

# CONSOLIDATED®

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## INSTALLATION & MAINTENANCE MANUAL

**Safety Relief Valves**

**Type 1970 and 1975**

**INDUSTRIAL VALVES**

**DRESSER**

**DRESSER VALVE AND CONTROLS DIVISION  
INDUSTRIAL VALVE NORTH AMERICAN OPERATIONS  
ALEXANDRIA, LOUISIANA USA**

Revised October, 1987

## **SAFETY NOTICE**

PROPER SERVICE AND REPAIR IS IMPORTANT TO THE SAFE, RELIABLE OPERATION OF ALL VALVE PRODUCTS. THE SERVICE PROCEDURES RECOMMENDED BY DRESSER INDUSTRIAL VALVE DIVISION AND DESCRIBED IN THIS INSTALLATION AND MAINTENANCE MANUAL ARE EFFECTIVE METHODS OF PERFORMING THE REQUIRED MAINTENANCE OPERATIONS. SOME OF THESE SERVICE OPERATIONS REQUIRE THE USE OF TOOLS SPECIFICALLY DESIGNED FOR THE PURPOSE. THESE SPECIAL TOOLS SHOULD BE USED WHEN AND AS RECOMMENDED.

IT IS IMPORTANT TO NOTE THAT THIS SERVICE MANUAL CONTAINS VARIOUS WARNINGS AND CAUTIONS WHICH SHOULD BE CAREFULLY READ IN ORDER TO MINIMIZE THE RISK OF PERSONAL INJURY OR THE POSSIBILITY THAT IMPROPER SERVICE METHODS WILL BE FOLLOWED WHICH MAY DAMAGE THE VALVE OR RENDER IT UNSAFE. IT IS ALSO IMPORTANT TO UNDERSTAND THAT THESE WARNINGS AND CAUTIONS ARE NOT EXHAUSTIVE. DIVD COULD NOT POSSIBLY KNOW, EVALUATE AND ADVISE THE CUSTOMER OR UTILITY OF ALL CONCEIVABLE WAYS IN WHICH SERVICE MIGHT BE DONE, OR IF THE POSSIBLE HAZARDOUS CONSEQUENCES OF EACH WAY. CONSEQUENTLY, DIVD HAS NOT UNDERTAKEN ANY SUCH BROAD EVALUATION ACCORDINGLY, ANYONE WHO USES A SERVICE PROCEDURE OR TOOL WHICH IS NOT RECOMMENDED BY DIVD MUST SATISFY HIMSELF THOROUGHLY THAT NEITHER HIS SAFETY NOR VALVE SAFETY WILL BE JEOPARDIZED BY THE SERVICE METHOD HE SELECTS. CONTACT DRESSER IF THERE IS ANY QUESTION ON THE METHOD.

THE TESTING, INSTALLATION, AND REMOVAL OF VALVE PRODUCTS MAY INVOLVE THE USE OF FLUIDS AT EXTREMELY HIGH PRESSURE AND TEMPERATURE. CONSEQUENTLY, EVERY PRECAUTION SHOULD BE TAKEN TO PREVENT INJURY TO PERSONNEL DURING THE PERFORMANCE OF ANY TEST, INSTALLATION OR REMOVAL SUCH AS, BUT NOT LIMITED TO, EAR DRUM PROTECTION, EYE PROTECTION, AND PROTECTIVE CLOTHING SUCH AS GLOVES, ETC., IN AND AROUND THE TESTING, INSTALLATION, OR REMOVAL AREA. DUE TO THE VARIOUS CIRCUMSTANCES AND CONDITIONS IN WHICH THESE OPERATIONS MAY BE PERFORMED ON OUR PRODUCTS, OR THE POSSIBLE HAZARDOUS CONSEQUENCES OF EACH WAY, DIVD COULD NOT POSSIBLY EVALUATE ALL CONDITIONS THAT COULD INJURE PERSONNEL OR EQUIPMENT, BUT DOES OFFER THESE SAFETY PRECAUTIONS AS AN ASSISTANCE ONLY.

BEFORE INSTALLING VALVE, READ PAGE 4 REGARDING INSTALLATION.

