SIZING THE SPARK ARRESTOR VENT TO THE HAZLOC VORTEX A/C

As stated in the introduction, the HazLoc Vortex A/C must be used in conjunction with an enclosure purge and pressurization system. The purge system must have a spark arrestor vent that allows the cold air flow (produced by the HazLoc Vortex A/C) and the pressurization air flow to safely escape the protected enclosure, without creating too little or too much pressure in the enclosure. Add the pressurization air flow to cold air flow as found in the table below to determine the total air flow through the spark arrestor vent.

<p>| HazLoc Vortex A/C Cold Air Flow (at 90 to 100 psig (6-7 bar) operating pressure) |</p>
<table>
<thead>
<tr>
<th>Models</th>
<th>Cold Air Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHL09160</td>
<td>7 ft³/minute (198 liters/minute)</td>
</tr>
<tr>
<td>VHL15160</td>
<td>14 ft³/minute (396 liters/minute)</td>
</tr>
<tr>
<td>VHL25160</td>
<td>very low (600 liters/minute)</td>
</tr>
</tbody>
</table>

Contact the purge system manufacturer or Hoffman if assistance is needed in selecting the correct spark arrestor vent to allow proper purging and pressurization.

OPERATION

It is recommended to operate the HazLoc Vortex A/C at 90 to 100 psig (6-7 bar) compressed air pressure. If compressed air pressure exceeds 100 psig (7 bar), regulate the pressure down to 90 to 100 psig (6-7 bar). Operation at pressures less than 90 psig (6 bar) and above 100 psig (7 bar) will effect the operation. When properly sized for the application, the HazLoc Vortex A/C will maintain the internal enclosure temperature between 75-100°F (24-38°C). Enclosure temperatures can momentarily reach 125°F (52°C) during initial start-up and after long periods of inactivity. Variations in heat load and compressed air conditions can effect thermostat operation. The mechanical thermostat will regulate an internal valve to minimize compressed air usage and maintain enclosure temperatures within the range specified. In some applications, the HazLoc Vortex A/C may run continually at low air pressure with the user always keeping the enclosure under slight internal pressure. In other applications, the HazLoc Vortex A/C may cycle on and off to maintain enclosure temperatures. When the HazLoc Vortex A/C is not cooling, the Check Valve closes shutting off the air passage from the enclosure interior to the exterior and allowing the purge/pressurization system to maintain slightly reduced pressure in the enclosure. Do not apply excessive heat or a flame to the mechanical thermostat to “test” it for operation. Damage to the product may result that is not covered under the warranty.

NOTICE:

When HazLoc Vortex A/C is not cooling, the Check Valve will close shutting off air passage from the enclosure interior to the exterior and allowing the purge/pressurization system to maintain slightly reduced pressure in the enclosure. Do not apply excessive heat or a flame to the mechanical thermostat to “test” it for operation. Damage to the product may result that is not covered under the warranty.

Troubleshooting

Insufficient cooling may be caused by the following:

1. Under sized compressed air line size.
2. Compressed air pressure at the product is too low.
3. Partial or complete blockage of internal compressed air path, due to dirt.
4. Water vapor in the compressed air supply.
5. Loose cold air outlet fitting. This may occur if not tightened properly after being disassembled for cleaning.

If trouble persists, please contact nVent Hoffman for assistance, phone #763.422.2211.

ELEVATED SURFACE TEMPERATURES

Because the HazLoc Vortex A/C operates according to the vortex principle, hot exhaust air is generated and released at low pressure from the opening in the protected enclosure. The reaction to temperature change is improved and the lag is minimized. When external temperatures are above 55°F (13°C), the lag between the rising air temperature and when the thermostat reacts, which can result in temperatures inside the enclosure exceeding 70°F (21°C). When and external temperatures equalize, the reaction to temperature change is improved and the lag is minimized.

LIMITED WARRANTY

nVent Hoffman products will be replaced or repaired if found to be defective due to manufacture within one year from the date of invoice. nVent Hoffman makes no specific warranty of merchantability or warrant of fitness for a particular purpose.

