INFLATE position and check the quick disconnect fitting with a soap and water solution. Air bubbles will appear when a leak is found.

3. Tighten or replace the fitting.
 4. If the fitting doesn't leak, the entire 500 feet of hose must be checked with a soap and water solution.
 5. If the hose is leak-free, check the rotary union. This may be done by checking the plug fitting for leaks. If no leaks are found, turn the BALL VALVE to its OFF position and monitor the BALL GAUGE for any drop in pressure. If pressure drops, the quad rings are leaking and should be replaced.

NOTE: Refer to Rotary Union Quad Ring Replacement instructions on page 21.

6. When ball testing is completed, return the BALL VALVE to the EXHAUST position.

Test Pressure Testing

Test Pressure Testing consists of air testing the blue and yellow hoses.

1. Refer to FIGURE 8. Connect the ends of the yellow and blue hoses using two quick disconnect nipples and one hex coupling.
2. Set the TEST REGULATOR to 15 PSIG.
3. Turn the TEST VALVE to the INFLATE position.
4. Check the yellow and blue hose fittings for leaks using soapy water.
5. If the fittings on the blue and yellow hoses are intact, the entire 500 feet of hose (blue and yellow) must be checked with soapy water.
6. If the hoses are leak free, check the rotary union. This may be done by checking the plug fittings for leaks. If none are found, turn the TEST VALVE to the OFF position and monitor the TEST PRESSURE GAUGE for any drop in pressure. If there is a pressure drop, the quad rings are leaking and should be replaced.
7. When test pressure testing is completed, return the TEST VALVE to the EXHAUST position and disconnect the hoses.

Ground Water Pressure Calculation

Where ground water is present in the area to be air tested, the pressure of the water must be calculated and added to the test pressure specified.

Water exerts a pressure of 0.433 PSI for each foot in height. The calculated water pressure should be added to the pressures in the engineers specifications for a total pressure required in air testing.

<i>GROUND WATER CHART</i>			
FEET	PSI	METERS	Kg/CM²
1	.43	.3	0.03
2	.86	.6	0.06
3	1.2	.9	0.09
4	1.7	1.2	0.12
5	2.1	1.5	0.15
6	2.6	1.8	0.18
7	3.0	2.1	0.21
8	3.4	2.4	0.24
9	3.9	2.7	0.27
10	4.3	3.0	0.30

TROUBLE SHOOTING GUIDE**PROBLEM: AIR-LOC PLUGS WILL NOT INFLATE**

Symptom: Ball pressure gauge registers too low.

Cause . . . Regulator set too low.

Solution . . Reset as required.

Cause. . . Compressor off.

Solution . . Start compressor.

Symptom: Ball pressure gauge will not register.

Cause . . . Leak in Air-Loc plug.

Solution . . See Air-Loc plug sleeve/body replacement.

Cause . . . Leak in air hose system.

Solution . . See "Air Line System Leaks" on page 20.

Cause . . . Broken pressure gauge.

Solution . . Replace gauge.

PROBLEM: AIR-LOC PLUGS LOSE PRESSURE

Symptom: Reading on ball pressure gauge drops; leak is heard at the control panel.

Cause . . . Leak in air hose system.

Solution . . See "Air Line System leaks" on page 20.

Symptom: Reading on ball pressure gauge drops; no leak is heard.

Cause . . . Leak in air hose system.

Solution . . See "Air Line System leaks" on page 20.

Cause . . . Hose between plugs leaking or fittings are loose.

Solution . . Repair or replace hose, tighten fittings.

Cause . . . Leak in Air-Loc ball.

Solution . . Repair or replace.

PROBLEM: TEST PRESSURE WILL NOT BUILD

Symptom: Test Pressure gauge registers too low.

Cause . . . Compressor off.

Solution . . Restart compressor.

Cause . . . Water in test monitor line.

Solution . . Temporarily reverse the yellow and blue hoses at the Air-Loc control panel to flush the test line.

-Trouble Shooting Guide continued on next page-

TROUBLE SHOOTING GUIDE

(Continued)

Cause Regulator set too low.
 Solution Reset as required.

