

TW Vortec

Innovative Compressed Air Technologies Innovative Compressed Air



PRODUCT GUIDE
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Vortex Tubes



Sub-Zero Spot Cooling using Compressed Air

Vortex tubes...our founding technology. More than 40 years ago, we pioneered the application of the vortex tube principle to solve industrial cooling problems.

Maintenance free, no moving parts

Cycle repeatability within $\pm 1^\circ$

Drops inlet temperature by up to 38°C

Cools without electricity or refrigerants

Exceptionally reliable, compact and lightweight

Over the years, thousands of companies of all sizes have used ITW Vortec vortex tubes on their equipment to spot cool a part or process, thermal test components, speed set solders or hot melt adhesives, and so much more. A vortex tube from ITW Vortec can produce up to 6000 BTUH of refrigeration or deliver temperatures down to -40°F . (40°C)

Vortex Tubes are an effective, low cost solution to a wide variety of industrial spot and process cooling needs. With no moving parts, a vortex tube spins compressed air to separate the air into cold and hot air streams. While French physicist Georges Ranque is credited with inventing the vortex tube in 1930, ITW Vortec was the first company to develop and apply this phenomenon into practical and effective cooling solutions for industrial use. Vortex Tubes have a very wide range of application for spot cooling on machines, assembly lines and processes.

Vortex Tubes have many applications:

- ◆ Cool machine operations
- ◆ Temperature cycle parts
- ◆ Set solders and adhesives
- ◆ Cool cutter blades
- ◆ Cool heat seal operations
- ◆ Dry ink on labels and bottles
- ◆ Keep electronics cool
- ◆ Dehumidify gas samples
- ◆ Thermal test sensors



MODEL	AIR CONSUMPTION		CAPACITY (100 PSIG)	
	(SCFM)	(SLPM)	BTUH	kCAL/hr
106-2-H	2	57	100	25
106-4-H	4	113	255	64
106-8-H	8	226	400	101
208-11-H	11	311	640	161
208-15-H	15	425	900	227
208-25-H	25	708	1500	378
308-35-H	35	991	2650	668
328-50-H	50	1415	3000	756
328-75-H	75	2123	4500	1134
328-100-H	100	2830	6000	1512

Specifications are at 100 PSIG (6.9 Bar).

Vortex Tubes

The table below shows approximate temperature drop and rise achieved by vortex tubes when adjusted to various Cold Fractions. A Cold Fraction is the percentage of cold air produced versus total filtered compressed air consumed by any Vortex Tube.

COLD FRACTION	10		20		30		40		50		60		70		80		90		
	PSIG/BAR	F°	C°	F°	C°	F°	C°	F°	C°	F°	C°	F°	C°	F°	C°	F°	C°	F°	C°
20/1.4		63	35	62	34	60	33	56	31	51	28	44	24	36	20	28	15	17	9
		7	4	15	8	25	14	36	20	50	28	64	36	83	46	107	59	148	82
40/2.8		91	51	88	49	85	47	80	44	73	41	63	35	52	28	38	21	26	14
		9	5	21	11	35	19	52	29	71	39	92	51	117	65	147	82	220	122
60/4.1		107	59	104	58	100	56	93	52	84	47	73	41	60	33	45	25	29	16
		10	6	24	13	40	22	59	33	80	44	104	58	132	73	168	93	236	131
80/5.5		119	66	115	64	110	61	102	57	92	51	80	44	66	36	49	27	31	17
		11	7	25	14	43	24	63	35	86	48	113	63	143	79	181	101	249	138
100/6.9		127	71	123	68	118	66	110	61	99	55	86	48	71	39	53	29	33	18
		12	8	26	14	45	25	67	37	91	51	119	66	151	84	192	107	252	140
120/8.3		133	74	129	72	124	69	116	64	104	58	91	50	74	41	55	31	34	19
		13	8	27	14	46	26	69	38	94	52	123	68	156	87	195	108	257	142
140/9.7		139	78	135	75	129	72	121	67	109	61	94	52	76	42	57	32	35	20
		14	8	28	16	47	27	71	39	96	53	124	69	157	88	196	109	259	144

Table Baseline: Compressed air temperature: 70°F/21°C
 Pressure Dew Point: -69°F/-56°C (dry air)
 Backpressure: not to exceed 5 PSIG/0.4 Bar
 Numbers on the Blue Bar: Temperature Drop
 Numbers on the White Bar: Temperature Rise

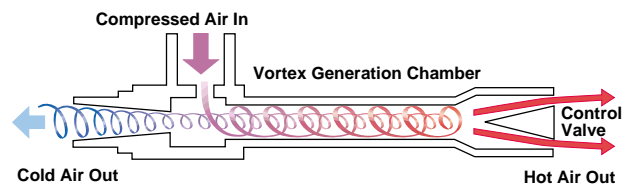
Air Flow - The total SCFM air consumption of any Vortex Tube is proportional to any particular absolute inlet pressure as follows:

$$\frac{(\text{PSIG} + 15) \times \text{Generator Rating}}{115} = \text{approximate total air consumption}$$

All Vortex Tubes are Easily Adjusted to Regulate Airflow Volume and Temperature

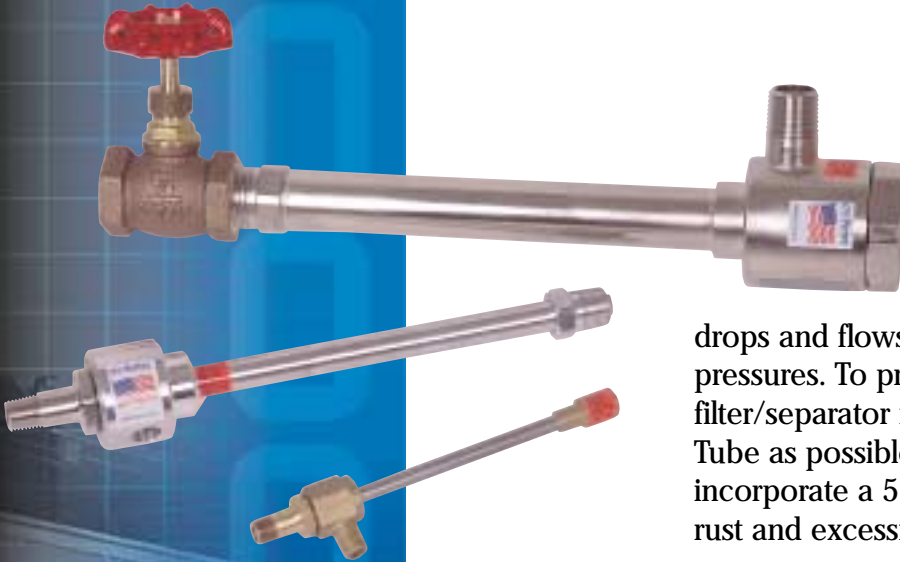
Vortex Tube performance can be further modified by changing an internal bushing or generator. These modifications can change the total flow capacity (CFM) and cold fraction to achieve maximum refrigeration or lowest possible cold temperature. Generator kits, hot end / cold end mufflers, as well as stainless steel Vortex Tube models are available. For help with your spot cooling application, please contact one of our Application Engineers. They will be happy to assist you with proper Vortex Tube selection.

TECH notes



Fluid (air) that rotates around an axis (like a tornado) is called a vortex. A Vortex Tube creates cold air and hot air by forcing compressed air through a generation chamber, which spins the air at a high rate of speed (1,000,000 RPM) into a vortex. The high-speed air heats up as it spins along the inner walls of the Tube toward the control valve. A percentage of the hot, high speed air is permitted to exit at the valve. The remainder of the (now slower) air stream is forced to counterflow up through the center of the high-speed air stream in a second vortex. The slower moving air gives up energy in the form of heat and becomes cooled as it spins up the tube. The chilled air passes through the center of the generation chamber finally exiting through the opposite end as extremely cold air. Vortex tubes generate temperatures down to 100°F below inlet air temperature. The control valve located in the hot exhaust end can be used to adjust the temperature drop and rise for all Vortex Tubes.

Vortex Tubes



With our models ranging from approximately 6" to 13" long, Vortex Tubes are a very compact source of refrigeration and spot cooling capability. They are designed to utilize a filtered compressed air supply of 80 - 110 PSIG. Pressures lower than 80 PSIG will still provide some cooling, but temperature drops and flows are reduced due to the lower inlet pressures. To prepare the air source, an appropriate filter/separator must be used, placed as near to the Vortex Tube as possible. ITW Vortec's Auto-Drain filters-separators incorporate a 5 micron filter that effectively removes dirt, rust and excessive moisture from the compressed air supply.

Reliable, Maintenance-Free Cooling

Using an adequately filtered and dried compressed air source, Vortex Tubes are essentially a no-maintenance cooling solution. With no moving parts to break or wear out, they will provide years of trouble-free operation. Prolonged use with dirty or oily air can cause wear or dirt collection within the tube. Under these conditions, occasional disassembly, inspection and cleaning are the only maintenance activities required.

Since the tube's performance is affected by the absolute pressure ratio applied, care should be taken not to restrict the cold outlet. A small amount of back pressure on the cold outlet to allow air to move through piping or ducting is acceptable. Back pressure, measured at the tube, should be limited to less than 5 PSIG.



