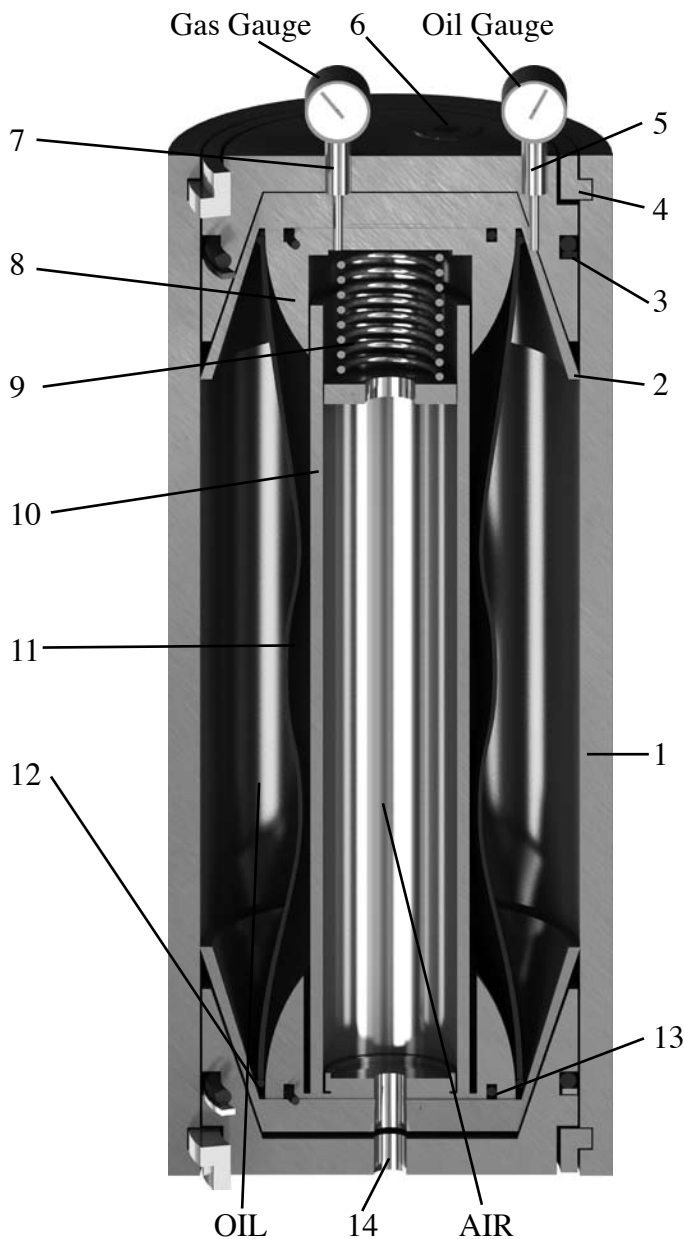




***Series Accumulators/
Nuclear Actuators***

Accumulators

Sleeve Bladder Type



- | | |
|-------------------------------------|-----------------------------|
| 1. High strength steel tube | 8. Sleeve cap |
| 2. Steel end cap | 9. Spring |
| 3. "O" ring and back-up | 10. Sleeve stop tube |
| 4. Split shear ring | 11. Sleeve bladder |
| 5. Fluid opening for pressure gauge | 12. Sleeve bladder end seal |
| 6. Safety fuse | 13. Sleeve cap "O" ring |
| 7. Gas opening for pressure gauge | 14. Fluid discharge port |
| | 15. Optional fluid ort |

The Sleeve Bladder Accumulator, (patent applied for) is very unique in that unlike conventional bladder accumulators which have a balloon type bladder open on only one end, it has many features and advantages as are emphasized as follows:

- A. When recharged with gas, filling the entire accumulator, if gas charge begins to leak out, or if excessive oil pressure is supplied to the accumulator, or if precharge pressure is somewhat under estimated or even under charged for any reason, the fluid pressure will tend to crush and distort the bladder which has no backing to resist the action. The sleeve bladder accumulator has a sleeve stop tube to back up the bladder in this event.
- B. Having end caps, gauge ports for either end of the accumulator can be supplied for monitoring both gas charge and fluid pressure. Try that on a conventional bladder accumulator.
- C. Like its counter part the Poppet Piston Accumulator with internal stop tube, has the ability to monitor the gas pressure to match the fluid pressure. If any precharge is lost for whatever reason and the sleeve bladder lays against the sleeve stop tube, then the gas and fluid gauges will not agree with each other. Further, by noting the gas pressure gauges, it can be determined exactly how much gas charge is left and how much fluid it will deliver and at what pressure.
- D. If you look closely at the assembly, it can be noted that there are no fasteners required to assemble the sleeve bladder accumulator. What's more, it cannot be disassembled accidentally when pressure is in the gas chamber. It is pressure locked at the end caps, such that the end caps must be depressed inward to release the split shear ring. This cannot be done under pressure without knowledge that much more force than the spring is holding the end cap for depressing even without a gauge to note pressure.
- E. The sleeve bladder accumulator can be installed horizontally without damage resulting to the bladder. Don't try this with a balloon type bladder accumulator or you will find out how quickly you can rub a hole in the bladder.
- F. The sleeve bladder accumulator can also be mounted with a common end cap to another accumulator for manifolding or piping convenience.
- G. Other than these fantastic features the Sleeve Bladder Accumulator is just like any other old bag type accumulator.

Poppet Piston Accumulator Lasts 5 Times Longer...

Compared to the service life of conventional piston accumulators, it takes 5 times longer to reach detectable leakage... why?

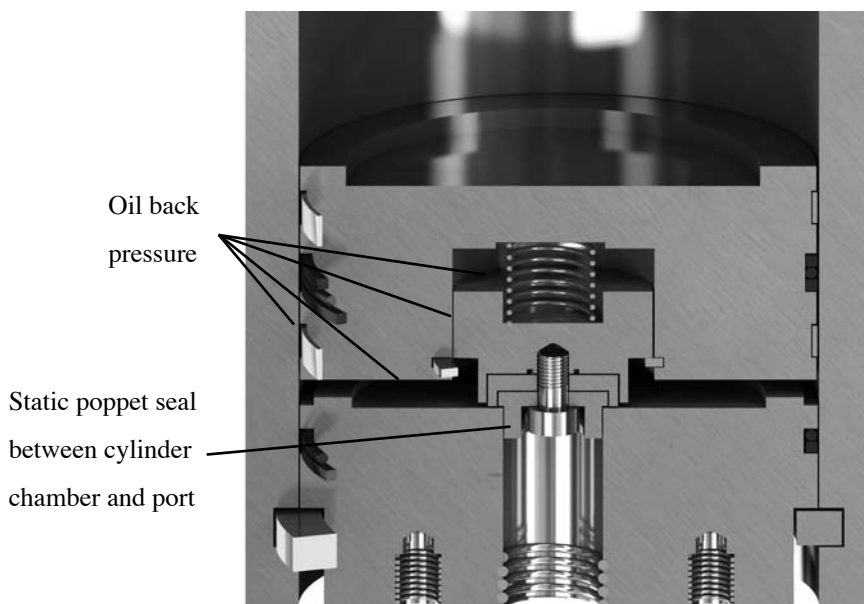
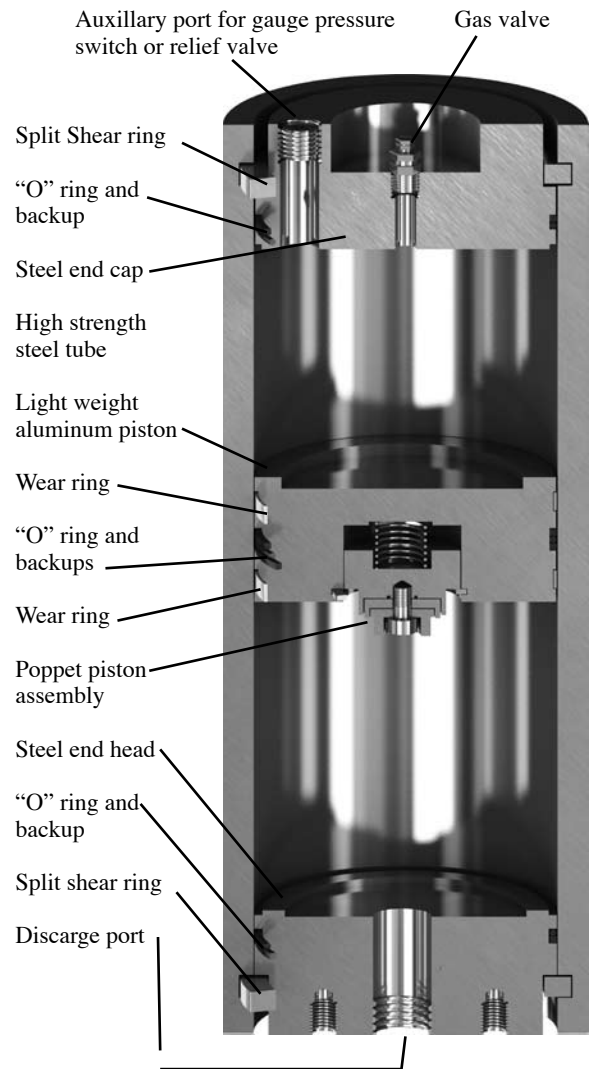
This is why...

