



HYDRO-PAC, INC.



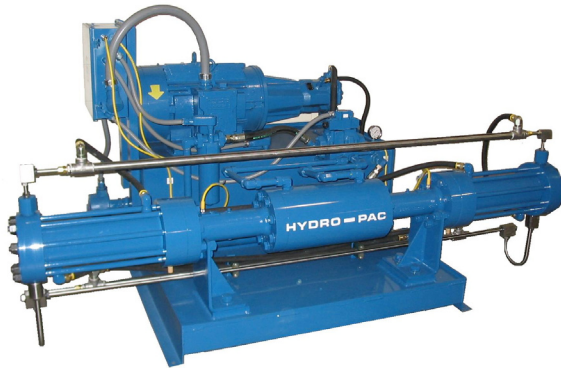
**LX-SERIES™
Hydrogen Gas
Compressors
1500 to 12000 PSI**





HYDRO-PAC INC.

LX-Series™ Compressors for Hydrogen Gas



Since the 1980s, Hydro-Pac has manufactured gas compressors for high-pressure hydrogen applications. We have developed the techniques to safely and reliably compress this difficult gas.

Our initial experience was the design and manufacture of ultra high-pressure hydrogen compressors for pressures of 30,000 psi to 120,000 psi (200 to 825 MPa).

The recent interest in hydrogen gas as an energy source has prompted us to expand our product offerings for this important application. In addition to the ultra-high-pressure machines, we manufacture units for pressures of 1,000 psi to 15,000 psi (7 to 100 MPa) and flow rates of 1 scfm to 350 scfm (3 to 1170 kg/day)

Today, our hydrogen compressors are in use at fixed and mobile fueling stations, industrial sites, research and development facilities, and backup power systems.

Features

Hydro-Pac LX-SERIES™ Gas Compressors feature:

- Oil-free non-lubricated gas pistons and cylinders protect against oil contamination of the process gas.
- Full stroke-length distance pieces isolate the hydraulic drive from the gas cylinders. This prevents contamination of the gas by the hydraulic drive oil.
- Hydro-Pac gas compressors work over a wide range of inlet pressures. In many cases inlet pressure regulators are not required.
- Intensifiers are ideally suited for high-pressures due to the simple geometry, slow operating speeds and in-line loads.
- Long slow stroke and small dead volume in the compressor cylinders result in high volumetric efficiency.
- Water cooled gas cylinders lower operating temperatures, which increases packing life.
- Hydraulically driven intensifiers allow control of both discharge pressure and gas flow rate by controlling the hydraulic drive. This may be important when matching the flow rate of the compressor to that of a reformer or electrolyzer.
- Straightforward arrangement and patented free piston design of Hydro-Pac compressors simplifies maintenance.
- Gas pressure assists in the compression stroke improving the overall efficiency of the machine.



HYDRO-PAC Intensifiers

The heart of every Hydro-Pac gas compressor is a hydraulically driven intensifier. An intensifier consists of a hydraulic cylinder (motive cylinder) coupled with two gas cylinders. The most common arrangement is a hydraulic cylinder in the center with a gas cylinder on each side of the hydraulic cylinder.

In operation, the force of the hydraulic pressure acting on a hydraulic piston is balanced by

gas pressure acting on the gas piston. As the hydraulic cylinder strokes, gas is compressed and displaced from one gas cylinder while simultaneously filling the other gas cylinder.

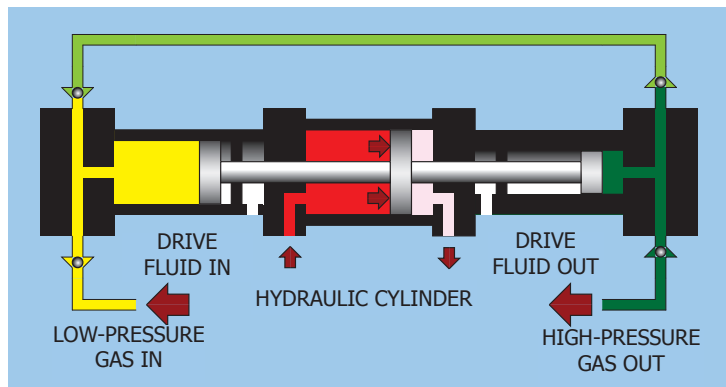
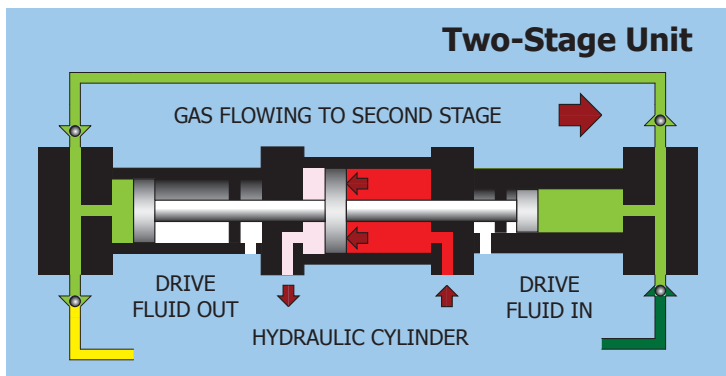
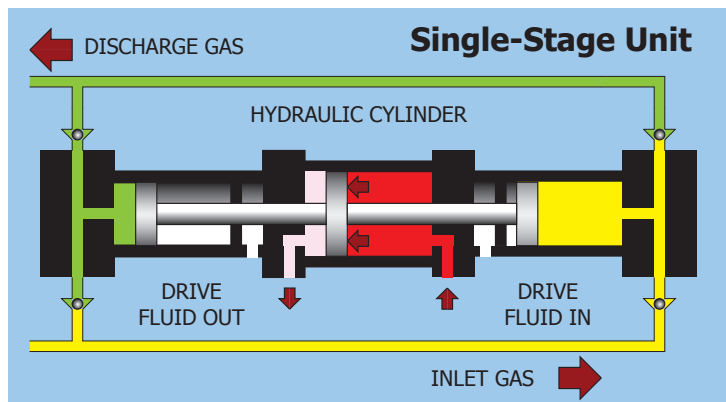
Intensifier designs are flexible and multiple arrangements are possible. The most common arrangements are double-ended machines that are either single-stage or two-stage units. Single-ended units are also available.

Single-Stage Machines

Single-stage compressors are commonly used to take advantage of high inlet pressures. The flexible design of the Hydro-Pac intensifiers, allows single-stage units to operate with very high inlet pressures to produce discharge pressure with each stroke. The compression ratio for a single-stage machine is limited to approximately 8:1.

