



**Triangle** Pump Components  
Incorporated  
Since 1919

**Leading Manufacturer of Reciprocating  
Pump Valves and Components**





## A Tradition Of Quality

Triangle Reciprocating Pump Expendables have earned a reputation for efficiency, long service life, and dependability. Our staff is dedicated to maintaining that tradition. Triangle uses state-of-the-art computer programs including a comprehensive finite element analysis package, to address pump system problems that shorten the life of expendable parts and to ensure the continuing development of superior pump components in the future.

### Design

Original Equipment Pump Manufacturers design reciprocating pumps to produce high pressure. These pumps are designed to transfer wear on expensive parts such as crankshafts and power frames to the less expensive expendable parts such as valves, plungers, and packing.

Triangle Pump Components Inc. offers a variety of pump expendables with this same design concept in mind. The main wear areas such as valve sleeves and discs are designed to be the least expensive replacement parts.

# Triangle Versatility

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## **DURABLA® Valve Model V7H (Low NPSH)**

The V7H Unit is most effective in low NPSH applications yet it operates efficiently in pumps running up to 600 rpm and at pressures up to 6500 psi. The light weight metal valve disc gives exceptional service life; is faster opening; and due to its “point contact” with the sleeve, is nonbinding, eliminating delayed opening or closing. This is imperative in high-speed pumps. Power consumption is kept to a minimum due to the low sliding friction and inertia of the disc. The V7H has a blind tapped deep seat eliminating leakage around the stud. It is available in pump ports sizes from 1-1/2” to 6” diameter.



## **DURABLA® Valve Model V7F**

The V7F incorporates all of the features of the V7H noted above and is designed to accommodate the higher volumes found in some pumping systems. The taller profile provides good lift and spill area while incorporating a guard that allows for a smoother flow. Its heavier spring provides prompt closure and it is available with an optional Delrin Disc (V7FD) instead of the formed metal disc.

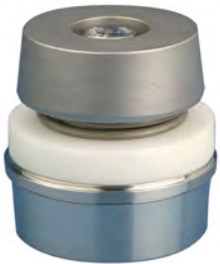


## **DURABLA® Valve Model V7**

The V7 Pump Valve Unit is popularly used on steam pump applications. Seats are furnished either threaded for screw fit, or tapered for press fit or rough as cast for machining by the user. The light weight formed valve disc opens completely on initial stroke. It operates quickly and freely. The V7 is available in a range of sizes to fit pump ports from 1-1/2” to 7-3/4” diameter, and for operation to 800 psi and up to 200 strokes per minute.

# A Tradition Of Quality

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## PLATE VALVE

The plate valve is a double-sprung, stem guided plate style valve available with a Delrin, stainless steel, or titanium plate. The plate valve features a one-piece retainer that can house one or two springs. Seats are of 316 stainless steel unless otherwise specified.



## Resista™ ABRASION RESISTANT VALVE

The Triangle Abrasion Resistant (AR) Valve is ideally suited for use in pumping environments containing abrasives, small solids, and high pressures. The AR valve is available in two different designs. Standard seats are made of 316 stainless steel but are also available in 17-4 hardened stainless steel or 8620 alloy. The valve member is made of the same materials as the seat, either with or without a polyurethane insert for use in temperatures not exceeding 160° F. Fluoroelastomer inserts are available for higher temperature applications.



## PLUNGERS AND DynaRod™ EXTENSION RODS

Ceramic plungers are made of the highest quality ceramics on the market today while manufacturing and assembly techniques have virtually eliminated pull-apart problems. Metal plungers are available in Colmonoy®, Tungsten Carbide, Chrome Oxide, Wallex®, and exotics upon request. Extension rods are available in Stainless Steel and may be coated. Connections are cut to match, either threaded or clamped.

# Triangle Versatility

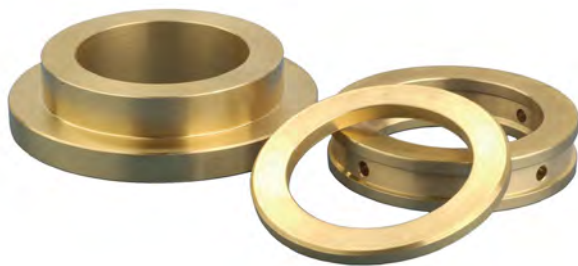
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## PLUNGER PACKING

