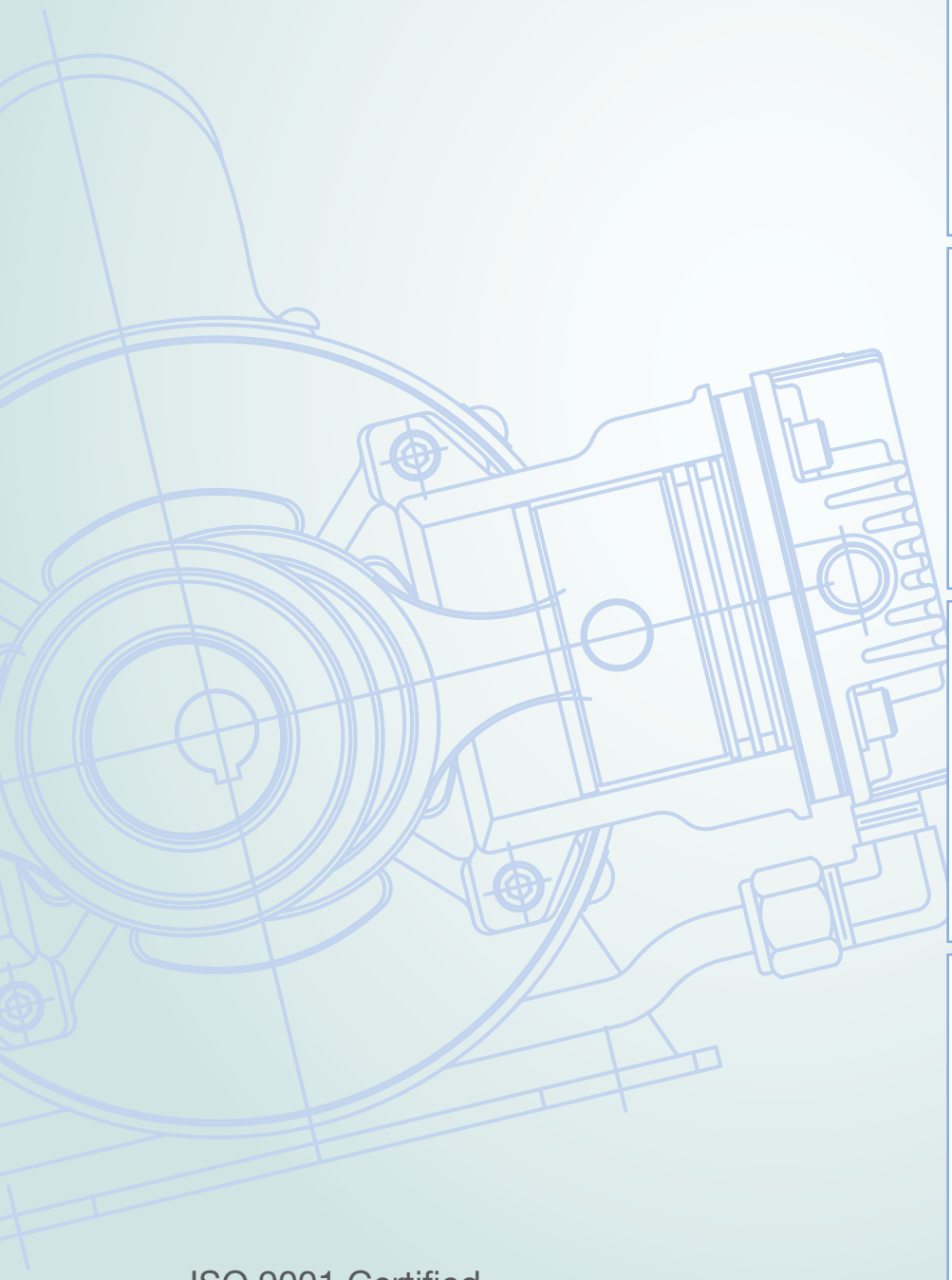
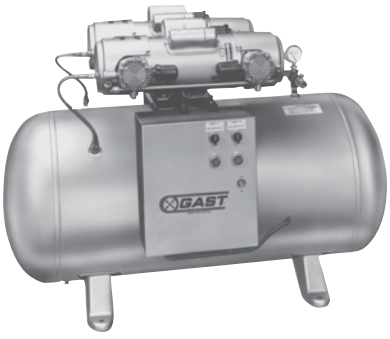
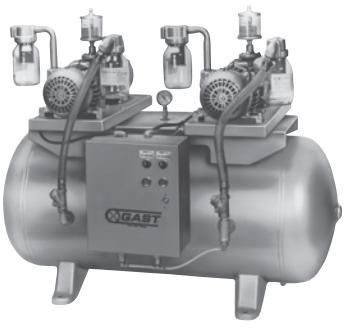
GAST

Compressed Air and Vacuum Systems







ISO 9001 Certified

The Gast Group **Difference**

For over 90 years, Gast Manufacturing has been providing innovative air solutions to a broad breadth of customers. With the relatively recent addition of JUN-AIR, we have expanded our capabilities and formed, "The Gast Group." Together, our diverse engineering background and pneumatic experience allow us to provide both component and system solutions to meet all of your pneumatic needs...backed by our strong commitment to quality and customer support.

