

CHLORINE TANK CAR LOADING PROCEDURE

1988

SL 086869

CHLORINE TANK CAR LOADING PROCEDURE

The chlorine tank car loading rack consists of four tank car preparation stations and four tank car loading stations.

The chlorine rack Tankerman handles the loading of the chlorine, while the Tankerman Helper prepares the cars for loading. All field training related to the chlorine tank car loading job, switching rail cars, scale tank line up, tank car preparation and loading as well as safety training will be conducted by experienced personnel.

All classroom training will be conducted using this loading procedure and PPG training manuals and video's.

Tankerman Helper Duties

1. Before switching an empty chlorine car into the chlorine rack prep stations, check the test dates stenciled on the side of the car. A car may be loaded up to the 20th of the month in which it is due test. Check the "Do Not Load" list to see if the car needs maintenance, shopping or inspection. Weigh or check "Inbound Weight List". Cars on the "Do Not Load" list, due test cars or cars not meeting the weight limitations of Step 2 should not be spotted at the chlorine rack.

2. Switch the car to the prep station. Weigh the car if not on the "Inbound Weight List". A heavy car is one which returns with 10,000 lbs. of chlorine in it. This car can be spotted at the prep station only when NO. 1 Scale Tank is in service for receiving returned liquid. If it is not available then any car with 5000 lbs. or more in it will be considered a heavy car. Heavy cars should be kicked out for spotting at the heavy car unloading station. Always notify your Foreman of any heavy car and make out a scale ticket.
3. Spot the car at the prep station.
 - A. Set the hand brake, chock the wheels, apply the placards and record all the pertinent information.
 - B. Put "Blue Flags" in place and close derails.
4. Visually inspect the car for stenciled numbers, defect cards (from the railroad) possible car defects such as broken handrails, loose platform sections, etc.
 - A. Lower the ramp into place, open the dome and remove the plugs from the valves. Check for leaks.
5. Insert 1" pipe nipples into each of the gas valves and one liquid valve (liquid valve opposite dome lid hinge) and hook up the hoses to the liquid valve and one gas valve.
 - A. With the valve on the rack manifold closed, slowly open the valves on the tank car. Check for leaks.
 - B. Record car pressure.
 - C. Notify North Liquefaction or Mercury Cell that you are ready to open cars up to blowdown.

- D. Open the cars to blowdown.
 - E. If the car has a vacuum, proceed with the necessary inspection and valve work.
 - F. The helper will notify the Tankerman in the event he finds anything unusual during the internal or external inspection of the tank car.
 - G. If there is liquid chlorine in the car, one liquid and two gas hoses will be hooked up. The car will then be blown down thru the one liquid valve and one gas valve, transferring the liquid to #1 scale tank. A minimum of 120 lbs. of pressure (air pad is necessary) should be maintained on the car for a good transfer. If no liquid is present, one gas valve and one liquid must be used at all times.
6. Check the dome cover plate for pits. Deeply pitted (low spots) around the valve openings on the dome plate will hinder the application of a capping kit, if needed.
- A. If you have any doubt, call your foreman.
 - B. Blow down car to 30 to 35 lbs and switch over to sniff if blowdown is going to Sulphur Chloride.

If blowing down to Mercury Cell, switch over to sniff when car pressure reaches 5 to 10 PSIG.
 - C. Sniff the car until it has a slight vacuum, 5 IN.HG MINIMUM, so inspection and valve work can be safely completed.

Always have one valve hooked up and ready to open to the sniff system if needed.
7. Complete necessary valve change and required inspection at this time.
- A. Refer to valve trip book for necessary information.
 - B. Replace any valve that is in bad condition regardless of the number of trips.
8. Gaskets must be replaced when a valve is changed. Be sure the gasket is the 1/8 inch thick gasket.

- A. Remove the safety valve housing, inspect the safety for any corrosion, moisture or any sign of a leak.

Check the upper diaphragm (lead disc) for punctures or any signs of distortion. Grease the threads and replace the housing.

- B. If the safety valve shows evidence of leaking or is due test, remove and replace it with a re-worked and re-tested safety valve.

- C. Record serial number and date of the safety valve removed and the safety valve installed in the SRV logbook. Make a certificate noting the reason for the change. Re-stencil the car.

9. Inspect the inside of the tank with an inspection light.

Be sure that the tank is clean and dry. Check the standleg holding bracket at the bottom of the car. Be sure that the standlegs are inside the bracket.

10. Replace angle valves after every fourth trip or every six months, whichever comes first.

11. Replace the seat gasket anytime a valve is removed.

NEVER RE-USE A GASKET.

12. Excess flow checks must be inspected when all four valves are changed or a problem was reported. Remove the seat and check ball. Test the check balls with a magnet. They should be slightly magnetic. Inspect the flow check body with an inspection light, look for any broken or missing pins and for holes in the check body. (See diagram of check valves this section.)

- A. After all necessary angle valve and inspection work is complete, close all the valves.

- B. There must be four good plugs with a cable on each one, proper tags (filled out and dated) on the valves, white "Chlorine Tag" for SRV and Dome handle and a dome pin and chain.

Paint the inside of the dome before applying the tags. Any discrepancies on the car should be noted on the Loading/Inspection Report.

- C. Close the valve on the manifold, disconnect the hoses and attach to hangers and tighten.
- D. Close the dome lid, pick the loading ramp up, and secure.

Chlorine Tank Car Loading

Tankerman's Duties

1. Check with liquefaction lead operator to determine what tank or tanks to load from.
 - A. The starting weight, hourly weight, and final car weight must be called in to liquefaction if you are loading from a tank they are producing into.
 - B. If you are relieving someone and loading is in progress, check all tank and loading manifold line ups.
 - C. Rail car switching is a very involved procedure with many very important safety factors involved. It is important you know that the person you will be switching with is trained in all areas of switching.
 - D. Before switching the rack, make sure all ramps are up, cars are disconnected, Blue Flag removed, and Derails open.
 - E. Look both ways along rack, make sure there is no equipment or persons near the track.
 - F. If a loaded car is on the scale, push it beyond the rack to the north end of the track you will be spotting.

SL 086874

- G. Every Monday morning one loaded car should be weighed on the other loading scales. This should be done anytime the scale pits are flooded.
- 2. Have a switchman at the road crossings to stop vehicles or persons when moving cars.
 - A. After clearing the scale of cars, check to make sure the scale is zeroed.
 - B. If you have a problem zeroing the scale, see scale procedure this section and notify the Leadman.
- 3. Before spotting the prepared car, recheck the test date "Do Not Load List" and inspect the underframe of the tank car. See key points (Tank car visual inspection).
- 4. Spot and weigh the car for loading.
 - A. If actual light-weight is not within 500 lbs. of the marked light-weight, call the foreman for approval to re-stencil the car and add "Note" Lt. weight changed to xx,xxx lbs.
- 5. The Tankerman must fill out the scale ticket and Loading/Inspection forms and punch the actual tare weight and have the helper verify the weight on the car and the ticket. (See scale procedure this section)
- 6. Record the car initial and number, marked tare, and actual tare weight in the logbook.
 - A. Lower the ramp.
- 7. Remove the loading hoses from the mounted plug hangers. Make sure there is no moisture in them and the threads on the hammer unions are in good shape.
- 8. Connect the two loading hoses. One goes to the liquid valve opposite the dome lid hinge, and one goes to the inside gas valve. Connect the equalizing line to the outside gas valve using gaskets at all connections.

9. Inspect liquid and gas hoses each time you hook up. If it is necessary to change a hose, stencil or tag the date you installed the hose.
10. Weigh the car and record the connected tare weight in the proper logbook.
11. Line up valves on transfer header (patio) to the correct loading station you will be using. Check all the other scale tank patio valves to make sure they are properly lined up.
 - A. Step #11 will require extensive hands-on-training.
 - B. Line up scale tank you will load from and start pump.
 - C. See chlorine rack suggested line up procedure this section.
12. When loading from a south liquefaction tank (14, 15, 16, or 17), the Shipping rack person will complete loading manifold line up and scale tank line up. (Do not attempt to adjust the auto-recirculation; call the operator.)
13. When loading from north liquefaction, their operator will complete scale tank line up and Shipping will complete rack manifold (patio) line up.
14. Observe valves during the line up and after the pump is started for leaks. Small leaks such as packing leaks can usually be corrected, without clearing the line or closing the valve, but they must be corrected.
 - A. For maintenance on the French-type valve, see diagram this section.