Due to the sound of escaping air, the noise from a Vortex Tube, in some externally mounted applications, should be muffled. Ordinarily the ducting of the cold air output through tubing or into an enclosure will adequately reduce noise levels. If required, specially designed cold end or hot end mufflers are available for your installation. It should also be noted that some applications have used the hot air output as a source of spot heating. Temperatures up to 200°F (93°C) can be generated using no electricity, with its related interference and hazards.

As the originator of vortex tube technology for industrial applications, ITW Vortec's expertise and problem-solving experience with vortex tubes is widely recognized. Our technical staff is ready to assist you with your cooling needs.

APPLICATION

notes

The manufacturer of form, fill and seal packaging equipment uses #106-8-H Vortex Tubes to keep sealing bar clamp shield temperatures below 150°F. Excessive clamp shield heat would inadvertently melt film adjacent to the seal and cause marred wrap or a defective package.

A laboratory uses a #208-15-H Vortex Tube connected to a simple heat exchanger to lower and maintain the water temperature in a cold water bath testing device.

One of the largest producers of air conditioning compressors cools the exterior shell of its units after a baked on painting process with #308-35-H Vortex Tubes mounted on a cooling enclosure.

Plastic injection and blow molders increase their production rates by using Vortex Tubes to speed the cooling of molded areas, especially those to be machined.

A worldwide manufacturer of finishing equipment for the printing industry incorporates ITW Vortec Vortex Tubes as a cooling device for slitter blades.

Cold Air Guns

Versatile Spot Cooling for Machining and More

If you want to substantially improve your dry machining operations, kill the heat buildup with a steady stream of sub-zero air from a Cold Air Gun. Cold air machining on almost any material results in improved production rates and quality, as well as prolonged tool life. And, with the ever-increasing need to protect worker breathing areas, you can eliminate the mess, expense and safety concerns associated with using mist coolants.



Cold Air Guns use filtered compressed air and vortex tube technology to produce sub-zero air for numerous industrial spot cooling applications. With no moving parts to wear out, the internal vortex tube converts factory compressed air into a cold air stream, producing temperatures down to as much as -30°F. Cold Air Guns are used in various industrial processes, fabrication, assembly and packaging as a versatile spot cooling device.

- ◆ Widely used in milling, drilling, turning and other metalworking operations
- ◆ Machining of plastics, composites, wood and other materials
- ◆ Surface grinding, drill and tool sharpening
- ◆ Cooling molds and molded pieces
- ◆ CNC routers, blades and band saws
- ◆ Spot cooling of parts and assemblies
- ◆ Industrial sewing and textiles
- ◆ Setting hot melts and adhesives
- ◆ Thermal testing sensors
- ◆ Cooling welds and solders



Exceptionally reliable, no moving parts

Produces cold air down to -30°F (-35°C)

Quiet operation, meets OSHA noise specifications

Uses only filtered compressed air

No refrigerants, no EMI/RFI interference

Low pressure air output helps clear chips & dust

MODEL	DESCRIPTION	OPTIONS	DESCRIPTION
610	Adjustable Cold Air Gun, magnetic base & filter	611-FNU	Frost-Free Nozzle Upgrade
610-1	Adjustable Cold Air Gun only	610-30	Dual-Point Flex Nozzle
608	Mini Cold Air Gun, 3 axis magnetic base & filter	608-30	Dual-Point Flex Nozzle
608-1	Mini Cold Air Gun only		

Most popular applications involve cooling during the machining of metals, plastics, wood, rubber, ceramics and other materials. Cold air machining outperforms mist coolants and substantially increases tool life and feed rates on dry machining operations. The effective cooling from a Cold Air Gun can eliminate heat-related parts growth while improving parts tolerance and surface finish quality.

Cold Air Guns



Model 610 Adjustable Cold Air Gun System

Our most popular and versatile model is ideal for a wide range of machining operations and other spot cooling needs. The Cold Air Gun's easily adjustable temperature and airflow settings and instant on/off capability makes it simple to adapt its cold air output to the application.

- ◆ Eliminates the mess, expense and safety concerns of using mist coolants
- ◆ Avoid secondary parts cleaning after machining
- ◆ Cools parts to reduce normalization time and hold tight part tolerance
- ◆ Single turn adjustable temperature for your specific application
- ◆ Magnetic base for easy machine to machine portability



Model 608 Mini Cold Air Gun System

Its compact size allows close positioning for dry grinding and operations with limited space. The Mini Cold Air Gun delivers a stream of sub-zero air to the work area to cut hours from your grinding, sawing, drilling, or other machining operations.

- ◆ Reduces grinding wheel loading caused by overheating
- ◆ 3 axis magnetic base for easy, close-in positioning
- ◆ Eliminates edge burning and heat distortion
- ◆ Speeds production and extends tool life

APPLICATION

notes

Apparel manufacturers have improved cutting speeds by mounting a Cold Air Gun on automated fabric cutter machines.

Operators of CNC routers used in industrial woodworking applications use Cold Air Guns to extend tool life, while the low pressure airflow clears sawdust from the cutting area.

Manufacturers of grinding equipment sell or recommend #608 Mini Cold Air Guns to minimize heat buildup and reduce wheel loading.

An Italian manufacturer of twist drill sharpening machines offers an optional pneumatic system that uses an internally mounted #610 Adjustable Cold Air Gun which is ducted to the work area.

Automated equipment for the composites industry is using Cold Air Guns to chill graphite epoxy materials for improved guiding in fiber placement layout machinery.

A facility producing thermostats saved money in their quality control test area by replacing CO₂ with two Cold Air Guns for testing low temperature settings.

Adjustable Hot Air Gun System

The Model 609 Adjustable Hot Air Gun spot pre-heats parts and processes using no electricity. Uses only filtered compressed air to generate fully adjustable temperatures up to 200°F (93°C). Ideal when moderate heat levels are required.



Model 424 Thread Guard

Keeps industrial sewing needles cool to virtually eliminate heat-related needle breakage and thread burning.

The 10°F (-12°C) air stream is especially effective on difficult sewing operations such as belt loops and waist bands or tough materials like denim.



Cold Air Guns

Air Consumption at 100 PSIG (6.9 Bar)

MODEL NO.	SCFM	SLPM
Model 610 Adjustable Cold Air Gun	15	425
Model 608 Mini Cold Air Gun	8	226
Model 424 Thread Guard Needle Cooler	4	113
Model 609 Adjustable Hot Air Gun	15	425

80-100 PSIG recommended for optimum performance.

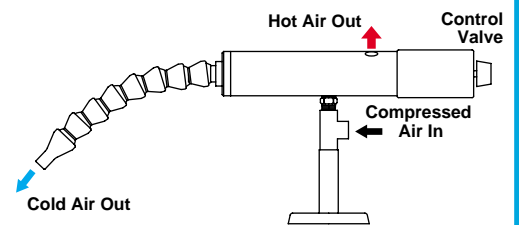
System models 610, 608, 609 and 424 include a 5 micron Auto-Drain filter.



**Increase dry machining speeds up to 36%
and extend tool life up to 50%**

Optional flex nozzles are available to improve the cold air delivery in certain applications. A Dual-Point Nozzle (for the #608 or #610 models) is effective for cooling a larger surface area or two sides of a machined part or area, such as dissipating the heat on both sides of a band saw blade. An optional Frost-Free Nozzle for the #610 Adjustable Cold Air Gun will minimize any icing conditions or condensation when ambient air is very humid.

TECH notes



Cold Air Guns are conveniently packaged, ready to go Vortex Tubes. The internal Vortex Tube spins the supplied compressed air and separates it into hot and cold airstreams. (See Vortex Tubes for more detail) The cylindrical body and internal mufflers provide for quieter operation, while the positionable nozzle allows full flexibility in directing the cold airflow. Most popular models offer adjustable temperature and airflow as well as magnetic bases for quick installation and portability.

Enclosure Coolers

Keep Electrical Enclosures Cool, Clean and Protected



Have your production lines or equipment ever shutdown from overheated electrical enclosures? It's a common problem, and one that can have serious consequences. Research by control manufacturers has shown that for each 18°F (10°C) increase in temperature, online production shutdowns will occur twice as often. Vortex Coolers offer a simple, reliable and affordable solution to keeping control panels cool, clean and protected.

Thermostatically-controlled to save energy

Continuous cooling models are available

Powered by compressed air, utilizing a vortex tube to generate cold air without Freon or other refrigerants (CFCs/HCFCs)

Exceptionally reliable, no moving parts to break or wear

Low maintenance

Cooling capacities to 5000 BTUH (1250 kcal/H)

Maintains NEMA 4, 4X and 12 ratings. All models are UL-listed

Today's small and compact, multi-function electronic controls, variable speed drives, servos and programmable logic controllers are extremely sensitive to heat and contamination. Smaller cabinet sizes make temperature control difficult and contribute to significant premature failures. Excessive heat causes components to "cook", digital displays to misread, controls to drift, and breakers to trip below their rated loads. The result is often lost productivity from machine or line shutdowns.

Fans often provide inadequate cooling and commonly pull in dirty, humid air creating another source of failure. Air conditioners require ongoing maintenance and are relatively expensive, large and difficult to install.

ITW Vortec's Vortex Cooler Enclosure Coolers are the affordable, low maintenance, easy to install alternative for keeping enclosures cool and clean without Freon or other refrigerants.