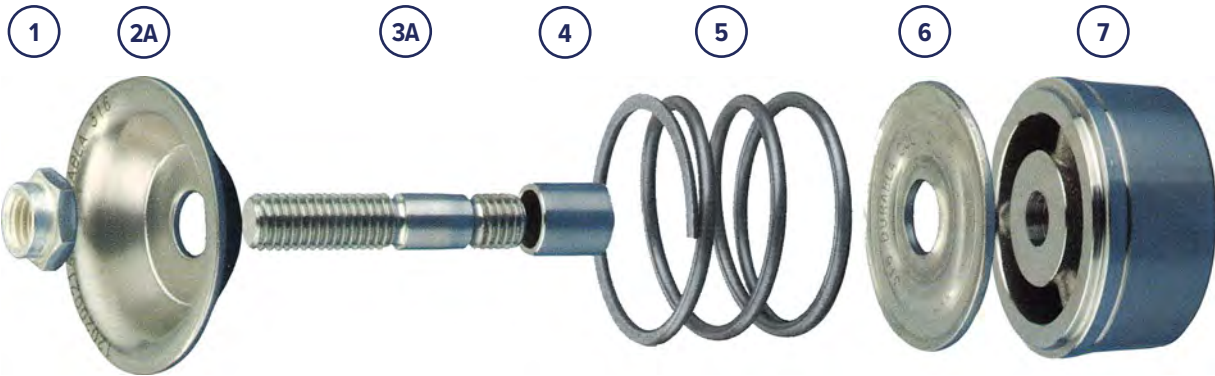
Packing plays a major role in the assurance of adequate downstream pressure. To that purpose, Triangle carries the top brand name in Utex® 838 style packing for general service applications. Die-formed packing, for extreme service or high temperature conditions, is manufactured by Triangle from the highest grade braided packing material. PTFE, Graphite, and Kevlar® cornered are some of the materials used in the spring-loaded or die-formed style of packing.



## STUFFING BOX COMPONENTS

Proper alignment of the plunger is critical to an extended wear life and correct flow conditions. The Stuffing Box Component tolerances assure that the plunger will be in motion at the correct angle to reduce wear and maintain adequate pressures. Triangle Stuffing Box Components are made of brass, 316 stainless steel, or other customer preferred materials. Close tolerances are adhered to so that proper plunger alignment and long packing life can be maintained.

# Durabla® And Plate Valve Components



## 1. SELF-LOCKING NUT:

The corrosion-resistant locknut with close tolerance threads provides positive, secure assembly of the entire unit and is only used on the Durabla® valves.

## 2A. GUARD 2B. RETAINER

The Durabla® valve uses a drop-on 316 stainless steel type of guard, which speeds assembly and disassembly. The plate valve uses a one-piece stainless steel retainer that will house one or two springs.

## 3A. STUD OR 3B. FASTENERS:

The Durabla® valve uses a “V” taperlock 316 stainless steel stud easily installed and it provides a rigid alignment of sleeve and disc. The plate valve uses a Monel Fastener with a Nylon thread locking insert.

## 4. SLEEVE:

The Durabla® valve has a 316 stainless steel sleeve to protect the stud while providing a polished surface for the disc to contact. The inexpensive sleeve is the main wear portion of the valve and is easily replaced. The sleeve on the plate valve is a one piece assembly with the retainer.

## 5. SPRINGS:

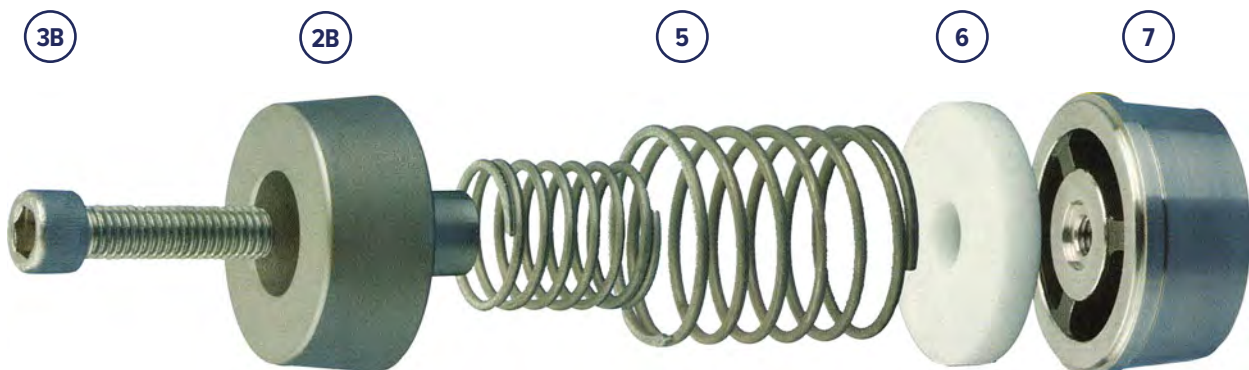
The spring of the Durabla® valve can be mounted on the inside or the outside edge of the valve member depending on NPSH and valve style. Either spring is of 316 stainless steel or Inconel upon request. The plate valve comes equipped with two springs unless otherwise specified. Springs are of Inconel.