Products for Almost Any Application – Worldwide

We offer an extensive and versatile line of air-moving products, including vacuum pumps, compressors, air motors, gearmotors, vacuum generators, and regenerative blowers. We design and build these components for original equipment manufacturers worldwide, but we also develop complete pneumatic solutions to solve tough customer challenges.

To ensure fast, efficient delivery of products, Gast has a vast network of sales representatives/distributors throughout the United States and the world. Plus, we maintain direct sales and service facilities in Europe, Hong Kong, and Shanghai, China.

Unparalleled Design Expertise

Unlike other manufacturers, who might expect you to modify your pneumatic system to fit their available product(s), Gast is committed to finding the right product to meet your specific needs. If we don't have a high-quality, off-the-shelf product to fit your existing application or meet your anticipated needs, we'll propose customized cost-effective design options that will serve your special requirements. We can even develop and produce your complete pneumatic system for you.

Our experienced Research and Development engineers and Product engineers work together to analyze customer needs and use computer-aided design to generate timely solutions for air-handling problems. The design team has one goal: to create problem-solving solutions that capitalize on the latest available technology, meet all application requirements, and benefit from cost-effective production methods. The end result: products and solutions that are the best value in the marketplace for our customers.

A Lasting Commitment to Quality

We invest heavily in both equipment and people to maintain the consistent quality for which our products are known worldwide, and we have done so since day one. As early as 1983, we implemented a total quality process designed to ensure the quality of our products. In keeping with that tradition, Gast has achieved ISO 9001 certification, making us a member of the elite group of manufacturing companies in the world to receive that certification.

European Community Directives CE

With extensive sales outside the United States, Gast has pledged to conform to the European Community Directives. These directives contain essential requirements concerning health, safety, environment, and consumer protection for all products targeted for the European Community market. Currently, all Gast products available for sale in the European Community are in compliance with the Machinery, Low Voltage, and Electromagnetic Compatibility Directives.

Why use a Compressed Air and Vacuum System?

Many find it difficult to decide whether to use stand-alone pumps or complete tank packages for their applications. The tank system offers many advantages, which satisfy:

High Volumes

If your application requires an instantaneous supply of high pressure or vacuum, then the reservoir provided by a tank system is essential. Even the largest of pumps has to start at atmospheric pressure and therefore will not be able to give that instantaneous supply of pressure/vacuum.

Longer Pump Life

A tank system makes it possible to utilize two pumps on one tank. Add a pressure switch and alternator control to start/stop the pump(s) only when needed. This allows the pump to cool down and "rest" between cycles to prolong operating life.

Cost Savings

Using a tank system can reduce initial maintenance and replacement costs. Here's why: Applications that require high volumes of air in intermittent cycles can use relatively small pumps. The longer the interval between cycles, the more applicable a tank system can be. For example, a 1 HP compressor on a tank can supply the same amount of flow for one minute as a stand alone 10 HP compressor.

Quiet Operation

In a tank system the pump runs on demand, which means that it is not operating a good part of the time. No operation, no operating noise.

Pulse Free

Pulse-free air is required by many pneumatic systems for proper operation of pneumatic tools or components. A tank provides pulsation-free air from the reciprocating compressor.

Central System

Small industrial shops where different tools are required at different times find tank systems ideal, since one tank system can supply air to multiple locations.

Call your Gast distributor for custom systems

Your Gast distributor has a complete line of complementary products to satisfy most of your requirements for pneumatic systems of all kinds. If your application requires modification of an existing system or a new design, your Gast distributor will be glad to assist you. Gast tank systems, just as all Gast products, can be modified or customized to satisfy the needs of quantity users. A list of distributors, both domestic and international, are listed on our website at www.gastmfg.com or call us at 269-926-6171 for the stocking distributor in your area.

GAST 2 Gallon Compressed Air Systems

71R142-P075T-D300X

DOA-P206T-AA

Applications

- Beverage dispensing
- Lab use
- Portable displays
- Commercial door actuation
- Portable - off site use