The addition of a patented poppet piston assembly with a built-in cushion secured within the main piston makes all the difference. By retaining a small unusable portion of the accumulator oil from discharging, then pressure is balanced on both sides of the piston. With oil on one side and gas on the other, the precharge gas cannot get past the piston seal, since the oil is never completely discharged from the accumulator, even when the pressure in the discharge line drops to zero.

The poppet seal assembly depends on zero leakage and it is. By trapping oil between the poppet seal and the piston seal, the piston seal is pressure energized on both sides, which compensates for piston seal wear. The end result is that the integrity of the main piston seal is no longer critical and leakage emphasis is shifted to the integrity of the poppet seal, hence giving the piston seal 5 or more times its normal life, regardless of the mounting position, and can even be self monitored. Try that with a bladder or conventional piston accumulator.

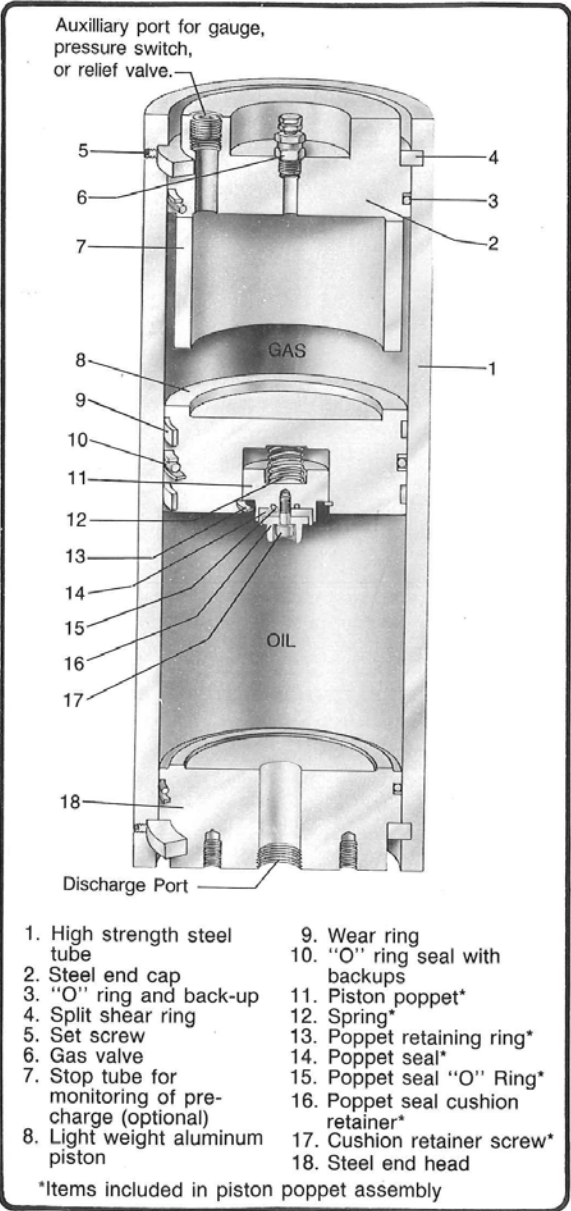
The poppet seal is not subject to frictional wear from moving back and forth in the cylinder because it is a static seal and called upon to perform only when the main piston bottoms out, (which is when the gas escapes other accumulators). The main piston seal (a dynamic seal) must be and is very much subject to wear. In fact, every time the piston changes position in the slightest there is dynamic wear on the piston seal.

Accumulators are used in oil industry applications, power generating, military aerospace, commercial aviation, ships, environmental water control, dams, mobile and off-highway equipment.



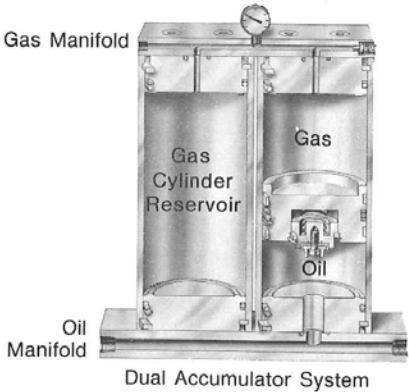
ACCUMULATORS

POPPET PISTON TYPE



The patented "Poppet" Piston Accumulator is an old established accumulator design with a new twist. By adding the poppet feature to the piston, a host of advantages takes place.

- A. By trapping a small portion of the accumulator fluid from discharging, there is created a pressure balance on both sides of the piston. With fluid on one side and gas on the other it is nearly impossible to loose the precharge of gas; the fluid is never completely discharged from the accumulator when the pressure drops to zero in the discharge line, while full gas precharge acts on the piston seal.
- B. This accumulator can be mounted horizontal, right side up or upside down. Most manufacturers do not recommend their product be mounted horizontally. The piston poppet is just as effective either way.
- C. The poppet piston accumulator makes an excellent de-surger because fluids are usually completely discharged each time the piston strokes, again trapping fluid and thereby balancing pressure on both sides of the piston. The cushion plunger automatically decelerates the piston momentum.
- D. Optional internal stop tube can be installed in order to monitor gas pressure compared to fluid pressure, and note to operator when gas pressure gauge and fluid pressure gauge do not match exactly, how much gas charge is remaining in order to deliver the amount of fluid and the minimum pressure to perform the required function.
- E. Accumulator and gas cylinder may be separate but coupled with a common end cap for greater volume but with full monitoring capability. (See dual unit below.)
- F. Designed in safety: accumulator can not be disassembled as long as unit is under pressure.



Patented in U.S.A.
 Foreign patents applied for.

ACCUMULATORS

HYDRO-PNEUMATIC POPPET PISTON TYPE

- Poppet Piston Design Maintains Precharge.
- Cushioned Cylinder Eliminates Abrupt Bottoming Resulting in Less Wear and Noise.
- Non Welded Construction; Both End Caps Removable.
- Water Operating Models Available.
- ASME Coded Models Available.

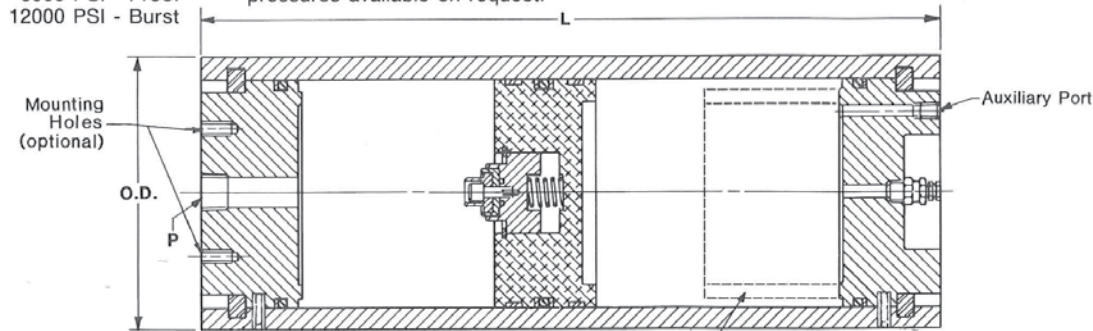
Sizes and General Data

Volumes not shown in chart are available as specials; consult factory.