## **SAFETY PRECAUTIONS**

FOLLOW ALL PLANT SAFETY REGULATIONS BUT BE SURE TO OBSERVE THE FOLLOWING:

1. BE SURE TO LOWER THE WORKING PRESSURE BEFORE MAKING ANY VALVE ADJUSTMENT. THIS WILL AVOID POSSIBLE PERSONAL INJURY.
2. DO NOT STAND IN FRONT OF THE DISCHARGE SIDE OF A PRESSURE RELIEF VALVE WHEN TESTING OR OPERATING.
3. HEARING PROTECTION SHOULD BE USED WHEN TESTING OR OPERATING VALVE.
4. WEAR PROTECTIVE CLOTHING, HOT WATER CAN BURN AND SUPERHEATED STEAM IS NOT VISIBLE.
5. EXERCISE CAUTION WHEN EXAMINING A PRESSURE RELIEF VALVE FOR VISIBLE LEAKAGE.
6. WHEN REMOVING THE PRESSURE RELIEF VALVE DURING DISASSEMBLY, STAND CLEAR AND/OR WEAR PROTECTIVE CLOTHING TO PREVENT EXPOSURE TO SPLATTER OF ANY CORROSIVE PROCESS MEDIUM WHICH MAY HAVE BEEN TRAPPED INSIDE. ENSURE VALVE IS ISOLATED FROM SYSTEM PRESSURE BEFORE VALVE IS REMOVED.

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## HANDLING, STORAGE, AND PREINSTALLATION

1. Safety Relief Valves should be stored in a dry environment to protect them from the weather. They should not be removed from the crates until immediately prior to installation.
2. Flange protectors and sealing plugs should not be removed until the valve is ready to be bolted into the installation, i.e., both inlet and outlet.
3. Safety Relief Valves, either crated or uncrated, should never be subjected to sharp impact. This would be most likely to occur by bumping or dropping during loading or unloading from a truck or while moving with a power conveyor, such as a fork lift truck.
4. When Safety Relief Valves are uncrated and the flange protectors or sealing plugs removed immediately prior to installation, meticulous care should be exercised to prevent dirt and other foreign materials from entering the inlet and outlet ports while bolting in place.

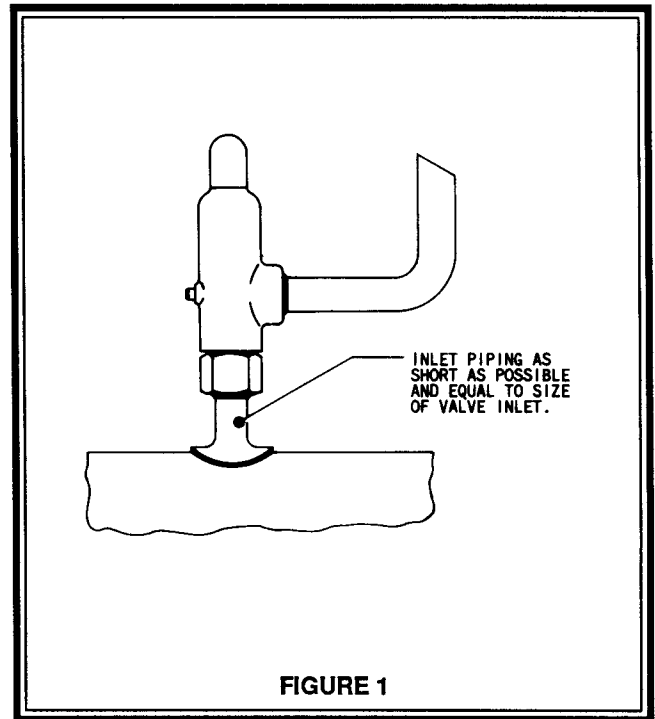
## INSTALLATION

Consolidated Safety Relief Valves are checked, set and adjusted at the factory. Inlet and outlet connections are protected for shipment and storage. Accumulation of sand, dirt, etc., in relief valve inlet ports will be carried across the seat while the valve is in operation and is frequently the cause of seat leaks and unsatisfactory operation. To prevent future trouble, store Safety Relief Valves in a clean dry place and do not remove from crate until ready for installation.

Safety Relief Valves must be connected on full sized vessel nozzles as direct and close as possible to the vessel or pipeline (Figure 1). No stop valve should be placed between the pressure vessel and its relief valve except as permitted by code regulations. If a stop valve is located between the pressure vessel and Safety Relief Valve, the stop valve port area should equal or exceed the nominal internal area associated with the pipe size of the safety relief valve inlet. Remove all dirt, sediment, or scale from the relief valve inlet port and vessel. The relief valve should be installed in a vertical position only, (Per API-520). Inlet bolts must be drawn down evenly to prevent distortion of the valve body.

The size of the discharge piping should never be less

than the valve outlet size, and designed so as to limit variable back pressure to a maximum of 10% of the valve set pressure. The arrangement should be as short and direct as possible. The outlet system should be designed and installed to eliminate all possible piping strains on the valve from various sources.