Two-Stage Machines

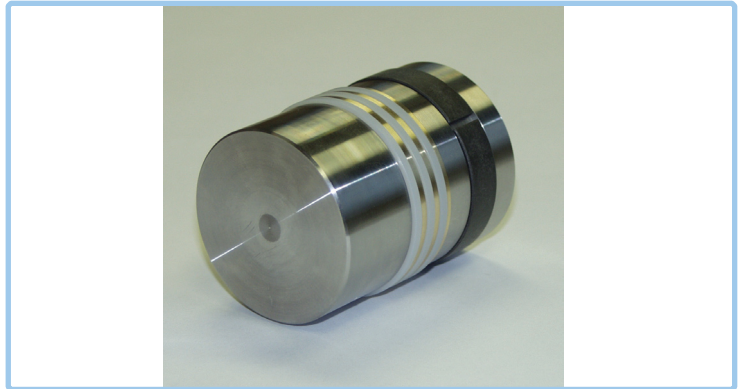
Two-stage compressors are used when the compression ratio exceeds 8:1. The principle of operation is very similar to the single-stage units. The main difference is that the diameter of the second stage gas cylinder is smaller than the first stage gas cylinder. The interstage cooling that occurs between stages allows higher overall compression ratios. The compression ratio for a two-stage machine is limited to approximately 64:1.





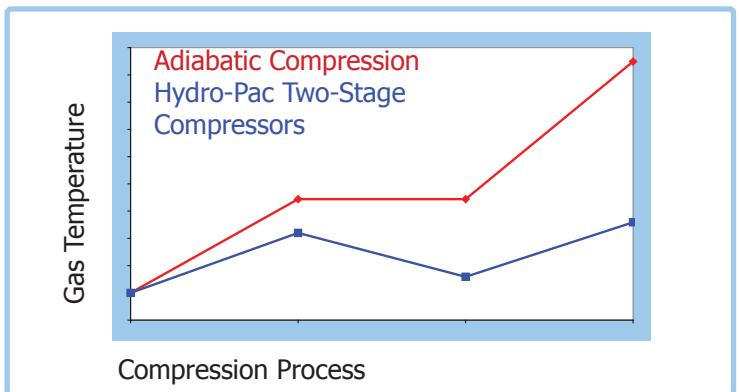
Continuous Piston Rings

Hydro-Pac's proprietary piston design features continuous piston rings for reliable leak free operation. This feature is available on units to 6,000 psi (40 MPa). Units operating at higher pressures feature our Bridgman packing design.



Slow Stroke Rate

The long slow stroke of the Hydro-Pac intensifier promotes cooling of the gas during the compression cycle. Crank-driven and diaphragm compressors stroke at a faster rate and typically operate at higher temperatures than Hydro-Pac machines.



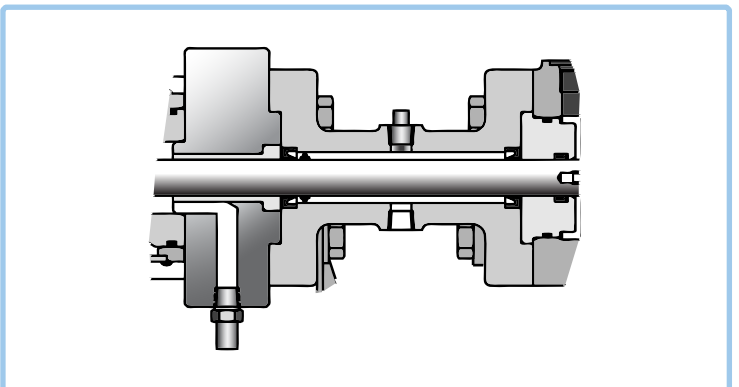
Poppet Type Check Valves

All LX-SERIES™ Gas Compressors feature poppet type check valves with reversible seats.



Extended Spacers

All LX-SERIES™ Gas Compressors feature extended spacers. These are full-length distance pieces that separate the process gas from the hydraulic drive section. No portion of the oil wetted plunger rod enters the gas cylinder.

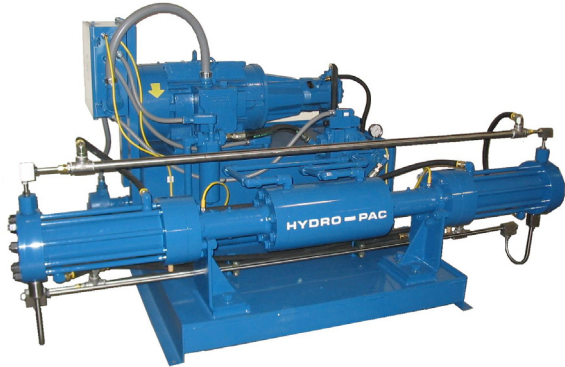




Types of Machines

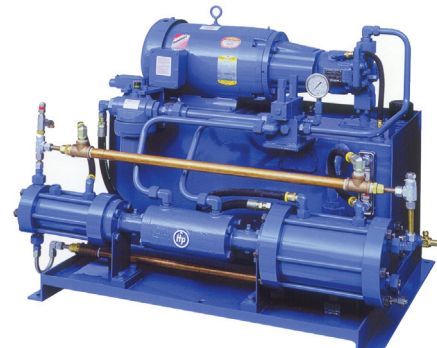
Our hydrogen compressor product line consists of three types of machines in various sizes. The types of machines we manufacture are classified as single-stage, multi-stage and hybrid models.

Each type of machine has specific features that make it well suited for its intended purpose.



The single-stage machines are perfect for moving large amounts of gas when high inlet pressures are available. The ability to work with high inlet pressures allows even small units to move significant amounts of gas. These machines are favorites for rapidly filling vehicle tanks, moving gas between storage vessels and emptying high-pressure tube trailers.

The multi-stage machines boost hydrogen gas from inlet pressures as low as 70 psig (0.5 MPa) to discharge pressures as high as 15,000 psi (100 MPa). These units are often used to fill storage tanks. They can be sized to match the flow of hydrogen gas produced by a reformer or electrolyzer. Some customers have powered our compressors with the electricity generated by windmills.



Hybrid machines share features with the multi-stage and single-stage units. When inlet pressures are low, hybrid compressors act as conventional multi-stage units and boost low-pressure inlet gas to high discharge pressures. When high inlet pressures are available, hybrid machines act as a single-stage compressor and take advantage of the naturally higher capacity that is possible with the higher inlet pressures.