SL 086876

- B. If you have any doubts about any part of the procedure for leaks, call your Leadman.
15. Before loading, pressure up the hoses by using 250-lb. air mixed with Cl₂ gas. The valves on the car must be closed for this task.
- A. When you are ready to start loading open the liquid and inside gas valves on the car to full open position 3-4 rounds.
16. To start loading, open the automatic valve and crack the loading valve open slowly at first, this will prevent flow checks on the scale tank pump from sticking.
- A. Equalizer valve should be opened first to build up pressure in the car to help prevent check valve on the pump from sticking.
- B. Open loading manifold valve to reach full loading rate.
17. Observe the loading rate (lbs. per hr.), record and report them to south liquefaction if you are loading from a tank they are producing into.
- A. Observing the loading rate will also help you stay aware of any pump or flow problems that may occur.
18. Keep a close watch on the car to be sure it is loading properly and you have no leaks. The car should be visually inspected at least every 15 minutes.
- A. To shut the car off at desired weight, use the manual loading valve. Shut the auto valve also for a backup.
19. The desired weight for example:
- | | |
|-----------------------|--------------------------|
| Connected weight plus | -180,000 for 90-ton cars |
| | -170,000 for 85-ton cars |
| | -110,000 for 55-ton cars |

- A. Sample the car only if specifically required by customers, etc. (See sampling Procedure C12 Car this section.)
20. Determine from the daily loading orders when air pad cars are required and complete. All 55 Ton cars are to be air pads.
- A. Caution, Do Not air pad a car that after loading is near the maximum gross weight. (263,000 lbs.)
 - B. Example - If a loaded car weighs 263,000 lbs the final weight, after air padding, will be 3-400 lbs. more or 263,400 lbs. Therefore the total weight will be over the allowable limit of 263,000 lbs.
21. The bottom line to air padding cars is to select a car with a gross weight of at least 400 lbs. below the maximum weight of 263,000 lbs.
22. Shut off the equalizer valve on the loading manifold before air padding the car.
- A. Blow the lines into the car using the 250 lb. air, shut off the valves on the car using a valve wrench.
 - B. Open all of the lines to the sniff and clear.
23. After the loading hoses and the equalizer hose have a vacuum, disconnect the hoses and connect them back to the mounted plug hangers, hammering them tight.
24. Test the valves on the car for leaks using ammonia and water mixture.
- A. Check the dome to see if it contains all of the required plugs, plug holding wires, I.D. tags, envelope with cable seals and special instructions or inspection forms. Paint dome area if not previously done.

SL 086878

- B. Close the dome lid and insert the dome pin, if the dome pin is missing replace it.
 - C. Close all of the port hole covers and free up if necessary.
25. Weigh loaded car and stamp the actual disconnected gross weight on the scale ticket. Sign the ticket and note the time and temperature of the chlorine. (See scale procedure)
26. Have helper check the weight and sign the weight ticket.

SCALE PROCEDURES FOR CHLORINE LOADING RACK

SCALE AT NORTHEAST STATION

1. How to Set Time and Date
 - a. Press "T" key until Day-Time LED is on
 - b. Press "E" key
 - c. Enter military time
 - d. Press "E" key
 - e. Press "T" key until Day-Time LED is blinking
 - f. Press "E" Key
 - g. Enter date
 - h. Press "E" key
2. How to Operate Scale
 - a. Zero Scale with Zero key
 - b. Place tank car on the Scale
 - c. Place the Scale Ticket in the Printer
 - d. Press I/D key
 - e. Press "E" key then enter tank car number
 - f. Press "E" key
 - g. Press A/T key
 - h. Press G/N key to display the Net Weight
 - i. Load the tank car
 - j. Press Weigh/Printer button
 - k. Press G/N key to display Gross Weight
 - l. Press button on front of Printer once
 - m. Remove Scale Ticket

3. How to Weigh and Printout Partial Loads

- a. Place tank car on Scale
- b. Place Scale Ticket in Printer
- c. Press I/D key
- d. Press "E" key then enter the tank car number
- e. Press "E" Key
- f. Press "T" key
- g. Press "E" key and enter Tare Weight of the tank car
- h. Press "E" key again.
(This enters the Tare Weight of the tank car.)
- i. Press G/N key to display the Net Weight
- j. Press Weigh/Print key
- k. Press key on the front of the Printer once
- l. Remove scale ticket

SCALE AT NORTHWEST STATION

1. How to Operate Scale

- a. Zero scale with Zero key
- b. Place tank car on the Scale
- c. Check Tare weight on the car against the Scale Weight
- d. Place Scale Ticket on the Tare line of the Printer
- e. Press Printer key
- f. Load the car
- g. Place Scale Ticket on the Gross Line of the Printer
- h. Press the Printer key
- i. Remove the Scale Ticket

2. How to Weigh and Printout Partial Loads

- a. Write the tank car number on the Scale Ticket
- b. Write the Tare Weight of the tank car on the Scale Ticket
- c. Place Scale Ticket on the Gross line of the Printer
- d. Press the Print key
- e. Remove the Scale Ticket
- f. Write in the Net Weight of the tank car

SCALES AT SOUTHWEST AND SOUTHEAST STATIONS

1. How to Operate Scale

- a. Zero scale with Zero key
- b. Place tank car on the Scale
- c. Check tank car Tare Weight against the Scale Weight
- d. Set tank car number on the Data Preset switches from right to left
- e. To Enter Tare Weight
 1. Press Auto Tare key
 2. Press Tare key
 3. Press Print key
 4. Press number 1 button (This enters and prints the Tare Weight)
- f. Press the Gross key for read out on the Scale
- g. Load the car
- h. Press the Print G-T-N key
- i. Press number 2 key (This prints out the Scale Ticket showing the Tare, Net, Gross and the Car Number.)

NOTE: On the two Fairbanks scales, the Tare Weight is printed twice on the Scale Ticket.

2. How to Weigh and Printout Partial Loads

- a. Place the tank car on the Scale
- b. Place the Scale Ticket in the Printer
- c. Set tank car number on the Data Preset switches from Right to Left
- d. Press the Tare key and enter the Tare Weight of the tank car
- e. Press the Enter key
- f. Press the Tare key
- g. Press the Print key
- h. Press the number 1 key (This enters and prints the Tare Weight.)
- i. Press the Gross key
- j. Press the G-T-N key
- k. Press the number 2 key (This prints out the Scale Ticket showing the Tare, Net, Gross and car number.)

NOTE: On the two Fairbanks scales, the Tare Weight is printed twice on the Scale Ticket.

KEY POINTS

1. Helper will work 1" angle valves as per established procedure.
 - A. See angle valve procedure this section.
2. Learn the proper use of the Scott air pack. Also, there is a video on reconditioning angle valves.
3. The chlorine rack job requires you to have a Comfo II Mask in your work area at all times.
4. Find and know the location of emergency pump shut down switches, chlorine alarms (sirens) and emergency valve switch.
 - A. Check the scale tank area for any contract personnel working. In the event of an emergency, they will need help and direction to evacuate.
5. Always upon entering the plant, take note of the wind direction, observe the wind socks. This will enable you to safely evacuate if the need arises.
6. During heavy rains, check scale pits to make sure there is not excessive water in them.
7. Southeast scale pit and southwest side have a manway operated steam siphon valve. Both north scale pits should pump out automatically. The north scale pits drain into a pit located at the west end of the chlorine scale tanks. This pit has a 2" automatic Pump, however, it may need help during heavy rains.

8. Gas sampling procedure.

- A. Fill the burette with water.
- B. Connect the sample hose to the top of the burette.
- C. Open the valve forcing the water out of the bottom of the burette.
- D. When all the water is out of the burette, close the sample valve, then the top and bottom valves of the burette.
- E. Run the sample with KI solution. The sample should be 90% chlorine.

