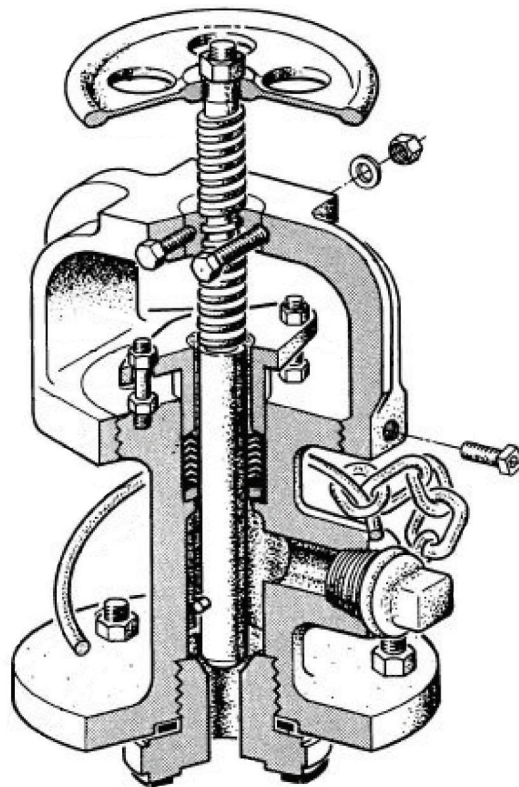


ARI1301 & ARI1302 1" Plug Type Angle Valves

INSPECTION & MAINTENANCE BULLETIN



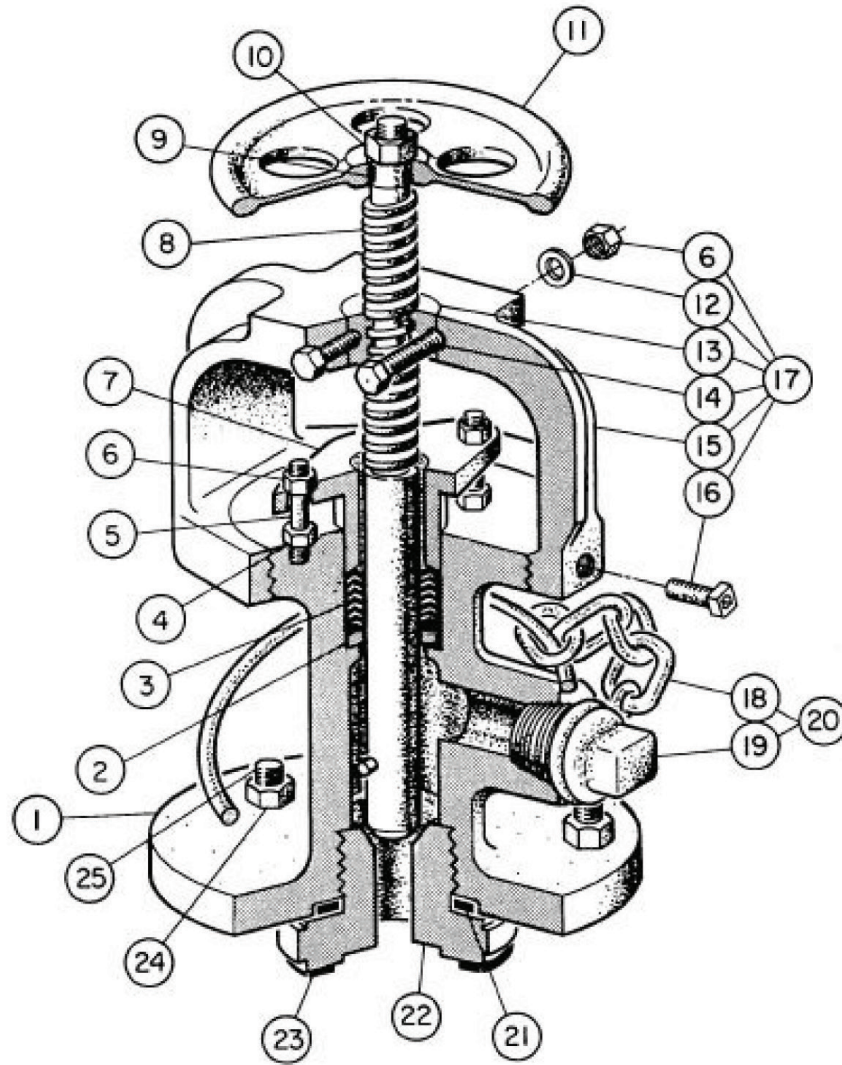
Only AAR class F facilities are certified to recondition, repair, retest and qualify tank car angle valves. Personnel performing inspection and test must be certified Level I per AAR Manual of Standards and Recommended Practices, M-1002, Appendix T, 1.4.3.