Size	Model No.	Total Volume cu. in.	P Port Size	O.D. in.	L Length in.	Dry Weight lbs.	Size	Model No.	Total Volume cu. in.	P Port Size	O.D. in.	L Length in.	Dry Weight lbs.
10 in. ³	10C-25	10	3/8"	2.86	7.82	7 1/4	2 1/2 Gal.	2-5G-8	580	3/4"	9.03	21.29	184
30 in. ³	30C-25	30	to 3/4"	2.86	11.90	9	5 Gal.	5G-8	1155	to 1 1/2"	9.03	32.73	230
60 in. ³	60C-25	60	NPT	2.86	18.00	11	7 1/2 Gal.	7-5G-8	1740	NPT or Straight Thd.	9.03	44.37	276
60 in. ³	60C-4	60	1/2"	4.53	12.27	27	10 Gal.	10G-8	2315	2 1/2" NPT or Opt. Flange Ports	9.03	55.81	322
1/2 Gal.	05G-4	116	to 1 1/2"	4.53	16.73	31	15 Gal.	15G-8	3470	2 1/2" NPT or Opt. Flange Ports	9.03	78.78	414
1 Gal.	1G-4	231	NPT or Straight Thd.	4.53	25.88	40	20 Gal.	20G-8	4625	2 1/2" NPT or Opt. Flange Ports	9.03	101.76	506
1 1/2 Gal.	1-5G-4	350		4.53	35.35	49	25 Gal.	25G-8	5780	2 1/2" NPT or Opt. Flange Ports	9.03	124.74	597
2 1/2 Gal.	2-5G-4	580		4.53	53.66	66	30 Gal.	30G-8	6970	2 1/2" NPT or Opt. Flange Ports	9.03	148.42	693
1 Gal.	1G-6	231		6.78	16.54	83	35 Gal.	35G-8	8085	2 1/2" NPT or Opt. Flange Ports	9.03	170.60	781
2 1/2 Gal.	2-5G-6	580	3/4", 1 1/2", or 2 1/2" NPT or Straight Thd. Opt. Flange Ports	6.78	28.88	110	10 Gal.	10G-10	2315	2 1/2" NPT or Opt. Flange Ports	11.28	40.99	455
4 Gal.	4G-6	925		6.78	41.09	137	15 Gal.	15G-10	3470	2 1/2" NPT or Opt. Flange Ports	11.28	55.71	547
5 Gal.	5G-6	1155		6.78	49.22	155	20 Gal.	20G-10	4625	2 1/2" NPT or Opt. Flange Ports	11.28	70.44	638
7 1/2 Gal.	7-5G-6	1740		6.78	69.91	200	25 Gal.	25G-10	5780	2 1/2" NPT or Opt. Flange Ports	11.28	85.12	731
10 Gal.	10G-6	2315		6.78	90.24	245	30 Gal.	30G-10	6970	2 1/2" NPT or Opt. Flange Ports	11.28	100.27	825
12 Gal.	12G-6	2776		6.78	106.55	281	40 Gal.	40G-10	9240	2 1/2" NPT or Opt. Flange Ports	11.28	129.17	1007
15 Gal.	15G-6	3470		6.78	131.10	335	50 Gal.	50G-10	11550	2 1/2" NPT or Opt. Flange Ports	11.28	158.58	1188
20 Gal.	20G-6	4625		6.78	171.95	425	60 Gal.	60G-10	13860	2 1/2" NPT or Opt. Flange Ports	11.28	188.00	1365

*2 1/2" ports are available on special order due to larger piston poppet assembly required.

3000 PSI - Working 5,000, 10,000 and 20,000 PSI working For larger volumes, see Dual Accumulator Systems.
 6000 PSI - Proof pressures available on request.
 12000 PSI - Burst



Operating temperature range: 20°F to 175°F.
 Optional temperature operating ranges: -60°F to 350°F.

Oil Volume at indicated Operating Pressures.
 (10 in.³ to 30 Gallon capacities only.)

DUAL ACCUMULATOR SYSTEMS HYDRO-PNEUMATIC POPPET PISTON TYPE

Sizes and General Data

- Water Operating Models Available.
- ASME Coded Models Available.

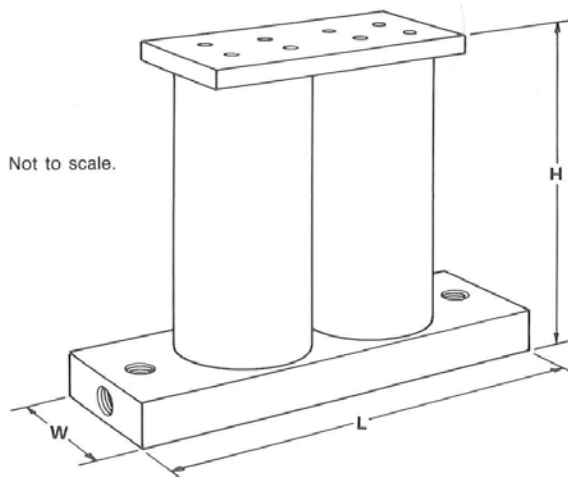
Size	Model No.	Max. Oil Vol. cu. in.	Total Volume cu. in.	L-Length W-Width in.	H Height in.	Dry Weight lbs.	Size	Model No.	Max. Oil Vol. cu. in.	Total Volume cu. in.	L-Length W-Width in.	H Height in.	Dry Weight lbs.
10 Gal.	D5G-6	1155	2388	L=23.50 W=7.75	52.70	330	20 Gal.	D10G-10	2315	4942	L=33.00 W=12.00	44.98	857
15 Gal.	D7-5G-6	1740	3558		73.41	375	30 Gal.	D15G-10	3470	7252		59.68	949
20 Gal.	D10G-6	2315	4708		93.74	420	40 Gal.	D20G-10	4625	9562		74.39	1041
25 Gal.	D12-5G-6	2887	5852		114.00	465	50 Gal.	D25G-10	5780	11872		89.09	1133
30 Gal.	D15G-6	3470	7018		134.60	510	60 Gal.	D30G-10	6970	14252		104.24	1228
40 Gal.	D20G-6	4625	9328		175.45	600	80 Gal.	D40G-10	9240	18792		133.15	1408
10 Gal.	D5G-8	1155	2485	L=27.50 W=10.00	36.47	499	100 Gal.	D50G-10	11550	23412	L=38.00 W=14.00	162.56	1592
15 Gal.	D7-5G-8	1740	3655		48.11	545	120 Gal.	D60G-10	13860	28032		191.97	1775
20 Gal.	D10G-8	2315	4805		59.54	591	60 Gal.	D30G-12	6970	14252		78.88	1495
30 Gal.	D15G-8	3470	7115		82.52	683	90 Gal.	D45G-12	10395	21102		109.15	1748
40 Gal.	D20G-8	4625	9425		105.45	776	120 Gal.	D60G-12	13860	28032		139.79	2004
50 Gal.	D25G-8	5780	11735		128.45	867	150 Gal.	D75G-12	17325	34962		170.43	2259
60 Gal.	D30G-8	6970	14115	152.15	962	180 Gal.	D90G-12	20790	41892	201.07	2514		

Volumes not shown in chart are available as specials; consult factory.

Operating temperature range: 20°F to 175°F.
Optional temperature ranges: -60°F to 350°F.

3000 PSI - Working
6000 PSI - Proof
12000 PSI - Burst

5,000, 10,000 and 20,000 PSI working pressures available on request.



Dual Accumulator Systems Porting Options

Model (Last Digit)	End Port NPT	Top of Bottom Plate Options		
		NPT	Straight Thd.	Flange
-6	1½	2½	2½	2½
-8	1½	2½	2½	2½
-10	1½	2½	3	3
-12	1½	2½	3	3

Oil Volume at indicated Operating Pressures.
(10 in.³ to 30 Gallon capacities only.)