9. Suggested Loading Station Line Up Procedure

Various loading conditions and production rates will cause the standard line up to vary at times. This suggested procedure will in most cases be the most productive way to proceed. It should allow for maximizing the use of the blowdown and the sniff system.

- A. When loading from two tanks, line up both tanks to both sides. For example: Load one side and push down while the other side is loading. This way you should have two cars on blowdown and two cars on sniff.
- B. When loading from three production tanks, line up two production tanks to one side of the loading rack and the third production tank to the other side of rack. The third production tank should be the one they are producing into the most.

For example: This way, one time you will push down two cars, and the next switch you will push down both sides of the rack or four cars.
- C. If you are loading from one production tank, use only one side of rack. This procedure will allow us to make better use of the blowdown and the sniff.

Also, by doing the cars this way, you will be able to pick up additional production tanks when they become available. The liquefaction operators are supposed to notify the rack person when chlorine is available to load.

When a production tank is made available for loading, pick it up at least by the next switch. Also, if you pull a production tank down that is being produced into and it will be over 12 hours before there is material to resume loading, shut down the pump and notify the liquefaction Operator.

10. The duties of the Tankerman working the chlorine rack at night and weekends also includes the responsibility for blowing down cars, sniffing and starting the water in the cars in the test rack. Note: see Tank Car Testing Procedure.
 - A. The car will be inspected for liquid or heavy gas prior to starting the water.
 - B. The car will be disconnected and tagged as being full of water.
 - C. NOTE: Caution, check the logbook, take every precaution the car does not contain water before hooking it up to pull a vacuum. This can cause severe damage to the sniff system and surge tank.

CHLORINE TANK CAR PRE-LOADING INSPECTION

Chlorine tank cars must be inspected by the Tankerman working the chlorine rack job before the cars can be loaded. The inspection is part of the requirements of the Department of Transportation (DOT) and the American Association of Railroads (AAR) for chlorine cars.

Notify your foreman of any defects so they can be repaired before the car is shipped. Some repair work, usually truck repairs, cannot be done on a loaded tank car. Record all defects on the bottom of the Chlorine Tank Car Inspection, Loading and Shipping Report (See Page XX) if the car is to be loaded. The Tankerman completing the inspection should be aware that he will be signing the inspection form to the effect that the inspection has been made.

Inspection steps are given below. Drawings on Pages XX, XX, and XX will assist you in locating the things to look for.

Truck

1. Check for broken or worn brake shoes. Shoes with 1/4" or less pad should be replaced.
2. Check the side bearings (Parts 123 and 127 on Page XX) on each side of the car for missing or broken rollers or blocks. There should be a clearance between the top of the side bearing and the shim bolts and shim plates.

3. Check the truck bolster friction wear plate for cracked or broken welds. This plate allows the truck bolster to move freely up and down. The pounding of the suspension system makes friction wear plate problems common. The plate can fall down to where it is visible next to the springs or is sometimes missing altogether. Some wear plates will have two bolts or a weld securing them to the truck side frames.
4. Check the roller bearing wedge. This wedge is the key to roller bearing operating in the correct position. The wedge should not be resting on the lip of the bearing part No. 4 on Page XX).
5. Check for broken or missing truck springs, both inner and outer.

Frame and Tank

1. Check the tank jacket for corrosion and the condition of the paint. Make a note of any discrepancies in the logbook and on the Loading/Inspection Report.
2. Check the test dates. Be sure all stenciling on the car is correct and legible.
3. Look for any obvious railroad damage such as dents, end sill damage and missing or hanging parts. Check for tags: "Bad Order", "Home Shop for Repairs", or "Do Not Load". These tags will usually be brightly colored and easily visible.

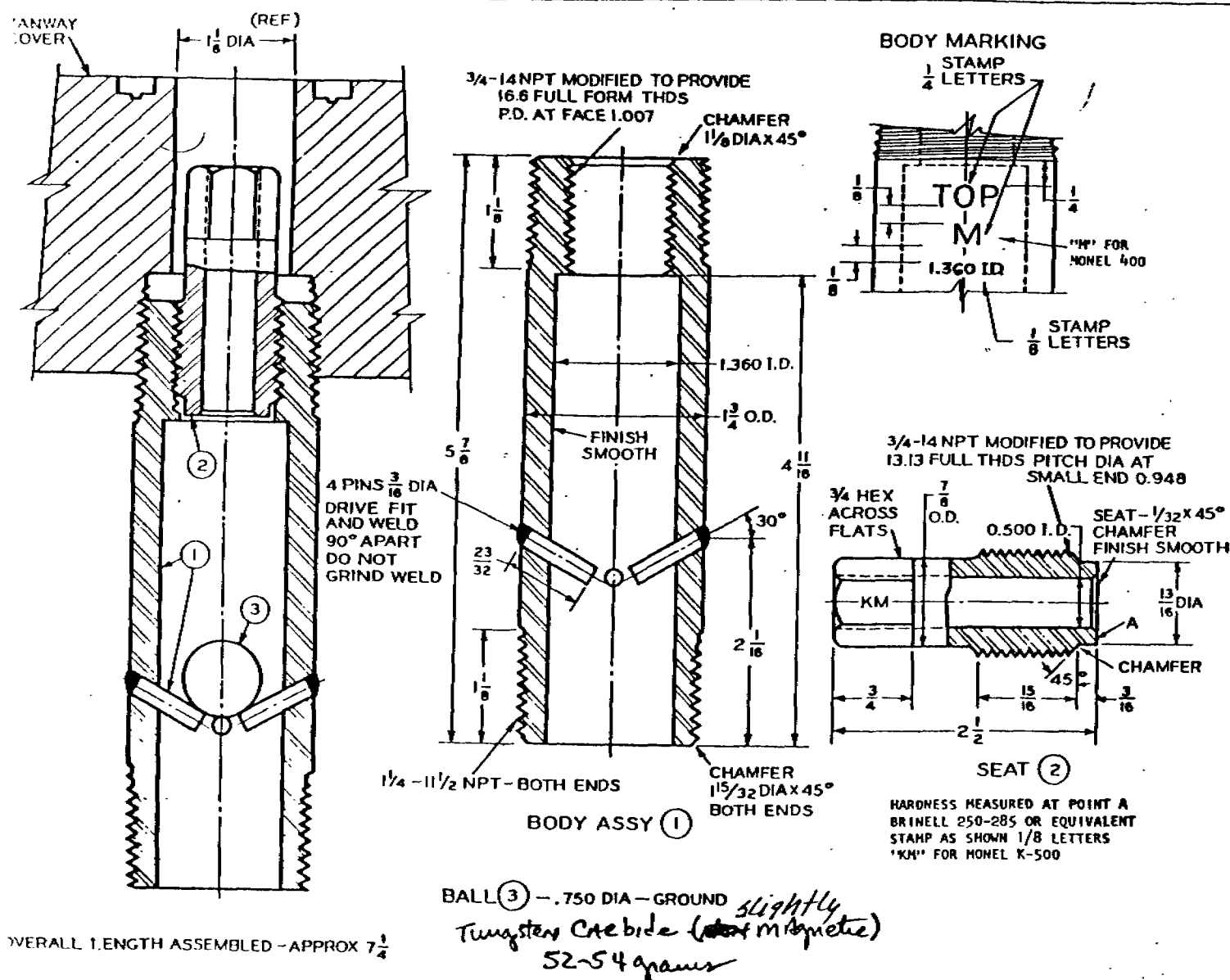
4. Look for missing or defective placard holders.
5. Be sure all cars have top and bottom shelf couplers.
6. Check for a cracked or damaged center plate. Look for missing bolts and rivets. Examine the bowl for damage.

Safety Appliance

Most of the safety items can be checked by shaking.

1. Check the top dome railing and bottom guard rails for missing bolts or broken rails. Look for loose or missing bolts on grab irons, sill steps, running boards, side ladders and the dome platform. Make sure these items are not bent or broken.
2. Check the uncoupler rod for correct operation.
3. Check the hand brake and the hand brake release. Inspect for a defective brake chain and any loose or hanging brake parts. Most hand brakes can be applied by turning the brake to the left or right.
4. If a car is involved in a derail, report the car number to your supervisor and inform the car shop. The car must not be shipped until it has been inspected by the tank car shop personnel.
5. Report any AAR cards to the foreman and the tank car repair shop.
6. Some of the problems that can arise from not inspecting a car prior to loading are:
 - A. The possibility of having to unload the car.