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THE
GREENBRIER
COMPANIES

October 7, 2020



<u>Item #</u>	<u>Description</u>	<u>Item #</u>	<u>Description</u>
1	Body	12	Washer
2	Packing Retainer	13	Bushing
3	Packet Set	14	Bolt
4	Jam Nut	15	Yoke
5	Stud Bolt	16	Set Screw
6	Nut	17	Yoke Assembly
7	Packing Gland	18	Chain Assembly
8	Stem Assembly	19	Plug
9	Woodruff Key	20	Plug and Chain Assembly
10	Nut	21	Seat Gasket
11	Handwheel	22	Seat

Valve Disassembly

Before disassembly, close valve and look at stem threads. If less than one complete thread projects above the yoke bushing, a longer stem should be used when reassembling. Being careful not to damage gasket tongue of valve seat, disassemble the valve as follows:

1. Remove the tag, if any, and plug from the valve. See if tag indicates a malfunction or problem the last user may have had.
2. Open valve 2 or 3 turns.
3. Remove both packing gland nuts.
4. Loosen yoke set screws and unscrew yoke from body. Be careful not to score body threads.
5. Align stem pin with slot in body and remove yoke and stem from body which will pullout packing gland, packing, and packing retainer.
6. Remove handwheel and Woodruff key. Screw valve stem, out of yoke.
7. Remove valve seat and seat gasket.

Inspect

Discard packing rings, gaskets and any broken parts clean all parts thoroughly. As necessary, clean per Clean and Steam Section of this Bulletin. Carefully inspect all parts for cracks, particularly the sharp corners of the body and yoke. Discard any cracked parts. Parts must not be thrown on the bench or into boxes, otherwise threads and finished surfaces will be damage. Be particularly careful with stem and seat.

Body

Inspect body for general condition. If severe corrosion is evident, body should be discarded. Inspect body outlet threads. If eroded or bent, clean with a 1"-11 1/2 NPT hand tap. Check with a standard plug gage. If threads are badly pitted, or if plug gage screws in more than one turn past the gaging notch, valve body must be scrapped or bushed. Inspect body seat threads. If eroded or bent, clean with a 1 3/8" – 12NF-3 hand tap. If threads are badly pitted, valve body should be discarded.

Valve Seat

Inspect valve seat for general condition. If threads are eroded or bent, clean with a 1 3/8"-12NF-3 hand die. If threads are badly pitted, seat must be discarded. Inspect closure face; if pitted, galled or otherwise damaged, seat must be refaced. Inspect tongue and body gasket face; any nicks or burrs must be removed. (See Special Maintenance Procedures Section.)

Valve Stem

Inspect valve stem for general condition. Inspect for straightness and for scratches where stem goes through packing. Discard any stem which is bent; all nicks, burrs and scratches must be made smooth to prevent damage to packing. Make sure that the pin is tight. If necessary, clean thread with a 7/8"-6ACME-2G hand die. Inspect closure face; if pitted, galled or otherwise damage, stem must be refaced. If stem is too short for refacing stem must be discarded. (See Special Maintenance Procedures Section.)

Valve Plug & Chain

Inspect valve plug for general condition. If threads are eroded or bent, clean with a 1"-11 1/2 NPT hand die. If threads are badly pitted, plug must be discarded. Screw valve plug snug in to body outlet thread; if less than one full thread projects, plug should be replaced. Inspect chain and replace if necessary.

