UNIVERSAL VORTEX, INC, *A Thermal Solution. . .*
410 Princeton Hightstown Road, Princeton Junction, NJ · 08555 USA
PHONE (609) 586-3702 · FAX (609) 586-0002· www.universal-vortex.com

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Pilot Gas temperature increment in the Vortex Pilot Gas Heater

The pilot gas temperature increase in the VPGH is a result of heat transfer from the heat generating part of the VPGH.
The heat generated in the VPGH is, roughly, proportional to the unit inlet to outlet pressure ratio, which is a ratio of the Pressure Regulating Station upstream to downstream pressures. Joule-Thomson temperature drop in the VPGH pressure reducing nozzles equal to the PRS upstream and downstream pressure differential reduces the vortex heat flux transferred to pilot gas.

Calculated values of the pilot gas temperature increment at different gas pressure ratios and gas pressure differentials are in the chart

Inlet Gas Pressure, psi	Outlet Gas Pressure, psi	Pilot Gas Temperature Net Increment, ºF
1500	150	50-55
1030	150	72-76
730	150	83-90
440	150	72-76
260	150	45-55

Measured values of the Pilot gas temperature increment are reduced by the heat losses to piping and ambient. Pipe insulation decreases but not eliminates these loses.

In the chart below are the values of the Pilot gas temperature increase in the VPGH measured in the field with an Infrared thermal gauge.

Inlet Gas Pressure, psi	Outlet Gas Pressure, psi	Pilot Gas Temperature Net Increment, ºF
980	60	80-90
690	60	90-100
365	60	85-95
700	350	30-40
850	350	40-50