- B. Delay of shipment in route to the customer to make repairs in the plant.
- C. Complaints from a customer.
- D. Personal injury due to the defective part.
- E. Possible cause of derailment.
- F. D.O.T. Regulations.



ITEM	NAME OF PART	MAT'L
1	BODY ASSY	
1A	BODY	MONEL 400
1B	PINS	MONEL K-500
2	SEAT	"
3	BALL	NOTE 6

NOTES:

- DIMENSIONS IN INCHES UNLESS NOTED
- BREAK ALL SHARP CORNERS IN ACCORD WITH GOOD COMMERCIAL PRACTICE
- NPT THREAD TOLERANCE AND GAGING SHALL CONFORM TO ANSI B2.1
- UNLESS NOTED DIMENSION TOLERANCES ARE FRACTIONAL $\pm 1/64$, DECIMAL ± 0.003 , ANGULAR $\pm 2^\circ$
- BODY ASSY MUST BE PRESSURE TIGHT AT 90 PSIG
- BALL MATL - *SLIGHTLY NOT MAGNETIC* FIRTHITE TUNGSTEN CARBIDE, GRADE H-6 *Grade - 52-54g*
- MAXIMUM OPERATING FLOW RATE 15,000 LBS LIQUID CHLORINE PER HR
- THIS VALVE IS DESIGNED FOR USE UNDER THE LIQUID ANGLE VALVE ON CHLORINE BARGE AND TANK CAR TANKS

1	Update Address & Mat'l Spec. Updated	ccss
2	Update Name & Title Revised	ccss
3	Update Title Revised	ccss
ISS. DATE	REVISION	APPR.

THE CHLORINE INSTITUTE, INC.
NEW YORK, N. Y.

EXCESS FLOW VALVE
WITH REMOVABLE SEAT

15,000 LBS. PER HOUR

DRAWN	N. Hollger	
TRACED		
CHECKED		
APPROVED	5/5/58 ccss	
DWG. NO.	114	4

53-54 GRAMS

ITEM	NAME OF PART	MAT'L
1	BODY ASSY	
1A	BODY	MONEL 400 OR R-405
1B	PINS	MONEL K-500
2	SEAT	"
3	BALL	NOTE 7

NOTES:

1. DIMENSIONS IN INCHES UNLESS NOTED
2. BREAK ALL SHARP CORNERS IN ACCORD WITH GOOD COMMERCIAL PRACTICE
3. NPT THREAD TOLERANCE AND GAGING SHALL CONFORM TO ANSI B2.1
4. UNLESS NOTED DIMENSION TOLERANCES ARE FRACTIONAL $\pm 1/64$, DECIMAL ± 0.003 , ANGULAR $\pm 2^\circ$
5. THE TIG PROCESS USING A $1/16"$ DIA. TUNGSTEN ELECTRODE WITH MONEL FILLER METAL 60 IS RECOMMENDED
6. BODY ASSY MUST BE PRESSURE TIGHT AT 90 PSIG
7. BALL MATL - FIRTHITE TUNGSTEN CARBIDE, GRADE H-6
8. MAXIMUM OPERATING FLOW RATE 15,000 LBS LIQUID CHLORINE PER HR
9. THIS VALVE IS DESIGNED FOR USE UNDER THE LIQUID ANGLE VALVE ON CHLORINE BARGE AND TANK CAR TANKS

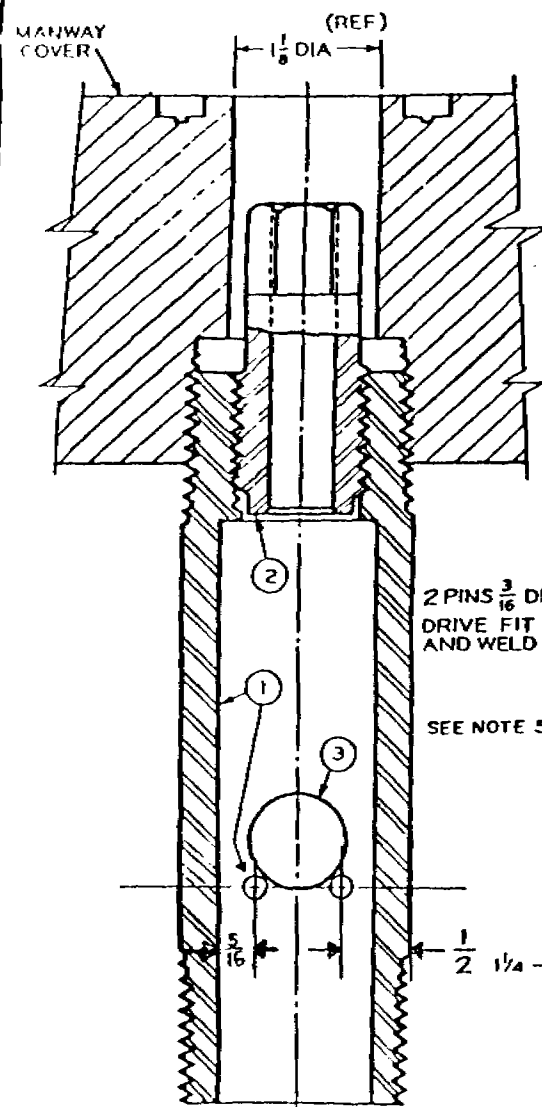
ISS	DATE	REVISION	APPR

PPG SKETCH

EXCESS FLOW VALVE
WITH REMOVABLE SEAT

15,000 LBS. PER HOUR

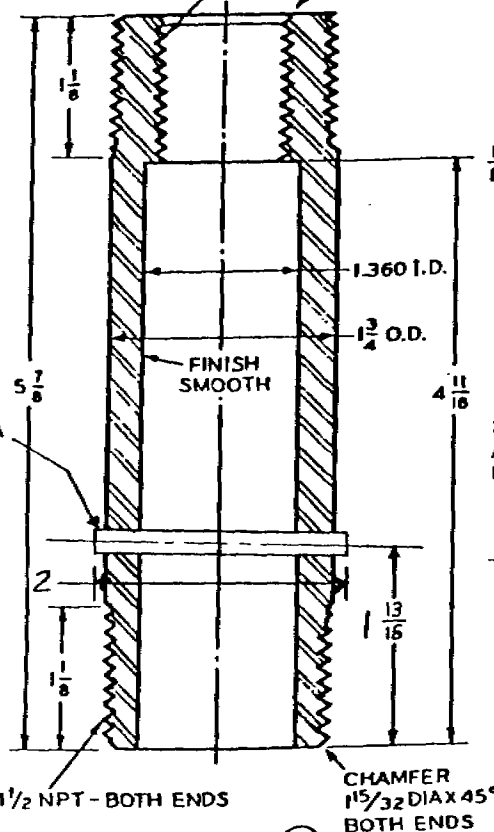
DRAWN R Haejirg	
CHECKED	
APPROVED 1-20-82	
DOC NO 1111-01	ISSUE 1