Yoke Assembly

Inspect yoke assembly for general condition. Make sure that the yoke bushing is tight and stem threads are in good condition. Replace bushing if necessary.

Miscellaneous Parts

Inspect studs, nuts and packing gland assembly. Discard if corroded or if threads are damaged. Inspect handwheel; discard if cracked. It is desirable to replace old style valve plug chains with new type chains which have a circular ring at the body end. If all parts are satisfactory, proceed with assembly, using the same stem and seat. Do not use the stem from one valve with the seat from another valve unless they are lapped together.

Clean & Steam

If examination of the valve indicates dirt and corrosion, the parts should be cleaned. One method of cleaning is called “clean and steam”. To do this, make a strong solution of soda ash and water in a pail. Place the parts in the pail and boil by injecting steam from a steam hose. Be careful to avoid damaging seating surfaces. Place the parts in a wire basket, wash with water, steam with a clean hose, and dry with an air hose. Wire brush where necessary to remove any scale which has not been removed by the above treatment. Be careful to avoid damaging seating surface.

Valve Reassembly

1. Put a gasket in place and screw in valve seat.
2. If a new type valve plug chain is to be used, place large ring of chain on body.
3. Lightly screw in valve plug. Plug should be large enough so one full thread projects; otherwise it should be replaced. If using reconditioned stem and seat, place stem in body with which it was lapped. If using stem and set which did not replay lapping, place stem in body from which it was removed.
4. Place packing retainer and packing rings in packing box. Be sure retainer is installed right side up.
5. Install packing gland assembly, but do not tighten nuts.
6. Screw yoke on stem threads, place key in keyway and attach handwheel and nut.
7. Screw yoke on body, being careful not to force stem against seat during the process.
8. When grooves on yoke and body are lined up, tighten yoke set evenly to prevent cocking stem.
9. Lightly close valve. At least one full thread of the stem should extend beyond top of yoke bushing; otherwise stem should be changed for a longer one. The tip of the longer stem must be lapped to the seat. (See Lap Stem and Seat Section.)
10. Partially open valve and adjust packing gland. Tighten gland nuts evenly to prevent binding. The gland must be loose enough to permit hand operation of the valve. When using PTFE packing rings the minimum suggested packing gland torque is 150 in. lbs. and should be rechecked after 24 hours.
11. Protect valve seat tongue with cork or other protection in valve inlet. Proceed with testing.

Test

Equipment

The recommended tools and test equipment are:

- Adapter Flange per DWG NO. 109
- Gasket – 2.25 OD x 1.50 ID x .125 Thick
- (4) ¾”-10 UNC x 3.50 long bolts with Hex Nuts per DWG NO. 109
- (4) Clamps per DWG NO. 109
- Lapping Bushing per DWG NO. 109
- Gasket Seating Tool per DWG NO. 109
- Test Plug Apparatus per DWG NO. 108
- Hand Taps: 1”-11-1/2 NPT, 1-3/8”-12 UNF-3B
- Hand Dies: 1”-11-1/2 NPT, 1-3/8”-12 UNF-3A, 7/8”-6 ACME-2G
- Plug Gauge (Go-No Go): 1”-11-1/2 NPT
- Wrench: 2-3/8” open end
- Pressure Gauge: 1000 psig range with Grade 1A Accuracy Level & 1% Sensitivity Level

If the shop is equipped to test the Institute Standard Safety Valve, the only additional equipment required to test the angle valve is the four clamps.

Seat Test

Remove inlet protection, open valve slightly and bolt it on the adapter flange using four clamps and a gasket. (See DWG NO. 108 attached to this Bulletin). Close valve by hand using steady pull rather than a snap action. Loosen valve plug, apply leak detection solution around plug threads and apply dry air or inert gas at 500 psi to the inlet.

If the valve leaks, release pressure, remove valve from adapter flange and turn stem while looking through inlet. This may indicate that the stem is cocked or bent. If the stem appears to be centered, disassemble valve and repeat lapping using another refaced stem and another refaced seat. Experience shows that relapping after testing is rarely successful.

