



## 1 WORLD TRADE CENTER – 1 WTC (FREEDOM TOWER)

### Overview

1 World Trade Center (1WTC) – also called Freedom Tower – is a building of significant importance. It symbolizes America’s strength and resilience in response to the 9/11 terrorist attack. But as 1WTC’s project architect, David Childs of Skidmore, Owings and Merrill has said, “We fully understand the iconic importance of the tower, but it also has to be a highly efficient building.”

That’s why Twin City Fan & Blower was chosen to provide nearly all of the fans for 1WTC and for the entire 10-million-square-foot World Trade Center complex, including four other skyscrapers and the National September 11 Memorial and Museum. Because the World Trade Center complex requires so many different types of fans – and because Twin City Fan manufactures a wider range of fans than any other company – TCF is one of the few companies capable of responding to the World Trade Center’s challenge. “For the typical job site like this,” says Gerry Lombardi of Metro Air Products, “you might see three to four manufacturers providing different types of fans. But Twin City Fan can build all of them – that’s how broad the product line is.”

### Challenge

The overall objective of The Port Authority of New York and New Jersey and its consulting engineers, Jarros Baum & Bolles, was to minimize cost while maintaining the highest possible quality in all materials and equipment throughout the WTC complex. When it came to specifying fans, they were searching for a single source with an impeccable record of reliability, high quality and an excellent product range.

## Quick Facts

### Industry

Commercial Buildings

### Application

Multiple applications throughout six buildings of the new World Trade Center Complex

### Customer

Port Authority of New York and New Jersey

### Twin City Fan Representative

Metro Air Products

### Location

Manhattan, New York

### Challenge

Provide all fans needed for six buildings that comprise more than 10 million square feet

### Solution

Twin City Fan & Blower’s broad product line and ability to provide all of the fans for the WTC complex

### Result

High quality fans for years of maintenance free operation



**Model BAE-DW**  
Centrifugal Fans



**Model BSI**  
Inline Centrifugal Fans



**Model TCVX**  
Vaneaxial Fans



## Fans Used

- **TCVA Vaneaxial Fans, with Cast Aluminum Wheel**
- **TCVX - Vaneaxial Fans, Adjustable Pitch Blades**
- **BAE-SW - Centrifugal Fans (Single Wide, Single Inlet)**
- **BAE-DW - Centrifugal Fans (Double Wide, Double Inlet)**
- **TSL - Inline Centrifugal Fans**
- **QSL - Mixed Flow Fans**
- **BSI - Square Inline Centrifugal Fans**
- **BAV - Utility Sets**
- **TL - Ceiling Ventilators**



## Solution

Twin City Fan was chosen as the sole source for nearly all fan applications in the five World Trade Center buildings and the National September 11 Memorial and Museum. As detailed below, the many TCF fan models chosen for the World Trade Center deliver a wide variety of benefits:

### Air handling units

More than 50 TCF fans will power air handling units in large mechanical rooms in the \$3 billion, 105-story 1WTC building. These are TCF model BAE DWDI (double width, double inlet) fans with very high efficiency ratings and superior sound characteristics. These fans are being installed in air handlers designed with special features including air-to-air energy recovery, speed control for efficiency and special thrust collars for seismic response. The units also have extra interior space reserved for future security-related technology. This extra space increases the static pressure requirements. “Again, that’s why we specified fans from Twin City Fan” says Lombardi. “They can supply all of the high-pressure units required.”

### Exhaust in mechanical rooms and stairwells

The fans chosen to exhaust mechanical rooms and to pressurize stairwells are TCF model TCVA with fixed-pitch blades and the patented model TCVX with adjustable-pitch blades. The adjustable-pitch blades can be adjusted without moving or removing any other fan components. Both types have aluminum wheels to reduce weight, save energy and resist corrosion. The stairwell fans serve a crucial safety function in the building. If evacuation is ever required because of fire, the stairwells will be correctly pressurized so smoke is pushed out of the stairwells and occupants are able to quickly exit the building.

### Kitchen exhaust and server hoods

TCF’s BCVU2 and BAE SWSI (single width, single inlet) fans are used to exhaust kitchens and server hoods. These units deliver high efficiency and quiet operation.

### Exhaust in electrical closets, fire and storm water pump rooms

Twin City Fan models T and TL ceiling ventilators were chosen to exhaust electrical closets, fire pump rooms and storm water pump rooms. These units deliver quiet, continuous and reliable operation.



**Model QSL**  
**Mixed Flow Fans**



## **Observation deck exhaust**

When 1WTC is completed, TCF's model TSL tubular centrifugal inline fans will provide exhaust for the building's 104th-floor observation deck. The TSL combines the reliability of a straightline fan with the space-saving features of an axial fan. The TSL has a higher and broader efficiency range compared to competitive tubular and square inline fans. This superior efficiency allows the fan to operate at lower speeds, yielding longer and more reliable operation, reduced cost and energy requirements, and quieter operation. Also, the unique wheel design provides minimal turbulence and losses.

## **Dishwasher Exhaust**

QSL mixed flow fans provide exhaust for dishwashers in 1WTC. Like the TSL described above, QSL fans combine the benefits of axial and centrifugal fans: higher and broader efficiency ranges for reduced energy use, long-term cost-savings, reduced maintenance and long life. These fans are licensed to carry the AMCA (Air Movement and Control Association) seal signifying superior inlet and outlet sound power levels.

## **Fuel Cell Exhaust**

TCF model BSI fans are used to exhaust fuel cells in the WTC complex. These fans are specifically designed for clean-air duct applications and offer high efficiency and quiet operation in a compact design that can be mounted in any position – horizontal, vertical or angular.

## **Benefits/Results**

With fans from Twin City Fan, the World Trade Center complex will fulfill architect Childs' requirement: The buildings will be highly efficient. TCF fans will help to reduce energy and maintenance requirements while at the same time increasing functionality and occupant comfort. Twin City Fan is proud to have been chosen as the sole source of fans for these prestigious, high-functioning and symbolically significant buildings.

Twin City Fan & Blower has the engineering and manufacturing capabilities to accommodate virtually every conceivable application. We have completed thousands of successful installations worldwide and have a proven track record for tackling the most technically complex and unique applications.

We separate ourselves from the competition by offering a greater breadth of products and quickly adapting to the needs of our customers. This is truly a testament to our company philosophy – respond to the needs of the customer, the first time, every time.



**WWW.TCF.COM**

**5959 Trenton Lane N | Minneapolis, MN 55442**  
**Phone: 763-551-7600 | Fax: 763-551-7601**