

# DATA SHEET

## PULSATION DAMPENERS



**Stainless Steel Models:**

**701501 - 701543, 701610**



### FEATURES

- Rebuildable and rechargeable.
- Optional bladder materials for liquid compatibility and 316 stainless steel construction for strength and liquid compatibility.
- Convenient rebuildable style with top access permits replacing bladder without disturbing plumbing.
- Nitrogen precharged to eliminate moisture and provide smooth bladder compression and pressure release.
- Absorbs system shocks while minimizing excessive pipe vibration, water hammering and pressure fluctuations.

### SHIPMENT REGULATIONS

- Pre-charged pulsation dampeners are defined as hazardous articles. **These articles use the proper shipping name of "Articles, Pressurized, Hydraulic" and use the identification number of "UN3164."**
- Uncharged pulsation dampeners require no special handling and can be shipped via standard shipping methods.
- All domestic shipments of hazardous articles must follow Department of Transportation CFR 49, parts 100 to 185 regulations (DOT).
- International shipments of hazardous articles must follow either International Air Transport Association regulation (IATA) or International Maritime Dangerous Goods Codes (IMDG).

### ORDERING INFORMATION

All models must be precharged before operation. Add .800 to base part number and indicate desired pre-charge on purchase order.

Note: A handling charge will apply.

### COMMON SPECIFICATIONS

	U.S.	Metric
<b>Model 701501, 701521, 701541</b>		
Maximum Flow	15 gpm	57 lpm
Pressure Range	100 - 4300 psi	6.9 - 296 bar
Max. Temp. (701501, 701521)	194° F	90° C
Max. Temp. (701541)	212° F	100° C
Volume	6 cu. in.	0.10 l
Safety Factor	4/1	4/1
Bladder Construction (701501)	NBR	NBR
Bladder Construction (701521)	EPDM	EPDM
Bladder Construction (701541)	FPM	FPM
Port Size	1/2" NPT(F)	1/2" NPT(F)
Diameter	2.6"	66 mm
Length	6.57"	166.9 mm
Weight	5.34 lbs.	2.5 kg
<b>Model 701502, 701522, 701542</b>		
Maximum Flow	25 gpm	95 lpm
Pressure Range	100 - 3800 psi	6.9 - 262 bar
Max. Temp. (701502, 701522)	194° F	90° C
Max. Temp. (701542)	212° F	100° C
Volume	15 cu. in.	0.25 l
Safety Factor	4/1	4/1
Bladder Construction (701502)	NBR	NBR
Bladder Construction (701522)	EPDM	EPDM
Bladder Construction (701542)	FPM	FPM
Port Size	1/2" NPT(F)	1/2" NPT(F)
Diameter	3.0"	76.2 mm
Length	7.79"	197.9 mm
Weight	8.34 lbs.	3.7 kg
<b>Model 701503, 701523, 701543</b>		
Maximum Flow	75 gpm	284 lpm
Pressure Range	100 - 3000 psi	6.9 - 207 bar
Max. Temp. (701503, 701523)	194° F	90° C
Max. Temp. (701543)	212° F	100° C
Volume	30 cu. in.	0.50 l
Safety Factor	4/1	4/1
Bladder Construction (701503)	NBR	NBR
Bladder Construction (701523)	EPDM	EPDM
Bladder Construction (701543)	FPM	FPM
Port Size	1" NPT(F)	1" NPT(F)
Diameter	3.7"	95 mm
Length	9.69"	246 mm
Weight	17.50 lbs.	7.9 kg

MATERIAL CODES: EPDM=Ethylene Propylene Diene Monomer  
FPM=Fluorocarbon NBR=Medium Nitrile (Buna-N)