ACCUMULATORS

OIL VOLUME AT INDICATED OPERATING PRESSURE (in cubic inches)

Size: 1 Gallon

OPERATING PRESSURE – PSI ISOTHERMAL

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	
100		123	164	184	196	205	211	215	218	221	223	225	226	227	228	229	230	231													
200			81.2	123	147	164	175	184	191	196	201	205	208	210	213	215	216	218	219	220	222	223	224	225	226						
300				62.2	98.7	123	141	153	164	172	178	184	189	193	196	199	202	204	207	209	210	212	213	214	216	217	218	219	220	221	
400					48.9	81.4	106	123	137	147	156	164	169	175	179	184	188	191	194	196	199	201	203	205	206	208	209	211	212	213	
500						40.7	71.0	92.6	109	123	134	143	153	158	164	169	173	177	181	184	185	189	190	194	196	198	199	202	203	204	
600							34.9	61.2	81.4	97.7	112	123	131	141	147	153	159	164	168	172	175	178	181	184	186	189	191	193	195	196	
700								30.4	54.3	73.3	88.8	103	114	123	131	136	144	148	155	158	162	167	171	174	175	179	182	184	186	188	
800									27.2	49.9	66.8	81.5	94.1	106	115	123	129	137	142	147	152	156	158	164	167	168	173	175	177	178	
900										25.4	45.5	62.1	76.1	88.3	98.7	108	116	123	129	135	139	145	147	151	155	158	164	167	169	172	
1000											22.2	41.7	57.2	71.0	82.4	92.6	101	109	116	123	129	134	139	143	145	153	155	158	161	164	
1100												21.3	38.6	53.3	66.2	77.2	87.3	95.7	104	111	117	123	128	133	138	141	145	149	153	155	
1200													19.7	35.9	49.9	62.2	72.8	82.4	91.0	98.7	106	112	117	123	128	131	137	141	145	147	
1300														18.4	33.6	46.8	56.5	68.6	78.2	86.5	94.0	101	105	113	118	123	127	132	136	139	
1400															17.3	31.5	44.0	52.2	65.3	74.2	82.4	89.9	96.5	103	106	114	118	123	127	131	
1500																16.3	29.7	41.7	52.5	62.1	69.9	78.6	86.0	92.6	98.7	104	109	115	119	123	
1600																	15.4	28.1	39.6	49.8	59.2	67.5	75.1	82.4	89.0	95.0	98.5	106	111	115	
1700																		12.5	26.7	37.7	47.4	56.5	64.7	72.4	79.2	85.5	91.7	97.1	102	107	
1800																				13.8	25.4	35.9	45.4	54.0	62.0	69.4	76.1	82.4	88.1	93.5	98.7
1900																					13.2	24.2	34.2	43.5	51.8	59.6	66.7	73.4	79.7	83.4	88.7
2000																						12.6	23.2	32.8	41.7	49.9	57.2	66.7	76.6	82.4	
2100																							12.0	22.3	31.6	39.2	48.0	55.3	62.2	68.5	74.5
2200																								11.5	21.3	29.4	38.7	46.3	53.4	58.0	66.3
2300																									11.0	19.6	29.2	37.2	44.8	51.4	58.0
2400																										9.8	19.8	28.2	36.0	43.1	48.0
2500																											9.5	19.1	27.2	34.8	41.9
2600																												10.0	18.6	26.4	33.6
2700																													9.8	17.9	25.4

Size: 1 1/2 Gallon

OPERATING PRESSURE – PSI ISOTHERMAL

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	
100		191	255	286	305	317	327	332	338	343	345																				
200			125	191	227	255	270	286	297	302	312	317	323	325	329	333	336	341	341	345	345										
300				95.0	153	191	219	239	255	268	277	286	293	298	305	309	314	317	322	322	327	329	331	331	332	333	334	338	340	343	
400					76.1	125	158	191	210	223	243	255	264	272	277	286	291	297	302	303	307	312	313	315	318	321	323	325	327	328	
500						63.4	108	143	168	191	209	223	235	243	254	262	269	275	281	284	288	293	297	300	305	306	311	313	313	315	
600							54.2	96.0	127	153	174	191	203	219	229	239	247	255	262	265	270	275	280	286	288	293	296	298	300	303	
700								47.4	84.4	115	139	159	174	191	203	214	224	233	241	246	253	258	263	268	272	278	282	284	287	293	
800									42.3	76.1	104	125	145	158	178	191	202	212	221	227	234	241	247	253	257	262	268	270	276	277	
900										38.1	69.3	95.0	117	137	153	165	178	191	202	208	216	223	230	237	242	247	253	257	269	265	
1000											34.6	63.6	87.3	108	125	143	157	168	180	191	198	209	216	221	227	235	241	243	248	252	
1100												31.7	58.4	81.5	102	118	135	149	162	170	180	191	197	205	212	218	226	232	237	241	
1200													29.1	54.4	76.1	95.1	113	127	141	151	164	173	182	191	198	201	211	217	223	227	
1300														27.0	50.6	71.3	89.3	106	121	132	144	154	164	173	181	191	196	203	211	216	
1400															25.4	47.4	66.9	84.2	102	113	125	139	149	159	166	176	184	191	198	203	
1500																23.6	44.7	63.4	80.3	95.1	108	120	133	143	153	162	167	176	185	191	
1600																	22.4	42.1	60.1	76.0	90.4	102	116	127	138	145	155	165	172	178	
1700																		21.0	40.1	57.1	72.0	86.0	95.1	112	122	132	142	148	156	163	
1800																			20.1	38.0	54.4	69.1	82.6	95.0	107	117	125	134	145	153	
1900																				19.1	36.1	51.5	66.1	79.3	93.2	103	113	123	132	141	
2000																					18.0	34.4	49.5	63.6	76.0	87.5	103	108	119	127	
2100																						17.0	33.2	47.6	60.9	73.0	84.5	96.0	106	113	
2200																							16.4	31.7	45.7	58.6	70.5	81.4	91.4	102	
2300																								15.7	30.5	43.9	56.3	68.1	78.2	88.6	
2400																									15.3	29.2	42.3	54.5	65.2	76.1	
2500																										14.3	28.2	40.7	52.3	63.6	
2600																											14.0	27.5	39.4	50.6	
2700																												13.6	26.1	38.1	

ACCUMULATORS

OIL VOLUME AT INDICATED OPERATING PRESSURE (in cubic inches)

Size: 2½ Gallon

OPERATING PRESSURE - PSI ISOTHERMAL

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	
100																															
200		304	406	457	486	507	523	533	541	549	555	559	562	565	577	570	573	576													
300			202	304	365	406	434	457	474	487	499	507	416	523	528	533	538	541	544	549	553	555	557	560	561	561	563	566	568	569	
400				151	243	304	349	381	406	427	443	457	468	479	487	495	502	507	514	517	523	526	529	533	536	540	541	544	547	549	
500					121	202	255	304	339	365	388	406	422	434	446	457	466	474	481	486	493	498	504	507	512	515	519	523	545	527	
600						101	174	228	270	304	333	355	379	391	406	419	431	440	450	457	464	470	476	483	487	491	496	500	504	506	
700							87.2	151	202	243	277	304	324	349	365	381	394	406	416	427	433	443	448	457	468	473	479	483	487		
800								76.3	134	182	221	253	281	304	324	342	358	372	385	396	405	416	424	432	440	445	451	456	461	467	
900									67.6	121	165	202	233	255	284	304	322	338	353	363	377	387	397	405	414	422	427	431	441	445	
1000										60.9	110	152	186	217	243	266	287	304	321	334	348	360	370	381	390	398	405	414	420	425	
1100											55.4	101	139	174	202	228	253	270	287	304	318	333	344	355	364	378	383	390	400	406	
1200												50.7	93.7	130	162	190	215	246	256	274	290	303	317	330	341	350	361	370	378	385	
1300													46.8	87.3	120	151	179	202	223	243	261	276	289	304	316	324	339	349	359	365	
1400														43.5	81.1	113	142	167	191	213	230	247	264	278	291	304	314	326	336	345	
1500															40.6	76.3	106	134	160	182	202	221	238	253	267	281	293	304	315	324	
1600																38.1	71.5	101	127	151	173	193	211	228	243	257	270	283	294	304	
1700																	35.8	67.6	96.2	121	144	165	184	202	220	233	247	254	273	283	
1800																		33.7	64.1	91.5	115	137	158	176	193	210	225	239	251	262	
1900																			31.9	61.0	87.1	110	131	152	170	186	202	217	230	243	
2000																				30.4	58.1	82.8	105	126	144	163	181	196	210	223	
2100																					28.4	55.4	79.2	100	121	138	163	174	187	201	
2200																						27.3	53.2	76.3	97.5	115	134	151	167	182	
2300																							26.1	50.6	73.2	93.9	110	130	146	162	
2400																								24.9	47.8	70.1	90.2	108	124	141	
2500																									24.3	46.8	67.6	87.1	104	121	
2600																										23.1	45.1	65.2	84.1	101	
2700																											22.5	43.9	63.3	81.1	
																												21.8	42.1	60.9	