## 6. VALVE PLATES:

The Durabla® valve comes standard with a 316 stainless steel or Delrin plate. The metal valve plate is formed by a special process from stainless steel or appropriate alloy sheet into an arched cross section, making it the lightest weight, lowest inertia yet strongest disc commercially available. The Delrin plate is machined from a high strength engineered plastic suitable for 2500 psi and assures long service life. Point contact with the sleeve minimizes friction and permits instant response to pumping forces. The plate valve comes equipped with either a Delrin or titanium plate. Tight, prompt plate closure maintains unit efficiency.

## 7. SEAT:

The seat of both the Durabla® valve and the plate valve is designed to provide optimum flow characteristics through the port area. Available in the correct metallurgy to assure maximum service life in the specified application, the seat face is carefully machined to supply the proper support and seating surface for the valve disc. Where applicable, the outside diameter is machined for press or screw fit to install easily in the pump port specified. Some seats may be supplied rough as cast for machining by the user.



# Pump Compatibility And Applications

## Triangle Manufactures Expendables To Fit The Following Brands Of Pumps.

Ajax®	Dawson & Downie®	Kinney®	Stokes®
Aldrich	Dean Brothers	Kobe®	Tritan®
American Marsh®	Deming®	Leyman McGowan	Union®
Aplex	Epping Carpenter	Loewy	Uraca®
Bethlehem®	Fairbanks Morse®	Milton Roy®	Wagner®
Butterworth®	Frontier	Myers®	Warren®
Byron Jackson®	Gardner Denver®	National Steam	Weir®
Cameron®	Gasol®	National Supply (ARMCO)®	Wheatley®
Canton	Gaulin®	National Transit	Wilson-Snyder®
Continental Emsco®	Gould Ingersoll Rand®	Noma	Woma®
Cooper-Bessemer®	John Bean	Oilwell®	Worthington®
Davidson	John Ingles	Perroni	
	Kerr®	Remuda	

If your pump is not listed , send application information (see FAX form) for a quote to your specifications.

## A Partial List Of Applications

### SECONDARY & TERTIARY OIL RECOVERY

Disposal  
Offshore Oil Production  
Injection  
Feed  
Charge  
Steam Generators

### PROCESS INDUSTRIES

Soap  
Chemicals  
Fertilizers  
Steel  
Food  
Refineries  
Petrochemicals  
Tar  
Asphalt  
Boiler Feed  
Condensate Return  
Vacuum  
Steam  
Paper Mills

### MARINE

Stripping Pumps  
Steam Standby  
Auxiliaries  
General Service  
Bilge & Ballast  
Fire Pumps

### HYDRAULIC

Extrusion Presses  
Piercers  
Upsetters  
Forge Presses

### PIPELINE

Mainline  
Field Gathering

# TRIANGLE'S Versatile Valve Puller

Seat Puller Assemblies are available with interchangeable claws to fit the web pattern of most **Durabla®** and plate valve seats.



## Installation And Maintenance

**Durabla®** pump valve units are designed for easy installation with minimum disassembly required to accomplish the task efficiently. V7H and press fit V7 valve units should not be disassembled before installation. Detailed instructions are available with each Pump Valve order.

Install **Durabla®** pump valve units in clean, dry pump ports. Avoid the use of force. **DO NOT STRIKE THE STUD OR BOLT!** Use the **Durabla®** installation tool, which will fit over the stud. For units with the press fit seat, the **Durabla®** pressing block will facilitate installation.

The **Durabla®** seat claw will fit the web pattern of the threaded seat and fit over the stud to accomplish installation.

When inspection shows that wear has occurred, proper maintenance will include replacement of the valve disc, spring, sleeve, and locknut or bolt. It is recommended that the seat be refaced so that no ridges exist at either the inner or outer edges of the valve seating surface, and the inside and outside seating surfaces remain on the same plane. Reinstallation of the seat should be made with the same care outlined for new units. Studs, locknuts and bolts should be torqued according to the table below.