3/4-14 NPT MODIFIED TO PROVIDE
16.6 FULL FORM THDS
P.D. AT FACE 1.007

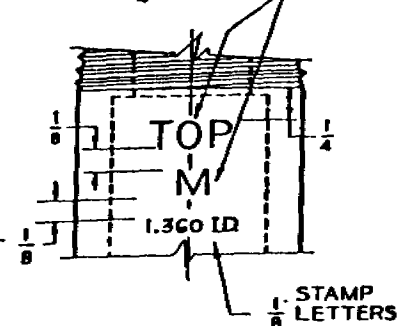
CHAMFER

1 1/8 DIA X 45°

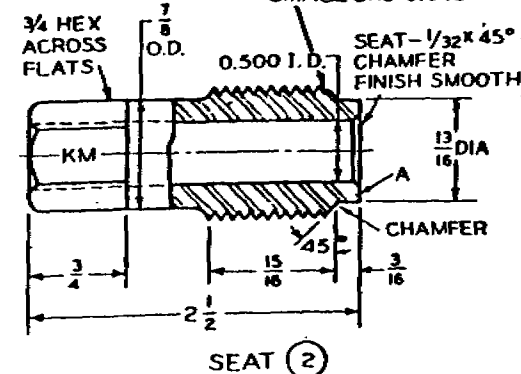


BALL ③ - .750 DIA - GROUND

BODY MARKING

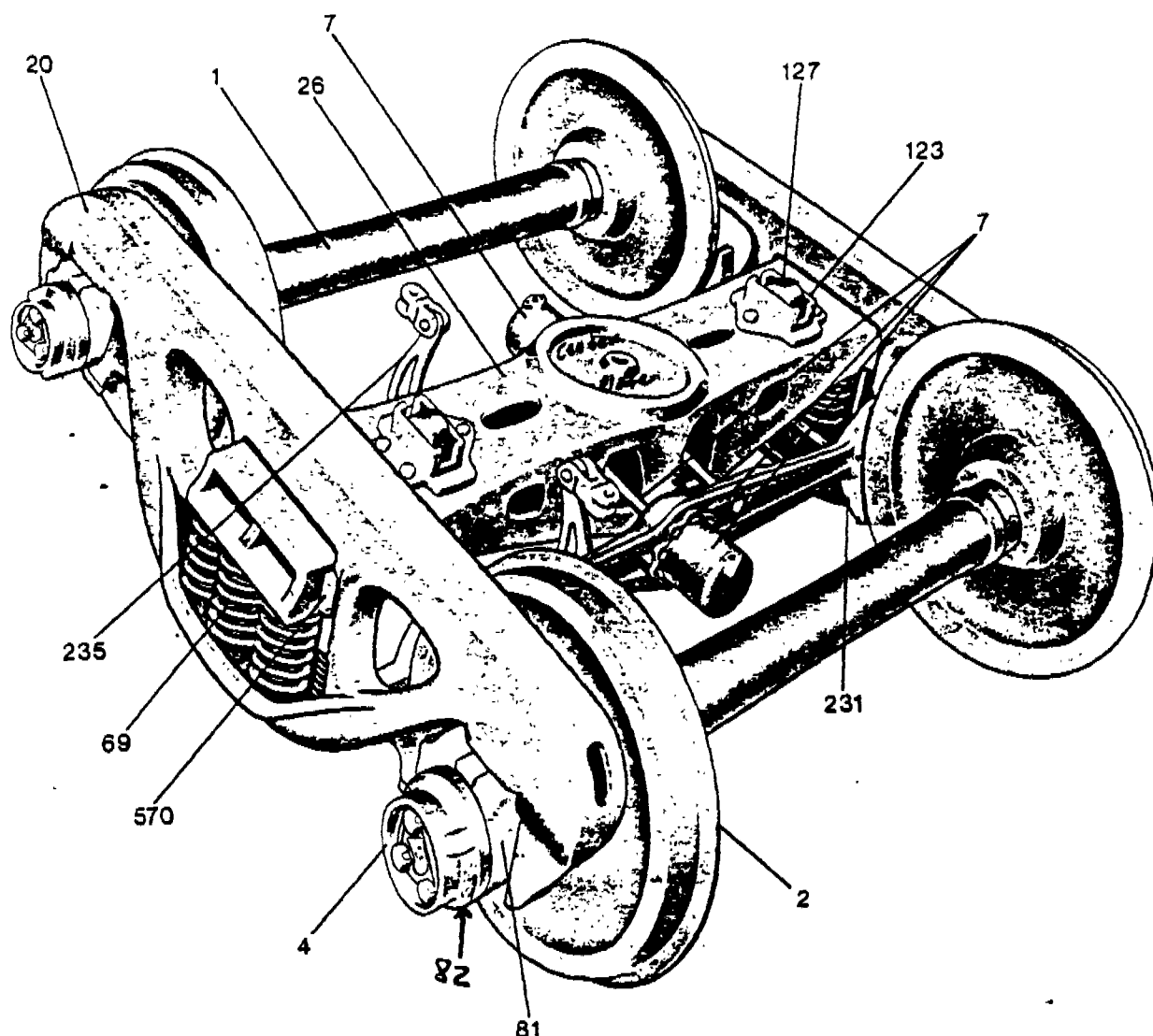
1/4 STAMP
LETTERSM-FOR MONEL 400
MR-FOR MONEL R-405

3/4-14 NPT MODIFIED TO PROVIDE
13.13 FULL THDS PITCH DIA AT
SMALL END 0.948



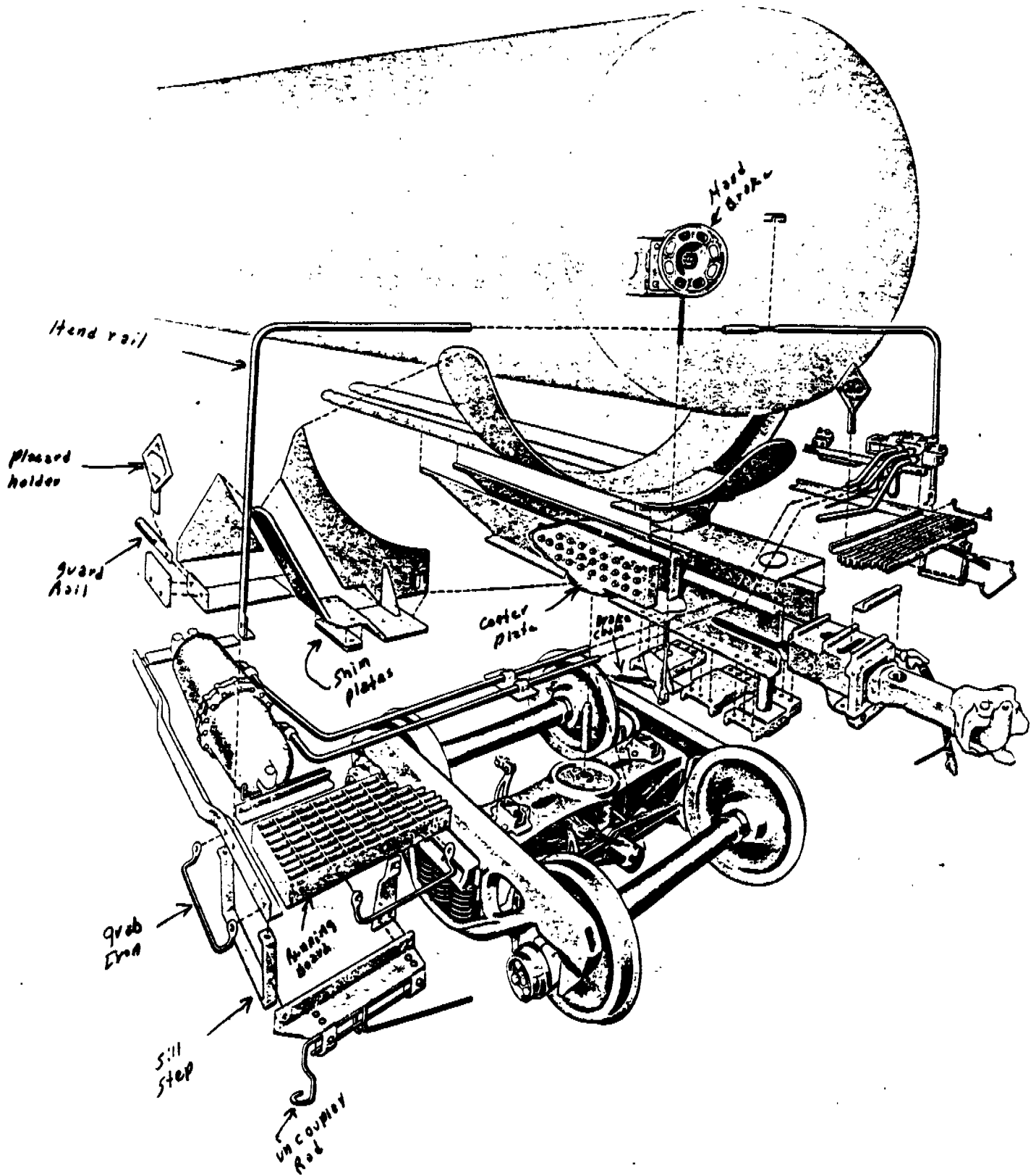
HARDNESS MEASURED AT POINT A
BRINELL 250-285 OR EQUIVALENT
STAMP AS SHOWN 1/8 LETTERS
"KM" FOR MONEL K-500