MAXIMUM AIRFLOW (SLPM) THROUGH PIPE AT 3.5 PSI PRESSURE DROP (6.0 BAR AND 21°C)

<table>
<thead>
<tr>
<th>Pipe Size (Meters)</th>
<th>Pipe Size (Nominal) - Schedule 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4</td>
<td>1/8</td>
</tr>
<tr>
<td>1/2</td>
<td>3/8</td>
</tr>
<tr>
<td>3/4</td>
<td>1/4</td>
</tr>
<tr>
<td>1</td>
<td>1/2</td>
</tr>
<tr>
<td>1-1/4</td>
<td>3/4</td>
</tr>
<tr>
<td>1-1/2</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1-1/4</td>
</tr>
<tr>
<td>2-1/2</td>
<td>1-1/2</td>
</tr>
</tbody>
</table>

Models VHL09160, VHL15160, VHL25160

ELEVATED SURFACE TEMPERATURES

Because the HazLoc Vortex A/C operates according to the vortex principle, hot exhaust air is generated and released at low pressure from the opening in the stainless steel shroud on the back of the unit. This exhaust air can reach temperatures up to 225°F (107°C) under normal conditions. (Normal conditions are defined as pressurized air inlet pressure of 90 to 100 psig (6-7 bar) and compressed air inlet temperature of 70°F (21°C). The HazLoc Vortex A/C models can be operated at compressed air temperatures that do not exceed 120°F (49°C). The HazLoc Vortex A/C models have a Temperature Class of T4.

LIMITED WARRANTY

nVent Hoffman products will be replaced or repaired if found to be defective due to manufacture within one year from the date of invoice. nVent Hoffman makes no specific warranty of merchantability or warrant of fitness for a particular purpose.

pipe size at top of column.

TABLE 2: DETERMINING COMPRESSED AIR LINE SIZE

1. Calculate total product compressed air consumption (SCFM, SLPM).
2. Determine length of compressed air line required for connection to main supply.
3. Locate pipe length in left column and read to the right to find the compressed air requirements.
4. Locate pipe size at top of column.

MAXIMUM AIRFLOW (SCFM) THROUGH PIPE AT 5 PSI PRESSURE DROP (100 PSIG AND 70°F)

<table>
<thead>
<tr>
<th>Pipe Length (Feet)</th>
<th>Pipe Size (Nominal) - Schedule 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4</td>
<td>1/8</td>
</tr>
<tr>
<td>1/2</td>
<td>3/8</td>
</tr>
<tr>
<td>3/4</td>
<td>1/4</td>
</tr>
<tr>
<td>1</td>
<td>1/2</td>
</tr>
<tr>
<td>1-1/4</td>
<td>3/4</td>
</tr>
<tr>
<td>1-1/2</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1-1/4</td>
</tr>
<tr>
<td>2-1/2</td>
<td>1-1/2</td>
</tr>
</tbody>
</table>

Models VHL09160, VHL15160, VHL25160

ELEVATED SURFACE TEMPERATURES

Because the HazLoc Vortex A/C operates according to the vortex principle, hot exhaust air is generated and released at low pressure from the opening in the stainless steel shroud on the back of the unit. This exhaust air can reach temperatures up to 225°F (107°C) under normal conditions. (Normal conditions are defined as pressurized air inlet pressure of 90 to 100 psig (6-7 bar) and compressed air inlet temperature of 70°F (21°C). The HazLoc Vortex A/C models can be operated at compressed air temperatures that do not exceed 120°F (49°C). The HazLoc Vortex A/C models have a Temperature Class of T4.

LIMITED WARRANTY

nVent Hoffman products will be replaced or repaired if found to be defective due to manufacture within one year from the date of invoice. nVent Hoffman makes no specific warranty of merchantability or warrant of fitness for a particular purpose.

pipe size at top of column.

TABLE 1: FILTER RECOMMENDATIONS

<table>
<thead>
<tr>
<th>Filter Model</th>
<th>Oil Removal Filter</th>
<th>Replacement Generator Kits (5 pc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHL09160</td>
<td>VC-OF17</td>
<td>VAGK09</td>
</tr>
<tr>
<td>VHL15160</td>
<td>VC-OF17</td>
<td>VAGK15</td>
</tr>
<tr>
<td>VHL25160</td>
<td>VC-OF25</td>
<td>VAGK25</td>
</tr>
</tbody>
</table>
DANGER: COMPRRESSED AIR COULD CAUSE DEATH, BLINDNESS OR INJURY.