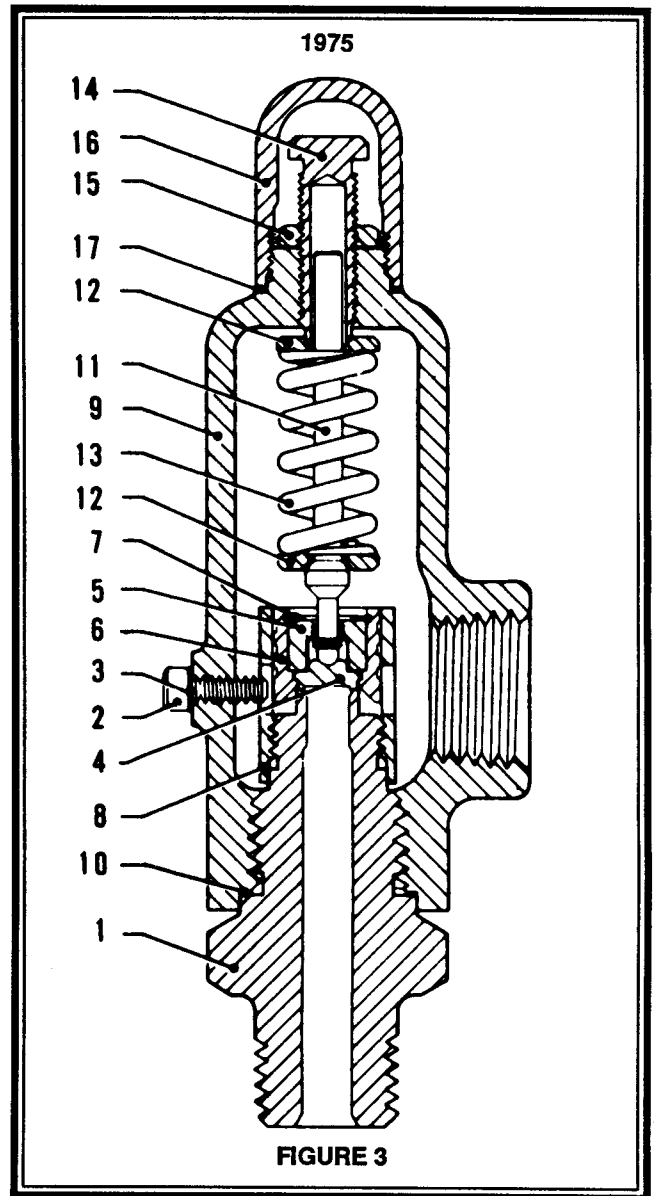
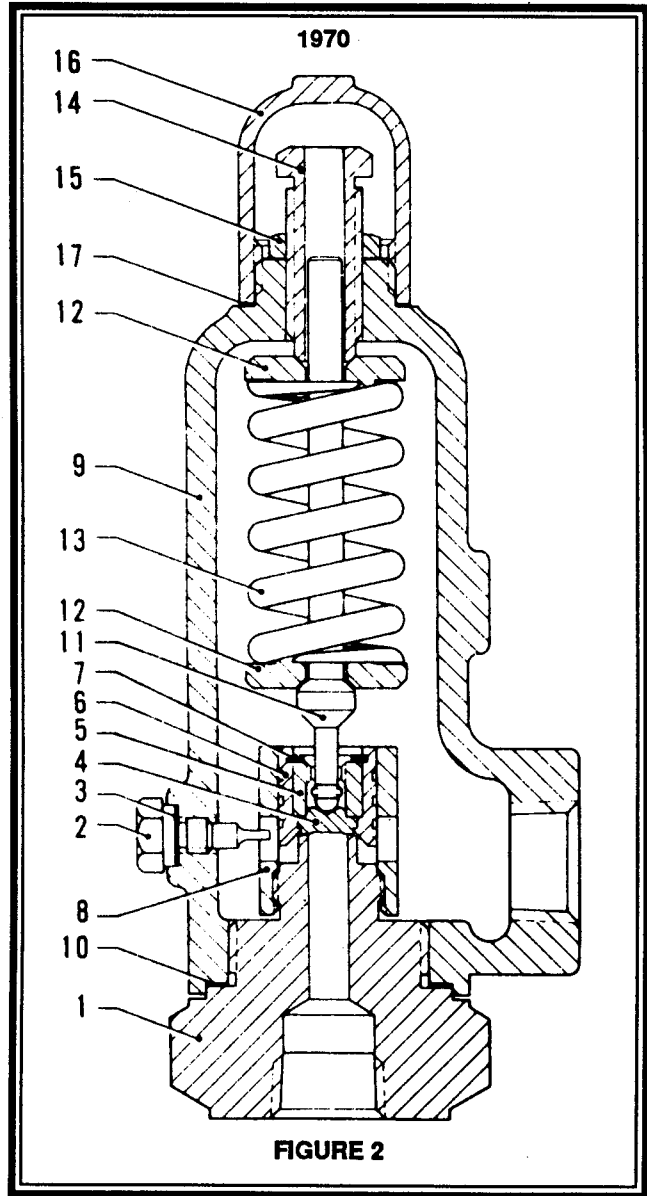


## DISASSEMBLY

(For parts information refer to Figures 2 and 3).