Includes

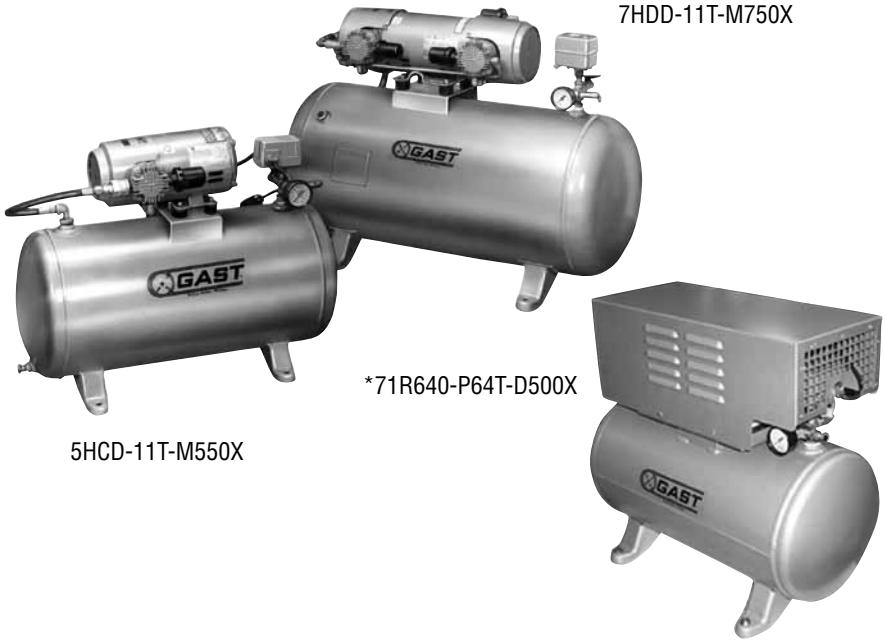
- Pressure switch
- Manual drain
- Pressure safety valve (ASME)
- Pressure gauge
- Unloading capability
- Globe valve
- 100% oilless operation

1HAB-11T-M100X

ROA-P206T-AA

Model Number	Tank Size Gallons	CFM @ psig						ON/OFF psig	0 to 100 Setting	Standard Setting	Recovery of Motor Voltage	HP	Shipping Weight lbs
		0	10	30	50	70	100						
ROA-P206T-AA	2	.76	.68	.55	.41	.27	.10	70/100	5:00	1:55	115-60-1	1/8	39
DOA-P706T-AA	2	1.00	.85	.50	.20	-	-	30/50	1:30	0:55	115-60-1	1/8	39
1HAB-11T-M100X	2	1.25	1.10	.85	.65	.5	.35	70/100	2:55	0:55	115-60-1	1/6	49
IHAE-11T-M104X	2	1.25	1.10	.85	.65	.5	.35	70/100	2:55	0:55	220-50-1	1/6	49
1LAA-11T-M100X	2	1.5	1.40	1.15	.88	-	-	30/50	0:50	0:20	115-60-1	1/6	49
2HAH-11T-M200X	2	1.65	1.55	1.30	1.15	.90	.85	70/100	1:45	0:30	115-60-1	1/4	56
71R142-P075T-D300X	2	2.00	1.80	1.50	1.25	1.10	.90	70/100	1:30	0:25	115-50/60-1	1/3	42

GAST 12, 20, 30 Gallon Compressed Air Systems



Applications

- Beverage dispensing
- Cylinder actuation
- Pneumatic temperature control
- Photo processing
- Spray painting
- Pneumatic logic
- Small to medium shops and filling stations

Includes

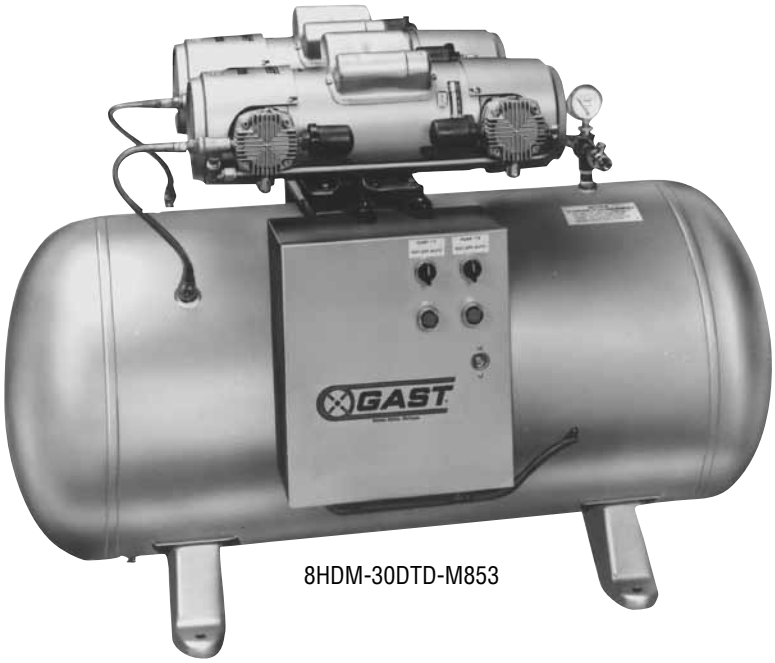
- ASME coded tank
- Pressure switch
- Manual drain
- Pressure safety valve (ASME)
- Pressure gauge
- Globe valve
- Magnetic starter (6HCA, 7HDD, 8LDF and 8HDM not shown in picture)
- 100% oilless operation (auto drain assembly K602 optional)