OVERALL LENGTH ASSEMBLED - APPROX 7 1/4



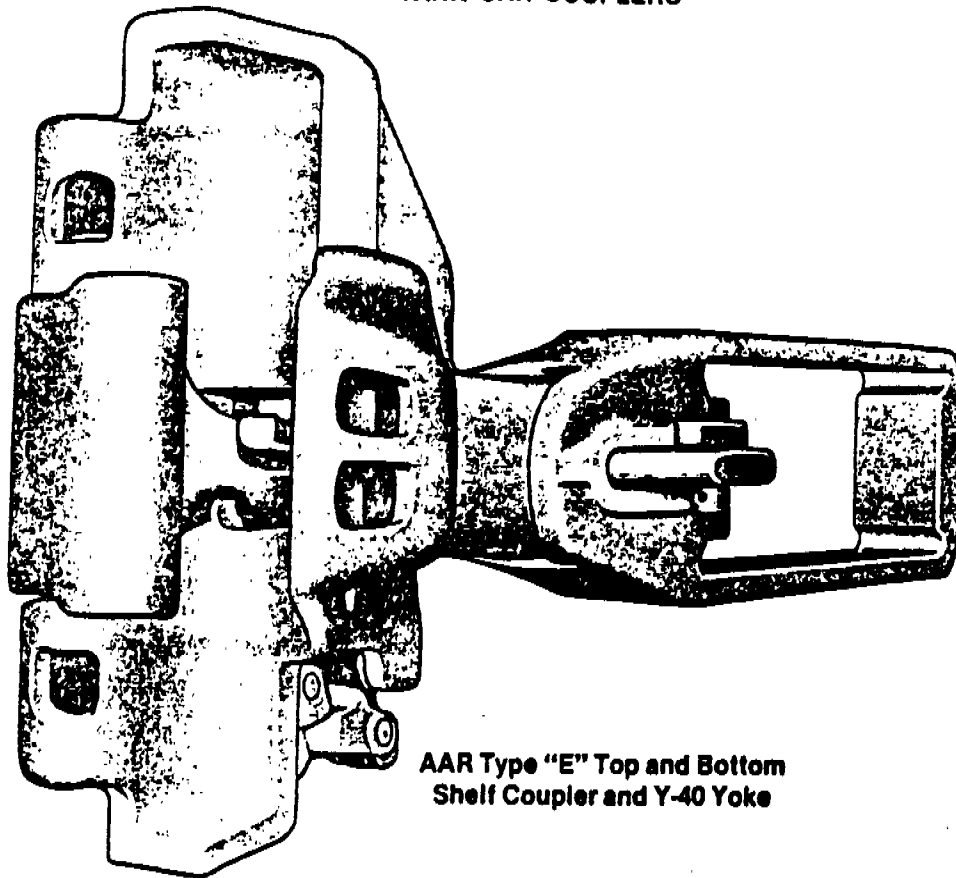
STABILIZED TRUCK, ROLLER BEARINGS, TRUCK MOUNTED AIR BRAKE EQUIPMENT

PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
1	CAR AXLE	81	ROLLER BEARING WEDGE
2	CAR WHEEL	123	TRUCK SIDE BEARING CAGE
4	TRUCK JOURNAL ROLLER BEARING	127	SIDE BEARING ROLLER
7	AIR BRAKE EQUIPMENT	231	BRAKE SHOE
20	TRUCK SIDE FRAME	235	BRAKE LEVER
26	TRUCK BOLSTER	570	TRUCK FRICTION WEDGE
69	TRUCK SPRING	82	ROLLER BEARING CASE

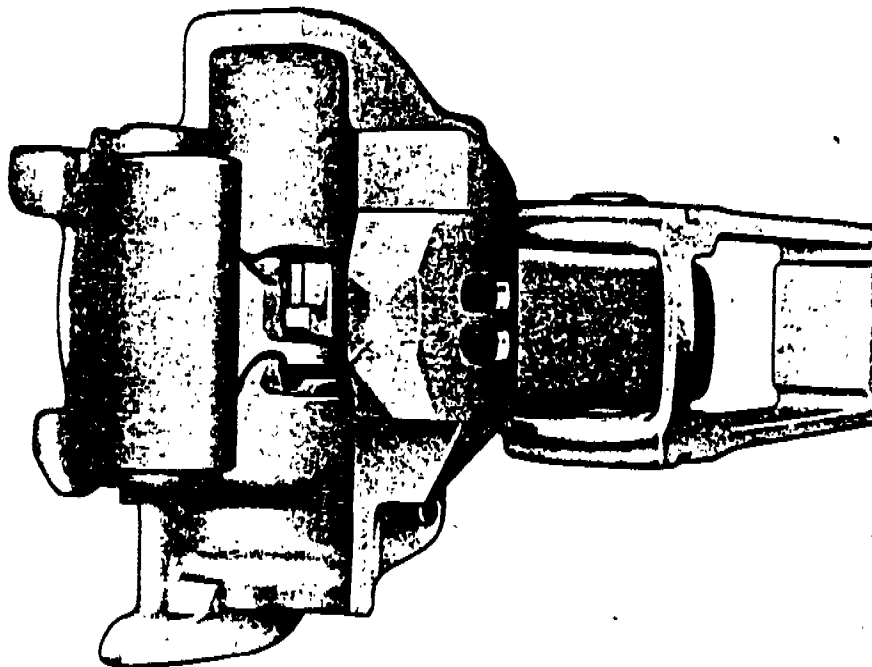


**DRAFT SILL AND END ARRANGEMENT
"EXPLODED" VIEW**

TANK CAR COUPLERS



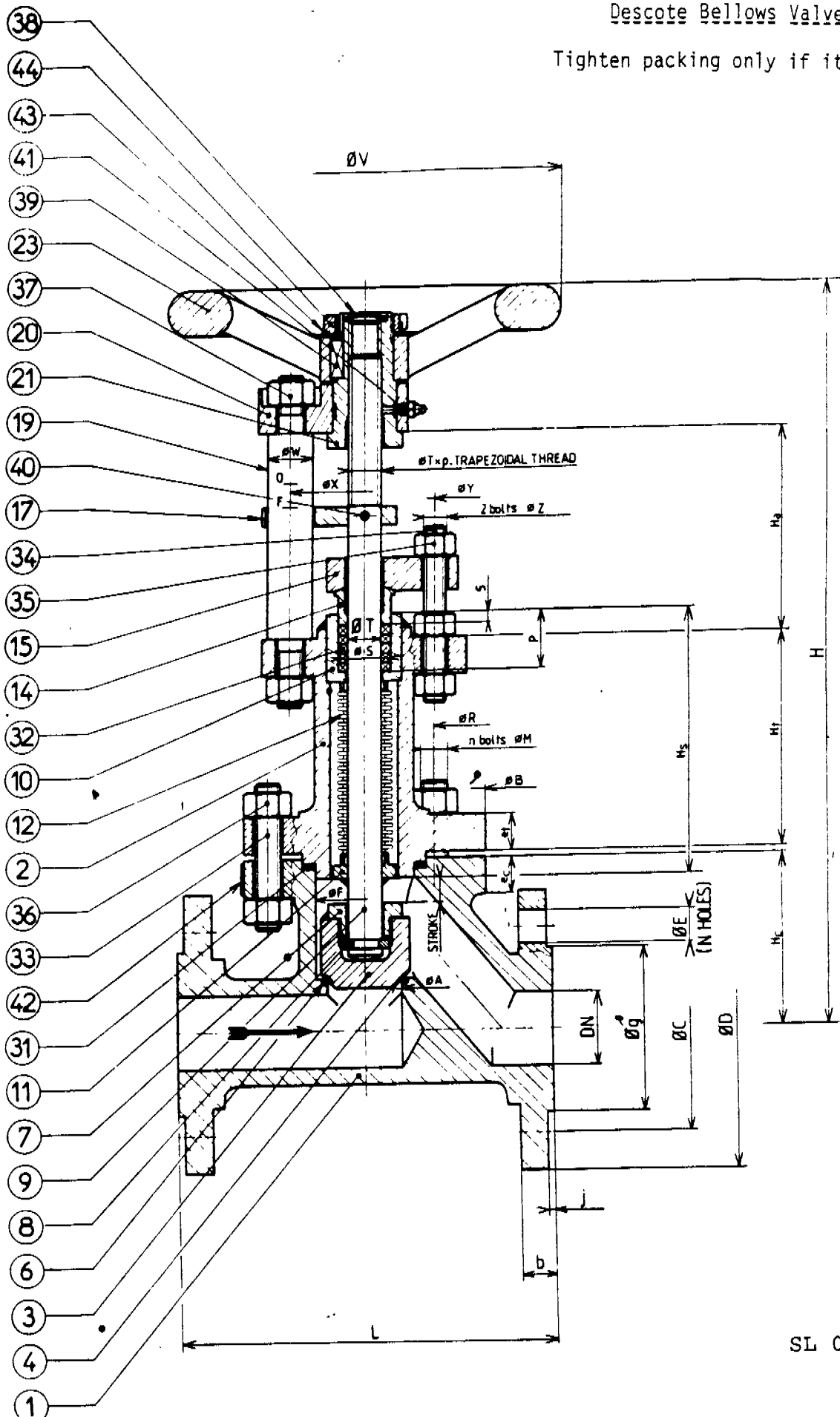
AAR Type "E" Top and Bottom
Shelf Coupler and Y-40 Yoke