1. Remove cap (lifting gear) and cap gasket.
2. Remove guide pin and gasket. If the existing valve action is to be restored, the position of the guide should be determined. Work through the valve outlet and turn the guide clockwise until it contacts the base, recording the number of holes turned. Leave in this position during disassembly. Return to the original position upon assembly.
3. Loosen the adjusting screw locknut.
4. Remove the adjusting screw. Count the number of

# DISASSEMBLY (Continued)



turns necessary to barely remove all spring compression and record this figure. Removal of spring compression is indicated when the spindle stops rotating.

5. Unscrew bonnet from base.

6. Remove spring, spring washers, spindle and disc holder assembly.

7. Remove guide from base.

## 1975 NOMENCLATURE

- |                       |                              |
|-----------------------|------------------------------|
| 1. BASE               | 10. BONNET GASKET            |
| 2. GUIDE PIN          | 11. SPINDLE                  |
| 3. GUIDE PIN GASKET   | 12. SPRING WASHER            |
| 4. DISC               | 13. SPRING                   |
| 5. DISC RETAINER      | 14. ADJUSTING SCREW          |
| 6. DISC HOLDER        | 15. ADJUSTING SCREW LOCK NUT |
| 7. RETAINER LOCK RING | 16. CAP                      |
| 8. GUIDE              | 17. CAP GASKET               |
| 9. BONNET             |                              |

# SEAT REPAIRING AND LAPPING

Reconditioning of the seating surface of the disc and base is accomplished by lapping with a flat cast iron ring lap coated with Grade No. 1000 KWIK-AK-SHUN Silicon-Carbide compound, or equivalent.

The following precautions and hints will enable anyone to do a "professional" job of lapping seats.

1. Keep the work clean.
2. Always use a fresh lap. If signs of wearing (out of flatness) is evident recondition the lap.
3. Apply a very thin layer of compound to the lap. This will prevent rounding off the edges of the seat.
4. Keep the lap squarely on the flat surface and avoid any tendency to rock the lap which will cause rounding of the seat.
5. When lapping, keep a firm grip on the part to prevent the possibility of dropping it and damaging the seat.
6. Lap, using a reciprocating motion in all directions, at the same time applying uniform pressure and rotating the lap slowly.

7. Replace the compound frequently after wiping off the old compound, and apply more pressure to speed the cutting action of the compound.

8. To check the seating surfaces, remove all compound from both the seat and the lap. Then shine up the seat with the same lap using the lapping motion described above. Low sections on the seating surface will show up as a shadow in contrast to the shiny portion. If shadows are present, further lapping is necessary and only laps known to be flat should now be used. Only a few minutes will be required to remove the shadows.