Leakage Test

If no seat leakage is discovered, tighten valve plug, open valve 2 or 3 turns and test for leakage at packing around seat threads, and around plug.

If the packing leaks and it cannot be stopped by tightening the gland, or if leaks occur around seat or valve plug, valve must be disassembled and inspected.

If no leakage is discovered, release pressure and remove valve from test chamber. Retighten valve seat as much as possible, replace the cork or other protection in inlet. Be careful not to damage valve seat tongue.

Special Maintenance Procedures

General

The principle to be observed when refacing a stem or seat is to produce smooth seating surfaces with minimum removal of metal. It is especially important to keep seating surfaces concentric with the center line of the stem or seat. Care must be taken to see that refaced parts are not damaged in handling or storage.

Stem

Reface the stem in a collet using a turning tool rather than forming tool. Refacing must not affect any dimensions of the stem except its length. All diameters to be concentric with .938" diameter within .003" T.I.R. The included seat angle must be held between 59° and 58 1/2°, and must be symmetrical around center line.

Seat

Reface the seat in a holding fixture so that the threads and the seating surface will be concentric to the .75" diameter to within .003" T.I.R. The included seat angle must be held between 60° 6 and 60 1/2° and must be symmetrical around the center line. The depth must be held to 1/16". To maintain the 1/16" seat depth, machine the top of the seat, see DWG NO. 109 attached to this Bulletin. Remove all nicks and burrs from the gasket tongue. The outside diameter must not be machined to less than 2.242" and the inside diameter, not greater than 1.508". The gasket surface containing the 1/16" diameter scores may be touched up to remove depressions, but the seat must be scrapped if the height of the tongue is reduced to 3/16" or less.

Lap Stem and Seat

Install Seat in Body

Since angle valve seats and stems may be reconditioned many times before they must be replaced, there is considerable variation in their lengths. When the valve is fully assembled and in a closed position, about one stem thread or more should project above the yoke bushing. This may require that a "long" stem be used with a "short" valve seat. This may be determined as follows: After completely removing oil and grease from the body, seat and stem, place a new seat gasket in the body and screw in a refaced seat as tightly as possible. Then place a refaced stem in the body and measure the distance from the top face of the body to the upper end of the stem thread. If this distance is at least 3 11/16", proceed with lapping; if not choose a longer stem.

Lapping

The lapping compound is a thin paste made of clean, light oil and #360 Carborundum grinding compound or equivalent. Use the lapping bushing, per DWG NO. 108 attached to this Bulletin, to keep the stem centered during the lapping operation. Apply a generous coat of compound to the seating surface of the stem and lap it into the seat by hand for 20 to 30 seconds. Stem rotation to be in the clockwise direction only. Wipe stem and seat and examine the ground surface of the stem. Lapping is complete when the part of the stem that contacts the seat has an even frosty appearance, and is free of nicks and flat spots. The edges of the ground surface should be well defined. Usually 3 or 4 applications of compound are required to produce this condition. When lapping is complete, wipe all trace of compound from the stem and proceed with valve assembly.