Model Number	Tank Size Gallons	CFM @ psig						ON/OFF psig	0 to Off Setting Min/Sec	Recovery of Standard Setting Min/Sec	Motor Voltage	HP	Shipping Weight lbs
		0	10	30	50	70	100						
2LAF-11T-M200X	12	2.10	1.80	1.70	1.50	--	--	30/50	2:15	0:55	115-60-1	1/4	55
3HEB-11T-M345X	12	2.40	2.20	1.85	1.50	1.30	1.15	80/100	5:45	1:55	115-60-1	1/3	93
3HBE-11TF-M303X	12	2.40	2.20	1.85	1.50	1.30	1.15	80/100	5:45	1:55	220-50-1	1/3	93
3LEM-11T-M345X	12	2.9	2.70	2.20	2.00	--	--	30/50	1:45	0:45	115-60-1	1/3	93
3LBA-11T-M300X	12	3.1	2.70	2.20	1.80	--	--	30/50	1:45	0:45	115-60-1	1/3	93
*71R640-P64T-D500X	12	3.50	3.15	2.65	2.20	1.85	1.46	90/110	5:43	1:13	115-60-1	3/4	105
*71R640-P67T-D500X	12	3.50	3.15	2.65	2.20	1.85	1.46	90/110	5:43	1:13	115-60-1	3/4	105
*71R640-P65DT-D500X	12	7.00	6.30	5.30	4.40	3.70	2.92	90/110	3:13	0:45	115-60-1	3/4	115
4HCC-11T-M450X	20	3.50	3.30	2.80	2.40	2.10	1.70	80/100	7:00	2:50	115-60-1	1/2	118
4LCB-11T-M450X	20	4.5	4.00	3.20	3.00	--	--	30/50	2:25	1:00	115-60-1	1/2	118
5HCD-11T-M550NGX	20	4.70	4.40	3.90	3.40	2.90	2.40	80/100	5:00	1:55	115-60-1	3/4	121
5HCD-11TA-M550X	20	4.70	4.40	3.90	3.40	2.90	2.40	80/100	5:00	1:55	230-60-1	3/4	121
6HCA-11T-M616X	30	5.40	5.20	4.70	4.30	3.90	3.20	80/100	5:50	2:25	115-60-1	1	124
6HCA-11TD-M617	30	5.40	5.20	4.70	4.30	3.90	3.20	80/100	5:50	2:25	460-60-3	1	123
6LCF-11T-M616X	30	6.30	6.00	5.50	5.00	--	--	30/50	2:00	0:50	115/230-60-1	1	125
7HDD-11T-M750X	30	9.00	8.40	7.25	6.50	5.75	5.00	80/100	4:15	1:35	115-60-1	1 1/2	155
7HDD-11TA-M750X	30	9.00	8.40	7.25	6.50	5.75	5.00	80/100	4:15	1:35	230-60-1	1 1/2	155
7HDD-11TC-M853	30	9.00	8.40	7.25	6.50	5.75	5.00	80/100	4:15	1:35	230-60-3	2	155
7HDD-11TD-M853	30	9.00	8.40	7.25	6.50	5.75	5.00	80/100	4:15	1:35	460-60-3	2	155
8HDM-11TC-M853	30	11.00	10.25	9.25	8.50	7.50	7.00	80/100	3:30	1:10	230-60-3	2	160
8HDM-11TD-M853	30	11.00	10.25	9.25	8.50	7.50	7.00	80/100	3:30	1:10	460-60-3	2	160
8LDF-11TA-M850X	30	12.50	12.00	10.60	9.3	--	--	30/50	0:45	0:20	230-60/50-1	2	162

* **These units also include**

- UL 1450 listed
- Enhanced design to start under any conditions
- Fully enclosed compressor design for safe operation
- All inclusive, fully assembled system
- Easy to install and maintain
- Automatic drain (optional)
- Pressure switch with on/off toggle switch, cord, and plug

GAST 60 Gallon Compressed Air Systems (Duplex)



8HDM-30DTD-M853

Applications

- Hospitals
- Medical/dental clinics
- Pneumatic temperature control
- Small to medium shops and filling stations
- Pneumatic logic
- Clean room environment

Includes

- ASME coded tank
- Easy-to-use electric panel (see page 10)
- Manual drain
- Pressure safety valve (ASME)
- Pressure gauge
- Globe valve
- 100% oilless operation (auto drain assembly K602 optional)