9. The seat should now be thoroughly cleaned with kerosene or light oil, using a lit-free cloth or tissue paper.

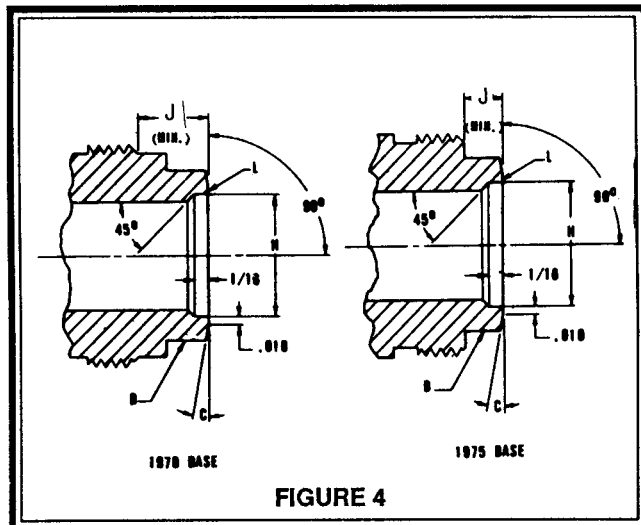


FIGURE 4

VALVE	SIZE	H	C	J(MIN.)
1970	3/4 & 1	.576	15°	1/2
1970	1-1/2 & 2	.854	7-1/2°	15/16
1975	1/2, 3/4, & 1	.389	10°	3/16

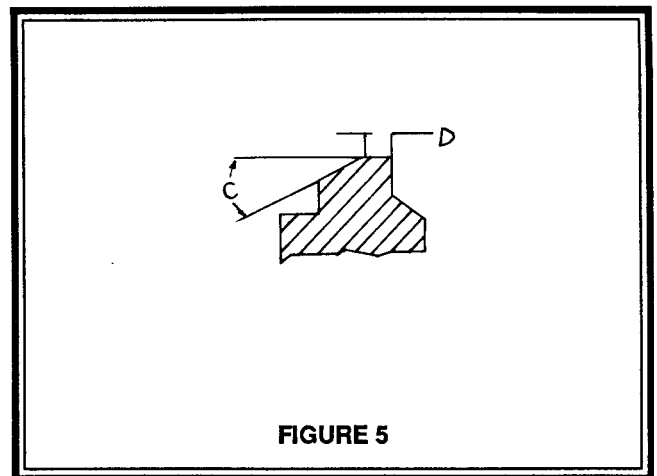
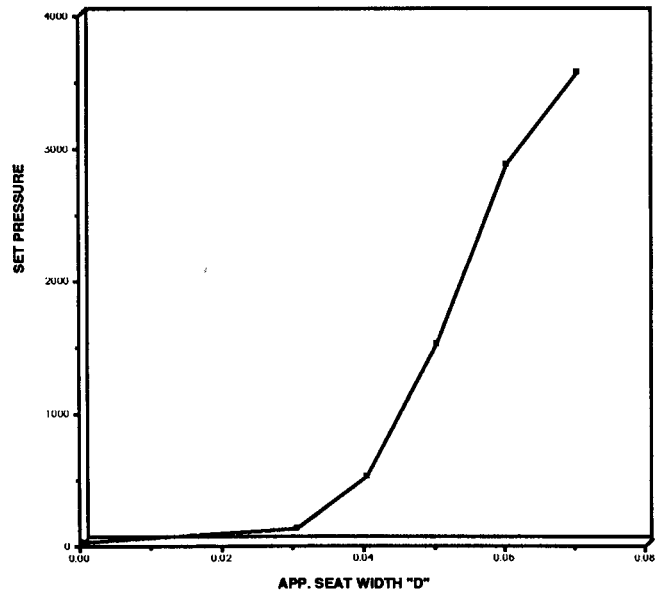


FIGURE 5

## SEAT REPAIRING AND LAPPING (Continued)

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When seats cannot be repaired by lapping, they can be remachined using dimensions given in Fig. 4.

The following procedure can be used when machining the base seat:

1. Using a four-jaw chuck, align the base so that it is running true.
2. Take light cuts on the seat surface until all damage is removed. Reestablish dimension.
3. Lap the seat width according to Fig. 5.
4. When minimum dimensioned "J" is exceeded, the base should be discarded.

### SET PRESSURE VS SEAT WIDTH

Figure 5 relates the nozzle seat width required for set pressures to 3600 psi. Above 3600 psi, the seat should be full width and flat, with no bevel.

## REASSEMBLY

(For parts identification refer to Fig. 2 and 3)

Before assembly, all parts should be cleaned.

1. Thread the guide onto the base until it contacts the base shoulder.
2. Apply a small amount of lubricant (Nickel Ease) to the end of the spindle and install it in the disc holder assembly.
3. Insert assembly into guide.
4. Apply a small amount of lubricant to the bearing surface of the lower spring washer and slip over spindle. Install the spring and upper spring washer.
5. Install a new bonnet gasket on base. Apply a small amount of lubricant to the bonnet thread on the base and install bonnet on base.
6. Apply a small amount of lubricant to the tip of the adjusting screw. Install the adjusting screw in the bonnet, rotating the number of times required to restore it to

the original position.

7. Restore the guide to the original position and install the guide pin with the guide pin gasket.
8. Valve is now ready for testing.

## SETTING, TESTING AND ADJUSTMENTS

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### SAFETY RELIEF VALVE PERFORMANCE

Satisfactory safety relief valve operation requires that the valve seat shall be tight at the operating pressure (normally about 90% of the set pressure). On gases and vapors, the valve should pop at set pressure after the usual slight warning.

### BLOWDOWN ADJUSTMENT (Reseating Pressure)

NOTE: UNLESS THE TEST STAND CAPACITY IS EQUAL TO OR GREATER THAN THAT OF THE VALVE, DO NOT ATTEMPT TO SET BLOWDOWN. SIMPLY RETURN THE GUIDE TO THE ORIGINAL POSITION.

