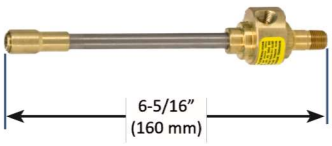
Sub-Zero Spot Cooling from Compressed Air

Vortex Tubes are an effective, low cost solution to a wide variety of industrial spot and process cooling applications. With no moving parts, a vortex tube spins compressed air to seperate the air into hot and cold air streams.

While French physicist Georges Ranque is credited with inventing the Vortex Tube in 1930, Vortec was the first company to develop and apply this phenomenon into pratctical and effective cooling solutions for industrial use.

Vortex Tubes have a wide range of applications for spot and process cooling on industrial machines, assembly and other manufacturing equipment.

Model 106



Model 208

Model 208 HSS

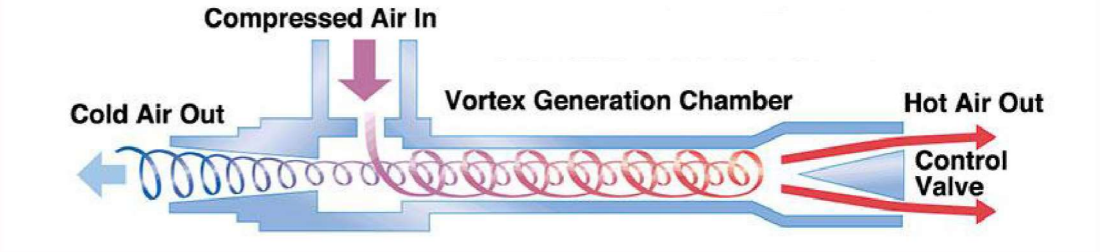
Model 308

Model 328

Model Number	Material of Construction	Air Consumption		Cooling Capacity	
		SCFM	SLPM	BTU / Hr	kCal / Hr
106-2-H	Stainless Steel and Brass	2	57	100	25
106-4-H	Stainless Steel and Brass	4	113	200	50
106-8-H	Stainless Steel and Brass	8	226	400	101
208-11-H	Aluminum	11	311	640	161
208-15-H	Aluminum	15	425	900	227
208-25-H	Aluminum	25	708	1500	378
208-11-HSS	Stainless Steel	11	311	640	161
208-15-HSS	Stainless Steel	15	425	900	227
208-25-HSS	Stainless Steel	25	708	1500	378
308-35-H	Aluminum	35	991	2650	668
358-50-H	Aluminum	50	1415	3000	756
328-75-H	Aluminum	75	2123	4500	1134
328-100-H	Aluminum	100	2830	6000	1512

VORTEC
Innovative Compressed Air Products

How it Works



A Vortex Tube spins compressed air to produce hot and cold air streams, generating temperatures down to 100° F below inlet temperature.

Fluid (air) that rotates around an axis (like a tornado) is called a vortex. A Vortex Tube creates cold 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 vortex generation chamber toward the control valve. A percentage of 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 back through the generation chamber. The chilled air continued back through the generation chamber finally exiting through the opposite end as extremely cold air. Vortex Tubes generate temperatures down to 100 F° below inlet air temperatures. The control valve, located in the hot exhaust end of the tube, can be used to adjust the temperature drop and rise for all Vortex Tubes. (See Cold Fraction chart below).

Cold Fraction

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

- Numbers on White Bar = Temperature Drop
- Numbers on Blue Bar = Temperature Rise

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	29	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	119	64	104	58	91	50	74	41	55	31	34	19
	13	8	27	14	46	26	69	38	84	52	123	68	156	87	195	108	257	142
140 / 9.7	139	78	135	75	129	72	127	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: -25°F / -32°C
- Compressed Air Pressure: 100 psig (6.9 bar)
- Backpressure: Temperature drops and rises in the chart are based on zero (0) backpressure on the hot and cold outlets of the vortex tube. Backpressure exceeding 5 psig (0.3 bar) will reduce the performance of the vortex tube.

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