Enclosure Coolers

With no moving parts to wear out or maintain, Vortex Coolers use only compressed air and vortex tube technology to produce quiet, efficient and reliable cabinet cooling. As an added benefit, these coolers create a slight positive pressure inside the enclosure to prevent dirt or dust from entering - even in the most challenging environments.

From small computer cabinets and touch-screen control panels to large electrical enclosures, a Vortex Cooler can protect sensitive controls from overheating to eliminate heat and dirt related shutdowns. Models are available to provide cooling capacities ranging from 400 to 5000 BTUH (101 to 1250 kcal/H).

- ◆ Compact and easier to install than air conditioners and most fan units
- ◆ Has no moving parts for highly reliable cooling protection
- ◆ Keeps components clean - no outside air ever enters the cabinet
- ◆ Offers quiet operation and little to no maintenance
- ◆ An affordable, UL-listed solution that maintains NEMA 4, 4X and 12 ratings



NEMA Type	MODEL NO.		CAPACITY		AIR CONSUMPTION	
	with Thermostat	without Thermostat	BTUH	Kcal/hr.	SCFM	SLPM
NEMA 12	750	760	400	101	8	227
	740	730	900	225	15	425
	790	780	1500	378	25	708
	795	785	2500	630	35	991
	7970	7870	5000	1260	70	1981
NEMA 4	747	737	900	225	15	425
	770	(a)	1500	378	25	708
	797	787	1700	428	25	708
	797-35H	787-35H	2500	630	35	991
	770-35H	(a)	2500	630	35	991
	7975	7875	5000	1260	70	1981
NEMA 4X	747SS	737SS	900	225	15	425
	797SS	787SS	1700	428	25	708
	797SS-35H	787SS-35H	2500	630	35	991
	7975SS	7875SS	5000	1260	70	1981

Models with 5000 BTUH capacity include two Vortex Coolers which use a common air line filter, solenoid and thermostat.

Thermostat models are factory set at 90°F±2°/32°C±1° with the exception of the following:
 (a) Panel Guard Vortex Coolers (770 and 770-35H) use a non-adjustable, mechanical thermostat which has an approximate control of 80-90°F/27-32°C.

NEMA 4X Vortex Coolers feature stainless steel construction for washdown protection and resistance to oxidation and corrosive surroundings.

For assistance in sizing the appropriate model to your requirements, Call our Technical Service Department or use the Interactive Sizing and Selection Worksheet on our website.

www.vortec.nl

Enclosure Coolers

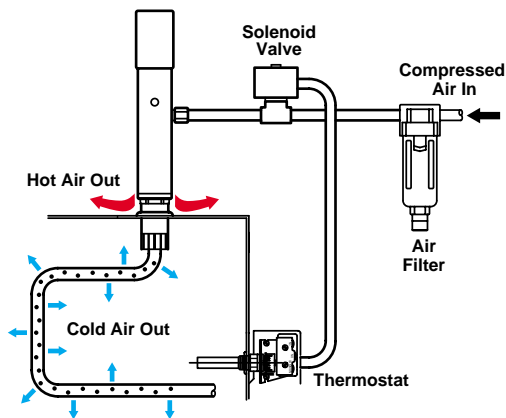


All Vortex Cooler systems include a 5-micron Auto-Drain filter and a ducting kit to distribute cold air throughout the enclosure. Thermostatically controlled models also contain a solenoid valve and thermostat, limiting compressed air usage to those times when cooling is required.

All Vortex Coolers are UL-listed and maintain NEMA 4, 4x and 12 ratings based on selected model. Coolers are designed to use a filtered factory compressed air supply of 80 -100 PSIG.

NEMA RATINGS	
12	Indoor Dust Tight/Drip Tight
4	Outdoor Weatherproof/Washdown
4X	Outdoor Weatherproof/Washdown Corrosion Resistant

TECH notes



Inside the Vortex Cooler, a Vortex Tube spins the supplied compressed air, separating it into hot and cold airstreams. (See Vortex Tubes for more detail) The cold airstream is distributed throughout the enclosure via a ducting tube, while the hot side exits out the side of the Cooler body. The low pressure cold air flows into the cabinet forcing the heated internal air out a relief valve or vent built into the base of the Cooler. This slight positive pressure helps purge the cabinet of dust and dirt. Thermostat controlled models utilize a solenoid valve to activate the compressed air flow to the unit.



Models 770 and 770-35H Panel Guard coolers feature an integral, mechanical thermostat. A heat sensitive element at the base of the cooler activates a control valve to open/close the compressed air supply. The non-adjustable thermostat requires no electrical connections and will provide cooling protection to maintain enclosure temperatures in the range of 80-122°F (27-50°C).

Enclosure Coolers

Vortex Coolers easily mount in tight spaces, with all models ranging from approximately 7 to 11 inches tall.

MODEL NO.	ACCESSORIES
701S-48	Auto-Drain Oil Removal Filter, 3/8" NPT(F), rated to 25 SCFM / 708 SLPM
701S-54	Auto-Drain Oil Removal Filter, 1/2" NPT(F), rated to 70 SCFM / 1981 SLPM
721T-70	Solenoid Valve & Thermostat Kit, 1/4" NPT(F), 110V/60Hz, 25 SCFM / 708 SLPM
721T-75	Solenoid Valve & Thermostat Kit, 3/8" NPT(F), 110V/60Hz, 35 SCFM / 991 SLPM

APPLICATION

notes

One of the leading US manufacturers of shrink-wrap packaging equipment uses Vortex Coolers to maintain safe temperatures in control panels near heated shrink tunnels.

Since the evolution of catalyzed coating systems has spawned the need to control paint temperature in many applications, insulated enclosures equipped with Vortex Coolers are now available to keep paint cold and within specifications for optimal spraying.

ITW Vortec Vortex Coolers are offered as a thermal management solution by leading electrical enclosure fabricators and control panel designers.

Model #790 Vortex Coolers were installed on computer control panels on three robotic welding stations in an automotive assembly plant. The cooling solution purged the panels of dirty welding fumes and high ambient temperatures that were causing the computer malfunctions.

A major snack foods company uses ITW Vortec Vortex Coolers on the control cabinets on all of their baking ovens to prevent heat-related shutdowns. Compact, easy to install Vortex Coolers are popular for enclosure protection on industrial ovens and heat finishing / processing systems and equipment.



Choose the best thermal management solution for your electrical enclosures and control panels
ITW Vortec s Vortex Coolers

Cold Pumps



Continuous evaporative condensate management system eliminates drain tubes, buckets & wet slippery floors, under normal conditions

Digital thermostat-preset / 75°F (23°C) - Screwdriver thermostat adjustment

Flashing high temperature alarm (125°F/52°C)

Automatic reset thermal overload protection

Washable aluminum external air filter

Most components accessible by filter removal

Suction and discharge compressor access fittings

Easy-mount flanges simplify installation to a two-step, one-person job

Both 115V and 230V models available

High performance, ball-bearing blowers

UL Listed / CE approved

Maintains NEMA 12 cabinet integrity

If you're looking to solve your overheating electrical enclosures with an air conditioner, we offer a versatile line of closed-loop cabinet cooling systems. Our Cold Pump® models are sized to handle the most common BTUH requirements, with both 115v and 230v models available. These UL listed and CE approved units have rugged construction and quality components to stand up to the harshest industrial environments.



Cold Pump® Cooling Systems are thermostatically controlled, closed-loop air conditioners that use CFC-free R22 or HFC-134A refrigerants. Room air is continuously drawn through an external filter, across condenser coils (where it removes the heat drawn from the enclosure) and flows out the top external vent. The sealed enclosure remains clean and cool because internal air is cooled and dehumidified continuously as it is drawn across the evaporator coils.

MODEL NO.	CAPACITY btuh/kCal/hr.	VOLTAGE	FULL LOAD AMPS 50/60	SHIPPING WEIGHT Lbs/Kgs	OVERALL DIMENSIONS
518T 518TF	2200/554 2200/554	115 230	9.7/9.0 5.5/4.6	90/41 90/41	Height: 10.25" (260mm) Width: 17.0" (432mm) Depth: 21.02" (534mm)
518S 518SF	1800/453 1800/453	110/115 220/230	6.6/6.7 4.2/3.7	56/25 56/25	Height: 17.65" (448mm) Width: 12.0" (305mm) Depth: 8.68" (220mm)
540S 540SF	4000/1007 4000/1007	115 230	14.6/14.0 7.4/6.9	116/53 116/53	Height: 28.50" (724mm) Width: 17.0" (432mm) Depth: 11.33" (288mm)
560S 560SF	6000/1511 6000/1511	115 230	14.0/14.0 7.0/7.0	120/54 120/54	Height: 38.72" (984mm) Width: 15.0" (381mm) Depth: 11.33" (288mm)

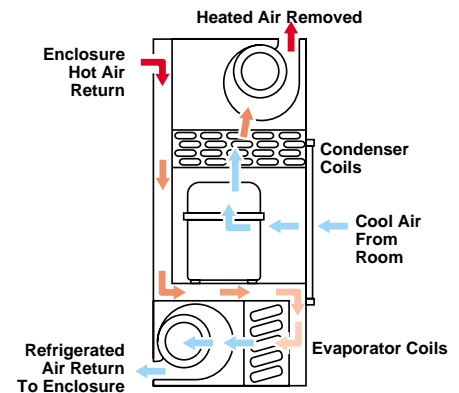
All Models: 50/60 Hz, Single Phase, Maximum Ambient Temperature: 125°F/52°C

Applications:

ITW Vortec Cold Pumps® are a reliable air conditioning system for electrical control panels and enclosures. These units, which maintain NEMA 12 ratings, are perfect for both new installations as well as retrofitting to cabinets already in place. Top and side mount models are available with cooling capacities ranging from 1800 to 6000 BTUH. Provides effective cooling protection for heat-sensitive electronics in numerous applications.