Fueling Strategies

Hydro-Pac compressors are well suited for a number of fueling strategies including:

- **Direct fill:** the compressor fills the tank directly.
- **Cascade fill:** the compressor fills individual storage cylinders, which are then equalized sequentially with the vehicle.
- **Low-pressure storage, high-pressure fill:** the compressors are sized to utilize storage at 3,000 to 6,000 psi (20 to 40 MPa) to fill a high-pressure vehicle tank at 6,000 to 12,000 psi (40 to 80 MPa). This eliminates the need for high-pressure storage tanks yet allows the compressors to displace a large quantity of gas when operating with a higher inlet pressure during the vehicle fill.
- **Scavenge scenarios on multiple storage tank installations:** the compressors scavenge gas from the lower pressure tanks and quickly fill the higher pressure tanks. This allows faster vehicle fill times.
- **Parallel/Series compressor arrangements:** two or more single-stage units act in parallel to move large quantities of gas when pressure differentials are low and then switch to series operation when pressure differentials increase.

In many instances, careful selection of the compressors will minimize the cost of the gas storage tanks by reducing the amount of storage required and the pressure rating of that storage.

Standard Equipment

Hydro-Pac LX-SERIES™ Gas Compressors are furnished as complete units ready for connection to utilities and gas supply.

- Gas intensifier with inlet, interstage and discharge check valves
- Electric motor 230/460V, 3PH, 60HZ, TEFC
- Hydraulic power unit with pump, directional control valve and filters
- Interstage relief valve
- Electrical sensor and switch for low oil level and high oil temperature
- Stainless steel process tubing
- Complete operational testing
- Paint "Hydro-Pac blue" with two-part automotive paint

When ordering or inquiring about LX-SERIES™ Gas Compressors please include:

- Type of gas
- Inlet and discharge pressures
- Capacity
- Utilities: voltage and hertz
- Installation: indoor or outdoor
- Ambient temperature
- Options



Optional Equipment

Hydro-Pac LX-SERIES™ Gas Compressors may be equipped with the following optional equipment.

- Electronic control of pressure or flow
- Manual pressure or flow control
- Inlet, interstage and discharge pressure gauges or switches
- Inlet and/or discharge relief valves
- Auto start/stop for high/low pressures
- Aftercoolers
- Inlet gas pressure regulators
- Special voltages
- Explosion proof motor and electrical controls
- Inlet and discharge receivers
- Closed-loop cooling systems
- Manual or remote motor starter and controls
- Complete system packages with PLC controllers, valves racks and pressure vessels
- Oil reservoir heater for operation at ambient temperatures below 50 deg F (10 deg C)
- Alarm or shutdown for low oil level, clogged oil filter, or high oil temperature
- Hour meter
- Paint to customer's specifications

Materials of Construction

All Hydro-Pac compressors are manufactured of materials suitable to resist the affects of hydrogen embrittlement at the expected operating conditions.

Compressor Packages

In addition to stand-alone compressors, Hydro-Pac also manufactures complete compressor packages. Our basic package includes a motor starter with high/low inlet and/or discharge pressure transducers. More sophisticated packages are available that include options such as a PLC controller, pressure transducers, cooling water flow switch as well as electronic control of pressure or flow, temperature monitoring and closed loop cooling systems. Please consult Hydro-Pac and our engineering team will be happy to help you select a package for your application. Please inquire with the factory for more information about compressor packages.

Worldwide Experience

Hydro-Pac has supplied hydrogen gas compressors to many major gas suppliers and auto makers all over the world.

Standards

Hydro-Pac compressors are available to meet the following international standards: Japanese High-Pressure Gas Safety Law (HPGSL), CSA, UL and the European CE .

Additional Information

This document is a supplement to our brochure describing our LX-SERIES™ Low-Pressure Gas Compressors. Please refer to that brochure for more detailed information about our LX compressors. In addition to the capacity information contained here, we also provide capacity charts in the units of Nm³/hr and Kg/day.



Compressor Specifications, Two-Stage Units

Model Number	Discharge Pressure		Range of Inlet Pressure		Capacity with H ₂ at min inlet		Capacity with H ₂ at max inlet		Motor Power	
	psig	MPa	psig	MPa	scfm	Nm ³ /hr	scfm	Nm ³ /hr	HP	KW
C01.5-03-70/140LX	1500	10	70-140	0.5-1.0	3.3	5.1	6.6	10.3	3	2.3
C01.5-05-70/140LX	1500	10	70-140	0.5-1.0	5.4	8.4	10.7	16.6	5	3.8
C01.5-10-70/140LX	1500	10	70-140	0.5-1.0	10.2	15.9	20	31	10	7.5
C01.5-15-70/140LX	1500	10	70-140	0.5-1.0	16.5	26	33	51	15	11
C01.5-20-70/140LX	1500	10	70-140	0.5-1.0	22	34	43	67	20	15
C01.5-40-70/140LX	1500	10	70-140	0.5-1.0	43	67	87	135	40	30
C01.5-60-70/140LX	1500	10	70-140	0.5-1.0	65	101	130	202	60	45
C01.5-03-140/300LX	1500	10	140-300	1.0-2.0	5.5	8.6	11.2	17.4	3	2.3
C01.5-05-140/300LX	1500	10	140-300	1.0-2.0	8.9	13.8	18.0	28	5	3.8
C01.5-10-140/300LX	1500	10	140-300	1.0-2.0	16.7	26	34	53	10	7.5
C01.5-15-140/300LX	1500	10	140-300	1.0-2.0	26	40	52	81	15	11
C01.5-20-140/300LX	1500	10	140-300	1.0-2.0	35	54	70	109	20	15
C01.5-40-140/300LX	1500	10	140-300	1.0-2.0	69	107	140	218	40	30
C01.5-60-140/300LX	1500	10	140-300	1.0-2.0	104	162	209	325	60	45
C03-03-70/140LX	3000	20	70-140	0.5-1.0	2.1	3.3	4.2	6.5	3	2.3
C03-05-70/140LX	3000	20	70-140	0.5-1.0	3.4	5.3	6.8	10.6	5	3.8
C03-10-70/140LX	3000	20	70-140	0.5-1.0	6.4	10.0	13.0	20	10	7.5
C03-15-70/140LX	3000	20	70-140	0.5-1.0	10.1	15.7	20	31	15	11
C03-20-70/140LX	3000	20	70-140	0.5-1.0	13.2	21	26	40	20	15
C03-40-70/140LX	3000	20	70-140	0.5-1.0	27	42	54	84	40	30
C03-60-70/140LX	3000	20	70-140	0.5-1.0	40	62	80	124	60	45
C03-03-140/300LX	3000	20	140-300	1.0-2.0	3.3	5.1	6.7	10.4	3	2.3
C03-05-140/300LX	3000	20	140-300	1.0-2.0	5.4	8.4	10.9	16.9	5	3.8
C03-10-140/300LX	3000	20	140-300	1.0-2.0	10.2	15.9	21	33	10	7.5
C03-15-140/300LX	3000	20	140-300	1.0-2.0	15.4	24	31	48	15	11
C03-20-140/300LX	3000	20	140-300	1.0-2.0	20	31	41	64	20	15
C03-40-140/300LX	3000	20	140-300	1.0-2.0	42	65	85	132	40	30
C03-60-140/300LX	3000	20	140-300	1.0-2.0	62	96	126	196	60	45
C03-03-300/600LX	3000	20	300-600	2.0-4.0	5.3	8.2	10.3	16.0	3	2.3
C03-05-300/600LX	3000	20	300-600	2.0-4.0	8.6	13.4	16.8	26	5	3.8
C03-10-300/600LX	3000	20	300-600	2.0-4.0	16.3	25	32	50	10	7.5
C03-15-300/600LX	3000	20	300-600	2.0-4.0	25	39	48	75	15	11
C03-20-300/600LX	3000	20	300-600	2.0-4.0	32	50	63	98	20	15
C03-40-300/600LX	3000	20	300-600	2.0-4.0	74	115	144	224	40	30
C03-60-300/600LX	3000	20	300-600	2.0-4.0	109	169	211	328	60	45