STUD/BOLT SIZE	STUD/BOLT TORQUE Pound Feet	NUT TORQUE Pound Feet
3/8"	20-25	10-15
7/16"	25-30	12-17
1/2"	30-35	15-20
5/8"	40-50	20-25
3/4"	45-55	30-35
7/8"	60-70	40-45



# Troubleshooting Quickfax Form

## Contact:

Name _____	Title _____
Company _____	
Address _____	
City _____	State _____ Zip _____
Phone (    ) _____	Fax (    ) _____

## Specifications & Information:

Pump & Model _____	Stabilizer (Suct.) (yes) (no) _____
No. Plungers _____	Stabilizer Capacity (Gal.) _____
Length of Stroke _____	Stabilizer Charged With What Type of Gas _____
RPM _____	_____
Gauge Pressure at Tank _____	Pipe Size & Sched. _____
Fluid Height in Tank _____	Age of Piping System _____
Length of Pipe _____	Screw or Flange Type _____
Flow Rate (GPM) _____	Gauge Fluctuation % _____
Fluid Type _____	Suction Gauge Pressure _____
Pumping Temperature _____	Discharge Gauge Pressure _____
Charge Pump _____	Are Valves Leaking? _____
Charge Pump HP _____	Are Discs or Springs Breaking? _____
Charge Pump Flow Rate _____	_____

## Pump & Piping Diagrams:



# Triangle Quickfax Order Form

## Contact:

Name	_____		Title	_____	
Company	_____				
Address	_____				
City	_____	State	_____	Zip	_____
Phone ( )	_____	Fax ( )	_____		
Ship Via	_____	P.O #	_____		

## How to Order:

1. Manufacturer and model of pump  
\_\_\_\_\_
2. Number of plungers and their diameter  
\_\_\_\_\_
3. Length of stroke  
\_\_\_\_\_
4. RPM  
\_\_\_\_\_
5. Suction pressure  
\_\_\_\_\_
6. Discharge pressure  
\_\_\_\_\_
7. Product handled  
\_\_\_\_\_
8. Pumping temperature  
\_\_\_\_\_

Quantity	Product Number and Description

# Expendable Parts Failures & Possible Causes

## Packing Failure

- |                      |   |                                       |
|----------------------|---|---------------------------------------|
| 1. Normal wear       | 3. Improper lubrication                             | 5. Dirty liquid                       |
| 2. Improper material | 4. Adjustable packing - gland tightened excessively | 6. Plunger or piston rod misalignment |

## Valve Failure

- |  |   |                 |
|--|---|-----------------|
| 1. Normal wear   | 5. Incorrect installation - driving on the valve stem, improper torque on jam nut, valve seat and valve deck not thoroughly clean when seat installed | 6. Electrolysis |
| 2. Inadequate NPSH   |   | 7. Cavitation   |
| 3. Abrasives in fluid                                      |   |                 |
| 4. Incompatibility of valve components to corrosive liquid |   |                 |