Model Number	Tank Size Gallons	Total CFM of both Units @ psig						#1Pressure Setting On/Off psig	#2 Pressure Setting On/Off psig	Pump Up Time in Minutes: Seconds (Approx.)			Voltage/Motor Enclosure	HP	Shipping Weight lbs
		0	10	30	50	70	100			On-Off Setting or 0-90 psig	Recovery of 1 Pump 80-100	Recovery of 2 Pumps 70-100			
6HCA-15DTA-M616X	60	10.80	10.40	9.40	8.60	7.80	7.00	80/100	70/90	6:40	3:10	2:25	230-60-1 Open	1	425
6HCA-15DTC-M617	60	10.80	10.40	9.40	8.60	7.80	7.00	80/100	70/90	6:40	3:10	2:25	230-60-3 Open	1	425
6HCA-15DTD-M617	60	10.80	10.40	9.40	8.60	7.80	7.00	80/100	70/90	6:40	3:10	2:25	460-60-3 Open	1	425
7HDD-69DTA-M750X	60	18.00	16.80	14.50	13.00	11.50	10.50	80/100	70/90	4:20	2:25	1:40	230-60-1 Open	1.5	450
7HDD-69DTD-M853	60	18.00	16.80	14.50	13.00	11.50	10.50	80/100	70/90	4:20	2:25	1:40	460-60-3 Open	1.5	450
8HDM-30DTC-M853	60	22.00	20.50	18.50	17.00	15.00	14.50	80/100	70/90	3:20	1:40	1:10	230-60-3 Open	2	455
8HDM-30DTD-M853	60	22.00	20.50	18.50	17.00	15.00	14.50	80/100	70/90	3:20	1:40	1:10	460-60-3 Open	2	455

GAST Vacuum Tank Systems (Simplex and Duplex)

0523-V184T-G588DX

2565-V93DTC-T336

Applications

- Vacuum thermo-forming
- Food processing
- Impregnation and degassing
- Avionics
- Tansfer/handling equipment

Includes

- Swing type check valve
- Vacuum switch
- Large inline filter/exhaust muffler
- Easy-to-use electrical panel (Duplex only - See page 11)
- Vacuum gauge
- Pre-tank filter AV460C optional

Tank Simplex Model Number	Size (Gallons)	Approximate Pump Down Switch Setting inHg Off	On	Speed (minutes: seconds) 0-25 inHg	20-25 inHg	System Voltage O = Oilless L = Lubricated	HP	Shipping Weight lbs
0523-V81T-SG588DX	2	25”	20”	0:15	0:09	115-60-1/L	1/4	47
0523-V184T-G588DX	2	25”	20”	0:15	0:09	115-60-1/O	1/4	46
1023-V17TA-SG608X	30	25”	20”	1:30	0:45	230-60-1/L	3/4	191
1023-V126T-SG608X	30	25”	20”	1:30	0:50	115-60-1/O	3/4	191
1023-V126TA-SG608X	30	25”	20”	1:30	0:50	230-60-1/O	3/4	191

Duplex Model Number	Tank Size Gallons	Approximate Pump Down Switch Setting inHg Switch #1 Off	Switch #1 On	Switch #2 Off	Switch #2 On	Speed (minutes;seconds) 0-25 inHg (2 pumps)	20-25 inHg (1 pump)	17-25 inHg (2 pumps)	System Voltage Lubricated-L Oilless-O	HP	Shipping Weight lbs
2565-V93DTC-T336	60	25”	20”	20”	17”	0:30	0:29	0:17	230-60-3/L	1.5	450
6066-V113DTC-T339	60	25”	20”	20”	17”	0:29* 0.25**	0:15* 0.10**	0:13* 0:8**	230-60-3/O	5	575
6066-V113DTD-T339	60	25”	20”	25”	17”	0.29* 0.25**	0.15* 0.10**	0:13* 0.8**	460-60-3/O	5	575

* Pump running cold
**Pump operating at stabilized

ACCESSORY	PART NO.	DESCRIPTION	USED ON
 Pressure and Vacuum Tank Assemblies (Complete Package Minus Pump)	AF599D	2 Gallon Tank Assembly for ROA & DOA Series (Pressure)	DOA-706T-AA ROA-P206T-AA
	AF599	2 Gallon Tank Assembly for 48 Frame Piston (Pressure)	1HAB, 2HAH
	AF599A	2 Gallon Tank Assembly for 56 Frame Piston (Pressure)	4HCC, 5HCD
	AF600	12 Gallon Tank Assembly for 48 Frame Piston (Pressure)	1HAB, 2HAH, 3HBB
	AF600B	12 Gallon Tank Assembly for 56 Frame Piston (Pressure)	4HCC, 5HCD, 6HCA
	AF601	20 Gallon Tank Assembly for 2 Cylinder 56 Frame Piston (Pressure)	4HCC, 5HCD, 6HCA
	AF606	30 Gallon Tank Assembly for 56 Frame Piston (Pressure)	5HCD, 6HCA, 7HDD, 8HDM
	AF599H	2 Gallon Tank Assembly for 48 Frame Rotary Vane (Vacuum)	0523
	AH318	30 Gallon Tank Assembly for 56 Frame Rotary Vane (Vacuum)	1023 (Oilless & Lube)
	AH333	30 Gallon Tank Assembly for “65 Series” Rotary Vane (Vacuum), Does not include magnetic starter	2565, 2567
	AH336	60 Gallon Tank Assembly for “65 Series” Rotary Vane (Vacuum), Does not include magnetic starter	2565, 6066
 Pressure and Vacuum Switches	AF265	Diaphragm-Type Unloading Pressure Switch 10-100 psi Range, 20-30 lb Differential	ROA-DOA
	AF564	Diaphragm-Type Pressure Switch 10-100 psi Range, 20-30 lb Differential (No Unloader)	All Simplex Systems
	AE265	Diaphragm-Type Vacuum Switch, Cutout 5-25 inHg, Differential 4-12 inHg	All Simplex Systems
 Check Valves	AE238	Spring-Loaded Check Valve, 1/4” NPTM Threaded at Both Ends	ROA (Pressure) 0523 (Vacuum)
	AJ550	Compression-Type Check Valve, 1/4” NPTM Threaded at Both Ends	DOA, 1HAB-6HCA (Pressure)
	AJ550A	Compression-Type Check Valve, 3/8” NPTM Threaded at Ends	7HDD (Pressure)
	AJ824	Spring-Loaded Check Valve, 3/8” NPTM Threaded at Both Ends	1023 (Vacuum)
	AH326A	Swing Check Valve, 3/4” NPTM Threaded at Both Ends	2565 (Vacuum)
	AH326B	Swing Check Valve, 1” NPTM Threaded At Both Ends	6066 (Vacuum)
	AK430	Spring-Loaded Check Valve, 3/8” NPTM Hose Connection (Inside Tank)	4HCC-8HDM
 Gauges	AA806	2” Dial Face Pressure Gauge, 0-160 PSI (0-11 Bar), 1/4” NPTM Mounting	All Simplex
	AE362	2” Dial Face Pressure Gauge, 0-100 PSI (0-7 Bar) 1/4” NPTM Bottom Mounting	All Duplex Pressure Systems
	AE136	2” Dial Face Vacuum Gauge, 0-30 HG (0-76mm HG) 1/4” NPTM Back Mounting	All Simplex Vacuum Systems
	AA640	2” Dial Face Vacuum Gauge, 0-30 HG (0-76mm HG) 1/4” NPTM Bottom Mounting	All Duplex Vacuum Systems

