

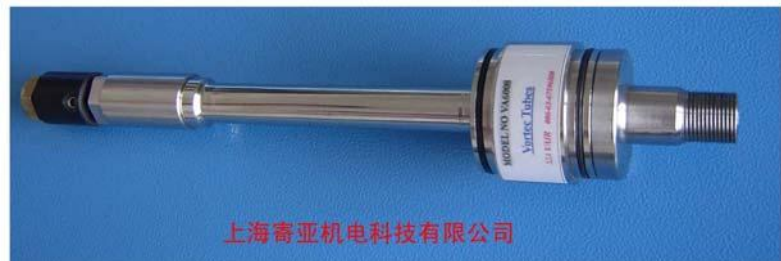
VAIR™ Vortex Tube

With no moving parts, a VAIR vortex tube spins compressed air to separate the air into -40°C cold air streams and $+110^{\circ}\text{C}$ hot air streams. Vortex tubes are an effective, low cost solution to a wide variety of industrial spot, assembly lines and process cooling needs.

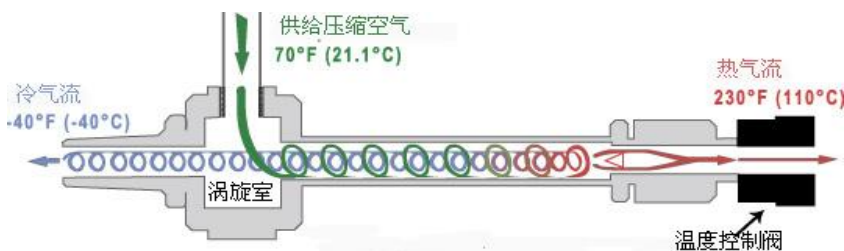
What is Vortex Tubes?

Vortex tube is a tool that can take normal compressed air and convert into two air

streams. One stream is hot air and the other stream is cold air. The cold air can be adjusted down to -50 degrees Fahrenheit, and the hot side can be adjusted up to a temperature of 250 degrees Fahrenheit. Vortex Tubes have an adjustable valve at the "hot" end controls the volume of the air flow, and the temperature exiting at the cold end. By adjusting the valve, you control the "cold fraction" which is the percentage of total input compressed air the exits the cold end of the vortex tube



How a Vortex Tube Works ?



A Vortex Tube creates cold air and hot air by forcing compressed air.

Compressed air, typically at 80 to 100 Psig (5.5 - 6.9

BAR), is injected into the vortex tube at extremely high speeds and that creates a spin chamber. At up to 1,000,000 RPM, this air stream revolves toward the hot end where some escapes through the control valve. The remaining air, still spinning, is forced back through the center of this outer vortex. The inner stream gives off kinetic energy in the form of heat to the outer stream and exits the vortex tube as cold air. The outer stream exits the opposite end as hot air. The air flow and temperature are totally controllable. And since there are no moving parts there is little need for maintenance.

Setting Flow and Temperature in Vortex Tubes

Adjusting the slotted valve at the hot air outlet sets the flow rate and temperature at the cold end. The more air let out at the hot end reduces the cold air flowing and the cold air temperature at the cold end. Close the valve at the hot end and you increase the cold air flow at the cold end as well as the air temperature at the cold end. The percentage of total input air to the vortex tube that is directed to the cold end is the "cold fraction". A cold fraction of 60% to 80% produces the optimum refrigeration.

Most industrial applications, such as electrical control panel cooling, parts cooling, and tool cooling require maximum refrigeration and utilize the Maximum Cooling series vortex tubes. Applications which require extreme cold temperatures such as lab sample cooling, circuit board testing, would utilize the Maximum Cold Temperature series vortex tubes.