Blowdown adjustments are made by means of the guide on 1970 and 1975 valves.

If longer or shorter blowdown is required, it can be obtained as follows:

- a. To increase blowdown (lower reseating pressure), the guide must be raised by moving the notches from left to right past the ring pin hole.
- b. To decrease blowdown (raise reseating pressure), the guide must be lowered by moving the notches from right to left past the ring pin hole.

### SETTING AND TESTING AFTER RECONDITIONING

Before putting the reconditioned valve in service, it must be set to open at the required set pressure. Although the valve can be set on the service installation, it is more convenient to set the valve and check seat tightness on a test stand.

When using a test stand, the valve should be set to open at the cold differential set pressure as shown on the nameplate. The cold differential set pressure is the set pressure corrected to compensate for back pressure and/or operating temperature.

### SETTING THE VALVE

Set the valve on clean air. Before mounting the valve on the test stand, remove all dirt, sediment or scale from the test tank nozzle and the inlet port of the valve. Be sure that the test gauge is accurate and has recently been calibrated on a dead weight gauge tester.

Mount the valve on the test stand. Slowly bring the pressure up in the test tank to the cold differential set pressure. If the valve opens before the desired pressure is reached, additional compression is required on the

spring. Turn the adjusting screw clockwise. If the valve does not open at the desired pressure, maintain the required pressure in the test tank and slowly release the compression on the spring by turning the adjusting screw counterclockwise until the valve opens. Continue adjustment until the valve opens at the desired pressure. The spindle should be centrally located within the adjusting screw as hard rubbing of the spindle against the side of the adjusting screw may cause poor valve action.

After the required set pressure is obtained, tighten the adjusting screw nut and repeat test. At least three repeat openings at the same pressure should be obtained to be sure that the valve is set accurately.



# REPLACEMENT PARTS

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The basic objective in formulating a service parts inventory philosophy is to provide prompt service capability, thus preventing maintenance outage time extensions. To accomplish this, it is necessary to have immediate availability of the proper inventory of service parts for optimum valve quantities. This can be achieved at a minimum of cost by defining the inventory on a frequency of need basis.

To assist towards this objective, the Field Service and Repair Organization of Dresser Industries - Industrial Valve and Instrument Division recommends that the following guidelines be utilized to establish meaningful inventory levels.

1. Identify the total number of safety valves in service by size, type number, temperature class, and serial number.
2. Identify the frequency of replacement tendency of specific parts.

**Class I** - Parts Most Frequently Replaced

**Class II** - Parts Less Frequently Replaced, but Critical in the Event of an emergency Requirement

**Class III** - Parts Seldom Replaced

**Class IV** - Hardware (e.g., nuts, bolts, pins, cap components, etc.)

**Class V** - Parts Practically Never Requiring Replacement.

3. "Need Probability Coverage" is defined as the probable per cent (5) of total, uninterrupted operational time which can be expected by stocking predetermined valve component classifications.

Determine "need probability coverage" which is compatible with a specific company's operational objectives and service parts inventory investment philosophy. Then relate "need probability coverage" to parts classifications which will satisfy that need. Guidelines are as follows:

Parts Classification	Need Probability Coverage
Class I	70%
Class I & II	85%
Class I, II, & III	95%
Class I, II, III & IV	99%

4. Consult recommended spare parts list by valve type to determine quantity of parts for valves to be covered by the inventory plan.

5. Select parts and specify quantities.

## YOUR SAFETY IS OUR BUSINESS!!!

Dresser Industrial Valve & Controls Division has authorized no company nor individual to manufacture replacement parts for our valve products.

When ordering replacement valve parts, please specify in your purchase order: "All parts must be documented as new and sourced from Dresser Industrial Valve & Controls Division.

**BE SURE BE SAFE**

## RECOMMENDED SPARE PARTS (Continued)

### Recommended Spare Parts - Safety Relief Valves 1970-1975 Portables - Conventional Design

CLASS	PART NAME	C-CONVENTIONAL	QTY. PARTS/ SAME VALVES IN SERVICE	NEED PROBABILITY COVERAGE
I.	Disc	C	1/1	70%
	Guide Pin	C	1/1	
	Gasket (Set)			
	(1) Cap Gasket	C	1/1	
	(2) Guide Pin Gasket	C	1/1	
II.	(3) Bonnet Gasket	C	1/1	85%
	Disc Holder Assembly	C	1/5	
	1. Disc Holder			
	2. Lift Nut			
	3. Retainer Ring			
III.	Disc Holder	C	1/5	95%
	Spindle	C	1/5	
	Guide	C	1/5	
	Spring Assembly			
	(1) Spring	C	1/5	
IV.	(2) Spring Washer (2)	C	1/5	99%
	Adjusting Screw	C	1/5	
	Adjusting Screw Nut	C	1/5	
	Cap (Select One)			
	1. Screwed	C	1/5	
	2. Plain Lever Assembly	C	1/5	99%
	(1) Cap Assembly			
	(2) Release Nut			
	(3) Lock Nut			
	3. Packed Lever Assembly	C	1/5	
	(1) Cap Assembly			
	(2) Release Nut			
(3) Lock Nut				