Size: 4 Gallon

OPERATING PRESSURE - PSI ISOTHERMAL

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	
100																															
200		474	630	715	764	798	820	834	852	860	872	876	884	885	891	895	902	902	904	906	909	912	915	917	918	921					
300			318	475	573	638	685	715	743	769	784	794	808	821	830	836	843	851	855	862	864	871	875	878	880	881	883	885	889	892	
400				240	385	480	549	599	634	671	694	714	736	751	767	778	786	794	803	815	820	824	830	834	840	845	851	853	857	862	
500					190	320	415	476	530	576	610	635	665	684	700	715	732	743	757	764	773	781	792	794	804	810	814	820	824	828	
600						165	274	355	427	477	523	558	598	617	637	658	676	692	706	719	728	738	747	756	764	772	778	784	792	794	
700							136	238	317	382	434	477	508	546	572	596	618	636	652	670	681	694	705	715	725	734	743	751	758	764	
800								120	211	286	346	397	441	477	510	537	562	583	603	621	637	651	664	676	686	697	705	715	725	733	
900									105	190	260	317	367	410	446	477	505	531	552	573	590	610	623	636	650	662	671	681	690	715	
1000										95.5	173	238	292	340	381	416	450	477	501	525	544	564	580	596	611	624	637	648	658	668	
1100											86.7	160	220	272	317	358	393	423	451	477	500	521	540	555	573	594	601	614	626	637	
1200												79.6	146	203	254	297	336	371	401	430	454	477	498	516	534	551	565	580	593	604	
1300													73.4	136	190	238	280	317	351	382	419	433	454	477	496	508	530	546	562	572	
1400														68.1	126	178	223	264	301	333	363	390	415	436	451	476	494	511	528	541	
1500															63.6	120	167	211	250	286	317	345	373	397	420	441	460	471	494	509	
1600																59.6	111	158	200	238	272	303	330	357	381	403	423	441	461	477	
1700																	56.2	105	150	190	227	260	290	317	343	367	387	410	428	446	
1800																		53.2	100	142	180	215	248	277	305	330	353	374	394	412	
1900																			50.2	95.7	135	173	206	238	267	293	317	340	361	381	
2000																				47.9	89.8	130	165	198	228	256	282	307	328	349	
2100																					45.4	86.8	123	160	190	220	256	272	295	317	
2200																						43.1	83.2	118	152	182	211	238	263	286	
2300																							41.1	79.4	114	146	176	203	230	254	
2400																								39.1	76.4	110	140	170	196	222	
2500																									38.1	73.6	105	136	163	190	
2600																										36.2	70.6	101	131	159	
2700																											35.3	68.1	99.6	126	
																													34.3	65.8	95.5

ACCUMULATORS

OIL VOLUME AT INDICATED OPERATING PRESSURE (in cubic inches)

Size: 5 Gallon

OPERATING PRESSURE - PSI ISOTHERMAL

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000		
100		595	794	894	955	993	1021	1044	1061	1074	1086	1093	1100	1106	1113	1119	1123	1126	1129	1133	1134	1138	1142	1141	1145	1148						
200			398	597	714	794	850	893	927	953	976	993	1010	1021	1033	1044	1053	1061	1063	1072	1077	1084	1088	1092	1095	1101	1105	1106	1111	1113		
300				299	479	595	683	747	794	836	868	894	918	936	953	971	982	996	1004	1013	1024	1031	1039	1044	1051	1053	1061	1066	1071	1072		
400					239	396	512	595	663	714	761	794	827	852	873	896	912	927	942	953	967	974	984	995	1003	1008	1017	1023	1028	1033		
500						198	342	448	531	575	650	694	744	766	796	821	843	861	878	893	908	922	933	943	953	961	972	981	985	995		
600							171	297	396	478	544	595	634	681	716	746	772	796	816	834	851	868	881	894	905	916	925	937	945	955		
700								148	264	357	433	496	551	575	636	671	703	727	755	774	796	813	831	846	857	871	883	893	903	914		
800									132	239	324	397	458	512	558	598	631	665	691	714	736	761	775	796	810	825	838	852	863	873		
900										118	215	299	378	426	476	522	562	575	629	654	681	706	722	746	762	777	796	811	821	834		
1000											107	198	273	342	398	446	491	531	562	575	624	652	673	696	714	744	752	766	784	794		
1100												99.1	182	256	319	373	422	465	503	535	566	597	623	644	666	688	706	723	742	754		
1200													91.5	171	238	299	351	399	438	478	513	543	568	598	621	634	665	683	704	716		
1300														86.1	159	225	281	331	379	418	455	486	519	545	573	595	617	641	661	675		
1400															79.4	149	212	265	313	359	396	433	467	496	524	551	574	575	619	634		
1500																74.6	141	198	252	299	342	378	416	446	476	506	528	555	578	595		
1600																	70.0	133	189	239	283	324	362	396	428	458	484	512	534	555		
1700																		66.1	126	178	225	272	312	347	381	411	443	468	495	515		
1800																			62.8	118	171	215	258	296	333	378	396	423	451	476		
1900																					59.7	114	161	209	246	285	322	352	371	413	438	
2000																						56.6	109	156	198	239	273	322	342	371	395	
2100																							53.5	103	148	192	229	263	297	328	359	
2200																								51.4	99.1	142	182	221	256	288	319	
2300																									48.8	95.4	136	175	215	245	279	
2400																										47.6	91.5	133	171	206	238	
2500																											45.2	88.1	128	166	198	
2600																												44.3	85.2	125	159	
2700																													43.0	82.3	119	

Size: 7 1/2 Gallon

OPERATING PRESSURE - PSI ISOTHERMAL

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	
100		899	1203	1350	1439	1502	1543	1575	1600	1619	1637	1649	1660	1678	1687	1692	1700	1704	1710	1714	1720	1722	1725	1730	1731						
200			598	898	1080	1202	1270	1350	1400	1440	1471	1500	1521	1543	1560	1575	1587	1600	1610	1620	1630	1637	1641	1650	1656	1660	1667	1670	1674	1678	
300				450	719	900	1030	1124	1199	1259	1307	1330	1381	1414	1446	1460	1481	1500	1516	1528	1541	1553	1564	1574	1582	1590	1600	1607	1613	1620	
400					360	599	772	900	1000	1080	1146	1200	1247	1270	1319	1350	1360	1400	1421	1440	1457	1471	1487	1500	1511	1521	1532	1543	1550	1560	
500						300	514	674	798	898	982	1050	1121	1157	1200	1237	1260	1300	1324	1350	1370	1390	1410	1424	1440	1450	1467	1480	1490	1500	
600							256	449	600	720	818	900	960	1030	1080	1124	1161	1199	1230	1260	1284	1307	1330	1350	1357	1381	1400	1414	1430	1440	
700								224	398	539	654	749	831	900	959	1011	1056	1100	1137	1169	1200	1225	1252	1273	1295	1313	1330	1350	1364	1380	
800									200	360	491	600	692	772	840	900	950	1000	1040	1080	1110	1146	1171	1206	1221	1247	1264	1270	1300	1320	
900										179	325	450	553	640	718	786	845	900	944	990	1024	1060	1091	1124	1151	1177	1200	1220	1240	1260	
1000											163	298	413	514	600	674	737	799	850	900	942	982	1014	1050	1080	1121	1130	1157	1180	1200	
1100												150	276	384	480	561	634	700	755	808	855	900	937	974	1008	1035	1062	1090	1117	1140	
1200													137	256	360	450	528	600	661	720	772	818	860	900	935	960	1000	1030	1060	1079	
1300														128	238	336	423	498	568	630	684	736	782	824	864	900	931	960	993	1020	
1400															120	225	315	398	472	539	600	654	704	750	791	831	865	900	914	959	
1500																112	210	300	380	450	514	572	625	674	720	760	800	835	871	900	
1600																	105	199	283	360	424	491	544	600	647	692	734	772	810	840	
1700																		100	190	269	341	416	470	524	578	621	666	706	744	780	
1800																			94.4	180	256	326	390	450	502	553	600	640	680	720	
1900																				89.9	170	244	312	374	431	484	531	580	620	659	
2000																					85.3	162	233	300	360	413	484	514	557	600	
2100																						79.8	156	224	287	344	400	450	495	540	
2200																							77.3	150	215	276	332	384	432	479	
2300																								73.7	143	206	265	321	370	420	
2400																									72.0	137	200	256	310	359	
2500																										68.3	132	192	247	300	
2600																											66.4	128	186	240	
2700																												64.8	123	179	

ACCUMULATORS

OIL VOLUME AT INDICATED OPERATING PRESSURE (in cubic inches)