AAR Type "F" Top and Bottom
Shelf Coupler and Y-45 Yoke

Descote Bellows Valve

Tighten packing only if it leaks.



ADVANTAGES OF PHOENIX BELLOWS SEALED GLOBE VALVES

13% Chrome Steel Upper Stem

Split Spindle avoids torsional forces on bellows, coupling serves as "OPEN" and "CLOSED" indicator.

Connecting Bolts make installation of limit switches, actuators and locking devices easy.

Safety Stuffing Box for secondary seal to atmosphere

Double walled Bellows protected in the bonnet designed for at least 10,000 cycles.

Bleed Hole for pressure release.

Stem Guide to avoid distortion of bellows.

Tongue and Groove flange arrangement between body and bonnet for tight static seal.

Tilting, conic Disc hardened with stellite for perfect seating.

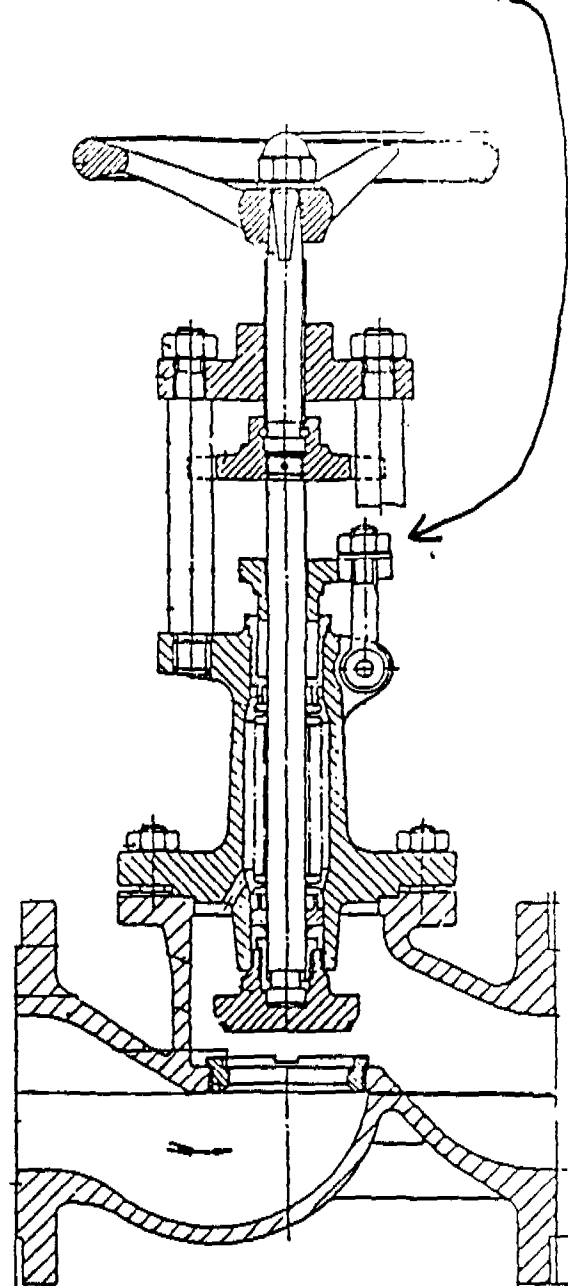
Travel stop serves as back-seat to avoid build-up on bellows.

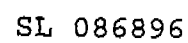
Replaceable seat for in-line maintenance, stellite for leaktight seal.

Smooth flow-path and bellows located in the bonnet, guarantee good cv-values.

CHARLESTON PROCESS CONTROL stocks PHOENIX valves for "General" and "Special" Applications as shown on the following pages. Other pressure ratings and Valves in other materials are available upon request.

PACKING IS TO BE LEFT LOOSE. IF BELLOWS START TO LEAK, TIGHTEN PACKING.



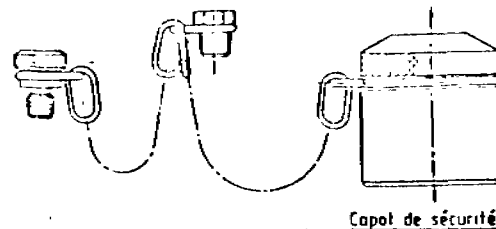
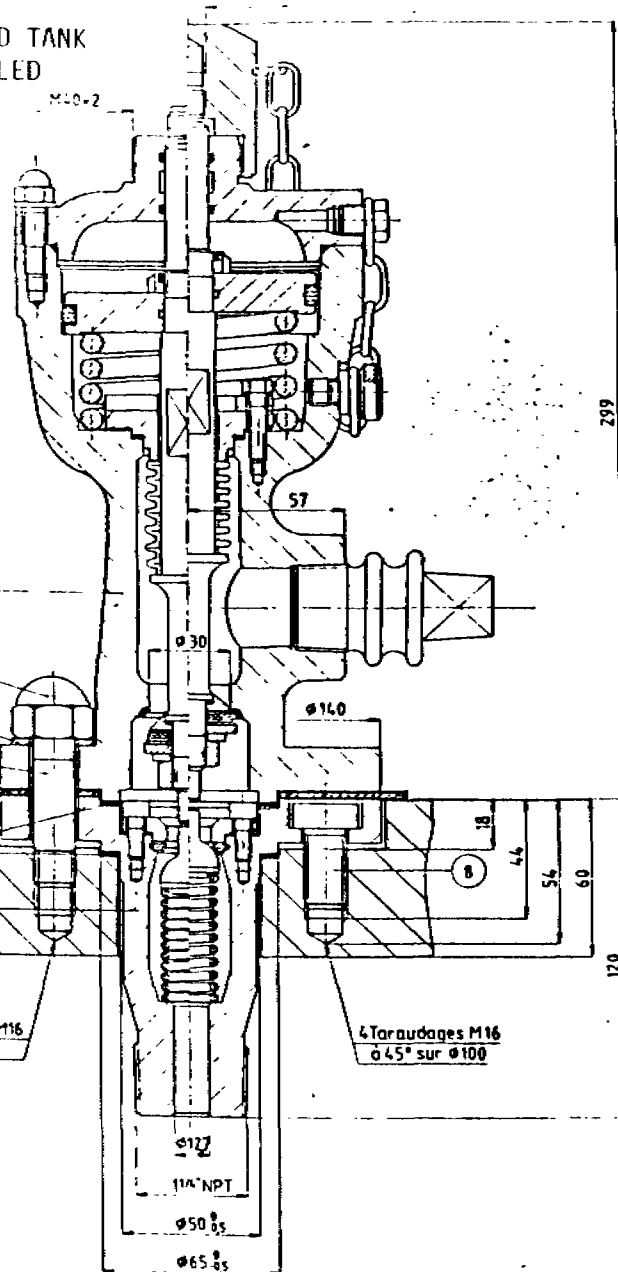