# MANUFACTURER'S FIELD SERVICE & REPAIR PROGRAM

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## FIELD SERVICE

Process industries expect and demand service on a moment's notice. CONSOLIDATED Field Service can be depended upon for prompt response, even in extreme off-hour emergency situations.

Dresser Industrial Valve Operation maintains the largest and most competent field service staff in the industry. Service Engineers are located at strategic points throughout the United States to respond to customer's requirements for service. Each Service Engineer is factory trained and long experienced in servicing Safety Relief Valves. Our Service Engineers restore disc and nozzle critical dimensions which affect valve performance, and are capable of modernizing valves in the field.

It is highly recommended that the professional talents of a Dresser Field Service Engineer be employed to make final adjustments during the initial setting of CONSOLIDATED Safety Relief Valves.

All Field Service Engineers' activities are coordinated from the Alexandria, Louisiana, Field Service and Repair Office. Upon receipt of a purchase order number authorizing the trip, the man is dispatched.

Contact:           Field Service Department  
                      Field Service Supervisor  
                      (318) 640-6055

## REPAIR

### FACTORY REFURBISHING

Many customers find it desirable to return their valves to the manufacturer for restoration or modernizing. Consolidated products returned to Dresser's valve renewal center in Alexandria, Louisiana are restored to original specifications and returned with a new valve warranty. An inventory of Consolidated service parts is available, enabling the return of refurbished valves within forty-eight hours after receipt.

In addition to valve restoration, the factory renewal center offers a host of unique services not authorized through any other channel. Examples are:

1) Seat bushing replacements on certain valve types.

2) Installation of updated retrofit kits on specific Consolidated valves.

3) Hydroset repairs, recalibration, and certification.

4) Specialty spring testing.

5) Repairs to valves in Nuclear applications.

6) Repairs to valve in use by the U.S. Government, Navy, and Coast Guard.

For more information on Dresser's Valve renewal services, please contact:

Manager, Valve Renewal  
(318) 640-6059

### SERVICE WARRANTY

Factory repaired valves carry a warranty which covers workmanship and new parts installed during repair, for a period of one year from date of repair completion.

### DRESSER PRODUCT REPAIR BY UNAUTHORIZED SOURCES

DIVD has authorized no outside repair companies, contractors, nor individuals to perform warranty repair service on new products, field or factory repaired products of its manufacture. Therefore, customers contracting such repair services from unauthorized sources must do so at their own risk. Likewise, if any DIVD product fails to perform within the scope of its design, we must be notified and given the opportunity to inspect and correct the product. We will accept no backcharges for unauthorized repair sources performing corrective repairs on our products.

## NOTES

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## NOTES

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# SAVE BIG MAINTENANCE DOLLARS! UP TO 50%!

## HERE'S HOW:

### PLUS 3:

Dresser's Full Support  
GREEN TAG CERTIFIED  
Valve Field Service and  
Repair Program

- 1 In-Place Valve Testing
- 2 Local Factory-Quality Repair
- 3 Continuous Preventive Maintenance Support

*Featuring the Portable Electronic  
Valve Testing Device Type 2566*

### What Is Plus 3?

PLUS 3 is Dresser's three phase valve field service and repair program.

Through the use of our electronic valve testing device, local repair, and continuous preventive maintenance support, PLUS 3 offers a highly effective integrated systems approach to lowering the cost of valve maintenance.

In addition, PLUS 3 effectively binds participating customer operations, Dresser Industries and individual Green Tag Centers together in a fast response program leading to reliable valve performance.

Dresser is proud of all products and services offered through our Green Tag-certified PLUS 3 Program. We want to help you keep all pressure relief valves in good working order. This way, they'll be ready to help protect your facilities and personnel from major accidents.