Compressed Air pressure	Cold fraction%						
	Temperature drop of cold air, °C in blue				Temperature rise of hot air, °C in red		
BAR(PSIG)	20%	30%	40%	50%	60%	70%	80%
1.4(20)	34°C	33°C	31°C	28°C	24°C	20°C	16°C
	8°C	14°C	20 °C	28°C	36°C	46°C	59°C
2.8(40)	48°C	46°C	42°C	39°C	34°C	28°C	20°C
	11°C	18°C	28°C	38°C	50°C	62°C	80°C
4.2(60)	57°C	55°C	51°C	46°C	40°C	33°C	25°C
	12°C	22°C	33°C	44°C	57°C	74°C	91°C
5.5(80)	63°C	62°C	56°C	51°C	45°C	36°C	28°C
	13°C	24°C	35°C	47°C	63°C	80°C	100°C
6.9(100)	68°C	65°C	62°C	55°C	48°C	39°C	30°C
	14°C	25°C	37°C	50°C	66°C	84°C	106°C
8.4(120)	72°C	69°C	64°C	58°C	50°C	41°C	31°C
	14°C	26°C	38°C	52°C	68°C	86°C	108°C

The above table is for the (15 SCFM) Medium sized vortex tubes. The performance can significantly change for higher flow designs. With that said, it's not generally important to get such "low" temperatures and in most application the Vortex Tube is "preset" to produce a specific temperature drop.

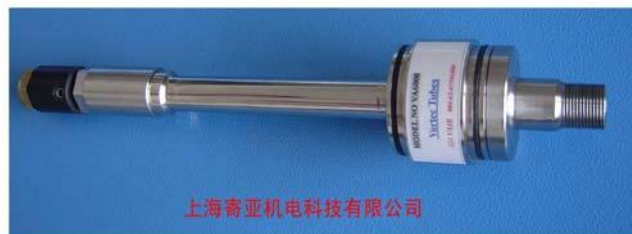
Vortex Tubes Specifications

size	model	Inlet Pressure		Air Consumption		Capacity		
		Psi	Bar	CFM	LPM	BTU/H	Kcal/H	H
mini	VC60001	100	6.9	1.5	43	90	24	27
mini	VC60002	100	6.9	2	57	120	31	36
small	VC62004	100	6.9	4	113	240	61	71
	VC60004							
	VC61004							
small	VC62006	100	6.9	6	170	360	91	106
	VC60006							
	VC61006							
small	VC62008	100	6.9	8	227	480	121	141
	VC60008							
	VC61008							
medium	VC60010	100	6.9	10	280	600	151	176
	VC61010							
	VC62010							
medium	VC60015	100	6.9	15	420	910	230	267
	VC61015							
	VC62015							
medium	VC60025	100	6.9	25	700	1510	380	442
	VC61015							
	VC62015							
medium	VC60035	100	6.9	35	990	2400	600	700
	VC61035							
	VC62035							
large	VC60050	100	6.9	50	1400	3020	760	884
large	VC60070	100	6.9	70	1980	4800	1200	1400
large	VC60099	100	6.9	100	2800	6000	1510	1760

Medium Vortex Tube

(Cold end no Muffler, Hot end with Muffler)

VC60010 , VC60015 , VC60025 , VC60035



MODEL	style	Hot end Muffler	Cold end Muffler	Inlet Pressure		Air Consumption		Capacity	
				Psi/Bar		scfm	slpm	BTU/H	Kcal/H
VC60010	-M/C	Yes	No	100/6.9		10	283	600	151
VC60015	-M/C	Yes	No	100/6.9		15	425	910	230
VC60025	-M/C	Yes	No	100/6.9		25	710	1510	380
VC60035	-M/C	Yes	No	100/6.9		35	991	2400	600

Medium Vortex Tube

(Both Cold end and Hot end with Muffler)

VC61010 , VC61015 , VC61025 , VC61035



MODEL	style	Hot end Muffler	Cold end Muffler	Inlet Pressure		Air Consumption		Capacity	
				Psi/Bar		scfm	slpm	BTU/H	Kcal/H
VC61010	-M/C	Yes	Yes	100/6.9		10	283	600	151
VC61015	-M/C	Yes	Yes	100/6.9		15	425	910	230
VC61025	-M/C	Yes	Yes	100/6.9		25	710	1510	380
VC61035	-M/C	Yes	Yes	100/6.9		35	991	2400	600