Size: 10 Gallon

OPERATING PRESSURE - PSI ISOTHERMAL

PRECHARGE PRESSURE - PSI	OPERATING PRESSURE - PSI ISOTHERMAL																															
	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000		
100		1191	1589	1788	1907	1983	2044	2084	2119	2144	2169	2184	2199	2209	2218	2234	2238	2248	2259	2265	2271											
200			793	1191	1429	1589	1704	1788	1849	1907	1971	1983	2019	2044	2064	2084	2098	2119	2129	2144	2157	2169	2174	2184	2189	2199	2204	2209	2214	2219		
300				595	952	1191	1362	1489	1589	1669	1734	1787	1831	1871	1907	1939	1961	1987	2009	2029	2044	2058	2074	2084	2096	2107	2119	2129	2139	2145		
400					475	793	1019	1191	1324	1425	1514	1589	1649	1704	1744	1789	1819	1849	1878	1907	1929	1951	1968	1983	1999	2019	2028	2044	2056	2064		
500						396	681	893	1057	1191	1299	1389	1484	1529	1588	1638	1681	1718	1757	1786	1814	1840	1862	1886	1905	1921	1941	1958	1971	1983		
600							340	595	793	952	1084	1191	1269	1362	1427	1489	1539	1589	1627	1669	1619	1734	1759	1787	1809	1831	1851	1871	1889	1907		
700								297	528	714	864	993	1099	1191	1269	1340	1399	1457	1504	1548	1588	1624	1659	1689	1717	1738	1764	1788	1808	1829		
800									263	475	649	793	916	1019	1111	1191	1259	1324	1379	1429	1474	1513	1552	1589	1620	1649	1674	1704	1721	1743		
900										237	432	595	732	849	953	1041	1120	1191	1252	1310	1358	1407	1447	1489	1524	1557	1589	1619	1644	1669		
1000											216	396	547	681	792	893	979	1057	1127	1191	1243	1299	1346	1389	1429	1484	1499	1528	1561	1589		
1100												197	365	509	635	742	841	924	1002	1071	1133	1191	1241	1288	1349	1374	1412	1447	1481	1508		
1200													182	340	476	595	700	792	876	952	1046	1084	1134	1191	1238	1269	1324	1362	1401	1427		
1300														171	316	446	558	659	752	834	907	975	1034	1088	1142	1191	1233	1279	1314	1349		
1400															157	297	418	527	625	714	793	864	932	993	1047	1099	1147	1191	1235	1269		
1500																148	279	396	501	594	681	757	829	893	953	1007	1157	1107	1152	1191		
1600																	138	263	375	475	566	649	721	793	851	916	969	1019	1069	1111		
1700																		131	249	357	451	541	621	695	762	824	884	912	985	1028		
1800																			124	236	340	432	516	595	666	732	793	849	903	953		
1900																				118	226	323	413	495	571	639	704	765	821	872		
2000																					113	216	309	396	475	547	639	681	738	792		
2100																						106	206	297	381	456	504	595	656	714		
2200																								101	197	285	365	441	509	573	635	
2300																										97.4	189	273	352	426	490	555
2400																											95.3	182	263	340	409	476
2500																												90.4	175	254	328	397
2600																													88.1	171	247	316
2700																														85.7	164	237

Size: 12 Gallon

OPERATING PRESSURE - PSI ISOTHERMAL

PRECHARGE PRESSURE - PSI	OPERATING PRESSURE - PSI ISOTHERMAL																															
	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000		
100		1385	1843	2078	2217	2309																										
200			924	1385	1663	1847	1979	2078	2155	2217	2267	2309	2345																			
300				692	1108	1385	1583	1732	1847	1940	2015	2078	2132	2177	2217	2252	2282	2309	2334	2350												
400					554	923	1187	1385	1539	1663	1764	1847	1919	1979	2032	2078	2119	2155	2188	2217	2243	2267	2289	2309	2328	2345	2361					
500						461	791	1039	1231	1385	1511	1616	1705	1781	1846	1905	1955	2001	2042	2078	2110	2151	2169	2194	2217	2238	2258	2276	2294	2309		
600							395	692	923	1108	1259	1385	1492	1583	1663	1732	1793	1847	1896	1940	1979	2015	2048	2078	2106	2132	2155	2177	2198	2217		
700								346	615	831	1007	1154	1279	1385	1478	1559	1630	1693	1750	1801	1847	1889	1928	1963	1995	2025	2053	2078	2102	2125		
800									307	554	755	923	1066	1187	1293	1385	1467	1539	1604	1663	1715	1763	1807	1847	1884	1919	1950	1979	2007	2002		
900										277	503	692	852	989	1108	1212	1304	1385	1458	1524	1583	1637	1687	1732	1774	1812	1847	1880	1911	1940		
1000											251	461	639	791	923	1039	1141	1231	1313	1385	1451	1511	1566	1616	1663	1705	1745	1781	1816	1847		
1100												230	426	593	739	866	978	1077	1167	1247	1319	1385	1446	1501	1552	1599	1642	1682	1720	1755		
1200													213	395	554	692	815	923	1021	1108	1187	1259	1325	1385	1436	1492	1539	1583	1624	1663		
1300														197	369	519	652	769	875	970	1064	1133	1205	1270	1330	1385	1437	1484	1529	1570		
1400															184	346	489	615	729	831	923	1007	1084	1154	1219	1279	1334	1385	1433	1478		
1500																173	325	461	583	692	791	881	964	1039	1108	1172	1231	1286	1338	1385		
1600																	163	307	437	554	659	755	843	923	997	1066	1129	1187	1233	1293		
1700																		153	291	414	527	629	723	808	887	959	1026	1087	1147	1201		
1800																			145	277	395	503	603	692	776	852	923	989	1051	1108		
1900																					138	263	377	482	577	665	746	821	909	955	1016	
2000																						131	251	361	461	554	639	718	791	860	923	
2100																							125	241	346	443	533	615	692	764	831	
2200																									120	230	332	426	513	593	669	739
2300																										115	221	319	410	494	573	646
2400																											110	213	307	395	477	554
2500																												106	205	296	382	461
2600																													102	193	286	369
2700																														98	191	277

ACCUMULATORS

OIL VOLUME AT INDICATED OPERATING PRESSURE (in cubic inches)

Size: 15 Gallon

OPERATING PRESSURE - PSI ISOTHERMAL

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000		
100		1732	2309	2598	2771	2887	2969																									
200			1154	1732	2078	2309	2474	2598	2694	2771	2834	2887	2931	2969																		
300				866	1385	1732	1979	2165	2109	2425	2519	2598	2664	2722	2771	2814	2853	1887	2917	2944	2969											
400					692	1454	1484	1732	1924	2078	2204	2309	2398	2474	2540	2598	2649	2693	2735	2771	2804	2834	2862	2887	2910	2931	2951	2969				
500						577	989	1299	1540	1732	1889	2021	2132	2227	2309	2382	2445	2502	2553	2598	2639	2677	2711	2743	2771	2798	2823	2846	2867	2887		
600							494	866	1154	1385	1574	1732	1865	1979	2078	2165	2242	2309	2370	2425	2474	2519	2561	2598	2633	2665	2694	2722	2748	2769		
700								433	769	1039	1259	1442	1599	1732	1847	1949	2037	2117	2188	2252	2309	2362	2410	2454	2494	2531	2566	2598	2628	2656		
800									384	692	944	1154	1332	1484	1616	1732	1834	1924	2006	2078	2144	2204	2259	2309	2356	2398	2438	2474	2509	2540		
900										346	629	866	1066	1237	1385	1515	1630	1732	1823	1905	1970	2047	2109	2165	2217	2265	2309	2351	2389	2425		
1000											314	577	799	989	1154	1299	1426	1539	1641	1732	1814	1889	1958	2021	2078	2132	2181	2227	2270	2309		
1100												288	533	742	923	1082	1222	1337	1458	1559	1649	1732	1807	1876	1940	1999	2053	2103	2150	2194		
1200													266	494	692	866	1019	1154	1276	1385	1484	1574	1657	1732	1801	1865	1924	1979	2031	2078		
1300														247	461	649	815	962	1094	1212	1319	1417	1506	1488	1663	1732	1796	1856	1911	1963		
1400															230	433	611	769	911	1039	1154	1259	1355	1556	1632	1703	1768	1828	1885	1937		
1500																216	407	577	729	866	989	1102	1205	1299	1385	1465	1539	1608	1672	1732		
1600																	203	384	549	693	824	944	1053	1154	1247	1333	1414	1484	1553	1616		
1700																		192	364	519	559	787	903	1010	1108	1199	1288	1361	1433	1601		
1800																			182	346	594	629	753	866	970	1076	1154	1237	1314	1385		
1900																				173	332	473	608	723	831	934	1026	1114	1189	1271		
2000																					164	314	451	577	732	838	935	1026	1109	1188		
2100																						157	303	433	554	666	770	866	956	1039		
2200																							150	288	416	533	641	742	836	923		
2300																									144	277	399	513	618	717	809	
2400																										138	266	384	493	597	694	
2500																											133	256	372	479	577	
2600																													131	247	358	461
2700																														123	239	347