### **Call Today!**

Field Service:

**318/640-6055**

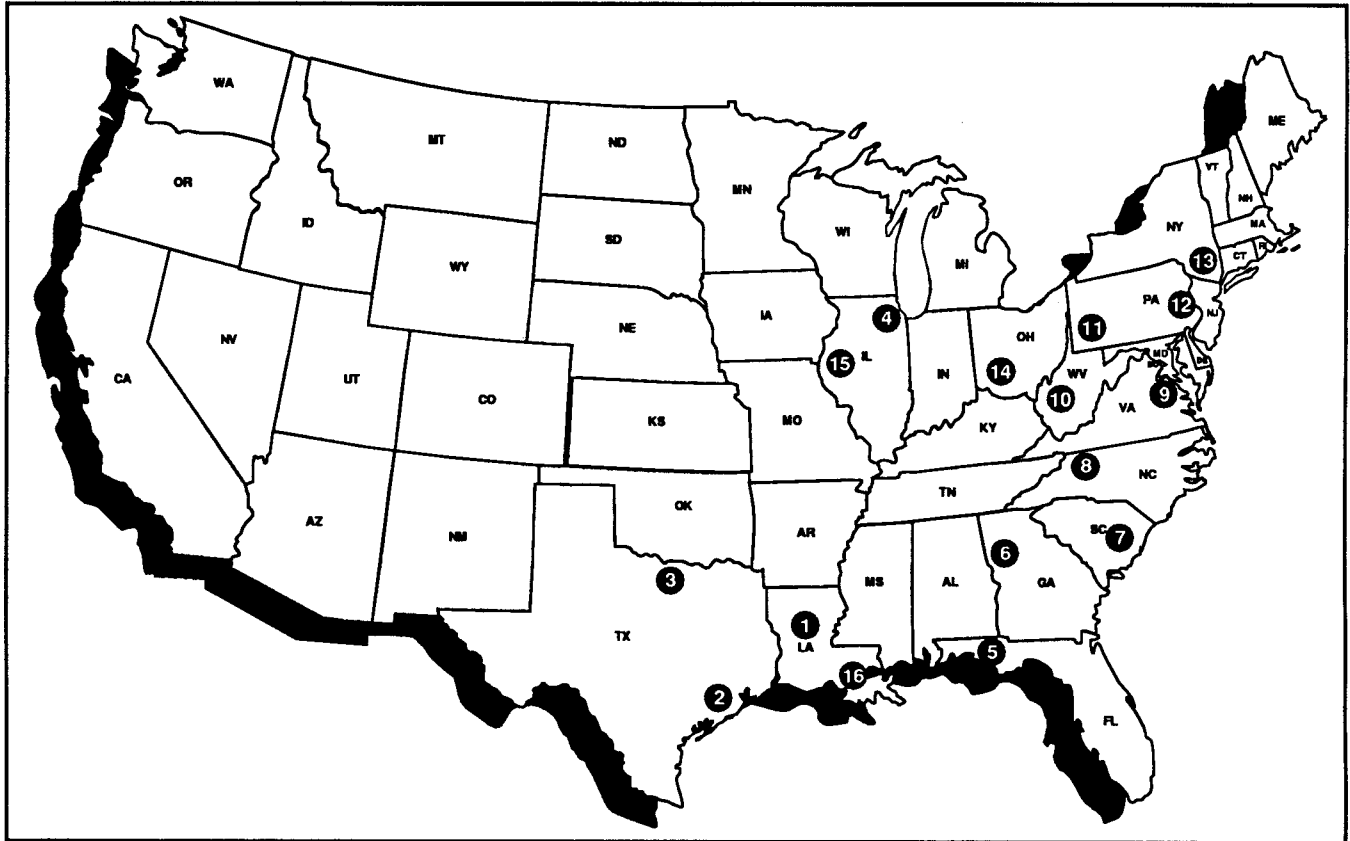
Local Green Tag Center:

**318/640-6191**

Preventive Maintenance Support:

**318/640-6158**

# SERVICE DEPARTMENT



**THE DRESSER FIELD SERVICE ORGANIZATION IS UNEQUALED.**

For prompt field service, please call Dresser Industrial Valve  
Operation Service Department, Alexandria, Louisiana.

Normal Working Hours - (318) 640-6055

After Hours, Weekends, Holidays - (318) 640-2250

### LOCATION OF SERVICE ENGINEERS

Alexandria, LA .....	1
Houston, TX .....	2
Dallas, TX .....	3
Chicago, IL .....	4
Pensacola, FL .....	5
Jacksonville, FL .....	6
Charleston, SC .....	7
Winston-Salem, NC .....	8
Richmond, VA .....	9
Charleston, WV .....	10
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Philadelphia, PA .....	12
Poughkeepsie, NY .....	13
Cincinnati, OH .....	14
Crawfordsville, IN .....	15
New Orleans, LA .....	16

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Spartan, Kempton Park 1620  
Transvaal, South Africa  
Telephone 011-27-11-970-1427/8  
Telex 427216

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