SPECIFICATIONS	U.S.	Metric
<b>Model 701520, 701535</b>		
Maximum Flow	15 gpm	57 lpm
Pressure Range	100 - 8300 psi	6.9 - 572 bar
Maximum Temperature	122°F	50°C
Volume	6 cu. in.	0.10 l
Safety Factor	4/1	4/1
Bladder Construction (701520)	NBR	NBR
Bladder Construction (701535)	FPM	FPM
Port Size	1/2" NPT(F)	1/2" NPT(F)
Diameter	3.0"	76 mm
Length	6.61"	168 mm
Weight	11.7 lbs.	5.3 kg
<b>Model 701507, 701527, 701537</b>		
Maximum Flow	25 gpm	95 lpm
Pressure Range	100 - 7100 PSI	6.9 - 489 bar
Maximum Temperature	122°F	50°C
Volume	15 cu. in.	0.25 l
Safety Factor	4/1	4/1
Bladder Construction (701507)	NBR	NBR
Bladder Construction (701527)	EPDM	EPDM
Bladder Construction (701537)	FPM	FPM
Port Size	1/2" NPT(F)	1/2" NPT(F)
Diameter	3.5"	88.9 mm
Length	7.83"	199.0 mm
Weight	17.4 lbs.	7.9 kg
<b>Model 701610</b>		
Maximum Flow	25 gpm	95 lpm
Pressure Range	100 - 10,000 psi	6.9 - 689 bar
Maximum Temperature	176°F	80°C
Volume	15 cu. in.	0.25 L
Safety Factor	4/1	4/1
Bladder Construction	NBR	NBR
Port Size	1/2" NPT(F)	1/2" NPT(F)
Diameter	3.75"	95 mm
Length	11.50"	292 mm
Weight	22 lbs.	10.0 kg

MATERIAL CODES: EPDM=Ethylene Propylene Diene Monomer  
FPM=Fluorocarbon NBR=Medium Nitrile (Buna-N)

## ⚠ WARNING

**Do not charge pulsation dampeners with oxygen. Oxygen may cause an explosion causing personal injury, death or property damage.**

1. Use nitrogen only when charging pulsation dampeners, DO NOT USE OXYGEN.
2. Use proper charging tools to charge pulsation dampeners.
3. Charge pulsation dampener within specifications stated on data sheet to assure proper pulsation dampening and prevent failure of bladder.

## SELECTION

The Pulsation Dampener should be selected to match the flow and pressure requirements of the system and satisfy the liquid compatibility. Although all models will operate down to 100 PSI, it is most economical to select a pulsation dampener closest to but higher than your desired system pressure.

## INSTALLATION

The pulsation dampener should be mounted in a vertical position and teed directly onto the pump discharge manifold for optimum pulsation dampening and to avoid system vibration damage.

When using a by-pass hose with liquid returning to the inlet, mount the pulsation dampener before the pressure reducing valve. If this is not possible, then mount the pulsation dampener after the pressure unloading valve to prevent pressure spikes to the pump inlet.

When using an inlet pressure regulator, mount the pulsation dampener downstream from the regulator to assure optimum performance of the regulator.

## OPERATION

The pulsation dampener must be pre-charged with nitrogen only before operation. Be certain the charging valve cap at the top of the accumulator is securely tightened to assure no loss of pressure during operation.

With the system turned on, liquid enters the fluid port of the pulsation dampener. The liquid compresses the nitrogen charged bladder, which in turn absorbs the liquid kinetic energy, thus reducing the pressure pulsations.

At standard 70°F (20°C), optimum pulsation dampener performance is obtained with a pre-charge of 70% to 80% of the operating pressure.

Check the pre-charge every 12 months for normal operation and more frequently for continuous-duty operation.

NOTE: Up to 50 PSI pre-charge pressure can be lost during the checking of your pre-charge.

NOTE: A gas regulator must be mounted between the nitrogen tank and the hose connection from the filling and gauging assembly to enable you to regulate the pre-charge and to prevent excessive pressure being transmitted directly to the pulsation dampener. This over pressurization will void the warranty.

## MAINTENANCE

Check the pre-charge every 12 months for normal operation and more frequently for continuous-duty operation.

If pulsation is noticed, relieve the pre-charge and inspect the bladder for wear. Replace as needed.