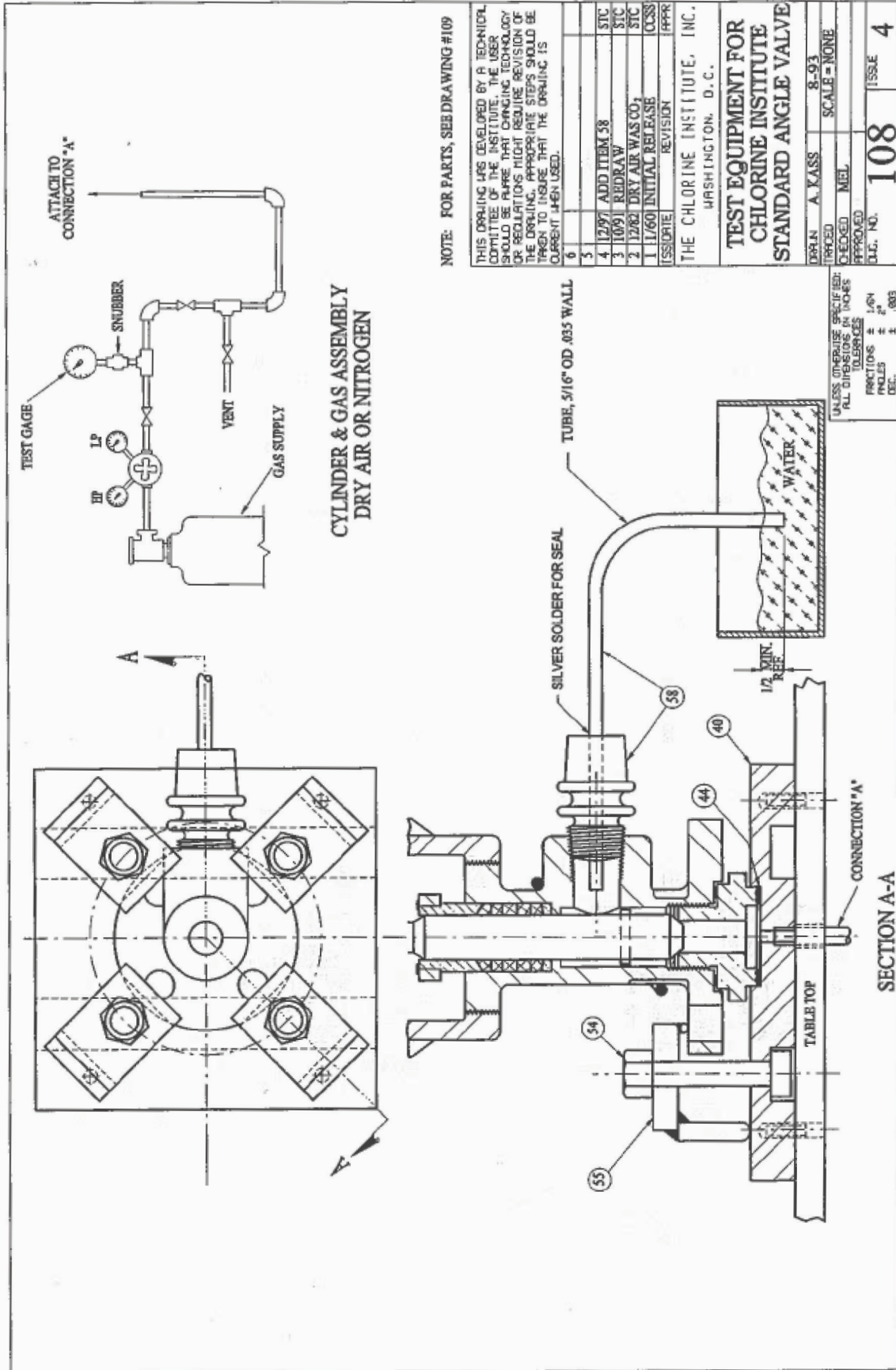
Painting

After testing, mask the stem and valve seat tongue, and paint the valve all over. Make sure that valve is partially open if placed in storage.

Marking

The valve assembly should be marked per AAR M-1002, Section C-III, Appendix A.

The undertaking of repair or replacement by the Purchaser, or its agents, without the expressed written consent of The Greenbrier Companies (GBX) shall void the warranty and relieve GBX of all responsibility. Under no circumstances shall GBX be liable for any direct, incidental, consequential or other damages of any kind in connection with the installation, operation, maintenance, repair, inspection or other use of any product purchased from it.



NOTE: FOR PARTS, SEE DRAWING #109

THIS DRAWING WAS DEVELOPED BY A TECHNICAL COMMITTEE OF THE INSTITUTE. THE USER SHOULD BE AWARE THAT CHANGING TECHNOLOGY OR REGULATIONS MIGHT REQUIRE REVISION OF THE DRAWING. APPROPRIATE STEPS SHOULD BE TAKEN TO INSURE THAT THE DRAWING IS CURRENT WHEN USED.