EMERTO AIR OPERATED TANK
CAR VALVE. INSTALLED
ON PPGX 1549 and
PPGX 1550

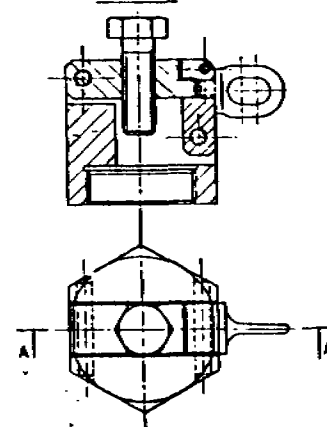
- ①
- ②
- ③
- ④
- ⑤
- ⑥
- ⑦

4 Taraudages M16
ø 5° sur ø 100

4 Taraudages M16
ø 45° sur ø 100



COUPE AA



Dispositif de commande manuelle

SL 086897

LAWRENCE LIQUID CHLORINE VERTICAL PUMPS

TECHNICAL DATA

1. While pumping, the 3-stage pumps were designed to pump 100-135 gpm at a discharge pressure of 200 psig. This corresponds to 75,000-100,000 lbs/hr of chlorine. Since we have pressure drop in lines and have to go through several valves, the losses bring us down to about the 60,000-70,000 lb/hr that we normally see with these pumps.
2. The excess flow valves seat at 150 gpm. They will also seat at 185 psig during start-up of the pump.
3. During start-up, the pump has no discharge pressure on it, so initially, it has the ability to pump well above 200 gpm until the discharge pressure builds up. This is well above the flow or pressure at which the excess flow valve seats.
4. The internal SRV relieves at 300 psig. Because the SRV relieves inside a tank that is normally operating between 45-50 psig, this pressure also has to be overcome. This means that the internal SRV actually does not relieve until 350 psig in reality.
5. Upon start-up or when a tank car is opened up for loading, the pump has to build up 165 psig after the check valve seats before it can relieve the internal SRV.
6. The pump dead head pressure with no recirculation is 250-260 psig. This cannot relieve the SRV. This continuous pressure will bend the pump shaft while it is spinning and wear out the bearings and bushings. Heat buildup also occurs down inside the pump and the bushings lose lubrication.
7. When the excess flow valve seats, the pressure shock wave surge that occurs is enough to create 6-8 times the normal pump discharge pressure (1200-1600 psig). The pump and gaskets between the pump bowls are only designed to withstand 300 psig. If the internal SRV sticks initially, the gaskets or pump casings will rupture.
8. Serious damage will occur to the pump impellers and bushings if reverse flow or reverse rotation occurs.

Rules to Follow During Normal Operations

1. Never transfer liquid or blow out lines for clearing through the pump discharge. No reverse flow can be tolerated. Close the discharge valve and use a recirculation drop or barge unloading tie-in to transfer or blow out a line. (See #8, page 1.)
2. Never start-up a pump with the discharge valve open. (See #2, & 3, page 1.)
3. Never start-up a pump by just pushing the start button once even with the discharge valve closed. (See #3, page 1.)
4. Never let the pump run deadheaded with no recirculation on the pump. (See #6, page 1.)
5. Never seat an excess flow check either during start-up or when first opening into a tank car or barge. (See #4, 5, & 7, page 1.)
6. Never close off into a tank car if no recirculation is open on the pump. (See #6, page 1.)
7. With the pump operating on recirculation, opening into a tank car or barge should be done slowly, especially if the tanks are sniffed down on a vacuum. (See #2 & 7, page 1.)

Problems Discovered During Pump Overhauls

1. Blown gaskets on pump bowls and discharge piping.
2. Bent or twisted shafts.
3. Extreme wear on the bushings and shafts.
4. Wear on the pump impellers.
5. Excess flow check balls lodged down inside the discharge piping.
6. Physical failure of the bolts that hold the pump bowls together.
7. Broken pump pressure gauges due to over ranging them beyond 300 psig.

Lawrence Liquid Cl₂ Vertical Pumps
Technical Data - cōntd.
Page 3

Proper Start-up Procedure for Liquid Chlorine Pumps

1. Check to be sure that the pump discharge valve is closed.
2. Open one recirculation valve 1/3 - 1/2 open.
3. While watching the pump shaft, bump the start-stop buttons 3-4 times to slowly and smoothly bring the pump up to operating speeds.
4. Immediately stop the pump if you hear the check valve seat.
5. Slowly open up the discharge valve while watching the pump discharge pressure gauge.
6. Bring the pressure up to 200 psig.
7. Slowly fill up the transfer piping.
8. Slowly open up into the tank car or barge.
9. If not enough flow is going into the car, slowly open the pump discharge valve wide open.
10. If loading is still too slow, the recirculation valve can be throttled back some, but it must be opened back to 1/3 - 1/2 open before closing off the tank car.
11. When the car is full slowly close off to the tank car.
12. If it's going to be awhile before you can push down and start loading again, check the pump discharge pressure. If it's at or above 250 psig, some recirculation will have to be added.

PROPER START-UP PROCEDURE FOR LIQUID CHLORINE PUMPS

WITH AUTOMATIC RECIRCULATION VALVES

1. The recirculation controllers have been tested and preset on each pump. The controller box should not be opened and the settings should not be changed.
2. Check to be sure that the block valve going to the discharge pressure gauge and controller impulse line is open.
3. Be sure that the pump discharge valve is closed.
4. Open the recirculation block valve at the tank dome on the recirculation line that has the automatic valve.
5. Be sure the other two recirculation lines are blocked off.
6. While watching the pump shaft, bump the start-stop buttons 3-4 times to slowly and smoothly bring the pump up to operating speeds.
7. Immediately stop the pump if you hear the check valve seat.
8. Slowly open the discharge valve while watching the pump discharge pressure gauge.
9. You should be able to open the discharge valve wide open without seating the excess flow check.
10. Slowly fill up the transfer piping. The automatic valve will close off as needed.
11. Slowly open up into the tank car/barge.
12. When the car is full, slowly close off to the tank car.
13. The automatic valve will close while loading and open back up to put recirculation on the pump when loading is stopped.
14. Shutdown the pump and block the discharge valve if you won't be loading out of that scale tank again for several hours.
15. If you plan on loading again out of that tank during your shift and the scale tank has more than 85,000 lbs of chlorine inventory, you can leave the pump on. The automatic recirculation valve will maintain flow through the pump to prevent damage to the pump.

2/26/87

FILE: LAWVERPP.LIQ

SL 086901

OPERATION OF SCALE TANK PUMP AUTOMATIC RECIRCULATION LINE

1. The valve eliminates the need for manual recirculation.
2. The valve will allow more chlorine to be loaded each hour.
3. The valve will help to lessen the number of times an excess flow check valve is seated.
4. The valve will protect the pump when it is running while tank cars are being switched.
5. Start-up of the pump should be the same as procedure as before.
6. When filling the loading headers, the valves should be opened slowly to pressurize the headers to the Tank Car Rack or the Docks.
7. Opening into unpressurized lines too fast will seat the excess flow check even with the automatic recirculation valve.
8. As you open up to the tank car, the automatic valve will start closing to keep over 200 psig pump pressure.
9. The valve should be completely closed while loading is taking place.
10. As you start closing off on the tank car, the valve will start opening to relieve the resulting high pump discharge pressure.
11. While blocked from the tank car, the valve will remain 100% open.
12. When starting a new tank car, start opening slowly so the automatic valve has time to close off.

2/26/87
FILE: LAWVERPP.LIQ

SL 086902

Cl_2 Scale Tank Pump

SL 086903

