Enclosure Cooling Solutions

CONNECT AND PROTECT

nVent HOFFMAN
nVent HOFFMAN Cooling helps create optimal conditions for the reliable operation of electronic and electrical components in a variety of industrial, data comm and commercial applications. With a broad portfolio including: filter fans, air conditioners, heat exchangers, and integrated cooling enclosures, nVent HOFFMAN assures maximum productivity and uptime while protecting the life cycles of controls and equipment.

As a premier global provider with decades of experience in cooling industrial automation and electrical components, nvent HOFFMAN has an industry-leading portfolio of proven products, pre- and post-sale support, and comprehensive engineering and testing services.

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**REASONS TO CHOOSE HOFFMAN FOR YOUR COOLING SOLUTION**

- Over 2,000 UL®-certified standard cooling, heating, and climate-control products for reliable operation and longer life of protected components
- Cooling specification is easier with our [Cooling Selection Tool](#) that will help you find the ideal cooling solution from 1,000+ standard cooling configurations
- Cooling products are stocked locally and supported by a vast distribution network for quick availability and service
- On-site thermal audits and consulting
- Available modifications including sizing, adaptation, power, custom paint, and accessories
- State-of-the-art, in-house laboratory testing, validation, and global agency certification services

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**THE ADVANTAGES OF COMBINING NVENT HOFFMAN ENCLOSURE AND COOLING SOLUTIONS**

- Ensures complete solution is engineered to maintain rating and certification
- Single-source accountability for support and service
- Ease of specification, ordering, and purchasing
- Reduced lead times and elimination of miscommunication between multiple vendors

For more information: nVent.com/HOFFMAN
Why Use Cooling?

HEAT DAMAGES AND REDUCES THE LIFE OF YOUR ELECTRONICS

Electronics Life Expectancy is Reduced by Half with Every 18 F Rise Above Room Temperature

Keeping your electronics cool is essential to maximizing the life cycles of your electronic devices, reducing capital expenses, and keeping your business running. Heat can have a significant impact on electronics, reducing performance, causing damage, and affecting manufacturer warranties.

**SOURCES OF DAMAGING HEAT**

Heat can be generated internally by electronic components and intensified by external sources. Inside a cabinet, uncooled components can generate as much trapped heat as a home furnace

- AC power supplies
- Controllers, drives and servos
- Transformers and rectifiers
- Processors and server racks
- Radio equipment

Heat is also generated from sources outside the enclosure such as

- Solar heat gain
- High ambient temperature
- Welding processes
- Paint oven
- Blast furnace
- Foundry equipment

**TRENDS TOWARD MORE HEAT**

With expanding deployment of smaller, more powerful, and more portable mission-critical electronics into increasingly harsh environments and conditions, cooling and thermal management is now a primary engineering consideration. The density of modern electronics in smaller cabinets intensifies heat issues that can compromise component performance.

**CONSEQUENCES OF HEAT**

Heat build-up can adversely affect industrial controls creating the potential for

- De-rated drive performance
- Intermittent fluctuations in I/C-based devices
- MTBF decreases exponentially
- Catastrophic component failure
- Warranty revocation
- Component replacement costs
- Late shipments
- Customer dissatisfaction
- Lost revenue
- Service outages
- Hours of factory downtime