Compressor Specifications, Two-Stage Units continued

Model Number	Discharge Pressure		Range of Inlet Pressure		Capacity with H ₂ at min inlet		Capacity with H ₂ at max inlet		Motor Power	
	psig	MPa	psig	MPa	scfm	Nm ³ /hr	scfm	Nm ³ /hr	HP	KW
C06-03-70/140LX	6000	40	70-140	0.5-1.0	1.1	1.7	2.2	3.4	3	2.3
C06-05-70/140LX	6000	40	70-140	0.5-1.0	1.8	2.8	3.7	5.8	5	3.8
C06-10-70/140LX	6000	40	70-140	0.5-1.0	3.4	5.3	7.0	10.9	10	7.5
C06-15-70/140LX	6000	40	70-140	0.5-1.0	5.6	8.7	11.4	17.7	15	11
C06-20-70/140LX	6000	40	70-140	0.5-1.0	7.4	11.5	15	23	20	15
C06-40-70/140LX	6000	40	70-140	0.5-1.0	18	28	35	54	40	30
C06-60-70/140LX	6000	40	70-140	0.5-1.0	26	40	52	81	60	45
C06-03-140/300LX	6000	40	140-300	1.0-2.0	1.7	2.6	3.5	5.4	3	2.3
C06-05-140/300LX	6000	40	140-300	1.0-2.0	2.8	4.4	5.8	9.0	5	3.8
C06-10-140/300LX	6000	40	140-300	1.0-2.0	5.4	8.4	11.1	17.3	10	7.5
C06-15-140/300LX	6000	40	140-300	1.0-2.0	9.4	14.6	19.2	30	15	11
C06-20-140/300LX	6000	40	140-300	1.0-2.0	12.3	19.1	25	39	20	15
C06-40-140/300LX	6000	40	140-300	1.0-2.0	29	45	58	90	40	30
C06-60-140/300LX	6000	40	140-300	1.0-2.0	42	65	86	134	60	45
C06-03-300/600LX	6000	40	300-600	2.0-4.0	2.9	4.5	5.8	9.0	3	2.3
C06-05-300/600LX	6000	40	300-600	2.0-4.0	4.8	7.5	9.4	14.6	5	3.8
C06-10-300/600LX	6000	40	300-600	2.0-4.0	9.1	14.2	17.7	28	10	7.5
C06-15-300/600LX	6000	40	300-600	2.0-4.0	14.1	22	27	42	15	11
C06-20-300/600LX	6000	40	300-600	2.0-4.0	18.4	29	36	56	20	15
C06-40-300/600LX	6000	40	300-600	2.0-4.0	43	67	83	129	40	30
C06-60-300/600LX	6000	40	300-600	2.0-4.0	63	98	122	190	60	45



Compressor Specifications, Single-Stage Units

Model Number	Discharge Pressure		Range of Inlet Pressure		Capacity with H ₂ at min inlet		Capacity with H ₂ at max inlet		Motor Power	
	psig	MPa	psig	MPa	scfm	Nm ³ /hr	scfm	Nm ³ /hr	HP	KW
C01.5-03-1300LX	1500	10	200-1500	1.4-10	5.0	7.8	38	59	3	2.3
C01.5-05-1300LX	1500	10	200-1500	1.4-10	8.2	12.8	61	95	5	3.8
C01.5-10-1300LX	1500	10	200-1500	1.4-10	15.5	24	116	180	10	7.5
C01.5-15-1300LX	1500	10	200-1500	1.4-10	25	39	183	285	15	11
C01.5-20-1300LX	1500	10	200-1500	1.4-10	33	51	240	373	20	15
C01.5-40-1300LX	1500	10	200-1500	1.4-10	71	110	498	774	40	30
C01.5-60-1300LX	1500	10	200-1500	1.4-10	106	165	740	1151	60	45
C03-03-2600LX	3000	20	400-3000	2.8-20	4.5	7.0	36	56	3	2.3
C03-05-2600LX	3000	20	400-3000	2.8-20	7.2	11.2	58	90	5	3.8
C03-10-2600LX	3000	20	400-3000	2.8-20	13.5	21	109	169	10	7.5
C03-15-2600LX	3000	20	400-3000	2.8-20	22	34	166	258	15	11
C03-20-2600LX	3000	20	400-3000	2.8-20	29	45	222	345	20	15
C03-40-2600LX	3000	20	400-3000	2.8-20	67	104	477	742	40	30
C03-60-2600LX	3000	20	400-3000	2.8-20	98	152	700	1089	60	45
C06-03-5200LX	6000	40	800-6000	5.5-40	3.6	5.6	32	50	3	2.3
C06-05-5200LX	6000	40	800-6000	5.5-40	5.8	9.0	52	81	5	3.8
C06-10-5200LX	6000	40	800-6000	5.5-40	11	17.1	97	151	10	7.5
C06-15-5200LX	6000	40	800-6000	5.5-40	21	33	161	250	15	11
C06-20-5200LX	6000	40	800-6000	5.5-40	23	36	187	283	20	15
C06-40-5200LX	6000	40	800-6000	5.5-40	63	98	437	680	40	30
C06-60-5200LX	6000	40	800-6000	5.5-40	92	143	644	1001	60	45
C12-03-10500LX	12000	80	1500-6000	10-40	2.3	3.6	15.1	23	3	2.3
C12-05-10500LX	12000	80	1500-6000	10-40	3.7	5.8	24	37	5	3.8
C12-10-10500LX	12000	80	1500-6000	10-40	7.1	11.0	46	72	10	7.5
C12-15-10500LX	12000	80	1500-6000	10-40	13.2	21	73	114	15	11
C12-20-10500LX	12000	80	1500-6000	10-40	17.1	27	96	149	20	15
C12-40-10500LX	12000	80	1500-6000	10-40	49	76	209	325	40	30
C12-60-10500LX	12000	80	1500-6000	10-40	74	115	313	487	60	45