ACCESSORY	PART NO.	DESCRIPTION	USED ON
Drains	AE248	Manual Drain Cock, 1/4" NPTM	All Systems
	AK602	Auto Tank Drain, 1/4" NPT	Pressure Systems
 Intake Filters	B300A	1/4" NPTM, Plastic with Internal Felts	1HAB-7HDD
	B300F	3/8" NPTM, Plastic with Internal Felts	8HDM
	AA900D	Jar-Type, 3/4" NPTF Ports	2565
	AV460C	Catch Pot with Vacuum Bag Element and Cloth Sack, 1 1/4" NPTF Ports (Install Before Tank)	6066
	V400G	Jar-Type, 3/4" NPTF Ports	0523 (Oilless & Lubricated)
	AB599	Jar-Type, 3/8" NPTF Ports	1023 (Oilless & Lubricated)
 Exhaust Mufflers	V425L	Jar-Type, 1/4" NPTF with Deflector in Exhaust Port	0523 (Oilless & Lubricated)
	AB599B	Jar-Type, 3/8" NPTF with Deflector in Exhaust Port	1023 (Oilless & Lubricated)
	AA900E	Jar-Type, 3/4" NPTF with Deflector in Exhaust Port	2565 Simplex and Duplex
	AD560B	Jar-Type, 1" NPTF with Deflector in Exhaust Port	6066
 Shock Mounts	AF631	1" Diameter, 3/4" Thickness, 1/4 X 20 Threading 1/2" Long	Optional
	AF633	1 1/2" Diameter, 1" Thickness, 5/16 X 18 Threading 5/8" Long	All Systems Except ROA and DOA
 Hose And Tubing	AE814B	12 1/2" L. Plastic Tubing (Needs AG427 Male Connector)	ROA, DOA
	AF634	14" L. Teflon Core, 1/4" NPTM Fittings	1HAB-5HCD
	AH332	16" L. Teflon Core, 3/8" NPTM Fittings	6HCA-8HDM
	AH325F	16" L. Plastic Tubing (Needs 2-AH138E Clamps)	0523 (Oilless & Lubricated)
	AH307C	25 1/2" L. Plastic Tubing (Needs 2-AH138D Clamps)	6066
Bases 	AB322E	Base For Duplex Vacuum System (Need 2)	6066
 Oil and Solvent	AD220	1 Quart High Detergent 10 Weight Lubricating Oil	0523, 1023, 2565
	AH255B	14 Ounces of Aerosol Can Nonflammable Flushing Solvent	Vacuum Systems

Compressed Air Systems

Moisture When air is compressed in a tank system, water accumulates in the tank. To understand how this works, think of a stack of sponges saturated with water. Exert pressure on the sponges and water comes out. Compressing volumes of air has the same effect. The humidity in the air accumulates in the tank, which will require draining. If you are considering a tank system for an application that requires moisture-free air, the design should include a refrigerated, or desiccant type air dryer. Consult your Gast Distributor for more information.

Air Consumption/Air Delivery Before Pump Cycles This table shows the cubic feet of air in a tank between various duties. With this data, you can estimate how many cycles of your operation can be performed before the pressure switch starts compressor operation.