TECH notes



Room air is continuously drawn through an external filter, across condenser coils (where it removes heat drawn from the enclosure) and flows out the external vent. The sealed enclosure remains clean and cool because air on the inside is cooled and dehumidified continuously as it is drawn across the evaporator coils.

Personal Air Conditioners

Personal Worker Comfort in Extreme Temperatures

Simply put, Personal Air Conditioners with Diffuse-Air Vests are the most effective body cooling solutions on the market – and, they’re very affordable. To minimize heat stress and fatigue and improve worker comfort and productivity in extreme temperatures, our vests deliver constant and adjustable cooling.

Personal Air Conditioners (PAC’s) use filtered compressed air and vortex tube technology to keep workers comfortable in extremely hot or cold areas. With no moving parts, the vortex tube forces a simple heat exchange to separate compressed air into hot and cold airstreams. The small vortex tube, worn on a supplied belt, is connected to our Diffuse-Air Vest which delivers continuous cooled or heated air through its perforated, inner lining. Temperature is easily adjusted to $\pm 60^{\circ}\text{F}$ above or below the inlet temperature.



Improve worker safety and increase productivity in challenging work environments

ITW Vortec PAC’s provide effective cooling or heating, and are especially popular for workers in confined spaces or operating in or near:

- ◆ Foundries
- ◆ Casting Shops
- ◆ Forging Shops
- ◆ Powder Coating
- ◆ Paint Baking Operations
- ◆ Hazardous Waste Removal
- ◆ Steel Mills
- ◆ Boiler Rooms
- ◆ Welding Operations
- ◆ Asbestos Abatement
- ◆ Refrigerated Lockers
- ◆ Power Plants
- ◆ Glass Plants
- ◆ Sand Blasting
- ◆ Smelters
- ◆ Mines

MODEL	DESCRIPTION	COMPRESSED AIR CONSUMPTION		TEMPERATURE	
		100 PSIG (SCFM)	6.9 BAR (SLPM)	DROP F°/C°	RISE F°/C°
22815	Vortex Air Conditioner with belt 900 BTUH	15	425	60/33	-
22825	Vortex Air Conditioner with belt 1500 BTUH	25	708	60/33	-
22835	Vortex Air Conditioner with belt 2500 BTUH	35	991	60/33	-
220	Hot/Cold Air Conditioner with belt 1500 BTUH	25	708	60/33	60/33
855	Diffuse Air Vest w/unfolding lapels, L size - Fits workers up to 182 cm				
857	Diffuse Air Vest w/unfolding lapels, XL size - Fits workers up to 205 cm				

Personal Air Conditioners have 1/4" compressed air Quick Connects and 3/4" garden hose thread for discharge of air flows to vest.

Exposure rating: 200°F with protective outer clothing 130°F no protective outer clothing
Not intended to provide protection from hazardous conditions

No moving parts — exceptionally reliable

Vest can be worn under protective outer clothing

Easy temperature adjustment even with gloved hands

Provides continuous cooled/heated air delivery

Cooling models available in 15, 25 and 35 SCFM

Vest collar unfolds to deliver tempered air flow to neck and face

Vest allows full range of motion with no airflow restrictions

Personal Air Conditioners



The only vest that offers consistent, continuous, and controllable temperatures

APPLICATION

notes

A Texas company specializing in welding repairs inside large storage tanks has been using ITW Vortec Personal Air Conditioners for the last 10 years.

Unbearable summer heat in a metal plating and finishing facility prompted the owner to equip his workers with #22815 PAC's, and to reject the \$145,000 quote to install air conditioning in the shop area.

A forging plant reported more than a 30% increase in productivity using #22825 PAC's with vests, eliminating an average of four daily cool-down periods for their workers.

Workers stationed near an oven in a Southeast powder coating facility scrapped their "gel pack" type vests and opted for the adjustable cooling of PAC's.

Leading manufacturers of welding hoods, respirators and breathing apparatus incorporate ITW Vortec Personal Air Conditioners into their products as a cooling option.

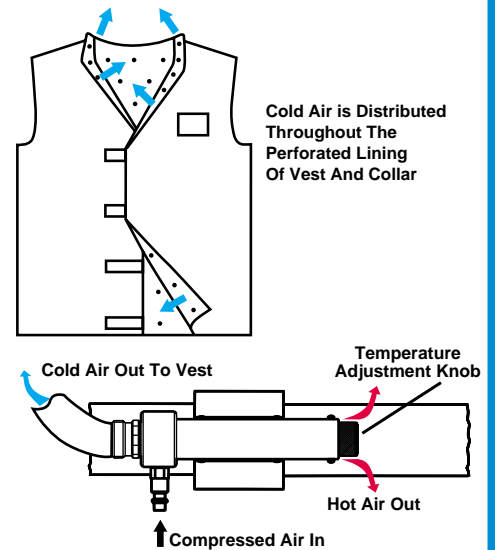


Personal Air Conditioners



Unlike “ice pack” type vests, the PAC offers consistent, continuous and controllable cooling to minimize heat stress and increase worker productivity in hot surroundings. The durable, plasticized PVC vest allows full range of motion with no airflow restrictions and can be worn under welding leathers or protective clothing. Both large and extra-large vests are available, each featuring a collar that can be unfolded to deliver tempered air flow to the neck and face.

TECH notes



Inside the PAC, a Vortex Tube spins the supplied compressed air, separating it into hot and cold airstreams. (See Vortex Tubes for more detail) The cold airstream is delivered to the vest via a ducting tube, while the hot air exits out the side of the PAC unit. The low-pressure cold air flows into the Diffuse-Air Vest's perforated inner lining, which distributes the refrigerated air over the upper body. Unfolding the collars of the vest will reveal air holes to cool the neck and face. (Model 220 uses hot and cold air from both ends of the vortex tube to create a fully adjustable heating or cooling option.)



Air Nozzles and Jets

Drastically Reduce Compressed Air Consumption

All air nozzles and jets are not the same. ITW Vortec's Energy-Saving Nozzles and Jets amplify airflow volume up to 25 times more than the compressed air supplied. The result is less compressed air usage to deliver the same or greater thrust performance.

ITW Vortec's blowoff nozzles and jets are designed to reduce compressed air consumption and noise drastically, compared to open jets.

Perfect for all types of blowoff, cooling and drying applications, these Nozzles and Jets are available in a variety of low and high thrust models. Use them to meet OSHA compliance as they meet OSHA specifications for noise and dead-end pressure. Additionally, Vortec Nozzles and Jets deliver a very precise airflow making them ideal for parts movement and ejection.



	VOVTEC MODEL 1201 NOZZLE	1/4" X 1' LENGTH COPPER TUBE
Air Consumption	9 SCFM	42 SCFM
Annual operating cost/8 hour shift	\$324	\$1512
Annual cost savings	\$1188	

Data based on 100 PSIG operating pressure and \$0.30/1000 SCF compressed air cost.

Reduce your operating costs significantly with our nozzles and jets.

Lowers operating costs and saves energy

Helps meet OSHA noise specifications

Meets OSHA dead-end pressure specifications

Wide range of styles and thrust performance

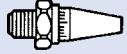








Patented design amplifies air

Big savings when replacing open copper tube jets



Air Nozzles and Jets

Nozzles are an excellent replacement for open copper tubes, flex-line and other nozzles not designed to save air. A full range of styles is available, with designs compatible to most installations.

MODEL NO.	DESCRIPTION	THRUST (POWER) OZ. AT 12"	AIR CONSUMPTION SCFM (SLPM)	FEATURES
1200 Nozzle 1200 SS Nozzle 	Adjustable output flow and thrust. 1/8" NPT(M) fitting	3 to 21	8 (226) to 26 (736)	Threaded connection – ideal for installing on blowguns and manifolds. Adjustable micrometer dial sets airflow and thrust. Available in stainless steel (1200 SS).
1201 Nozzle 	1/4" OD, copper tubing	6	9 (255)	Compact size. Permanently mounted on copper tubing – can be bent, flared, used with compression fittings or soldered.
1201F-12 	3/8" OD, flexible rubber shaft 1/8" NPT(M) fitting.	6	9 (255)	Compact size. Permanently mounted on flexible hose. Holds position under full line pressure. Perfect for areas with limited space.
1202 Nozzle 	1/4" OD, copper tubing, high thrust	20	23 (651)	Compact size. Permanently mounted on copper tubing – can be bent, flared, used with compression fittings or soldered.
1203 Nozzle 	3/8" OD, copper tubing.	9	13 (368)	Permanently mounted on copper tubing – can be bent, flared, used with compression fittings or soldered.
1204 Nozzle 	1/2" OD, flexible rubber shaft. 1/8" NPT(M) fitting.	9	13 (368)	Permanently mounted on flexible hose. Holds position under full line pressure. Excellent replacement for flex-line used for blowoff.
1205 Nozzle 	3/8" OD, copper tubing, high thrust.	28	31 (877)	Permanently mounted on copper tubing – can be bent, flared, used with compression fittings or soldered.
1206 Nozzle 	11/16" OD, high thrust, flexible rubber shaft. 1/4" NPT(M)	28	31 (877)	Permanently mounted on flexible hose. Holds position under full line pressure. Excellent replacement for flex-line used for blowoff.
1220 Nozzle 	3/4" NPT(M), maximum thrust	72	120 (3396)	Threaded connection – ideal for maximum thrust applications such as large surface blowoff. Perfect for paving, roofing and construction uses.