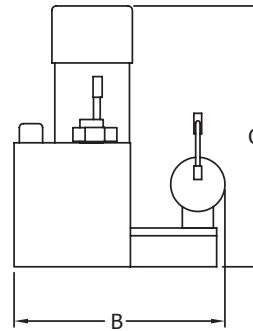
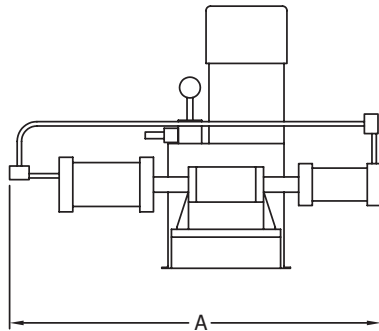


Common Specifications - 1500, 3000, 6000 and 12000 psi Units

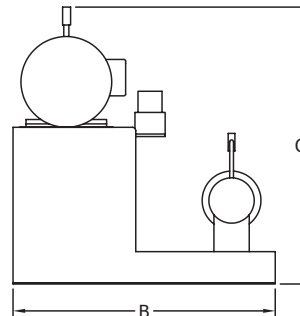
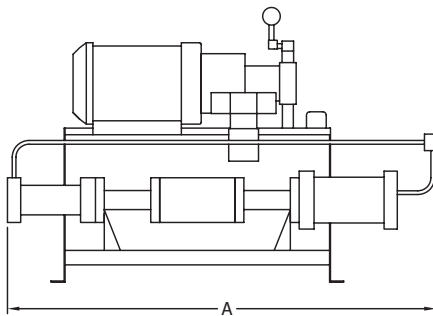
Motor Power		Cooling Fluid		Weight with oil		Reservoir Volume		Length "A"		Width "B"		Height "C"		Connection Sizes	
HP	KW	gpm	lpm	lb	kg	gal	l	in	mm	in	mm	in	mm	Inlet	Discharge
3	2.3	1	4	570	260	10	37	50	1270	30	762	36	915	½ FNPT	½ tube
5	3.8	2	8	570	260	10	37	50	1270	30	762	36	915	½ FNPT	½ tube
10	7.5	3	12	900	410	30	111	50	1270	30	762	36	915	½ FNPT	½ tube
15	11	4	16	1200	545	40	148	78	1727	40	940	42	1067	½ FNPT	½ tube
20	15	5	19	1200	545	40	148	78	1727	40	940	42	1067	½ FNPT	½ tube
40	30	10	38	3500	1590	70	260	100	2413	53	1347	50	1194	1 FNPT	¾ tube
60	45	15	57	3700	1680	70	260	100	2413	53	1347	50	1245	1 FNPT	¾ tube

Notes:

1. Inlet connection sizes refer to US standard taper pipe sizes. Discharge connection sizes refer to ferrule-type tube connections.
2. The discharge connections for the 12000 psi units are medium pressure cone and thread type connections. The 1/2 tube connections would be SFC562-20 and the 3/4 tube connections would be SFC750-20.
3. Due to the very high flow rates of some of the single-stage machines, the inlet and discharge connections may differ from those shown in the chart. Please consult the factory.



3 and 5 hp Units



10, 15, 20, 40 and 60 hp Units



Compressor Capacity in (scfm) - Two-Stage Units
70 to 140 psi Inlet Pressure
Hydrogen Gas

Model Number		Motor hp	Inlet Pressures (psig)								
			70	80	90	100	110	120	130	140	
Maximum Discharge Pressure	1500 PSI	C01.5-03-70/140LX	3	3.3	3.9	4.4	4.8	5.1	5.6	6.1	6.6
		C01.5-05-70/140LX	5	5.4	6.3	7.2	7.8	8.4	9.1	10.0	10.7
		C01.5-10-70/140LX	10	10.2	12.0	13.7	14.7	15.9	17.3	18.9	20
		C01.5-15-70/140LX	15	16.5	19.5	22	24	26	28	31	33
		C01.5-20-70/140LX	20	22	26	29	31	34	37	40	43
		C01.5-40-70/140LX	40	43	51	58	63	68	73	80	87
		C01.5-60-70/140LX	60	65	77	87	94	101	110	121	130
	3000 PSI	C03-03-70/140LX	3	2.1	2.5	2.8	3.0	3.3	3.5	3.9	4.2
		C03-05-70/140LX	5	3.4	4.0	4.6	4.9	5.3	5.8	6.3	6.8
		C03-10-70/140LX	10	6.4	7.6	8.7	9.3	10.1	11.0	12.0	13.0
		C03-15-70/140LX	15	10.1	11.9	13.6	14.6	15.8	17.1	18.8	20
		C03-20-70/140LX	20	13.2	15.5	17.7	19.0	21	22	24	26
		C03-40-70/140LX	40	27	32	36	39	42	46	50	54
		C03-60-70/140LX	60	40	47	54	58	62	68	74	80
	6000 PSI	C06-03-70/140LX	3	1.1	1.3	1.5	1.6	1.7	1.9	2.0	2.2
		C06-05-70/140LX	5	1.8	2.1	2.4	2.6	2.8	3.1	3.4	3.7
		C06-10-70/140LX	10	3.4	4.0	4.6	5.0	5.4	5.9	6.5	7.0
		C06-15-70/140LX	15	5.6	6.7	7.6	8.2	8.9	9.6	10.6	11.4
		C06-20-70/140LX	20	7.4	8.7	10.0	10.7	11.6	12.6	13.8	14.9
		C06-40-70/140LX	40	17.6	21	24	26	28	30	33	35
		C06-60-70/140LX	60	26	31	35	38	41	44	48	52