Size: 20 Gallon

OPERATING PRESSURE - PSI ISOTHERMAL

	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000		
200		1774	2661	3194	3549	3802	3991	4140	4259	4355	4436	4505	4563	4614																
300			1329	2129	2661	3042	3327	3549	3726	3871	3992	4094	4183	4259	4325	4384	4435	4483	4525	4563	4597									
400				1064	1774	2281	2661	2957	3194	3387	3549	3685	3801	3904	3992	4071	4140	4203	4259	4309	4355	4398	4436	4472	4504	4535	4563	4589	4614	
500					887	1521	1996	2366	2661	2903	3105	3276	3422	3549	3660	3758	3845	3922	3992	4056	4113	4166	4214	4261	4300	4338	4373	4406	4436	
600						760	1330	1774	2129	2419	2661	2866	3042	3194	3327	3444	3549	3642	3726	3801	3870	3935	3992	4046	4095	4140	4183	4222	4259	
700							665	1183	1597	1943	2218	2456	2661	2839	2994	3131	3253	3362	3460	3549	3629	3703	3771	3833	3890	3943	3992	4038	4081	
800								591	1064	1450	1773	2047	2281	2484	2661	2818	2957	3082	3194	3295	3387	3472	3549	3620	3685	3746	3802	3855	3905	
900									532	966	1330	1637	1901	2129	2328	2504	2661	2802	2928	3042	3145	3240	3327	3407	3481	3549	3612	3671	3727	
1000										483	887	1228	1521	1774	1996	2192	2365	2521	2661	2788	2903	3009	3105	3194	3275	3352	3421	3488	3548	
1100											443	818	1140	1419	1663	1879	2070	2241	2395	2535	2661	2777	2883	2981	3071	3154	3232	3304	3371	
1200												409	760	1131	1330	1565	1774	1961	2129	2281	2419	2546	2661	2768	2866	2957	3042	3120	3194	
1300													380	709	998	1252	1478	1681	1863	2028	2177	2314	2440	2555	2661	2759	2852	2937	3016	
1400														354	665	939	1183	1401	1597	1774	1935	2083	2218	2342	2457	2563	2661	2752	2839	
1500															332	626	887	1120	1330	1521	1693	1851	1996	2129	2252	2366	2471	2570	2661	
1600																313	591	840	1064	1266	1451	1620	1774	1916	2047	2169	2281	2386	2484	
1700																	295	560	798	1014	1209	1388	1552	1703	1842	1971	2091	2203	2307	
1800																		280	532	760	967	1157	1330	1490	1638	1774	1901	2019	2129	
1900																			266	507	725	925	1109	1277	1433	1577	1711	1835	1952	
2000																					253	483	694	887	1064	1228	1380	1521	1652	1774

ACCUMULATORS

OIL VOLUME AT INDICATED OPERATING PRESSURE (in cubic inches)

Size: 25 Gallon

OPERATING PRESSURE - PSI ISOTHERMAL

	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	
200	1920	2880	3450	3830	4110	4320	4480	4600	4710	4795	4865	4928	4985	5032	5074	5110	5143	5172	5200	5225	5247	5268	5287	5307	5323	5340	5354	5367	
300		1470	2330	2992	3310	3610	3850	4030	4190	4320	4430	4530	4610	4680	4740	4800	4850	4895	4935	4972	5005	5035	5065	5093	5116	5139	5160	5180	
400			1150	1920	2470	2870	3200	3450	3660	3835	4085	4105	4215	4315	4400	4475	4540	4600	4655	4708	4750	4793	4830	4865	4898	4930	4957	4983	
500				910	1600	2170	2520	2870	3110	3325	3520	3680	3815	3935	4045	4138	4221	4300	4368	4430	4490	4544	4590	4635	4675	4715	4745	4782	
600					815	1430	1915	2290	2610	2890	3088	3275	3440	3585	3725	3830	3935	4022	4105	4180	4245	4310	4366	4420	4465	4515	4560	4595	
700						715	1285	1726	2100	2398	2655	2880	3070	3220	3395	3520	3640	3745	3835	3925	4005	4075	4145	4205	4260	4315	4365	4413	
800							630	1150	1565	1925	2215	2465	2690	2885	3050	3200	3335	3450	3565	3666	3755	3835	3915	3985	4050	4110	4165	4215	
900								555	1050	1430	1775	2065	2300	2520	2710	2880	3030	3165	3290	3400	3500	3600	3675	3765	3835	3905	3970	4025	
1000									520	965	1330	1650	1925	2165	2370	2560	2730	2875	3010	3140	3250	3360	3455	3540	3620	3700	3765	3835	
1100										500	880	1230	1525	1815	2035	2200	2425	2600	2750	2880	3005	3210	3225	3325	3420	3500	3575	3650	
1200											450	950	1160	1430	1690	1925	2115	2300	2465	2615	2750	2880	2990	3100	3200	3295	3370	3255	
1300												420	770	1085	1350	1595	1815	2010	2190	2350	2500	2640	2751	2815	2980	3080	3170	3620	
1400													380	715	1015	1280	1485	1715	1920	2080	2250	2393	2530	2650	2770	2875	2970	3065	
1500														365	680	960	1220	1430	1640	1825	2000	2155	2300	2430	2555	2670	2775	2870	
1600															330	625	900	1125	1320	1565	1740	1910	2065	2205	2330	2455	2570	2675	
1700																330	620	875	1100	1320	1500	1685	1835	2085	2130	2270	2380	2485	
1800																	300	565	815	1030	1250	1425	1610	1765	1910	2050	2180	2300	
1900																		285	540	780	1005	1185	1375	1555	1705	1852	1975	2110	
2000																			280	520	750	955	1140	1315	1475	1630	1775	1910	
2100																				270	480	715	905	1100	1270	1415	1570	1705	
2200																					250	475	678	875	1070	1225	1375	1530	
2300																						220	450	645	830	1015	1185	1318	
2400																								218	425	670	816	980	1130
2500																									415	430	515	775	935
2600																										225	410	605	765
2700																											185	375	530