Specifications are at 100 PSIG (6.9 Bar) except 1220 Nozzle is at 40 PSIG (2.7 Bar).

Airstream Size:

MODEL(S)	AT NOZZLE	12" FROM NOZZLE
1200, 1200 SS	5/8" (16mm)	3 1/2" (89mm)
1201, 1202, 1201F-12	3/16" (5mm)	3 1/4" (82mm)
1203, 1204, 1205, 1206	1/4" (6mm)	3 1/4" (82mm)

Air Nozzles and Jets

Jets are round-throated air amplifiers; one end provides a strong airflow while the other creates suction as free air is entrained. Since jets output a more concentrated, targeted volume of air than nozzles, they are ideal for water, solvents or light oil stripping applications.

Amplification 4:1

MODEL NO.	DESCRIPTION	THRUST (POWER) OZ. AT 12"	AIR CONSUMPTION SCFM (SPLM)
909 Jet	Adjustable output flow and thrust 1/8" NPT(M) fitting.	2 to 17	5 (142) to 21 (594)
901 Jet	1/8" NPT(M) fitting.	6	8 (226)
901B Jet	1/8" NPT(M) fitting, 3/4" diameter suction and discharge, for conveying	6	8 (226)
901D Jet	1/8" NPT(M) fitting.	14	17 (481)

Specifications are at 100 PSIG (6.9 Bar). All jets are brass and can be shimmed (except Model 909) to vary the thrust and air consumption.

For assistance in selecting the appropriate model for your requirements, call our Technical Service Department



Air Nozzles and Jets

ITW Vortec nozzles and jets deliver precise airflows and are ideal for cleaning, drying, cooling, parts movement or ejection.

Airstream Size:

MODEL	AT JET	12" FROM JET
909	3/8" (10mm)	3" (76mm)
901	5/8" (16mm)	3 1/2" (89mm)
901B	5/8" (16mm)	3 1/4" (89mm)
901D	3/8" (10mm)	3" (76mm)



Annual Blowoff Cost Calculation Guide

Use these formulas to determine and compare the annual operating cost of your current blowoffs versus ITW Vortec alternatives.

Quick method:

Assuming:

- 100 PSIG operating pressure.
- \$.30 per 1000 SCF compressed air cost.
- 250 work days/year.

Calculate operating cost/shift by multiplying air consumption (SCFM) by 36.

Example:

9 SCFM (air consumption) x 36 = \$324 (annual operating cost/shift).

For other operating conditions, follow these calculations:

- ___ SCFM x 60 minutes = ___ SCFH
- ___ SCFH x ___ Hours of operation/day = ___ SCF/day.
- ___ SCF/day x ___ Days of operation/year = ___ SCF/year.
- ___ SCF/year x \$ ___ /1000 SCF = \$ ___ Annual operating cost.



APPLICATION

notes

Compressed air through open 1/4" copper tubes was the method being used by a wood slotwall manufacturer to clean each slot of excessive sawdust, until an OSHA inspection resulted in a noise violation. The company replaced the tubes with quiet #1201 Nozzles and saved \$10,800 in reduced air consumption.

After a die-punching step, an injection molder of plastic gas cans uses the powerful thrust of a #901D Transvector Jet to knock out the slug which creates the molded-in handle.

A company-wide conversion from open tube blowoffs to ITW Vortec Nozzles and Jets at the largest US producer of aluminum cans resulted in impressive compressed air savings. In one plant's aerosol can press department alone, annual savings of \$39,500 were achieved.

Styrofoam cups were being ejected from molds with continuous air from a blower motor until bearing replacements and ongoing maintenance proved too costly. The precise and instant airflow from #1201 Nozzles, set up in an on/off cycling, became the maintenance-free solution.

A Canadian facility machining aluminum extrusions reconfigured their automated lathe with #1204 Nozzles. The flexible hose mounting of the nozzles allowed them to easily reposition the blowoff to accommodate varying sizes of extrusions.

Air Nozzles and Jets



Whether the installation is for cooling, cleaning, drying or parts movement, there's an energy-saving Nozzle or Jet for your application. Various nozzle models come in low or high thrust versions with threaded or pre-mounted configurations. Nozzles mounted on copper tubing can be easily bent, and for adjustable positioning, our flexible hose mounted versions will maintain their position under full line pressure. Our nozzle Models #1200 and #1200SS have fully adjustable thrust performance and can be easily disassembled for cleaning if necessary. These threaded-end nozzles can be used in

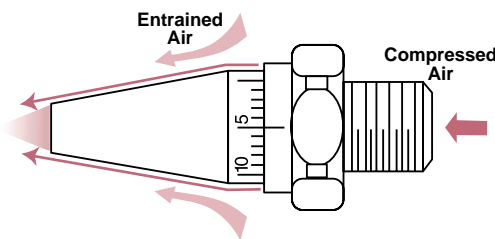
conjunction with a 12" positionable hose by specifying our #1204E Flexible Shaft Extension.

When the utmost air blowoff is needed, our largest nozzle, the Model #1220 Max Thrust, is a powerful cleaning and drying tool. While versatile for many uses, most popular applications involve the construction trades for clearing debris or moisture from large surfaces such as roofs and pavement.

Meet OSHA specifications for noise and dead-end pressure

ITW Vortec Nozzles and Jets will significantly reduce compressed air usage and noise, but even further steps can be taken to conserve energy. Many conventional blowoffs use too much air, and consequently create excessive noise. For best results, pressure regulators are recommended to adjust to the minimum necessary air required to do the job. A regulator will isolate the blowoff Nozzle or Jet performance from the typical fluctuations in plant air pressure, and allows optimum blowoff adjustment setting for variations in parts.

TECH notes



We incorporate the proven Transvector® amplification principle in our nozzle and jet designs. When compressed air enters the nozzle or jet, it fills a chamber with only one exit path - a .002" (.051mm) annular orifice. As air passes through this orifice, it accelerates to 1000 feet (304.8m) per second and entrains free surrounding air as it exits. The result is airflow volume up to 25 times more than the compressed air supplied.

Blowing at small targets with large air streams often wastes compressed air as well. Resulting blowby is useless and can be harmful when it is reflected backward carrying debris. Often, one large open tube jet can be replaced with a few small Nozzles or Jets. This set up takes full advantage of amplification and creates an opportunity to design an air spray pattern optimized to the shape of the target.

Our technical service personnel can provide additional suggestions and assist you with your project, from a single nozzle sizing request to designing a plant-wide, compressed air savings program.



Model 9401 Blow Gun

The design of our blow gun makes it comfortable to hold and includes a convenient hang-up hook. Model 9401 has a 1/4" NPT (F) inlet thread and a 1/8" NPT (F) outlet thread. Includes a Model 1200 Adjustable Nozzle.

Provides Ultra-Fine, Controlled Spray

ITW Vortec's Sprayvectors provide ultra-fine droplet sized sprays for evaporative cooling, moisturization, atomization and humidification. Superior to conventional hydraulic and piezoelectric nozzles, they produce defined spray patterns that can be widely diffused or directed. By use of compressed air, these liquid atomizing devices create micron and sub-micron sized spray droplets. This ultra-fine spray produces greater surface coverage than conventional nozzles. With more efficient use of liquid, Sprayvectors accelerate air-liquid interaction providing effective cooling, humidifying and dust control.



Sprayvectors introduce 2-20 PSIG (0.14-1.4 Bar) filtered liquids through a 1/4" NPT port. They can spray liquids with viscosities up to 1100 CPS for fogging and atomizing applications. Liquids with viscosities up to 100 CSP are suitable for humidifying. Large internal passages eliminate

APPLICATION

notes

An East Coast food processor utilizes #1713 Atomizing Sprayvectors to apply a liquid based preservative to frozen pizzas and other food products.

Model #1713 Atomizing Sprayvectors apply rust inhibitors to recently machined engine parts at a high volume engine rebuilding facility.

A fine woods furniture manufacturer installed #1707 Humidifying Sprayvectors in a storage room filled with valuable fine oak and walnut veneers. During winter months, the humidification saved thousands of dollars in lost materials by preventing the veneers from becoming brittle and cracked due to dry ambient air.

Manufacturers of air conditioners test the performance of their products at varying humidity levels by using #1707 Humidifying Sprayvectors mounted on a test stand.

A facility producing automobile bumpers found that a water mist from #1713 Atomizing Sprayvectors provided effective cooling to stop heat distortion of sheet steel as it emerged from a polishing operation.