**Compressor Capacity in (scfm) - Two-Stage Units
140 to 300 psi Inlet Pressure
Hydrogen Gas**

Model Number		Motor hp	Inlet Pressures (psig)									
			140	160	180	200	220	240	260	280	300	
Maximum Discharge Pressure	1500 PSI	C01.5-03-140/300LX	3	5.5	6.2	7.0	7.7	8.4	9.1	9.8	10.5	11.2
		C01.5-05-140/300LX	5	8.9	10.0	11.2	12.4	13.5	14.7	15.8	17.0	18.0
		C01.5-10-140/300LX	10	16.7	18.8	21	23	25	28	30	32	34
		C01.5-15-140/300LX	15	26	29	33	36	39	43	46	49	52
		C01.5-20-140/300LX	20	35	39	44	48	52	57	61	66	70
		C01.5-40-140/300LX	40	69	77	87	96	105	114	123	131	140
		C01.5-60-140/300LX	60	104	116	131	144	157	171	184	197	209
	3000 PSI	C03-03-140/300LX	3	3.3	3.7	4.2	4.6	5.1	5.5	5.9	6.4	6.7
		C03-05-140/300LX	5	5.4	6.0	6.8	7.5	8.2	8.9	9.6	10.3	10.9
		C03-10-140/300LX	10	10.2	11.5	12.9	14.2	15.6	16.9	18.2	19.5	21
		C03-15-140/300LX	15	15.4	17.3	19.4	21	23	25	27	29	31
		C03-20-140/300LX	20	20	23	25	28	31	33	36	38	41
		C03-40-140/300LX	40	42	47	53	59	64	69	75	80	85
		C03-60-140/300LX	60	62	70	79	87	95	103	111	119	126
	6000 PSI	C06-03-140/300LX	3	1.7	1.9	2.2	2.4	2.6	2.9	3.1	3.3	3.5
		C06-05-140/300LX	5	2.8	3.2	3.6	4.0	4.3	4.7	5.1	5.5	5.8
		C06-10-140/300LX	10	5.4	6.1	6.8	7.6	8.3	9.0	9.7	10.4	11.1
		C06-15-140/300LX	15	9.4	10.6	11.9	13.1	14.4	15.6	16.8	18.0	19.2
		C06-20-140/300LX	20	12.3	13.8	15.6	17.2	18.8	20	22	24	25
		C06-40-140/300LX	40	29	32	36	40	44	47	51	55	58
		C06-60-140/300LX	60	42	47	53	59	64	70	75	81	86



**Compressor Capacity in (scfm) - Two-Stage Units
300 to 600 psi Inlet Pressure
Hydrogen Gas**

Model Number		Motor hp	Inlet Pressures (psig)							
			300	350	400	450	500	550	600	
Maximum Discharge Pressure	3000 PSI	C03-03-300/600LX	3	5.3	6.2	7.0	7.8	8.7	9.5	10.3
		C03-05-300/600LX	5	8.6	10.0	11.4	12.7	14.1	15.4	16.8
		C03-10-300/600LX	10	16.3	18.9	21	24	27	29	32
		C03-15-300/600LX	15	25	29	33	37	40	44	48
		C03-20-300/600LX	20	32	37	43	48	53	58	63
		C03-40-300/600LX	40	74	86	97	109	121	132	144
		C03-60-300/600LX	60	109	126	144	161	178	195	211
	6000 PSI	C06-03-300/600LX	3	2.9	3.4	3.9	4.4	4.8	5.3	5.8
		C06-05-300/600LX	5	4.8	5.6	6.3	7.1	7.9	8.6	9.4
		C06-10-300/600LX	10	9.1	10.5	12.0	13.4	14.9	16.3	17.7
		C06-15-300/600LX	15	14.1	16.3	18.6	21	23	25	27
		C06-20-300/600LX	20	18.4	21	24	27	30	33	36
		C06-40-300/600LX	40	43	50	56	63	70	76	83
		C06-60-300/600LX	60	63	73	83	93	103	112	122

1. Please consult with Hydro-Pac, Inc. for applications not covered by machines listed here.
2. Charts showing detailed capacity information for other gases and in other units are available on request.
3. This information is supplied for reference only and is subject to change.
4. All capacities listed are based on gas at maximum inlet temperatures of 80F (27C). The capacity will be less if the inlet gas temperature is higher.
5. All capacities are based on 60 hertz power. Depending on the model, the capacity may be less with 50 hertz power. Please consult with Hydro-Pac for capacity information for a specific model.
6. Capacity information in Nm³/hr is based on standard conditions of 1 atm and 0 C.
7. All pressures listed are gauge pressures.
8. To convert to kg/hr multiply the scfm capacity by 0.14.
9. To convert to kg/day multiply the scfm capacity by 3.33.



**Compressor Capacity in (scfm) - Single-Stage Units
Hydrogen Gas**

Model Number		Motor hp	Inlet Pressures (psig)								
			100	200	300	400	500	750	1000	1250	1500
Maximum Discharge Pressure 1500 PSI	C01.5-03-1300LX	3	2.6	5.0	7.7	10.4	13.0	19.4	26	31	38
	C01.5-05-1300LX	5	4.3	8.2	12.6	16.9	21	32	42	51	61
	C01.5-10-1300LX	10	8.1	15.5	24	32	40	60	79	96	116
	C01.5-15-1300LX	15	13.1	25	38	51	64	95	125	152	183
	C01.5-20-1300LX	20	17.2	33	50	67	83	124	164	199	240
	C01.5-40-1300LX	40	37	71	106	141	175	259	342	415	498
	C01.5-60-1300LX	60	55	106	158	209	260	385	508	616	740

Note: The minimum inlet pressure for 1500 psi discharge is 200 psig. The compressors will operate at lower inlet pressures. Do not exceed an 8 to 1 compression ratio. For example, the maximum discharge pressure with 100 psig inlet is 905 psig.

Model Number		Motor hp	Inlet Pressures (psig)								
			100	200	400	500	1000	1500	2000	2500	3000
Maximum Discharge Pressure 3000 PSI	C03-03-2600LX	3	1.2	2.3	4.5	5.8	12.3	18.5	24	30	36
	C03-05-2600LX	5	1.9	3.6	7.2	9.3	19.7	29	39	48	58
	C03-10-2600LX	10	3.6	6.9	13.5	17.5	37	56	74	91	109
	C03-15-2600LX	15	5.7	11.0	22	28	57	85	113	140	166
	C03-20-2600LX	20	7.7	14.7	29	37	77	114	151	187	222
	C03-40-2600LX	40	18.0	34	67	84	169	248	326	403	477
	C03-60-2600LX	60	26	50	98	123	247	363	478	591	700

Note: The minimum inlet pressure for 3000 psi discharge is 400 psig. The compressors will operate at lower inlet pressures. Do not exceed an 8 to 1 compression ratio. For example, the maximum discharge pressure with 100 psig inlet is 905 psig.