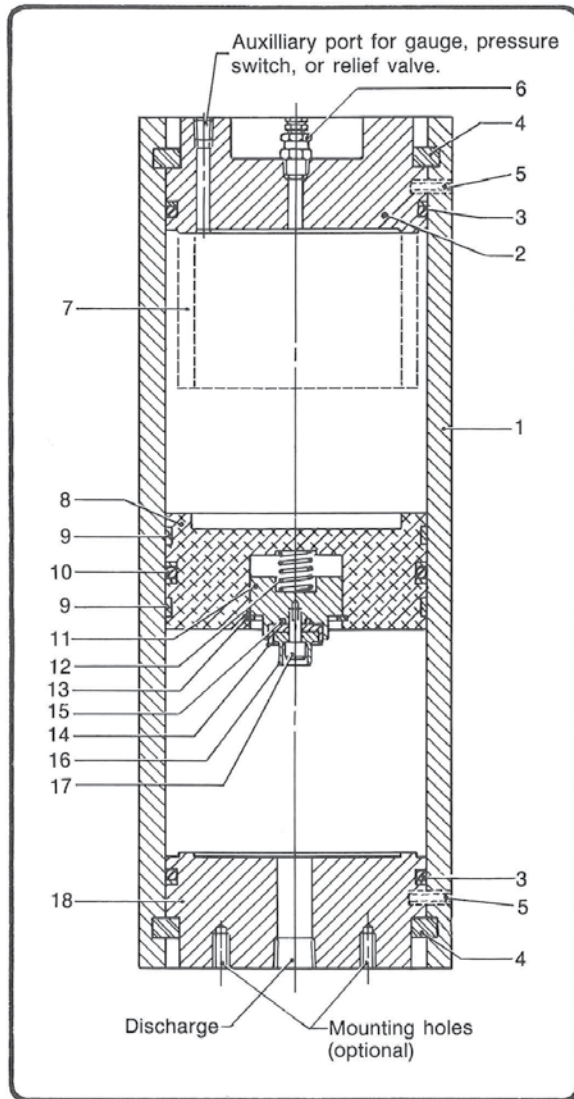
Size: 30 Gallon

OPERATING PRESSURE - PSI ISOTHERMAL

	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	
200	2330	3490	4185	4650	4990	5230	5425	5580	5700	5810	5900	5975	6040	6100	6150	6200	6240	6270	6310	6340	6364	6390	6415	6434	6454	6475	6490	6506	
300		1750	2800	3490	3990	4360	4650	4880	5070	5230	5365	5480	5580	5665	5740	5810	5870	5930	5975	6020	6062	6100	6134	6166	6196	6224	6248	6273	
400			1420	2330	3000	3490	3880	4190	4455	4650	4830	5000	5115	5230	5330	5420	5505	5580	5645	5710	5760	5810	5857	5900	5940	5946	6010	6042	
500				1170	1975	2620	3110	3490	3810	4070	4290	4485	4650	4800	4945	5035	5135	5230	5310	5385	5455	5520	5575	5630	5680	5728	5770	5810	
600					1740	2330	2795	3175	3490	3750	2990	4190	4360	4525	4650	4770	4880	4990	5070	5155	5230	5300	5365	5420	5478	5530	5580		
700						1550	2100	2540	2910	3225	3490	3525	3930	4110	4260	4410	4530	4650	4750	4850	4940	5020	5095	5165	5230	5290	5325		
800							780	1415	1910	2330	2690	2990	3250	3490	3690	3870	4035	4185	4325	4435	4550	4650	4740	4830	4905	4980	5048	5110	
900								720	1280	1750	2150	2500	2830	3050	3255	3490	3670	3840	3990	4130	4248	4360	4470	4560	4650	4730	4810	4880	
1000									645	1170	1620	2000	2330	2620	2870	3110	3310	3490	3650	3800	3940	4070	4185	4290	4390	4485	4570	4650	
1100										590	1070	1490	1860	2180	2460	2710	2930	3130	3320	3490	3620	3780	3900	4020	4130	4230	4325	4415	
1200											530	1000	1390	1740	2040	2320	2570	2790	2985	3170	3330	3490	3625	3750	3870	3980	4085	4180	
1300												500	930	1310	1630	1940	2210	2440	2650	2850	3030	3200	3320	3490	3615	3735	3845	3951	
1400													470	870	1230	1640	1830	2090	2330	2630	2720	2910	3070	3220	3355	3490	3605	3720	
1500														440	830	1170	1480	1745	1995	2220	2430	2620	2795	2950	3100	3210	3370	3490	
1600															410	770	1100	1395	1670	1895	2130	2330	2510	2690	2845	2990	3120	3260	
1700																390	745	1045	1330	1595	1820	2030	2240	2415	2590	2745	2890	3025	
1800																	370	695	995	1270	1520	1745	1945	2145	2330	2490	2645	2790	
1900																		350	670	950	1220	1450	1680	1880	2070	2245	2400	2650	
2000																			340	645	920	1170	1395	1610	1815	1995	2170	2350	
2100																					320	610	870	1120	1345	1545	1745	1920	2070
2200																						310	580	840	1070	1290	1495	1690	1850
2300																							290	655	795	1030	1245	1445	1620
2400																								275	540	770	995	1195	1390
2500																									270	520	745	970	1170
2600																										255	495	720	940
2700																											250	590	710

ACCUMULATORS

PARTS LIST



To order parts for listed accumulators, specify:

1. Part Number
2. Part Name
3. Quantity desired
4. Accumulator model number
5. Accumulator serial number
6. Accumulator size

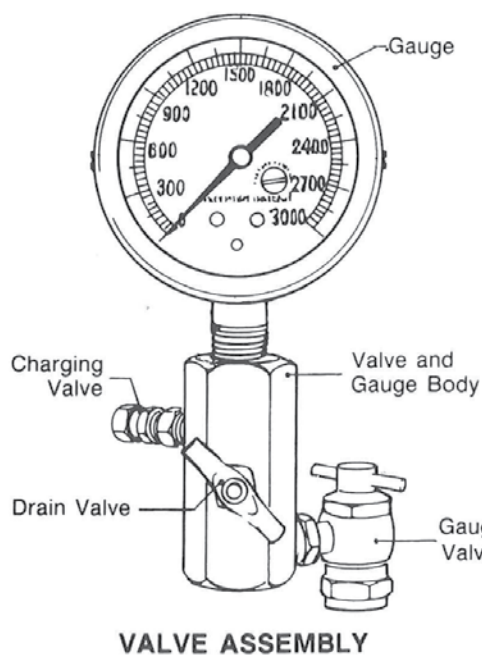
Example: Part No. 4, split shear ring, 2, 15GA-7, serial No., 15 gallon.

2A Part No.	No. Req'd.	Part Name
1	1	High strength steel tube
2	1	Steel end cap
3	2	"O" ring and back-up
4	2	Split shear ring
5	2	Set screw
6	1	Gas valve
7	1	Stop Tube (optional)
8	1	Light weight aluminum piston
9	2	Wear ring
10	1	"O" ring seal with back-ups
11*	1	Piston poppet
12*	1	Spring
13*	1	Poppet retaining ring
14*	1	Poppet seal
15*	1	Poppet seal "O" ring
16*	1	Poppet seal cushion retainer
17*	1	Cushion retainer screw
18	1	Steel end head

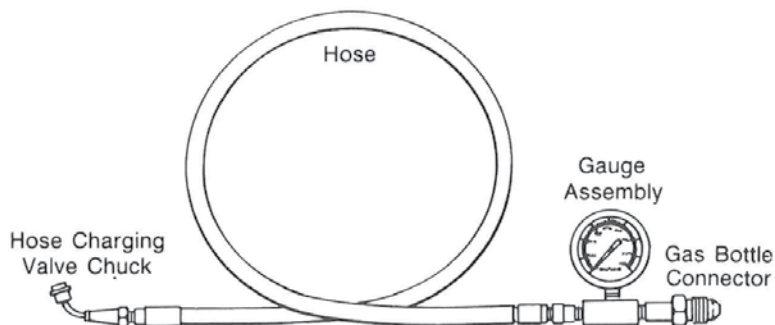
*Items included in piston poppet assembly.

ACCUMULATORS

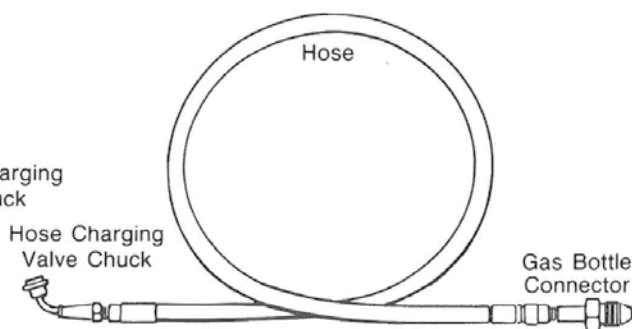
Accessories



VALVE ASSEMBLY



CHARGING HOSE & GAUGE ASSEMBLY



CHARGING HOSE ASSEMBLY

PARTS LIST

Item	Part No.	Description
Complete Valve Assembly No. CVA 200	V4240	Valve and Gauge Body
	V2145	Gauge Charging Valve Chuck
	V52564	Drain Valve
	V71466	Charging Valve
	V41371	Gauge
Complete Charging Hose Assy. No. CHA 300	H33114	Hose Charging Valve Chuck
	H6614	Hose
	H5880	Gas Bottle Connector
No. CHVA 400 - Complete Charging Hose and Valve Assembly		
No. CHGA 500 - Complete Charging Hose and Gauge Assembly		

Nuclear Actuators

Hanna Cylinders' quarter turn and rising stem nuclear actuators are constructed to withstand severe duty applications. All of our nuclear actuators are manufactured in accordance to the standards of our 10CFR50 appendix B quality assurance program.

Hanna supplies all 3 sections (cylinder, center mechanism {scotch yoke design}, and spring pack) which allows us to be unique in the marketplace.

1. Our quarter turn mechanisms are manufactured in (3) frame sizes with torque values ranging from 1,000 ft/lbs ~ 150,000 ft/lbs.
2. Designed for inside / outside containment & safety / non-safety related applications.
3. Qualify to IEEE 323-2003, IEEE 344-1987, & IEEE 382-1996 specifications.
4. Qualify to latest Westinghouse specifications:
 - *APP-PV11-Z0-001 rev. 0 (valve specification)*
 - *APP-PV11-Z0R-001 rev. 0 (data sheet report)*
 - *APP-GW-VP-010 rev. 0 (EQ for valves)*
5. High pressure direct spring actuators for rising stem valves.
6. Air and hydraulic valving panels, optional override accessories for nuclear & non-nuclear applications.