Medium Vortex Tube

(Both Cold end and Hot end without Muffler)

VC62010 , VC62015 , VC62025 , VC62035



MODEL	style	Hot end Muffler	Cold end Muffler	Inlet Pressure		Air Consumption		Capacity	
				Psi/Bar		scfm	slpm	BTU/H	Kcal/H
VC62010	-M/C	No	No	100/6.9		10	283	600	151
VC62015	-M/C	No	No	100/6.9		15	425	910	230
VC62025	-M/C	No	No	100/6.9		25	710	1510	380
VC62035	-M/C	No	No	100/6.9		35	991	2400	600

Small Vortex Tube (Both Cold end and Hot end without Muffler) VC62004 , VC62006 , VC62008

-A style

-B style



MODEL	style	Hot end Muffler	Cold end Muffler	Inlet Pressure		Air Consumption		Capacity	
				Psi/Bar		scfm	slpm	BTU/H	Kcal/H
VC62004	-M/C	No	No	100/6.9		4	113	240	61
VC62006	-M/C	No	No	100/6.9		6	170	360	91
VC62008	-M/C	No	No	100/6.9		8	227	480	121

Small Vortex Tube

(Both Cold end and Hot end with Muffler)

VC61004 , VC61006 , VC61008



MODEL	style	Hot end Muffler	Cold end Muffler	Inlet Pressure		Air Consumption		Capacity	
				Psi/Bar		scfm	slpm	BTU/H	Kcal/H
VC61004	-M/C	Yes	Yes	100/6.9		4	113	240	61
VC61006	-M/C	Yes	Yes	100/6.9		6	170	360	91
VC61008	-M/C	Yes	Yes	100/6.9		8	227	480	121

Small Vortex Tube

(Cold end no Muffler, Hot end with Muffler)

VC60004 , VC60006 , VC60008



MODEL	style	Hot end Muffler	Cold end Muffler	Inlet Pressure		Air Consumption		Capacity	
				Psi/Bar		scfm	slpm	BTU/H	Kcal/H
VC60004	-M/C	Yes	No	100/6.9		4	113	240	61
VC60006	-M/C	Yes	No	100/6.9		6	170	360	91
VC60008	-M/C	Yes	No	100/6.9		8	227	480	121

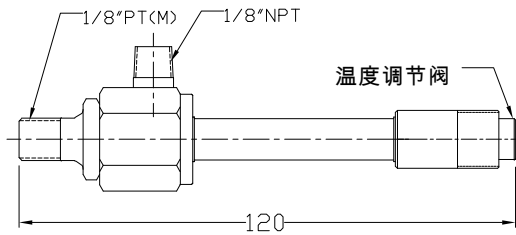
-M: These Vortex Tubes optimize airflow and temperature drop to produce maximum cooling power

-C: These Vortex Tubes provide the lowest cold air temperatures, but at a low cold airflow