1. Do not operate a HazLoc Vortex A/C at compressed air pressures above 100 psig (6.9 bar).
2. Do not operate at compressed air temperatures above 120°F (49°C).
3. Do not direct compressed air at any person.
4. Do not remove the O-Ring. Then remove the red (model VHL09160), or the blue (model VHL15160) or the brown (model VHL25160) or the stainless steel shroud.
5. Do not operate at compressed air temperatures above 120°F (49°C).
6. Do not operate a HazLoc Vortex A/C with 3/8" schedule 40 pipe when the pipe length may result in frost or ice forming internally and resulting in decreased cooling efficiency or damage to the HazLoc Vortex A/C.
7. Reassemble the generator, O-Ring and cold air outlet fitting in the correct position.
8. Snap the Cold Air Muffler into the Mounting Clamp.
9. Cut a 1-15/16" (49mm) diameter hole (1-1/2" knockout size) in the selected location of the flat horizontal (or vertical) surface of the enclosure.
10. Mount the Cold Air Muffler inside the enclosure cooler near the mechanical thermostat/valve and pressurized enclosure must be verified during installation.
11. Connect the compressed air supply to the inlet of the HazLoc Vortex A/C.
12. Connect the compressed air supply to the inlet of the HazLoc Vortex A/C.

GASENSAL CONSIDERATIONS

INTRODUCTION

The Hazardous Location Vortex A/C ("HazLoc Vortex A/C") is designed for industrial control cabinets located in hazardous locations, using only filtered and dried compressed air to generate the cooling. The HazLoc Vortex A/C shall only be used in conjunction with a properly sized enclosure purge system and pressurization system that must be able to vent the additional air introduced by the HazLoc Vortex A/C.

ATTENTION! To maintain the normal UL type 4 / 4X: Lorsque monter sur la partie supérieure d’un boîtier, cet appareil doit être installé debout et dans une orientation verticale. Lorsqu’il est monté sur le côté d’un boîtier, cet appareil doit être installé de sorte que l’entrée d’air comprimé est orientée vers le haut, OU, de sorte que le carénage en acier inoxydable est orienté vers le bas. Votre indication d’installation.

ATTENTION! Les surfaces extérieures de cet appareil peuvent être chaudes. Évitez le contact.

The cooling air produced by the HazLoc Vortex A/C in the enclosure is vented into the hazardous area (outside of the enclosure) through the purge system’s spark arrestor vent. The spark arrestor vent must be properly sized to accept the additional cold air flow generated by the HazLoc Vortex A/C to prevent over-pressurization of the enclosure.

Manufacture reserve the right to change the cooling system functions properly when integrated with the HazLoc V vortex A/C.

The cooling system is the intiate must originate in a non-hazardous area. Compressed air piping must be fabricated from noncombustible materials suitable for the conditions present. The pressurized air system must be located in a nonhazardous location so that the entire mounting “footprint” of the HazLoc Vortex A/C is supported by the enclosure.

ATTENTION! Only two moving parts in the system: the "generator" in the unit.

When using compressed air, wear safety glasses with side shields.

WARNING! Explosion Hazard: Substitution of components may impair suitability for Class Division 2.

The compressed air supply must be filtered (5 micron maximum) to remove water and dirt. The 5 micron filter is supplied for this purpose (Hoffman model VAAF15 or VAAF25). If oil is present in the compressed air supply, remove the oil using an optional 0.01 micron coalescing filter (Hoffman model VC-OF17 or VC-OF25). If an oil removal filter is necessary, install it downstream of the 5 micron filter in a nonhazardous location to facilitate easy filter element changes. Change the filter elements as needed (see Maintenance).

It is recommended to dry the compressed air (to remove water vapor) using a refrigerated dryer. Failure to dry the air adequately may result in frost or ice forming internally and resulting in decreased cooling efficiency or damage to the HazLoc Vortex A/C with 3/8" schedule 40 pipe when the length is less than 30 feet (9m). If pipe length exceeds 30 feet (9m), use 1/2" pipe and contact your local authorized distributor or Wrent Hoffman for assistance.

Maintenance

The only maintenance involved with the HazLoc Vortex A/C is normal element changes to the compressed air filter. The filter element should be changed when there is a decrease in performance or when pressure drop across the filter reaches 0.25 bar.

The compressed air supply must be shut off before changing the filter element. The compressed air filter should be located in a nonhazardous area so that normal filter element maintenance can be carried out without risk of hazardous substances entering the enclosure. If the compressed air filter must be located in the hazardous area, electric power to the enclosure must be shut off while performing filter maintenance and then routine purge system startup procedures should be followed when filter maintenance is complete and before power is applied to the enclosure.