**WARNING:** This is not proper functionality.
# Cooling Strategies

## CHOOSING A SOLUTION TO MAXIMIZE THE OPERATIONAL LIFE OF YOUR ELECTRONICS

<table>
<thead>
<tr>
<th>COOLING SYSTEM TYPE</th>
<th>TECHNOLOGY DESCRIPTION</th>
<th>HEAT REMOVAL RANGE</th>
<th>ENVIRONMENT TYPE</th>
<th>TYPICAL APPLICATIONS</th>
<th>Cools Below Ambient</th>
<th>Cools Above Ambient</th>
<th>Closed Loop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Conditioners</td>
<td>Forced air Refrigerant-based</td>
<td>High</td>
<td>Hot Environments (typically over 35°C/95°F)</td>
<td>Indoor or Outdoor&lt;br&gt;Industrial enclosures&lt;br&gt;Telecommunications&lt;br&gt;Wastewater treatment&lt;br&gt;Metal working&lt;br&gt;Foundry&lt;br&gt;Oil &amp; Gas Operations</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>High Heat Load (300W-17,300W)</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dirty or Corrosive Air&lt;br&gt;Harsh/Humid Environments&lt;br&gt;Hazardous Locations</td>
<td>☐</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Thermoelectric Coolers</td>
<td>Peltier effect&lt;br&gt;No moving parts or liquids</td>
<td>Low</td>
<td>Small Enclosures&lt;br&gt;Low Heat Load (60-200W)&lt;br&gt;Remote/ DC-powered applications</td>
<td>Indoor or Outdoor&lt;br&gt;Telecommunications&lt;br&gt;Battery cabinets&lt;br&gt;Industrial enclosures&lt;br&gt;Security systems</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Air-to-Air Heat Exchangers</td>
<td>Closed loop&lt;br&gt;No liquids</td>
<td>Moderate</td>
<td>Cool Air Environment&lt;br&gt;Moderate Heat Load (7-150W/F)&lt;br&gt;Dirty or Corrosive Air&lt;br&gt;Hazardous Locations</td>
<td>Indoor or Outdoor&lt;br&gt;Telecommunications&lt;br&gt;Light-duty manufacturing&lt;br&gt;Oil &amp; Gas Operations</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Air-to-Water Heat Exchangers</td>
<td>Close-coupled water cooling&lt;br&gt;No moving parts exposed to environment</td>
<td>Highest</td>
<td>Very Hot Environments&lt;br&gt;High Heat Load (870W to 6700W)&lt;br&gt;Extremely Dirty/Dusty Air&lt;br&gt;Hazardous Locations</td>
<td>Extreme conditions where air conditioners would be subject to failure&lt;br&gt;Automotive manufacturing&lt;br&gt;Machine tool&lt;br&gt;Packaging&lt;br&gt;Paper mill&lt;br&gt;Oil &amp; Gas Operations</td>
<td>☐</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Filter Fans</td>
<td>Forced, fresh air&lt;br&gt;Open loop</td>
<td>Low to Moderate</td>
<td>Cool, Clean Air Environment</td>
<td>Industrial manufacturing&lt;br&gt;Outdoor telecom&lt;br&gt;Data networking</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Vortex Coolers</td>
<td>Requires compressed air source&lt;br&gt;Forced air&lt;br&gt;No liquids or moving parts</td>
<td>Moderate</td>
<td>Hot Environments (typically over 35°C/95°F)&lt;br&gt;Heat Load (up to 1,465W)&lt;br&gt;Dirty or Corrosive Air&lt;br&gt;Harsh/Humid Environments&lt;br&gt;Hazardous Locations</td>
<td>Heavy manufacturing&lt;br&gt;Metal working&lt;br&gt;Oil rig/refinery&lt;br&gt;Paper mill&lt;br&gt;Foundry&lt;br&gt;Oil &amp; Gas Operations</td>
<td>☐</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Conductive (no cooling unit)</td>
<td>Passive&lt;br&gt;Heat radiates through enclosure walls</td>
<td>Very Low</td>
<td>Cool Air Environment&lt;br&gt;Low Heat Load (&lt;78°F/25°C)</td>
<td>Where enclosed components operate within recommended temperature range</td>
<td>☐</td>
<td></td>
<td>✓ Per enclosure rating</td>
</tr>
</tbody>
</table>
HOFFMAN Cooling
A WIDE RANGE OF THERMAL MANAGEMENT SOLUTIONS FOR CRITICAL APPLICATIONS

AIR CONDITIONERS FOR RUGGED ENVIRONMENTS
Delivering reliable enclosure cooling in the most extreme indoor and outdoor environments, nVent HOFFMAN air conditioners are available in multiple configurations that offer a broad range of cooling capacities, power input, and mounting options.