Model Number		Motor hp	Inlet Pressures (psig)								
			100	500	800	1000	2000	3000	4000	5000	6000
Maximum Discharge Pressure 6000 PSI	C06-03-5200LX	3	0.5	2.1	3.6	4.9	11.2	17.1	22	27	32
	C06-05-5200LX	5	0.7	3.5	5.8	8.0	18.0	28	36	44	52
	C06-10-5200LX	10	1.4	6.5	10.9	15	34	52	68	83	97
	C06-15-5200LX	15	2.5	11.5	21	28	58	88	114	139	161
	C06-20-5200LX	20	3.0	13.8	23	30	66	101	132	161	187
	C06-40-5200LX	40	8.5	39	63	80	162	240	311	376	437
	C06-60-5200LX	60	12.5	58	92	118	239	354	458	554	644

Note: The minimum inlet pressure for 6000 psi discharge is 800 psig. The compressors will operate at lower inlet pressures. Do not exceed an 8 to 1 compression ratio. For example, the maximum discharge pressure with 100 psig inlet is 905 psig.

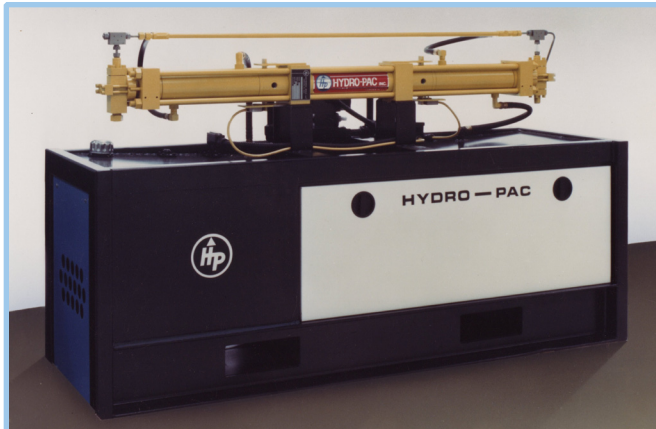
Model Number		Motor hp	Inlet Pressures (psig)								
			500	1000	1500	2000	2500	3000	4000	5000	6000
Maximum Discharge Pressure 12000 PSI	C12-03-10500LX	3	0.6	1.5	2.3	3.9	5.5	7.1	10.0	12.6	15.1
	C12-05-10500LX	5	1.0	2.4	3.7	6.3	8.9	11.4	16.0	20	24
	C12-10-10500LX	10	2.0	4.6	7.1	12.2	17.1	22	31	39	46
	C12-15-10500LX	15	4.3	8.7	13.2	21	29	36	49	62	73
	C12-20-10500LX	20	5.2	11.3	17.1	27	37	47	64	81	96
	C12-40-10500LX	40	16.6	34	49	70	90	110	145	179	209
	C12-60-10500LX	60	25	50	74	105	135	164	218	267	313

Note: The minimum inlet pressure for 12000 psi discharge is 1500 psig. The compressors will operate at lower inlet pressures. Do not exceed an 8 to 1 compression ratio. For example, the maximum discharge pressure with 500 psig inlet is 4000 psig.



Additional Equipment:

In addition to the LX-SERIES™, Hydro-Pac manufactures two lines of high-pressure compressors: the FLEXI-POWER™ and the Li'l CRITTER™. These compressors provide unique solutions to high-pressure applications.



10 HP FLEXI-POWER™ Compressor

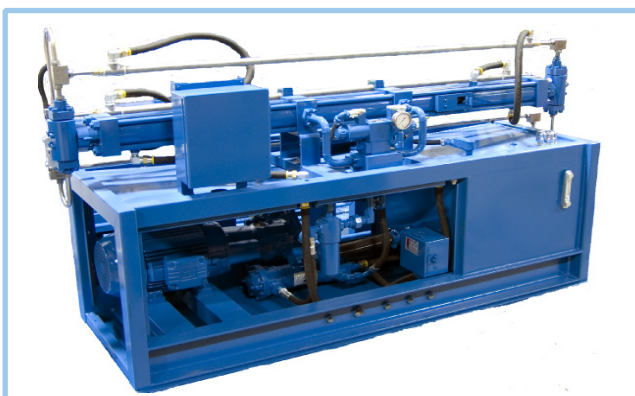
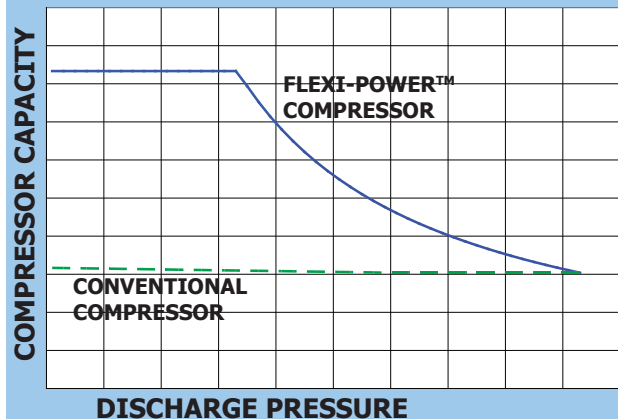
FLEXI-POWER™: Increased capacity at lower operating pressures.

An important feature of the FLEXI-POWER™ Gas Compressor is the ability to increase stroke rate to make full use of available horsepower. This allows the compressor to minimize fill time by producing a higher capacity when the discharge pressure is low. This feature is ideal for filling applications because it significantly reduces overall fill time. The graph to the right compares a FLEXI-POWER™ Gas Compressor to a fixed capacity compressor.

FLEXI-POWER™ High-Pressure Gas Compressors

are manufactured to meet the requirements of many industries. These compressors are available in powers to 200 hp (150 kW).

The FLEXI-POWER™ (FX) Gas Compressors are ideal for high-pressure production applications. Standard units are available for discharge pressures of 10,000 to 60,000 psig (70 to 415 MPa). Two-stage FX compressors typically operate with inlet pressure ranges of 500 to 3,000 psig. Single-stage compressors operate on an 8:1 compression ratio.



10 HP FLEXI-POWER™ Compressor

Features:

- Intensifier mounted over power unit.
- Patented free piston design.
- Extended spacer to provide fail-safe freedom from contamination.
- Compressor can be started under full load.
- Easily removable, sound dampening panels to enclose the hydraulic drive section.