Fogging Sprayvectors are used by a sheet rubber producer to apply a water-based release agent that allows the rubber to be rolled up without sticking to itself.

clogging. Precise adjustable flow rates of 6-30 GPH (22.7-113.6 LPH) can be controlled with a knob. External mixing of fluids and compressed air permits delivery of a dense, directable, high velocity spray by using Atomizing and Fogging Sprayvectors or a diffused low velocity spray using Humidifying Sprayvectors. Dry compressed air up to 100 PSIG (6.9 Bar) and airflows of only 12 SCFM (339.6 SLPM) atomize fluids to produce droplet sizes of 20-200 microns.

Sprayvectors can be used for:

- ◆ Sanitizing or Deodorizing
- ◆ Atomizing
- ◆ Moisturization
- ◆ Pressure Spray Cleaning
- ◆ Wetting
- ◆ Spray Application
- ◆ Dust Suppression
- ◆ Humidification
- ◆ Lubrication
- ◆ Mist Coating

Controlled, ultra-fine droplet size

Removable and interchangeable nozzle tips for easy cleaning or replacement

Wide viscosity range
1 to 1100 CPS

Delivers wide range of liquid flows

Precise adjustability and delivery

No clogging problems

No electricity

Quiet — inexpensive

Allows low pressure liquid supply (2-20 PSIG)

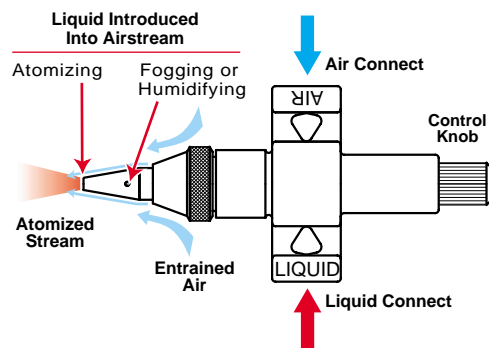
Sprayvectors



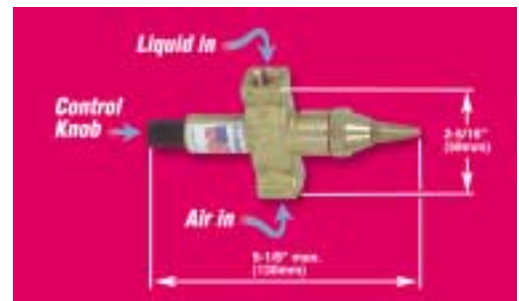
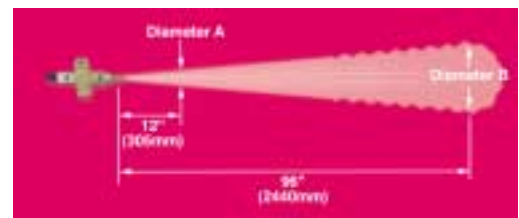
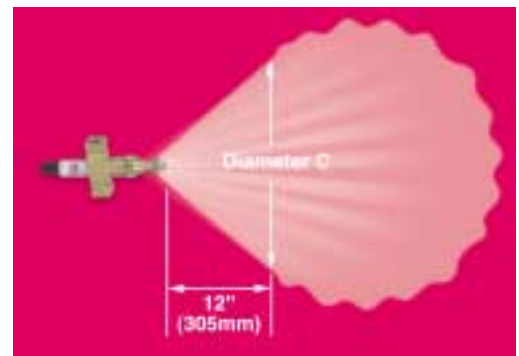
MODEL	PATTERN DIA.	WATER FLOW RATE (GPM)				
		.1	.2	.3	.4	.5
Fogging and Atomizing	A in. mm	5 127	5 127	5 127	5 127	5 127
	B in. mm	30 762	30 762	30 762	30 762	30 762
Humidifying	C in. mm	.10	.15	.20	.25	
		80 2030	48 1218	44 1117	30 761	

MODEL NO.	SPRAY PATTERN	DROPLET SIZE	SUGGESTED APPLICATIONS
1703	Fogging	20-60 microns	Moisturizing, coating, evaporative cooling, dust suppression
1713	Atomizing	60-200 microns	Washing, applying lubrication
1707	Humidifying	20-200 microns	Mist coating, moisturizing, evaporative cooling, spray drying

TECH notes



The Transvector® amplification principle of our nozzle design is the basis for the Sprayvector's effective atomizing capability. Sprayvectors atomize liquids externally when a small amount of liquid is discharged into a stream of amplified compressed air moving at sonic velocity. Liquid is sheared by this high speed airstream into fine droplets as entrainment of large volumes of additional surrounding air occurs. The precise and powerful airflow results in a dense and very controllable spray of micron and sub-micron sized droplets.



Curtain Transvectors

Air Knives Deliver Flat Sheet of Amplified Air

ITW Vortec Curtain Transvector® Air Knives efficiently blowoff wide surfaces of debris as well as provide high speed drying or cooling for a broad range of industrial applications. Ionizing Curtain Transvectors® add a Static Neutralizing Bar to kill static cling and discharge dust and particles for blowoff.



Since Curtain Transvectors® are air amplifiers, they use a small amount of compressed air to deliver a powerful, high velocity, laminar sheet of air over wide areas such as moving webs, film, sheets, strips, auto bodies and other large assemblies and objects. Our patented design produces increased thrust and velocity, reduced noise, excellent uniformity, and significantly outperforms any competing, wide blowoff device. Stainless steel models are ideal for food, pharmaceutical, chemical and other applications where purity, high temperatures or corrosive environments are concerned.

More Compact and Affordable Than Electric Blowers

APPLICATION

notes

On an automated fabric cutting machine, a problem-prone, retracting clamp bar was replaced with two #921-24 Curtain Transvectors. The maintenance free air knives hold the fabric in position for slitting and blow away any loose threads.

After testing many different products, a sheet metal fabrication plant stamping oil pans for automobile engines determined that a #921-18 Curtain Transvector was ideal for replacing their inefficient, drilled-pipe blowoff. The patented air knife did a superior job of stripping moisture and debris from the pans, while reducing air consumption.

A German packaging company increased production rates of their label printing equipment by 34% when a #921-12 Curtain Transvector was installed to speed ink drying.

Cooling parts emerging from a powder coating oven had been the problem for a metal finishing firm until they mounted #921-24 Curtain Transvectors on each side of the product to quickly dissipate the heat.

Curtain Transvectors®, as well as the Ionizing versions, have numerous and diverse processing, finishing, fabrication, assembly, and other industrial uses for cooling, drying, cleaning or static removal on wide surfaces, including:

- ◆ Food processing
- ◆ Shrink wrapping
- ◆ Clean room procedures
- ◆ Form and fill
- ◆ Films and plastics
- ◆ Textiles
- ◆ Printing and labeling
- ◆ Converting and packaging
- ◆ Woodworking and laminates
- ◆ Paint preparation and drying
- ◆ Sheet and web materials
- ◆ Conveying or hold down

High performance patented design

Fraction of the cost of fans and blowers

No guards or rotating machinery

Instant on/off — output air easily regulated

Compact and easily mounted

No moving parts — maintenance free

Quiet — meets OSHA noise specifications



Curtain Transveectors

Curtain Transvector Models:

OAL – Overall Length

EFFECTIVE LENGTH	ALUMINUM		STAINLESS STEEL			IONIZING		
	MODEL	OAL (mm)	MODEL	OAL (mm)	MODEL	OAL (mm)	MODEL	OAL (mm)
3"	921-3	3 11/32" (85)	-	-	-	-	-	-
6"	921-6	6 11/32" (161)	921SS	6 3/16" (157)	981-6	7" (178)		
12"	921-12	12 11/32" (313)	922SS	12 3/16" (310)	981-12	13" (330)		
18"	921-18	18 11/32" (466)	924SS	18 3/16" (462)	981-18	19" (483)		
24"	921-24	24 11/32" (618)	923SS	24 3/16" (614)	981-24	25" (635)		

Curtain Transvector/Ionizing Curtain Transvector Performance Specifications

PRESSURE PSIG	AIR CONSUMPTION (SCFM)					VELOCITY AT DISTANCE FROM OUTLET (FT./MIN.)			THRUST* PER IN. OZ.
	3"	6"	12"	18"	24"	2"	6"	12"	
30	6	11	23	34	45	12,500	5,100	3,700	1.2
40	7	14	29	43	58	14,400	7,100	4,600	1.7
50	9	17	35	52	70	16,200	8,400	5,800	2.3
60	10	20	40	60	80	17,000	9,900	6,700	2.8
70	12	23	46	69	92	17,800	10,600	7,600	3.4
80	13	26	52	78	104	18,600	12,200	8,400	3.9
90	14	29	57	86	114	19,400	13,200	9,200	4.4
100	16	32	64	95	127	20,200	14,200	10,000	4.9

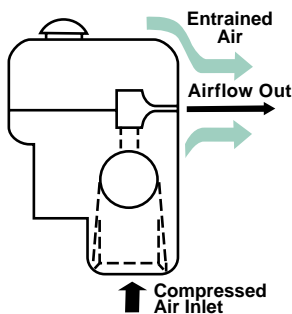
* At 12" from Curtain Transvector outlet (e.g. a 12" Curtain Transvector at 50 PSIG will produce $2.3 \times 12 = 27.6$ oz. of thrust.)