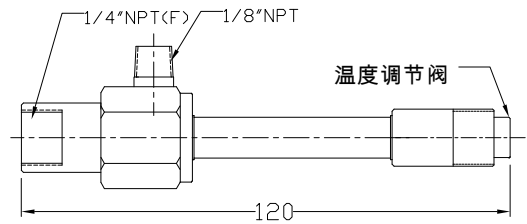
Vortex Tube Size

VC62004 , VC62006 , VC62008 small vortex tube

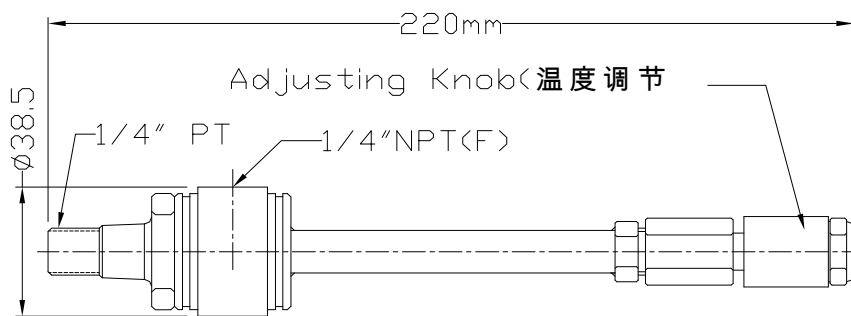
-A Style



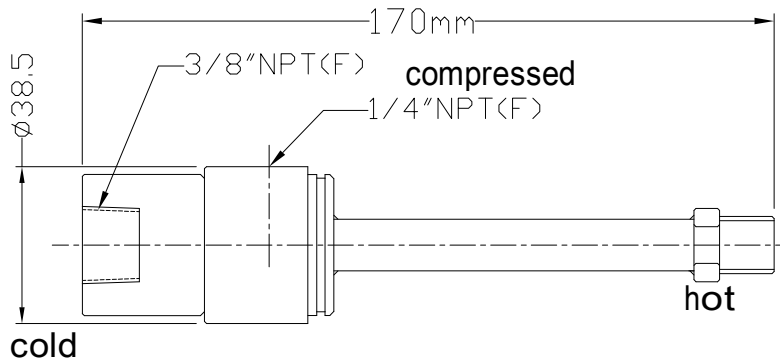
-B Style



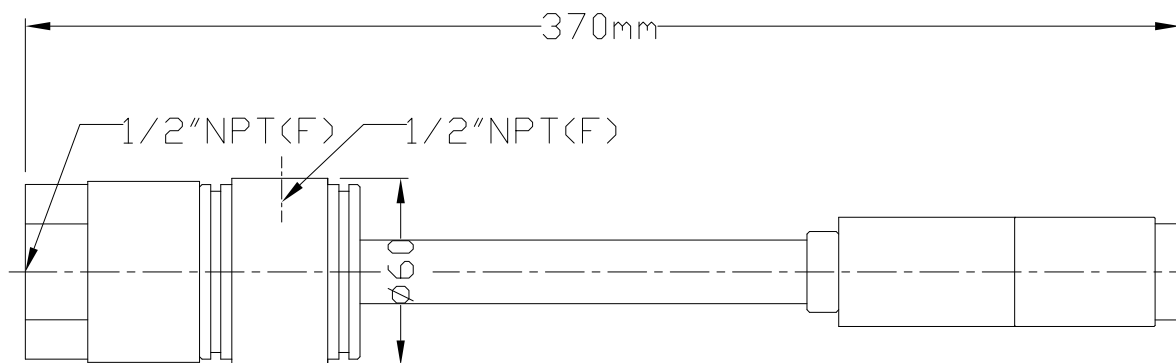
VC60010 , VC60015 , VC60025 , VC60035 medium vortex tube



VC62010 , VC62015 , VC62025 , VC62035 medium vortex tube



VC60050 , VC60070, VC60099 large vortex tube



Vortex Tubes Features & Advantages

- * No moving parts, reliable, maintenance free, lightweight, Low cost application
- * Up to 6000 Btu/H (1510 Kcal/H) refrigeration
- * Air flow rates up 1 to 100 SCFM (2800 SLPM)
- * Temperatures from -50 °F (-40°C) to +250 °F (+110°C)
- * use compressed air for spot cooling- no electricity or refrigerants are required
- * No spark or explosion hazard, RF/EMI interference
- * Instant on/off, easy to control, cools without waste
- * No residue to clean up, no part washing needed
- * Reliable, maintenance-free, durable stainless steel construction

Vortex Tubes Applications:

- * Cool manufacturing processes: Machining plastics or metals, woodworking, soldering, adhesive application, heat sealing, sewing needles, mold tooling and many others
- * In the laboratory, cool and dehumidify gas samples, cool environmental chambers
- * Temperature cycle electronic and electrical controls, instruments, switches, thermostats
- * Air condition electronic control enclosures: CNC cabinets, industrial PCs, PLCs, motor controls, CCTV cameras
- * Generate hot air to +250°F (+110°C), without a spark or explosion hazard to soften plastic, melt adhesives, seal packaging Cool workers wearing protective gear, soldered parts