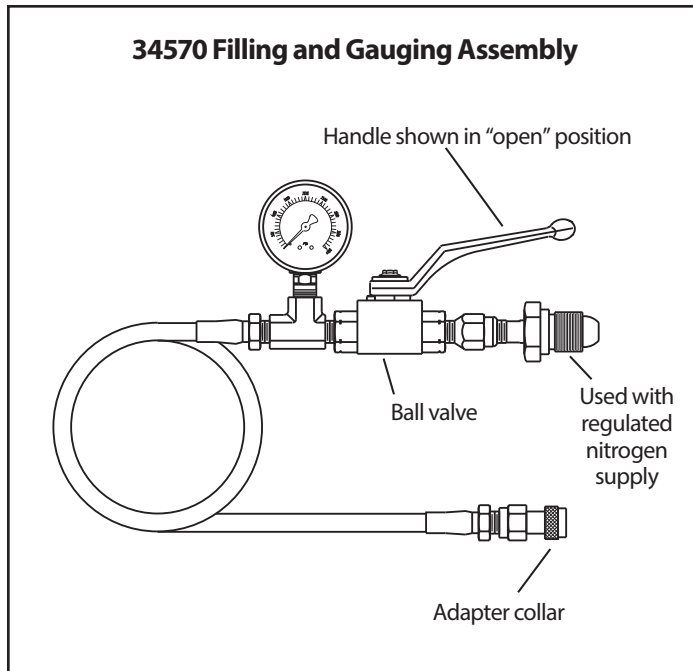
## FILLING AND GAUGING INSTRUCTIONS

### To Add Pre-charge

1. Mount filling and gauging assembly onto a regulated nitrogen supply.
2. Open ball valve (handle inline with valve).
3. Thread adapter collar hand tight onto top of pulsation dampener.
4. Open main valve on nitrogen supply.
5. Slowly increase pressure from the regulator to pulsation dampener.
6. Close ball valve and regulated supply when desired pre-charge is reached.
7. Remove adapter collar from pulsation dampener (a small amount of nitrogen will escape from hose as collar is removed).
8. Replace charging valve cap and tighten securely.
9. Close main valve on nitrogen supply.
10. Slowly open ball valve to purge all fittings of nitrogen before removing filling and gauging assembly.

### To Remove Nitrogen

1. Do not mount filling and gauging assembly to a nitrogen supply.
2. Remove the dust cap.
3. Remove charging valve cap from top of pulsation dampener.
4. Close ball valve (handle perpendicular to valve).
5. Secure adapter collar onto top of pulsation dampener.
6. Slowly open ball valve and release the nitrogen from the pulsation dampener.
7. When desired pre-charge pressure is reached, close the ball valve.
8. Remove the adapter collar from the pulsation dampener (a small amount of nitrogen will escape from the hose).
9. Replace the charging valve cap and tighten securely.



## REPLACING THE BLADDER

### Disassembly

1. Remove the dust cap at the top of the pulsation dampener.
  2. Remove the charging valve cap.
  3. Release the nitrogen precharge using the filling and gauging assembly as described under TO REMOVE NITROGEN steps 4 through 8.
  4. Using a soft mallet, tap threaded gas fitting to drive gas cap below snap ring.
- NOTE:** If the gas cap will not press down after the pre-charge has been released, the charging valve may be plugged. Remove the charging valve to ensure all gas has been released. Then replace valve.
5. Using a screw driver, carefully remove the first segment of the three piece snap ring. The other two pieces can be removed by hand.
  6. Grasp the gas cap and bladder assembly by the top hex nut with a locking plier and carefully remove from the body. Keep aligned to avoid damage to the bladder.
  7. Inspect the bladder for cracks, punctures or deformity.
  8. Remove bladder from gas cap, then inner and outer o-rings. Replace if damaged or worn.

### Reassembly

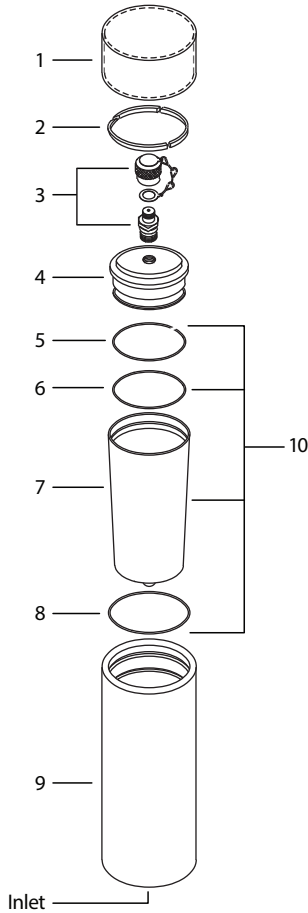
1. Install the new inner o-ring into the groove on the gas cap (back-up ring for models 701520, 701535).
2. Install the new bladder over the o-ring onto the gas cap.
3. Install the new outer o-ring into the groove in the body of the pulsation dampener.
4. Lubricate both the outer o-ring and bladder and press the bladder and gas cap assembly into the body.
5. Using a soft mallet tap the gas cap into the body until the snap ring groove is exposed, then insert the three sections of snap ring. Be certain the gas cap is pulled up squarely in position and gas valve is fully exposed.
6. Pre-charge pulsation dampener as described under TO ADD PRE-CHARGE steps 1 through 9.