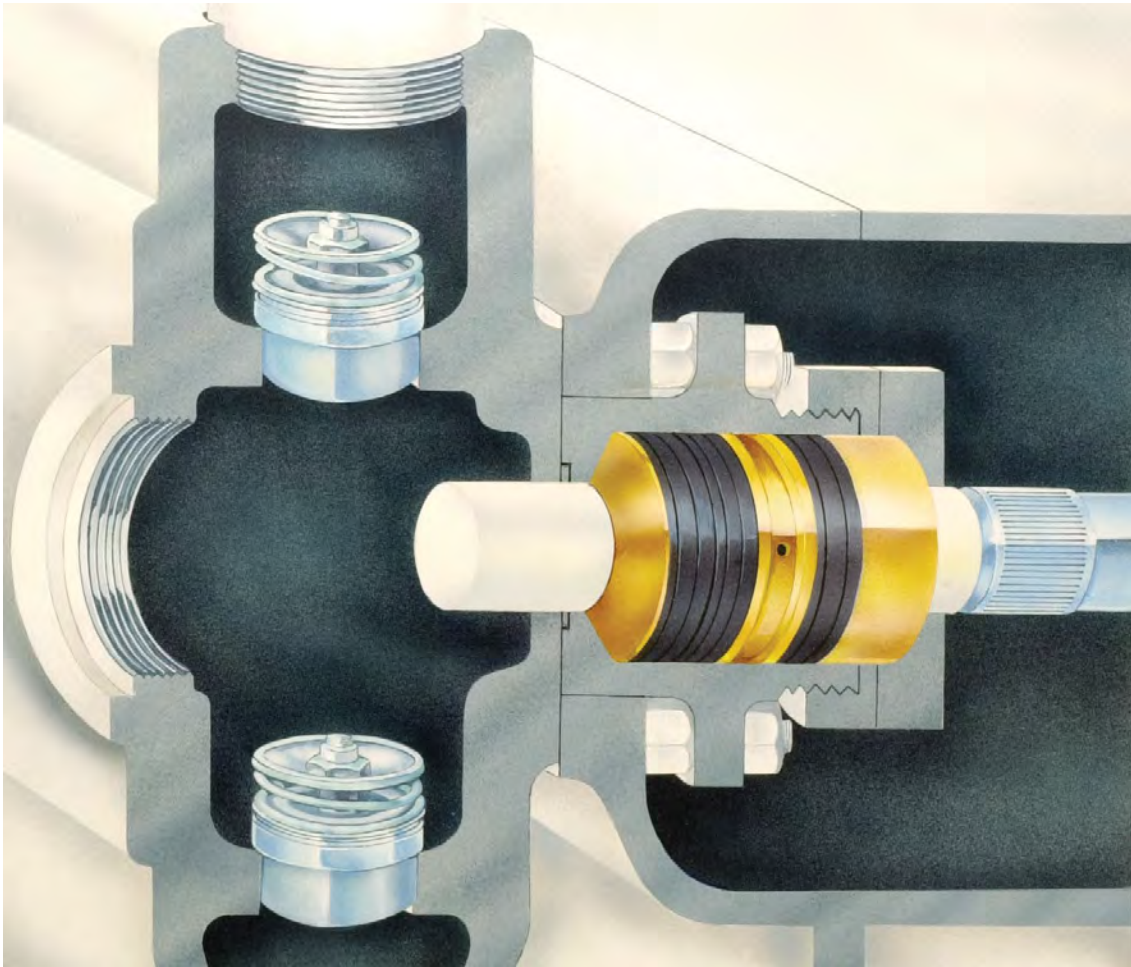
## Plunger Failure

- |   |   |                      |
|---|---|----------------------|
| 1. Thermal shock (cold water hitting hot ceramic plunger) | 3. Inlet valve becomes disassembled while pump is in operation                | 5. Dirty liquid      |
| 2. Packing too tight                                      | 4. Stuffing box gland rubbing on plunger die to improper tightening procedure | 6. Dirty environment |
|   |   | 7. Cavitation        |

## **Warranty**

Each Triangle Pump Components, Inc. (TPCI) product is warranted against defects in material workmanship for a period of one year after being placed in service, but not exceeding 18 months after shipment, when these products are properly installed, maintained and used within the service and temperature and pressure ranges for which they were designed and manufactured, and provided they have not been subject to accident, negligence, alteration, abuse, misuse or the like. This warranty extends to the first purchaser only. All defective material must be returned to the person from whom you purchased the product, transportation prepaid, free of any liens or encumbrances and if found to be defective will be repaired free of charge or replaced, at the warrantor's or TPCI's option.

For a complete understanding of your sole and exclusive legal rights and remedies, and the procedures to be followed with respect to any claims, please refer to the "Limitation and Disclaimer of Warranties and Liabilities," available on request from TPCI. The express warranties set forth in that document and the obligations and liabilities of TPCI thereunder are exclusive and are expressly in lieu of all other warranties, express or implied, including, without limitation, the warranties of merchantability and fitness for a particular purpose, and all other obligations and liabilities of TPCI. It is understood that there are no warranties which extend beyond the description of the express terms in the "Limitation and Disclaimer of Warranties and Liabilities." Under no circumstances shall TPCI be liable for any consequential, incidental, economic, direct, indirect, general or special damages, expenses or losses relating to any breach of warranties.



visit: [www.triangle-pump.com](http://www.triangle-pump.com)

## Triangle Pump Components Inc. Sales and Manufacturing Locations:

### Corporate Office and Valve Manufacturing:

Triangle Pump  
Components Inc.  
3644 W Highway 67,  
Cleburne, TX 76033

**Phone:** (817) 202-8530

**Fax:** (817) 202-8533

### Plunger and Packing Manufacturing and Stocking Warehouse

1600 S.E. 23rd  
Oklahoma City,  
Oklahoma, 73129

**Phone:** (405) 672-6900

**Fax:** (405) 672-8088

### Canada Stocking Warehouse

6721 67th Avenue  
Bay #4  
Red Deer, Alberta, Canada  
T4P 1K3

**Phone:** (403) 343-1969

**Fax:** (403) 342-1959