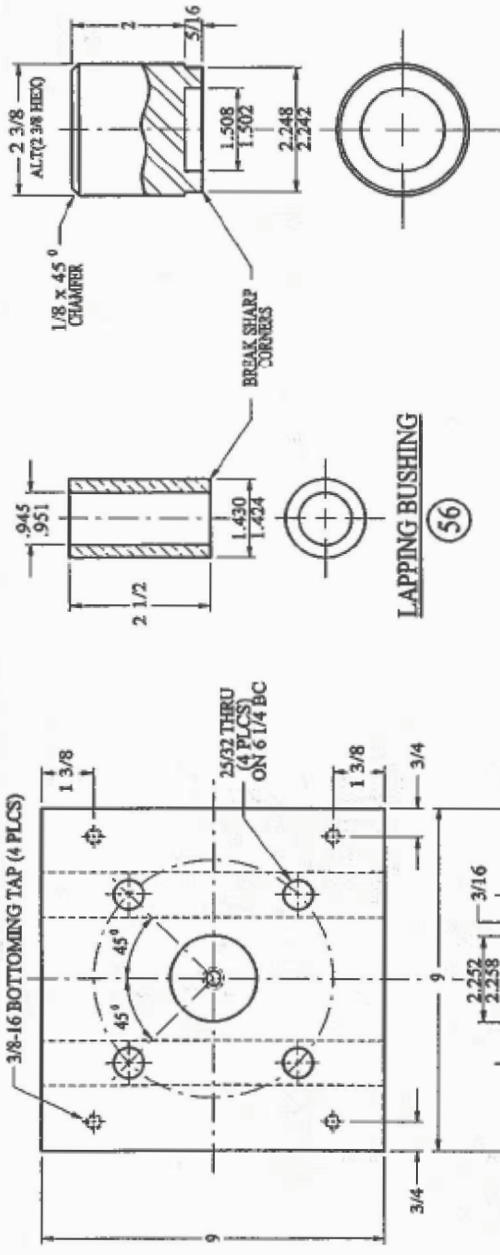
6		
5		
4	12/97	ADD ITEM 38
3	10/91	REDRAW
2	12/82	DRY AIR WAS CO ₂
1	11/60	INITIAL RELEASE
		REVISION
		DESIGNER
		APPROVER

TEST EQUIPMENT FOR CHLORINE INSTITUTE STANDARD ANGLE VALVE

DRWN	A. KASS	8-93
TRD		
CHKD	MEL	SCALE - NONE
APPROVED		
DWG. NO.	108	ISSUE 4

UNLESS OTHERWISE SPECIFIED:
 ALL DIMENSIONS IN INCHES
 FRACTIONS ± 1/32"
 DECIMALS ± .005

ITEM	NAME OF PART	MAT.
40	ADAPTER FLANGE	STEEL
44	USE ITEM 4 DWG 102 GASKET	
54	4 3/4-10NC 1.3 LG LG 80 HD MACH E ROCKS REGULAR WITH IRK NUTS	STEEL
55	CLAMP (4 REQD)	ALST 1000
56	LAPPING BUSHING	BRASS
57	VALVE GASKET SEATING TOOL	HRS
58	TEST PLUG APPARATUS	NOTE 1



NOTE 1:
FOR TEST EQUIPMENT (INCLUDING ITEM 58) SEE DRAWING 108.

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6		
5		
4	12/97	ADD ITEM 58
3	8/93	REDRAW
2	3/79	DELETED ITEM #53
1	1/60	INITIAL RELEASE
		REVISION
		ISSUING
THE CHLORINE INSTITUTE, INC. WASHINGTON, D. C.		

TOOLS FOR STANDARD ANGLE VALVE		
DRAWN	A. KASS	8-93
TRACED		SCALE = NONE
APPROVED	RJP	
DWG. NO.	109	ISSUE 4

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS IN INCHES
TOLERANCES
FRACTIONS ± 1/64
ANGLES ± 2°
DEC. ± .003