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7. Replace dust cap over top of pulsation dampener.

## EXPLODED VIEW



## PARTS LIST

ITEM	P/N	MATL	DESCRIPTION	MODEL USED	QTY
1	—	NY	Cap, Dust (15 GPM)	701501, 21, 41	1
	—	NY	Cap, Dust (25 GPM)	701502, 20, 22, 42, 35	1
	—	NY	Cap, Dust (75 GPM)	701503, 23, 43, 610	1
	—	NY	Cap, Dust (25 GPM)	701507, 27, 37	1
2	—	SS	Ring, 3-piece	All	1
3	702038	SS	Assembly, Charging Valve	All	1
4	—	SS	Cap, Gas	All	1
5	—	PTFE	Backup-Ring	701520, 701535	1
6	—	NBR	O-Ring, Inner	All	1
	—	EPDM	O-Ring, Inner	All	1
	—	FPM	O-Ring, Inner	All	1
7	—	NBR	Bladder	All	1
	—	EPDM	Bladder	All	1
	—	FPM	Bladder	All	1
8	—	NBR	O-Ring, Outer	All	1
	—	FPM	O-Ring, Outer	All	1
	—	EPDM	O-Ring, Outer	All	1
9	—	SS	Body	All	1
10	701510	NBR	Bladder Kit (Inclcds: 5, 6, 7, 8)*	701520	1
	701511	NBR	Bladder Kit (Inclcds: 6, 7, 8)	701501	1
	701512	NBR	Bladder Kit (Inclcds: 6, 7, 8)	701502	1
	701513	NBR	Bladder Kit (Inclcds: 6, 7, 8)	701503	1
	701526	NBR	Bladder Kit (Inclcds: 6, 7, 8)	701507	1
	701528	EPDM	Bladder Kit (Inclcds: 6, 7, 8)	701527	1
	701529	FPM	Bladder Kit (Inclcds: 6, 7, 8)	701537	1
	701531	EPDM	Bladder Kit (Inclcds: 6, 7, 8)	701521	1
	701532	EPDM	Bladder Kit (Inclcds: 6, 7, 8)	701522	1
	701533	EPDM	Bladder Kit (Inclcds: 6, 7, 8)	701523	1
	701551	FPM	Bladder Kit (Inclcds: 6, 7, 8)	701541	1
	701552	FPM	Bladder Kit (Inclcds: 6, 7, 8)	701542	1
	701553	FPM	Bladder Kit (Inclcds: 6, 7, 8)	701543	1
	701564	FPM	Bladder Kit (Inclcds: 5, 6, 7, 8)*	701535	1
	701620	NBR	Bladder Kit (Inclcds: 6, 7, 8)	701610	1
	34570	—	Filling and Gauging Assy	701610, 701501, 701521, 701541, 701502, 701522, 701542, 701503, 701523, 701543	1
	701617	—	Filling and Gauging Assy	701610, 701520, 701535, 701507, 701527, 701537	1

\*Models 701520 and 701535 include bladder, one o-ring and one back-up ring.

All other bladder kits include bladder and two o-rings. Italics are optional items.

Material Codes (Not Part of Part Number): EPDM=Ethylene Propylene Diene Monomer FPM=Fluorocarbon  
NBR=Medium Nitrile (Buna-N) NY=Nylon SS=316SS

### ⚠ CAUTIONS AND WARNINGS

All High Pressure Systems require a primary pressure regulating device (i.e. regulator, unloader) and a secondary pressure relief device (i.e. pop-off valve, relief valve). Failure to install such relief devices could result in personal injury or damage to pump or property. Cat Pumps does not assume any liability or responsibility for the operation of a customer's high pressure system.

Read all CAUTIONS and WARNINGS before commencing service or operation of any high pressure system. The CAUTIONS and WARNINGS are included in each service manual and with each Accessory Data sheet. CAUTIONS and WARNINGS can also be viewed online at [www.catpumps.com/cautions-warnings](http://www.catpumps.com/cautions-warnings) or can be requested directly from Cat Pumps.

### WARRANTY

View the Limited Warranty on-line at [www.catpumps.com/warranty](http://www.catpumps.com/warranty).