FEATURES
• Models with 1,000 to 20,000 BTUs/Hr cooling power for indoor, outdoor, and harsh environments
• Dust-resistant coil design supports filterless operation in most environments
• Built-in flanges for easy installation
• nVent HOFFMAN Easy Swap Adapter Plenums provide a quick and easy way to upgrade to a new air conditioner unit using the existing enclosure cut-out while maintaining enclosure rating
• nVent HOFFMAN Remote Access Control is a unit upgrade for monitoring and managing an entire network of HOFFMAN air conditioners

HAZARDOUS LOCATION COOLING
HOFFMAN Cooling products offer air conditioners with an attractive design, heaters, and Vortex coolers.

HAZLOC A/C FEATURES
• Class 1 Div 2 Groups B, C, D T4
• Models with 4,000 to 11,000 BTUs/Hr cooling power for
• Narrow construction to fit any 12 in. deep enclosure
• Type 4, 4X and Offshore models available

HAZLOC HEATER FEATURES
• Class 1 Div 1 Groups A, B,C, D T4
• ATEX IECEx II2G Ex d IIC T3 / II2 D Ex Td A21 IP65 T200 C
• Conductive and Convection heating types available

HAZLOC VORTEX COOLER FEATURES
• Class 1 Div 2 Groups A, B, C, D and Class 2 Div 2 Groups F & G
• Approved for 175 F (80 C) maximum ambient temperature
• Cooling capacities update to 5000 BTU/Hr. (1465 W)

SIDE-MOUNT FILTER FANS
nVent HOFFMAN Filter Fans are available in a wide selection of Type 1 and Type 12 configurations offering a compact, click-fit design. They can also be converted to Type 3R or Type 4/4X with our easy to use Filter Fan Shrouds.

FEATURES
• Airflows ranging from 21 CFM (36 M3/Hr) to 484 CFM (822 M3/Hr)
• Sizes from 4 in. to 13 in.
• Similar cut-out sizes to match other filter fan manufacturers

THERMOELECTRIC COOLERS
nVent HOFFMAN Thermoelectric Coolers provide refrigerant-free, filterless design without a compressor and virtually eliminates maintenance.

FEATURES
• Cooling capacities from 60 to 200 Watts (nominal); (204 to 682 BTUs/Hr)
• DC powered operation for 24 V and 48 V applications
• Optional temperature controller and condensate manager
Local Service

COVERAGE YOU CAN COUNT ON

With HOFFMAN, you’re assured of the most complete maintenance and service offerings. That means reduced downtime, higher levels of overall system performance, and maximum operational life for your protected equipment. Our product quality and complete aftermarket care keeps your equipment running.

HOFFMAN offers pre- and post-sales services and support to let you choose the right cooling product for the job, and tailor the level of assurance you need to mitigate risks. Our plans and offerings include:

• A choice of flexible service plans that can be customized to your needs
• Extended product warranties
• Operator and maintenance training programs
• Custom installation, commissioning, and upgrades

AN UNRIVALED STRATEGIC PARTNERSHIP FOR THE MOST RESPONSIVE LOCAL SERVICE

Through partnership with Johnson-Northwest, HOFFMAN offers unsurpassed service presence and response in North America with expertise that reaches worldwide. JNW delivers full-service capabilities and complete in- and out-of-warranty service for HOFFMAN cooling products from over 570 local service locations in North America.

Through JNW, HOFFMAN offers:

• 24/7/365 service availability
• Online service requests
• Factory-authorized expertise to service all HOFFMAN and McLean® models and many competitor models
• Local service in hundreds of North American cities and around the globe
• In-stock availability for selected cooling parts
• Global coordination of service and maintenance programs
• Expedited service and parts availability
• Extensive reporting capabilities including up-to-date status monitoring
• Automatic emails about change-to-repair-order status

Peace-of-Mind

INCLUDED WITH EVERY HOFFMAN PRODUCT

LOCAL AVAILABILITY MEANS PARTS IN HOURS, NOT WEEKS

In each global region, our local distributors have access to large inventories of service parts. Repair technicians worldwide can place parts orders regionally, eliminating communication barriers and ordering delays. HOFFMAN parts are usually available in-stock or shipped within hours, versus shipping delays that can last weeks.