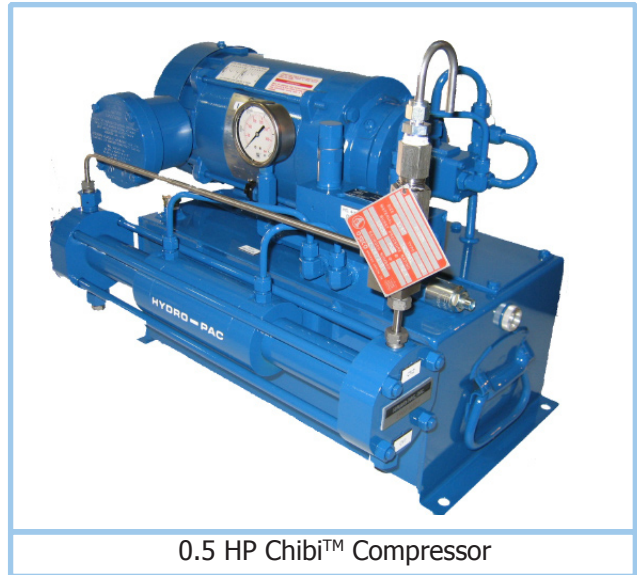
5 HP Li'l CRITTER™ Compressor

High-pressure in a small package.

Due to the compact design, the Li'l CRITTER™ Gas Compressor is Hydro-Pac's most mobile compressor and can be used to reach high-pressure in applications where a larger compressor cannot be installed. These compressors have been manufactured with casters, hand trucks, and handles.

Li'l CRITTER™ High-Pressure Gas Compressors were designed by Hydro-Pac to offer big compressor reliability and service life in smaller machines.

These tough "little brothers" of Hydro-Pac's FLEXI-POWER™ Gas Compressors are well suited for laboratory and production applications. They are offered in sizes 3, 5 and 7.5 hp (2.3, 3.8 and 5.6 kW) for pressures to 60,000 psi (415 MPa).



0.5 HP Chibi™ Compressor



5 HP Mobile H₂ Test System

Features:

- Small, compact design.
- Can be mounted to carts or casters.
- Patented free piston design.
- Extended spacer to provide fail-safe freedom from contamination.
- Compressor can be started under full load.

Additional information on the FLEXI-POWER™ and Li'l CRITTER™ Gas Compressors is available on request. Please contact Hydro-Pac for more information.



Unit Configurations



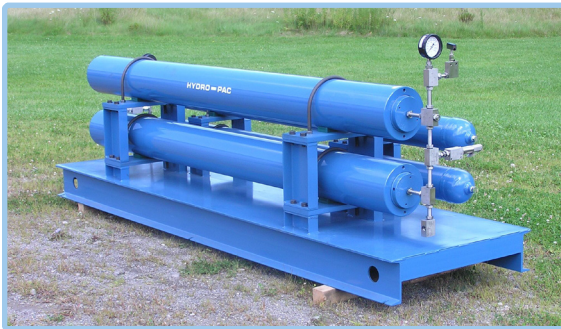
Unit with stainless steel wet ends for use with high-pressure hydrogen gas.



Five horsepower compressor packaged with gas storage cylinders.



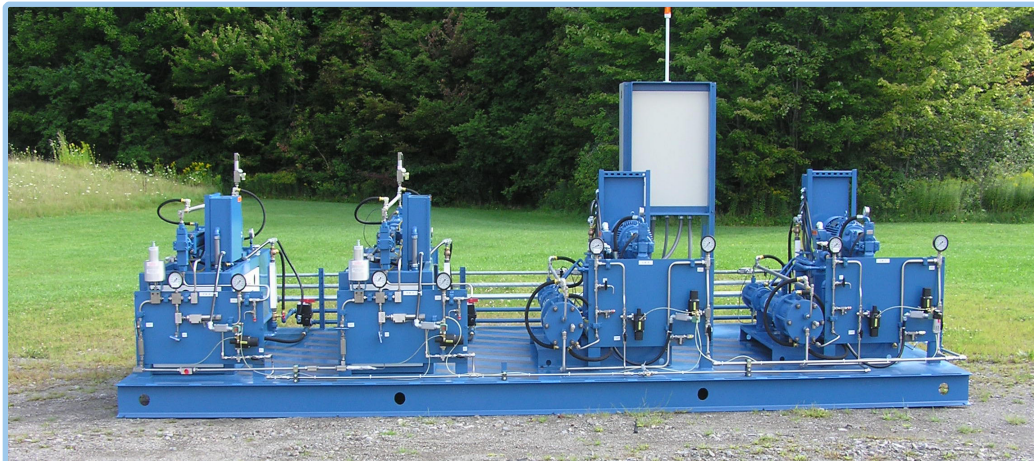
Forty horsepower single-stage unit for 12,000 psi discharge pressure.



Pressure vessel skid with intermediate and high-pressure storage vessels.



Two compressor package with valve racks and PLC controller.



Compressor package featuring redundant high and low-pressure units, valve racks and PLC controller.



Other Products

Hydro-Pac designs and manufactures a wide variety of pressure generating and containment equipment. Our product line includes:

Gas compressors for:

- Gas assist injection molding
- Hot isostatic pressing
- Air bag inflator filling
- Hydrogen fuel cells

Liquid pumps for:

- Cold isostatic pressing
- Pressure testing
- Pressure forming
- Cyclic pressure testing

ASME section VIII, divisions 1, 2 and 3 pressure vessels for:

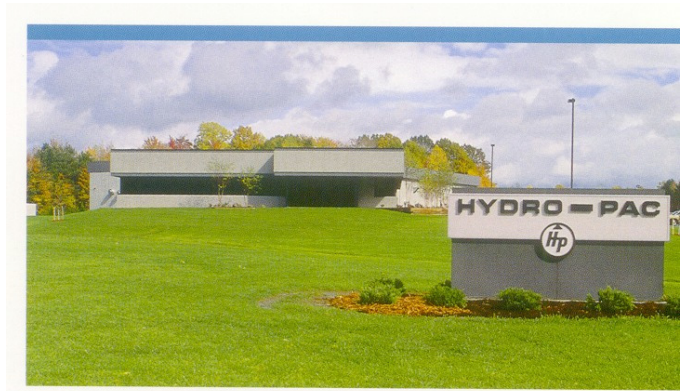
- High-pressure gas storage
- Hot and cold isostatic pressing

- Leak testing
- Supercritical extraction
- Inert gas foaming
- Fuel studies
- Hydrostatic extrusion
- Pressure sterilization
- High-pressure homogenizing
- Burst testing
- Autofrettage

Pressure test systems for:

- Fatigue cyclic testing
- Hydrostatic pressure testing
- Gas leak testing

Please call or write Hydro-Pac, Inc. with your pressure equipment requirements. Our complete product catalog is available on request.



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