CUBIC FEET OF AIR

Pressure Setting	Tank Size in Gallons				
	2	12	20	30	60
0 PSI	.26	1.6	2.6	4	8
0-50 PSI	1.1	7.0	11.4	17.6	35.2
0-100 PSI	2	12.4	20.8	31.2	62.4
30-50 PSI	0.3	2.2	3.6	5.5	10.9
80-100 PSI	0.3	2.1	3.6	5.4	10.8
70-100 PSI	0.5	3.2	5.4	8.1	16.2

The following example will assist in sizing a tank package based on a desired duty cycle.

Application Example:
Determining Duty Cycle (compressor On vs. Off time)
Given: Air requirement is .5 CFM continuous @ 70 psig. Refer to the above chart and based on the pressure switch setting, select one of the tank sizes based on the available/stored air. First choice could be a 20 gallon tank and a .5 HP compressor. The 4HCC-11T-M450x provides a starting point for you to consider.

Determining Pump Operating Time:

1. **Determine the average flow provided by the compressor between the cut in and cut out pressure settings for the pressure switch. (The average pressure for a Simplex tank package is 85 psig and Duplex tank package is 90 psig).** The flow at 85 psig for model 4HCC compressor is 1.9 CFM. (For this example .5 CFM is continuously being supplied to the application). The actual flow going into the receiver will be corrected to **1.4 CFM** (1.9 CFM - .5 CFM = 1.4 CFM).

2. **Determine the amount of time the receiver (alone) will supply the required flow before the pressure switch turns on the air compressor.** We selected a 20-gallon air receiver and referring to the above chart we can determine that 3.6 cubic feet of air is stored in the receiver between 70 psig - 100 psig. The amount of time the receiver satisfies the continuous flow of .5 CFM will be **3.6 cu ft / .5 CFM = 7.2 minutes or 7 minutes and 12 seconds**.

3. **Determine the amount of time the air compressor will operate to satisfy the pressure switch setting (70 psig - 100 psig).** We determined in step #1 the compressor delivers 1.4 CFM into the receiver. The required volume of air of 3.6 cu ft will return the receiver pressure to 100 psig. The amount of run time the compressor will operate will be 3.6 cu ft / 1.4 CFM = 2.6 minutes or 2 minutes and 36 seconds.

Conclusion:
The 4HCC-11T-M450X will operate with a Duty Cycle of 27% Pump run time: 2.6 minutes per cycle or 15.9 min per hour or 2.12 hours (8 hour shift) or 10.6 hours (5 day week, 8 hour shift) or 551 hours per year. Pump off time: 7.2 minutes per cycle or 1,528 hours per year.

Location of Tank System Regardless of what system your application requires, its size, and the heat it generates, it is usually desirable to locate the tank system away from the work area. Operating noise, even when it is reduced by cycling, can still be a factor in determining location. However, a remote installation can cause problems in a pneumatic system. Some of these may be prevented by following these few simple rules.

1. Be sure the electrical hookup can supply proper voltage and amperage to the area selected for installation. Don't run the system from an extension cord. Do have the system installed by a trained electrician.
2. Choose a location for the tank system which will be readily accessible for weekly maintenance, then establish and follow a regular maintenance schedule. Make copies of all tags and instructions for a permanent file, then return originals to the tank so they're available for quick reference.
3. Use the largest size pipe practical when plumbing the system. The larger the pipe, the smaller the frictional losses. In other words, pipe that is too small will restrict air flow and prevent tools from operating properly regardless of compressor size. Large pipe also provides capacity for expansion of the system, should it become necessary.
4. In both vacuum and compressed air systems, the biggest problem that affects performance is leaks in plumbing. Be sure to use a sealant when setting up your system and periodically check all gaskets in filters.

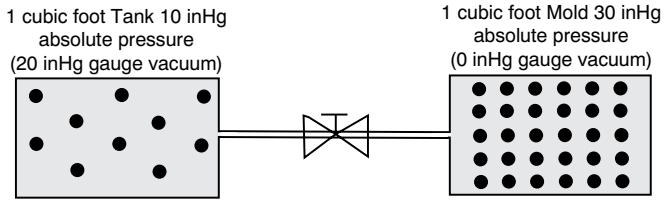
It should be recognized that the performance in this catalog is based upon ambients at sea level. Changes in altitude or barometric pressure will affect pumping speed for both compressors and vacuum pumps.

Sizing a Vacuum Receiver

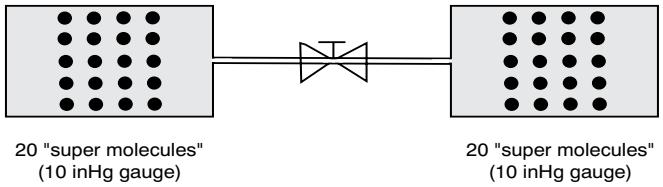
To understand tank sizing for a desired level of vacuum, it is important to remember that the volume of the tank vs. the volume of the mold will determine your system vacuum.