Cause Leak in pipe.
 Solution Replace or repair pipe.

Cause Air by-passing balls.
 Solution Clean line, remove debris.

Symptom: Test pressure gauge will not register.

Cause Yellow hose plugged.
 Solution Disconnect the yellow hose from the Air-Loc reel rotary union and induce air into the test line. This will remove any debris blocking the test line air passage.

Cause Bad leak in pipe.
 Solution Leak location procedure.

PROBLEM: TEST PRESSURE DROPS

Symptom: Reading on test pressure gauge drops, leak is heard at control panel.

Cause Leak in hose system.
 Solution See "Air Line System Leaks" on page 20.

Symptom: Reading on test pressure gauge drops, no leak is heard at control panel.

Cause Leak in hose system.
 Solution See "Air Line System Leaks" on page 20.

Cause Air by-passing Air-Loc balls.
 Solution Clean line, remove debris. See problem called "Air-Loc balls will not inflate".

Cause Leak in sewer line.
 Solution Leak location procedures.

PROBLEM: TEST PRESSURE INCREASES

Symptom: Reading on test pressure gauge rises.

Cause Sewer line is warmer than test air introduced.
 Solution Read air testing procedures.

Cause Infiltrating water between balls.
 Solution See "Ground Water Pressure Calculation", page 21.

Cause Air by-passing to test chamber.
 Solution Check all air connections, check fittings on ball.

MAINTENANCE SCHEDULE

(Based on 8 hour day of operation)

Description	Every day	Every 5 days	Every 30 days	Every 60 days	Every 90 days	Every 120 days
Hose reel assembly						
Grease rotary union	Every 15 days					
Clean and oil chains			X			
Grease bearings			X			
Grease counter guide rod	As required					
Air-Loc reel (air motor)						
Check oil		X				
Clean and oil chain			X			
Grease bearings			X			
Check chain tension			X			

Time Charts

**APPROXIMATE TIME REQUIRED TO PRESSURIZE TO 4 PSIG (0.28 Kg/cm²)
THROUGH 50 FOOT (15.2 METERS) INFLATION HOSE
(IN MINUTES, UNLESS OTHERWISE NOTED)**

Pipe Size		20' Reach	100' Reach	200' Reach	300' Reach	400' Reach	500' Reach	600' Reach
Inches	Millimeters	(6.09 M)	(30.4 M)	(60.9 M)	(91.4 M)	(121.9 M)	(152.4 M)	(182.8 M)
4	101	1 sec.	7 sec.	14 sec.	21 sec.	28 sec.	34 sec.	42 sec.
6	152	3 sec.	14 sec.	31 sec.	44 sec.	1.02 min.	1.37 min.	1.51 min.
8	203	5 sec.	28 Sec.	52 sec.	1.4 min.	1.79 min.	2.24 min.	2.7 min.
10	254	8 sec.	39 sec.	1.37 min.	2.1 min.	2.7 min.	3.4 min.	4.1 min.
12	304	12 sec.	58 sec.	1.96 min.	2.94 min.	3.92min.	4.94 min.	5.99 min.
15	381	18 sec.	1.54 min.	3.1 min.	4.62 min.	6.16 min.	8.2 min.	9.24 min.
18	457	28 sec.	2.21 min.	4.4 min.	6.6 min.	8.8 min.	11 min.	13.2 min.
21	533	36 sec.	2.5 min.	5.9 min.	8.82 min.	11.8 min.	15 min.	17.6 min.
24	609	48 sec.	4 min.	7.9 min.	12 min.	15.9 min.	24 min.	32 min.

* The above times are approximate only. They're applicable to a compressor with capacity of 17.9 CFM at 100 PSI.

SAMPLE PIPE TESTING TIMES		
PIPE DIAMETER/INCHES	PIPE DIAMETER/MM	MINUTES PER 100 FEET
4	101	.11
6	152	.23
8	203	.42
10	254	.53
12	304	.63
15	381	.74
18	457	.84
21	533	1.1
24	609	1.3