HazLoc Vortex A/C has one 3/8" npt mechanical thermostat/valve (and the check valve) which are not serviceable in the field. Do not disturb the setting of the thermostat. Evidence of tampering to the thermostat/valve and the check valve will void the warranty.

If it is suspected that the compressed air filter has not been maintained after an extended period of operation, there may be pipe scale or foreign material in the HazLoc Vortex A/C. If the unit is not cooling sufficiently, there may be pipe scale or foreign material in the orifices of the "generator" in the unit.

1. To check, shut off all electric power to the protected enclosure and remove the HazaLoc Vortex A/C. Before opening the enclosure door, allow sufficient time for any internal pressure to equalize.
2. Detach the 5/8" (16mm) ID vinyl tubing from the check valve assembly and remove the check valve assembly from the cold air outlet fitting of the HazLoc Vortex A/C.
3. Remove the brass cold air outlet fitting from the bottom of the unit (with a 1" (25mm) open end wrench).
4. Remove the O-Ring. Then remove the red (model VHL0160), or the blue (model VHL15160) or the brown (model VHL25160) or the stainless steel shroud.
5. Inspect the five slots in the O-Ring for foreign material and clean if necessary.
6. Clean the cavity in the HazLoc Vortex A/C that the generator was located in if necessary.
7. Reassemble the generator, O-Ring and cold air outlet fitting in reverse order. Tighten the cold outlet fitting to at least 100 inch pounds (11.14 newton meters) torque.
8. Attach the check valve assembly to the cold outlet fitting making sure the air flow through the check valve is in the proper direction. Tighten all pipe connections securely. Reattach the 5/8" (16mm) vinyl tubing to the check valve outlet. Open the compressed air supply valve(s) to the HazLoc Vortex A/C. Follow purge system startup procedures before applying electric power to the enclosure.

INSTALLATION

1. The HazLoc Vortex A/C must be installed on the top of the enclosure on a flat horizontal surface of the enclosure. Alternatively, the HazLoc Vortex A/C can be installed on the side of the enclosure. When the unit is side mounted (on a flat vertical surface of the enclosure), the compressed air inlet must be pointing up, or the stainless steel shroud must face away from the floor. If side mounted, it is best if the unit is located near the top of the enclosure.
2. Find a location for the HazLoc Vortex A/C on your enclosure so that there is sufficient clearance for the internal mechanical thermostat and cold air outlet and check valve assembly, and so that the entire mounting “footprint” of the HazLoc Vortex A/C is supported by the enclosure. (A 4-3/4" wide x 1-1/2" (121mm x 89mm) area.) Position the unit so that there is an allowed clear area of 12x12" around the front of the unit for service personnel, if possible. Also, position so that no internal enclosure components obstruct air flow around the mechanical thermostat. This area is important for the HazLoc Vortex A/C to properly cool its system’s spark arrestor vent. This will allow the mechanical thermostat to sense temperature of the airflow exiting the vent (front) of the mechanical thermostat and respond faster to the temperature changes in the enclosure.
3. Cut a 1-15/16" (49mm) diameter hole (1-1/2" knockout size) in the selected location of the flat horizontal (or vertical) surface of the enclosure. De-burr any sharp edges around this hole.
4. The HazLoc Vortex A/C has one 3/8" npt mechanical thermostat/valve (and the check valve) which are not serviceable in the field. Do not disturb the setting of the thermostat. Evidence of tampering to the thermostat/valve and the check valve will void the warranty.
5. From inside the enclosure, screw the 1-1/2" electrical lockout on the threads of the HazLoc Vortex A/C. Tighten the lockout securely to the 3/8" (3mm) thick sealing gasket that is located between the enclosure surface and the HazLoc Vortex A/C.
6. Attach the Check Valve assembly to the cold air outlet of the HazLoc Vortex A/C (a 3/8"-18 npt thread) inside the enclosure. The Check Valve can be attached to the HazLoc Vortex A/C (A) after the supplied 3/8" npt straight pipe nipple OR with the supplied 3/8" npt pipe elbow. The orientation of the Check Valve assembly is not properly sized to accept the additional cold air flow generated by the HazLoc Vortex A/C.
7. Attach the Check Valve so that the air outlet is approximately 15-20 degree downward from horizontal. The Check Valve will align with the flow of compressed air entering the enclosure.
8. Snap the Cold Air Muffler into the Mounting Clamp.