AFTERMARKET SUPPORT – REGIONAL LOCATIONS

NORTH AMERICA
2100 HOFFMAN Way
Minneapolis, Minnesota 55303-1745
Tel: +1-763-421-2240

EUROPE
Langenalber Straße 96-100
75334 Straubenhardt, Germany
Tel: +49 (0) 7082 794-0

CHINA
21st Floor of Cloud Nine Plaza
No. 1118 West Yan’an Road
Changning District, Shanghai
Tel: +86 400 820 1133

SINGAPORE
18 Boon Lay Way
TradeHub 21, #04-110/111
Singapore 609966
Tel: +65.6768.5800

TECHNICAL SUPPORT

cooling.support@nvent.com
1-866-545-5252

- Technical assistance
- Service and warranty support
- On-line resources
- Specifications and drawings
Custom Engineering

DEVELOPMENT, TESTING & CERTIFICATION CAPABILITIES

State-of-the-art engineering, prototyping and testing combined with uncompromising manufacturing delivers optimal performance.

SUPERIOR COOLING SOLUTIONS DRIVEN BY HIGHLY EXPERIENCED ENGINEERING AND DESIGN TEAMS

Custom cooling projects are engineered to meet performance demands for thermal loads, size and configuration considerations, and environmental requirements. Solutions include:
- Closed- or open-loop cooling
- Indoor and outdoor environments
- Remote monitoring and control capabilities
- Direct air cooling systems
- General, targeted or remote cooling
- Low- to no-maintenance solutions
- Custom packaged blowers and fan assemblies
- High-efficiency AC and DC power solutions and battery backup options
- Corrosion-resistant designs, materials and finishes including stainless steel, non-metallic materials, coatings, and paints
- Proven, environmentally friendly components
- Thermal and environmental management solutions including heating, condensation management, pressure compensation, temperature monitoring, and control

Custom cooling projects are assigned a lead thermal engineer and supported by a dedicated cross-functional team. Using proprietary software to develop cooling system prototypes, cooling performance is calculated and simulated utilizing different technologies, configurations, and sizes prior to build. Prototypes can be developed in as little as two weeks.

A battery of advanced testing is available with mechanical and environmental stresses measured beyond industry standards, including temperature extremes, airflow, UV, dust, corrosion and salt spray, seismic and vibration, EMI/RFI, and water ingress. Each system can be engineered to meet UL, cUL, CSA, Telcordia, NEMA, IEC, European Safety, and FCC compliances and standards.

Enforced Solutions to meet your cooling challenges

HOFFMAN can custom-engineer cooling solutions for many enclosed controls, electronic devices or electrical systems:
- Design and build capabilities to perform in extreme environments
- Rapid prototyping
- UL/CSD certified testing facility and capabilities to meet global certification standards
- 60+ years of custom engineering experience

Our development process ensures timely delivery

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Testing and certification

A battery of advanced testing is available with mechanical and environmental stresses measured beyond industry standards, including temperature extremes, airflow, UV, dust, corrosion and salt spray, seismic and vibration, EMI/RFI, and water ingress. Each system can be engineered to meet UL, cUL, CSA, Telcordia, NEMA, IEC, European Safety, and FCC compliances and standards.
### North America
- Minneapolis, MN  Tel: +1.763.421.2240
- Mexico City, Mexico  Tel: +52.55.5280.1449
- Toronto, Canada  Tel: +1.416.289.2770

### South America
- Cajamar, SP, Brazil  Tel: +55.11.96438.6262

### Europe
- Betschdorf, France  Tel: +33.3.88.90.64.90
- Straubenhart, Germany  Tel: +49.7082.794.0
- Dzierzoniow, Poland  Tel: +48.74.64.63.900
- Assago, Italy  Tel: +39.02.5776151.224

### Middle East & India
- Dubai, United Arab Emirates  Tel: +971.4.378.1700
- Bangalore, India  Tel: +91.80.6715.2001

### Asia
- Shanghai, P.R. China  Tel: +86.21.2412.6943
- Singapore  Tel: +65.6768.5800
- Shin-Yokohama, Japan  Tel: +81.45.476.0271
- Seoul, Korea  Tel: +82.2.2129.7755
- Qingdao  Tel: +86.532.8771.6101

**Our powerful portfolio of brands:**

**CADDY**  **ERICO**  **HOFFMAN**  **RAYCHEM**  **SCHROFF**  **TRACER**