

## Load Bank Cooling Fans



### Project Snapshot

#### Industry

Electrical standby power support systems

#### Customer

Global OEM of load banks, switchgear, and electrical monitoring/control systems

#### Aerovent Representative

Powell & Associates  
Euclid, Ohio

#### Application

Fans provide cooling air for resistive load banks

#### Challenges

Improve efficiency of load bank manufacturing process; meet fan performance criteria

#### Solution

Customized, direct drive panel, tubeaxial, vaneaxial, and Axipal fans

### **Overview**

During an electrical utility outage, mission critical facilities, such as hospitals, data center, and certain financial institutions continue to operate via emergency standby generators. The only way to verify that a backup power system will operate as designed is to periodically test it under load. Load bank tests assure facility managers that their generators will perform at 100% of their nameplate rating.

A load bank applies a stable, controllable electrical load on a generator. It can be permanent or portable, can accommodate AC or DC, and can generate electrical power that ranges from a few kW to multiple MW. Even small load banks can generate a substantial amount of heat, which makes cooling a key consideration. Most load bank units have an internal fan that pushes air over the resistive load bank elements to cool them – otherwise they would burn up.

A major OEM that supplies resistive load banks used to assemble its own load bank cooling ventilation systems by attaching ring fans to rectangular panel frames, mounting the motors, and assembling those components using the associated support hardware – which is a time- and labor-intensive process. An Aerovent sales rep suggested using preassembled fan units to save time and money. That was the beginning of a business relationship that has lasted nearly 20 years.

### **Challenges**

The biggest challenge was convincing the OEM to use preassembled fan units instead of buying fan parts and assembling those components. Upon realizing that doing so would greatly increase the efficiency of the load bank manufacturing process, the OEM laid out several requirements for the fans. Fan type and performance depends on the sizes of the load banks. Therefore, different kinds of fans had to be considered.



**MODEL DDP**  
DIRECT DRIVE PANEL FAN



**MODEL ATA**  
DIRECT DRIVE TUBEAXIAL FAN



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Because the OEM provides load banks to both domestic and international markets, fan motors needed to operate on either 50 Hz or 60 Hz, and, at times, special voltages, such as 208 V or 575 V. Fan motors had to be totally-enclosed fan cooled (TEFC) or totally-enclosed air over (TEAO) and directly coupled to the cooling propeller. Rectangular vs. square panel construction and various special hole patterns completed the customization requirements.

## The Aerovent Solution

When the OEM realized it could save time and money, Aerovent's engineers and rep worked together to satisfy the OEM's criteria. For smaller load banks, Aerovent supplies direct drive panel (DDP) fan – many with Macheta Airfoil propellers and some with adjustable pitch backswept propellers. Most of them have 36-inch diameter propellers. Other sizes are supplied based on the OEM's needs. The DDP fans are customized to have rectangular (instead of square) panels to fit various load bank frames. The 5-, 10-, or 15-HP panel fans have various air flow characteristics depending on the load bank model. The final destination of a load bank determines its voltage and frequency.

For larger load banks, Aerovent supplies tubeaxial fans – most of them 10 HP – with the propeller on the inlet, which provides exceptional air flow over the load bank resistors. Performance is based on the number of fans that the OEM includes in the design of any given load bank.

For very large load banks, Aerovent supplies direct drive Axipal tubeaxial (ATA) fans because they are more compact than typical tubeaxial or vaneaxial fans. Axipal propellers also provide more performance for a given diameter. These large load banks require more airflow and higher pressures than smaller units. For this application, Axipal fans supply 1.7 inches WC static pressure.

## Results

Aerovent worked with the OEM to improve the efficiency of its load bank manufacturing process, which saves many hours of labor per unit.

The fans that Aerovent supplies to the OEM provide more horsepower than those available elsewhere. In addition, Aerovent works with this OEM to deal with many restrictions in order to meet the needs of the end user.

Aerovent's eagerness to go that extra step – to do whatever needs to be done – will ensure that this 20-year-old business relationship will last for many years to come.