Example: Let's assume that for each inch of mercury we have one "super molecule", and we have a tank that is 1 cubic foot and a mold that is 1 cubic foot.

At sea level the barometric pressure is 29.92 inHg absolute (0 gauge). Due to variations in the atmospheric pressure, we can safely assume that 30 inHg is a good round number. So, at sea level we can say that the atmosphere has almost 30 "super molecules."



Now, we open up the valve and what happens? It balances



Now, with an average of 20 molecules per cubic foot, our system vacuum is 30 - 20 = 10 inHg gauge vacuum.

If we double the size of the vacuum tank, we now have an average of 10 super molecules in two cubic feet and 30 super molecules in the one cubic foot mold. So, we have 10 + 10 + 30 = 50 super molecules in 3 total cubic feet, or 17 super molecules per cubic foot, relating back to our new vacuum gauge reading, 30 - 17 = 13 inHg gauge vacuum.

Now that we understand this concept, here is a simple tank calculation based upon Boyles Law of $P_1V_1 = P_2V_2$. If we have a tank that we are going to pump down to 25 inHg and we need a total system vacuum of 20 inHg, we can do the following calculation:

$$\frac{D}{T - D}$$

D = Desired Mold Vacuum inHg
T = Tank Vacuum inHg
R = Tank to Mold Ration or Tank Volume: Mold volume (1)

So:
D = 20 inHg
T = 25 inHg

$$\frac{20}{25 - 20} = R, \quad \frac{20}{5} = R, \quad 4{:}1 = R$$

We need a 4:1 ratio between the tank volume and the mold volume. This means if the mold is 1 gallon, the tank must be at least 4 gallons to reach the level of 20 inHg instantaneously.

Other tank to mold volume ratios:

D = 15 inHg	D = 22 inHg
T = 25 inHg	T = 25 inHg
1.5:1	**7.5:1**

Vacuum Forming Work sheet

To set up a proper vacuum forming system we must:
1. Calculate the volume of the cavity(ies) to be evacuated.
2. Calculate the volume of the plumbing.
3. Determine the proper receiver (tank) size.
4. Determine the proper vacuum for the application.

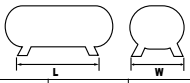
All of these factors are interrelated and demand equal consideration in the final system design. This work sheet is designed to help you through these considerations in a step-by-step fashion.

The next step is usually easy for a vacuum former because they know the area of the mold. Some simple reminders for volume calculations are:
1. Volume is always surface area times depth (height).
2. Volume of squares or rectangles are calculated by multiplying length times height times width.
3. Surface area of a circle is Pi x radius^2 or 3.14 times radius^2.
4. Volume of a sphere is calculated by multiplying 4/3 Pi x R^3 or in other words, 4.189 times Radius^3.

Cubic Feet for 10-foot Section of Schedule 40 pipe

Pipe Inside Size	Dia.	Volume	Pipe Inside Size	Dia.	Volume
1/8"	.269	.004 cu ft	3/4"	.824	.037 cu ft
1/4"	.364	.007 cu ft	1"	1.049	.06 cu ft
3/8"	.493	.013 cu ft	1 1/2"	1.610	.14 cu ft
1/2"	.62	.021 cu ft	2"	2.067	.23 cu ft

Reference Dimensions (inches)

	Overall						Plumbing Connection
Model	**Length**	**Height**	**Width**	**Length**	**Width**	**Hole**	**All Female**
ROA-P206T	19	18	8	10	4	3/8	1/4
DOA-P706T	18	15	8	10	4	3/8	1/4
1HAB-11T	18	17	8	10	4	3/8	1/4
1LAA-11T	18	17	8	10	4	3/8	1/4
2HAH-11T	18	18	8	10	4	3/8	1/4
3HEB-11T	26	25	14	16	12	7/16	1/4
4HCC-11T	33	27	16	18	14	9/16	1/4
5HCD-11T	33	27	16	18	14	9/16	1/4
6HCA-11T	38	29	17	22	15	9/16	3/8
7HDD-11T	38	29	17	22	15	9/16	3/8
8HDM-11T	38	29	17	22	15	9/16	3/8
0523-V	21	17	10	10	4	3/8	1/4
1023-V	39	30	22	22	15	9/16	1 1/4
2565-V90	40	35	24	24	15	9/16	1 1/4
4HCC-89	48	35	38	26	18 1/2	9/16	1/2
5HCD-95	48	35	38	26	18 1/2	9/16	1/2
6HCA-15	48	35	38	26	18 1/2	9/16	1/2
7HDD-69D	48	35	38	26	18 1/2	9/16	1/2
8HDM-30D	48	35	38	26	18 1/2	9/16	1/2
2565-V93	49	36	37	26	18 1/2	9/16	1 1/4
6066-V113	50	48	34	26	18 1/2	9/16	1 1/4
71R640-P64T-	26	23	13	16	12	7/16"	1/4"
71R640-P67T-	26	24	13	16	12	7/16"	1/4"
71R640-P65DT-	26	23	14	16	12	7/16"	1/4"

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