PRESSURE BAR	AIR CONSUMPTION (SLFM)					VELOCITY AT DISTANCE FROM OUTLET (M/S)			THRUST* PER CM. (G)
	7.6CM	15CM	31CM	46CM	61CM	5CM	15CM	31CM	
2.1	162	323	642	965	1285	64	26	19	14
2.8	204	408	815	1223	1630	73	36	23	19
3.5	246	492	985	1477	1970	82	43	29	25
4.1	284	569	1138	1707	2275	86	50	34	31
4.8	325	651	1302	1953	2604	90	54	39	38
5.5	368	736	1472	2207	2943	94	62	43	44
6.2	404	807	1613	2420	3226	99	67	47	49
6.9	450	900	1800	2700	3600	103	72	51	55

* At 30" from Curtain Transvector outlet.



TECH notes



The Curtain Transveectors' amplification uses an impulse principle to accelerate a large mass of stationary air with a thin sheet of sonic-velocity compressed air. When compressed air enters the Transvector, it fills a plenum which has only one exit path - a linear .002" gap running the length of the curtain. As the air is forced out of the orifice, it accelerates and collides with surrounding air entraining a great volume of free, ambient air. The result is an air knife that delivers a large volume of output air in return for a small amount of compressed air.



Round Transvectors

Air Amplifiers for Vacuum, Blowoff, Cooling or Conveying



Round Transvectors® use a small amount of filtered compressed air to deliver a large airflow for a wide range of conveying, ventilation, drying and cooling applications.

The high-flow, bladeless blowers don't require machine guards and are especially useful for removing metal chips and scrap, ventilating fumes or smoke, and conveying small parts, pellets, powders and dust.

As a vacuum or blowoff device, these air amplifiers are more compact and less expensive than variable-speed blowers and fans, provide instant on/off performance, and operate at low noise levels to meet OSHA requirements. Round Transvectors® are easily mounted and, with no moving parts to wear out or break, are virtually maintenance-free. Used in ducted and unducted applications, Round Transvectors® are available in several sizes, in both aluminum and stainless steel, and can deliver flow rates from 32 to 2300 SCFM.

Instant on/off — no moving parts

Airflow and output easily adjusted

No guards or safety hazards

Quiet — meets OSHA noise requirements

Easily mounted, ducted and moved

Outperforms venturis and ejectors

No electricity, explosion hazard or RF interference

APPLICATION

notes

When the vacuum from an electric motor blower proved ineffective, a label manufacturer opted for the strong suction of a #904 Round Transvector to pull away paper trim scrap from a die cutting operation.

A facility producing plastic body side moldings for the automotive industry increased production by installing two #903 Transvector air amplifiers - one to remove moisture after a water bath, and the second to pull away edge trim for recycling.

Each welding station at a wrought iron furniture assembly plant is equipped with #904 Transvectors to ventilate smoke and fumes.

One of the leading pharmaceutical companies uses #902XSS Stainless Steel Transvectors to weigh sort drug capsules after filling. The precise suction lifts away only those capsules that failed the filling process, while the heavier, filled pieces move on to packaging.

CNC routers at a New England kitchen cabinet company have #903 Transvectors mounted near the router bit to vacuum sawdust and directly convey it to a reclamation container.

Transvectors wide range of applications include:

- ◆ Convey any material that can be moved in an airflow including grain, plastic pellets, sawdust, powder, capsules, metal chips, paper and cloth trim, lint, dust, small parts, stamping scrap and lead shot.
- ◆ Ventilate and exhaust welding, soldering and machine smoke, auto exhaust, plating tank fumes and other gases.
- ◆ Cool, clean or dry molded parts, castings, food products, etc.
- ◆ Weigh sort pharmaceuticals and other light materials.



Round Transvectors

Performance Specifications

MODEL NO.	AIR CONSUMPTION				AMPLIFICATION	DUCTED OUTPUT
	80 PSIG (5.5 BAR) (SCFM)	(SLPM)	100 PSIG (6.9 BAR) (SCFM)	(SLPM)		
901B	7	192	8	235	4:1	32 SCFM (906 SLPM)
901XSS	8	212	9	255	5:1	45 SCFM (1358 SLPM)
902/902XSS	15	411	17	482	12:1	204 SCFM (5773 SLPM)
903/903XSS	21	583	25	708	19:1	475 SCFM (13443 SLPM)
904	58	1633	71	2012	20:1	1420 SCFM (40186 SLPM)
905	107	3028	117	3311	20:1	2340 SCFM (66222 SLPM)

All flows are at the standard factory setting. Flows are adjustable on the stainless models via rotation of the outlet "barrel". Flows are adjustable on the other models via shim substitution. Reducer adapters available for inline configuration.

Transvector Dimensions

MODEL NO.	THROAT DIAMETER MIN I.D.	SUCTION END DIAMETER	OUTLET DIAMETER O.D.	COMPRESSED AIR INLET PORT
901B	0.40"	0.75"	0.75"	1/8"
	10mm	19mm	19mm	NPTM
902	0.79"	1.75"	1.25"	1/4"
	20mm	44mm	32mm	NPTF
903	1.57"	2.75"	2.00"	3/8"
	40mm	70mm	51mm	NPTF
904	3.00"	5.00"	4.00"	1/2"
	76mm	127mm	102mm	NPTF
905	5.00"	7.00"	8.00"	3/4"
	127mm	178mm	203mm	NPTF

Transvector models are aluminum, except the 901B is brass construction.

Stainless Steel Transvector Dimensions

MODEL NO.	THROAT DIAMETER MIN I.D.	SUCTION END DIAMETER	OUTLET DIAMETER O.D.	COMPRESSED AIR INLET PORT
901XSS	0.39"	1.00"	0.79"	1/8"
	10mm	25.4mm	20mm	NPTF
902XSS	0.79"	1.50"	1.18"	1/4"
	20mm	38mm	30mm	NPTF
903XSS	1.57"	2.50"	1.97"	3/8"
	40mm	63.5mm	50mm	NPTF

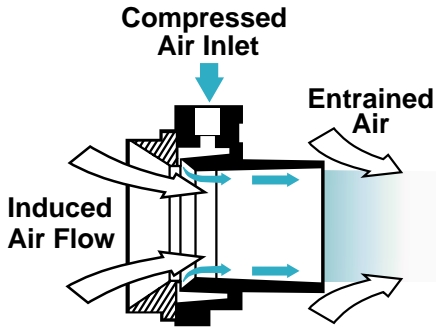
Significantly smaller and less expensive than variable-speed blowers or fans

In ducted applications, Round Transvectors can be used to transport metal chips and shavings, sawdust, powders, grains, small parts, and almost any material that can be conveyed in a flow of air. Simply calculate the total flow you will require and specify a model that will meet that requirement. A pressure regulator can be used to control the flow rate of material, or shims of various thicknesses are available to also modify air flows.



Round Transvectors

TECH notes



Transvectors use the impulse principle to achieve amplified airflows. When compressed air enters the Transvector, it fills a chamber that has only one exit path – a 0.002" (0.051mm) annular orifice. As the air is forced out of the orifice, it accelerates and collides with surrounding air entraining a great volume of free, ambient air. The result is a large volume of output air in return for a small amount of compressed air.

Stainless steel models are ideal for applications where purity, corrosion, abrasion or heat is a concern.

Stainless steel versions are fully adjustable simply by rotating the barrel of the outlet. A shoulder on each end of the Transvector will allow for mounting and clamping hose or tubing. For inline configurations, the following reducing adapters can be ordered:

Model No.	Inline Mounting Adaptors
996	Reducer for Model #902 (Aluminum Body) 1 3/4" x 1.25"
997	Reducer for Model #903 (Aluminum Body) 2 3/4" x 2.00"



As a ventilating device, Round Transvectors are highly effective in drawing off welding and machining smoke, engine exhaust and other pollutants, as well as purging tanks and confined spaces of explosive or toxic fumes.

More Compact and Less Expensive than Variable Speed Blowers or Fans

In unducted applications, Transvectors deliver amplification ratios of 60:1, creating a powerful and concentrated flow of air for cooling or drying from a relatively small account of compressed air. Unlike motor-driven fans and blowers, Transvectors have instant on/off cycling capability for equipment and applications requiring intermittent vacuum, blowoff or conveying.



Hand-E-Vac

Easy-to-use vacuum or blowgun for fast, effective clean up.



The Hand-E-Vac is a powerful, hand-held vacuum gun that's lightweight and durable. Its internal air amplifier converts the supplied compressed air into a strong suction that is regulated by an ergonomic trigger. Dust, chips and debris can be ducted directly to a drum, recycling container, or to an optional collection bag. In seconds, the Hand-E-Vac converts to a blowgun by reversing the nozzle insert. Made of strong, impact-resistant nylon, the Hand-E-Vac's internal amplifier has no moving parts to break or wear out. Optional tools and accessories extend the Hand-E-Vac's adaptability to countless applications.

Fast and efficient clean up for a wide variety of materials

- ◆ Metal Chips
- ◆ Small Parts
- ◆ Lint
- ◆ Rubber and Plastic Trim
- ◆ Sawdust
- ◆ Cloth Scrap
- ◆ Powders
- ◆ Glass
- ◆ Dust
- ◆ Plastic Media

INLET (PSI)	AIR CONSUMPTION (SCFM)	VACUUM INCHES OF MERCURY	TOTAL FLOW (CFM)	OUNCES OF THRUST (AT 12")
40	11.5	1.2	80.5	12.0
60	15.7	2.0	110.0	18.6
80	20.0	2.8	140.0	26.0
100	22.2	3.5	155.4	33.0



APPLICATION

notes

On an automated assembly line, a continuously running, electric shop vacuum was used to clear metal shavings that occasionally accumulated in the corners of a stamped metal frame. Operators now use the instant on/off vacuuming capability of a Hand-E-Vac for the job.

An electronics company in California uses Hand-E-Vac's in their packaging department to convey small Styrofoam pellets into shipping cartons around delicate components.

All 17 machining cells at a plastics fabrication facility have Hand-E-Vac's which are ducted to adjacent recycling drums. While recycling efficiency was their objective, the company also realized an 11 man-hours/week saving in plant maintenance labor.

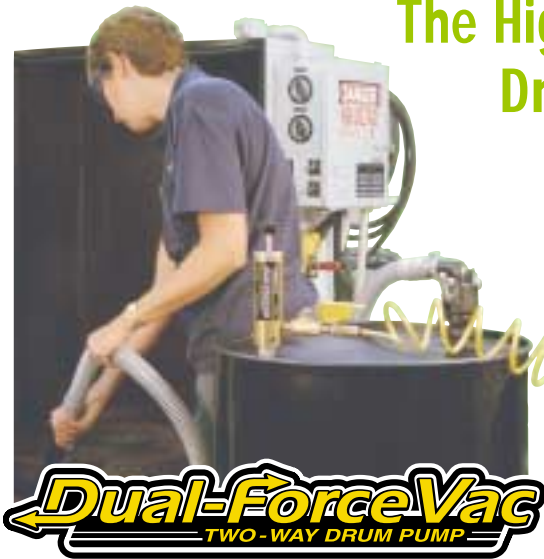
Working with large wood panels, a furniture manufacturer improved their assembly procedures by using a Hand-E-Vac DH to thoroughly vacuum sawdust out of drilled holes before inserting wooden dowels.

Being able to regulate vacuum with the ease of a trigger was the reason workers applying paint to assemblies chose the Hand-E-Vac. The gun allowed them to control their pre-paint cleaning, reducing suction in some areas to prevent pulling off masking materials.

Dual-Force Vac

The Highest Quality Dual Mode Drum Pump Available

There's a number of drum pumps on the market that will simply empty fluids from a 55 gallon drum. But if you're looking for the convenience and versatility of a dual-mode drum pump, the Dual-Force Vac is the powerful and affordable equipment for liquid material handling and spill clean-up.



Automatic safety shutoff valve prevents overflows

Relief valve limits internal drum pressure to 8 PSIG

Installs on 55 gallon drum in less than a minute

Virtually no maintenance — quiet operation

Resistant to most non-volatile, non-flammable liquids

Optional wand and squeegee kit handles large floor spills

Closed head drum not included

ITW Vortec has introduced the new Dual-Force Vac – a powerful yet economical two-way drum pump. Its all new, patented design offers many unique features. The quiet and safe operation of this air-powered drum pump means no motor burn out and no shock hazard. The Dual-Force Vac is truly a versatile, plant maintenance cleaning tool for fast, pump-in/pump-out handling of:

APPLICATION

notes

After literally four motor burnouts in less than a year, a Pennsylvania machine shop purchased a Dual-Force Vac to replace the electric vacuum used for clean out of parts washers. In the pump mode, they now directly transfer the liquid waste into 55 gallon drums for disposal.

A company supplying industrial cleaning fluids uses Dual-Force Vacs for product delivery, and remarked that, if they dispense too much product in the customer's tank, they simply vacuum it back.

Faced with frequent floor spills, a facility processing lubricants told us that their Dual-Force Vac paid for itself in less than a month from their savings in absorbents and disposal costs.

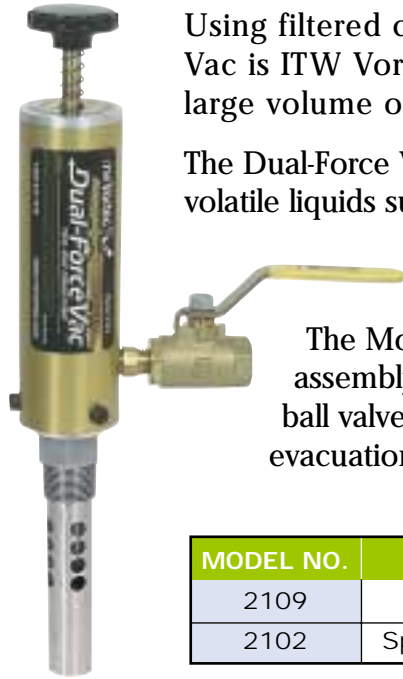
Dual-Force Vacs are widely used to thoroughly clean machine sumps because of its fast vacuuming of both chips and coolant.

An East Coast firm providing industrial wastewater and water pollution control consulting services recommends ITW Vortec Dual-Force Vacs to their clients as an affordable means of liquid transfer.

- ◆ Coolant sumps, even with chips and swarf
- ◆ Sludge and waste water from parts washers
- ◆ Solvents
- ◆ Hydraulic Oil
- ◆ Liquid Transfers
- ◆ Tramp Oil
- ◆ Liquid spills
- ◆ And much more



Dual-Force Vac



Using filtered compressed air, the heart of the Dual-Force Vac is ITW Vortec's Transvector air amplifier, which moves a large volume of air using a lesser amount of compressed air.

The Dual-Force Vac is not intended for use with flammable or volatile liquids such as gasoline, alcohol, kerosene, aviation fuel, mineral spirits or any materials that have a low flash point.

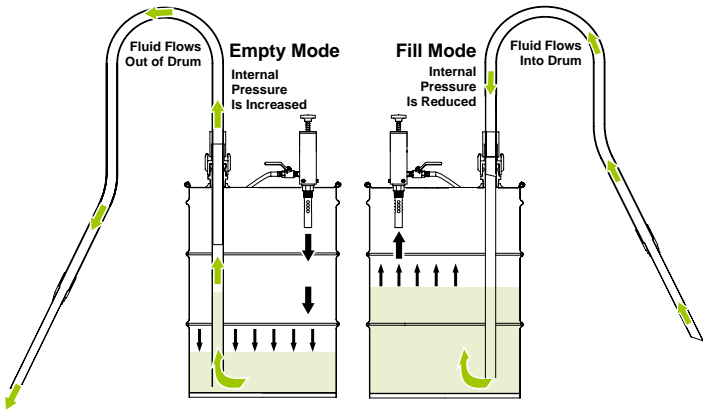
The Model #2109 Dual-Force Vac includes: pump body assembly w/overflow preventer & pressure relief valve, ball valve with 1/4" NPT (F), hose drum connection, drum evacuation tube, hose (1 1/4" x 10' long), extension wand.

MODEL NO.	DESCRIPTION
2109	Dual-Force Vac, Two-Way Drum Pump
2102	Spill Pick Up Kit, Includes aluminum wand and squeegee

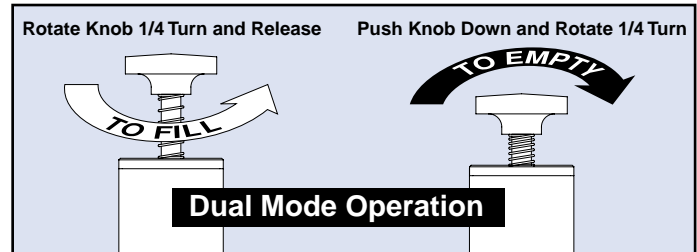
AIR SUPPLY PRESSURE PSIG (BAR)	AIR CONSUMPTION SCFM (SLPM)	VACUUM IN. OF MERCURY (kPA)	FILL RATE GPM (LPM)	EMPTY RATE GPM (LPM)
50 (3.5)	15 (425)	6.7 (22.7)	29.5 (112)	36.7 (139)
100 (6.9)	23 (651)	9.5 (32.2)	33 (125)	33 (125)

Note: Not recommended to operate at less than 50 PSIG. Flow rates based on a liquid viscosity of 0.8 cps.

TECH notes



A powerful Transvector air amplifier delivers the two-way pumping strength of a Dual-Force Vac. (See Round Transvectors for more detail) In a vacuum mode, the suction side of the Transvector is used to create a vacuum inside the drum, drawing the liquid in through the hose. Air from the output side of the amplifier exits out the pump assembly in a safe, downward direction. Depressing and locking the knob for the pump-out mode changes the direction of the airflow to create pressure inside the drum. The downward regulated pressure on the surface of the liquid forces the liquid out the hose.



The Dual-Force Vac delivers fast, reliable operation, backed by a two year warranty

The Dual-Force Vac quickly installs on a UN/1A1/X1.8/300 rated, closed head 55 gallon drum. The drum should be in good condition free of dents or rust.

The Dual-Force Vac is ideal for large floor spill pick-ups. Order model #2102 accessory kit. Kit includes aluminum wand and squeegee spill pick up tool.

Perfect for machine sumps, parts washers, floor spills and versatile liquid transfers



For Europe:

POB 71, 7240 AB Lochem the Netherlands

Phone: +31 (0)573 288381

Website: www.vortec.nl

E-mail: info@vortec.nl