

# San Francisco International Airport: Terminal 2

Price Industries provides Custom Displacement Ventilation Systems, leading to a reduction in energy usage of 20% compared to a traditional overhead mixing system.

Originally opened as the Central Terminal in 1954, San Francisco International Airport's Terminal 2 (SFO T2) served both domestic and international passengers for 46 years before being closed indefinitely in 2000. It wasn't until 2008, with the airport experiencing increased passenger traffic, that a plan for Terminal 2's revitalization was launched. Reopened in the spring of 2011, Terminal 2 is now the home of Virgin America and American Airlines. The design of the new terminal set out to redefine the travel experience by reducing the terminal's environmental impact and providing travelers with a unique "San Francisco" flavor. The state-of-the-art domestic terminal

displays the artwork of local artists, features local cuisine and includes such sustainable features as reclaimed water in the restrooms, preferential parking and charging stations for hybrid and electric cars, hydration stations where passengers are encouraged to refill reusable water bottles, and the utilization of as much natural lighting as possible. With sustainability in mind, a Price Displacement Ventilation system—supplied by Norman S. Wright Mechanical Equipment Co.—was selected for the terminal. Price provided custom displacement diffusers for the project that met the energy efficiency goals of the customer, while seamlessly integrating into the Architect's design for the terminal.

## Project Summary



LEED Gold Certified

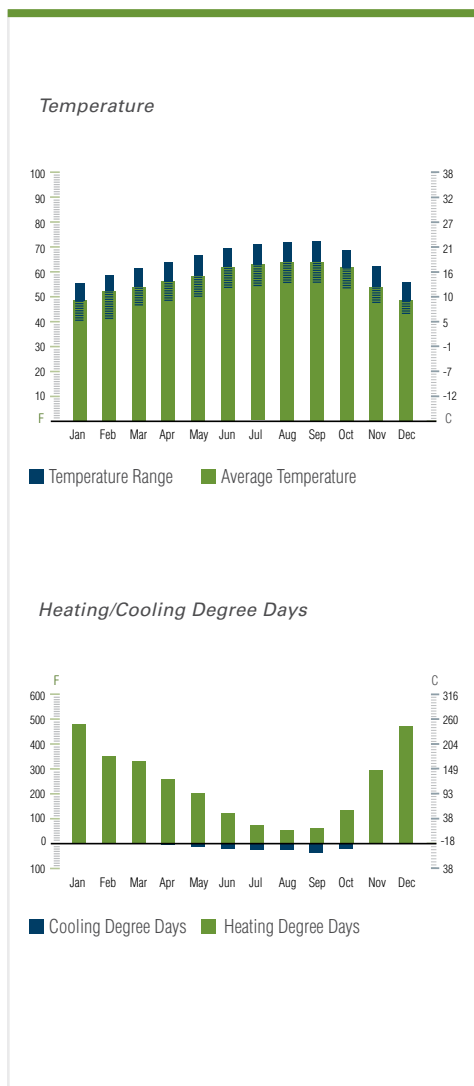
- + Project Type: Renovation, Large Public Space
- + Project Cost (construction cost): \$383 million
- + Completed: April 2011
- + Building Square Footage: 640,000 ft<sup>2</sup>
- + Lead Architect: Gensler
- + Associate Architects: Michael Willis Architects, Hamilton Aitken Architects
- + Mechanical Engineer: SJ Engineers
- + Sculptor: Janet Echelman
- + Price Product Family: Displacement

---

## The Challenge: Architecturally Beautiful Energy Efficiency

---

Two crucial goals for the design of the new terminal included minimizing the building's environmental footprint and achieving LEED certification, making energy efficiency a key priority. In addition to this requirement, the selected air distribution system would have to compliment the aesthetic of the terminal. Meeting the unique aesthetic requirements of the building dictated the need for architecturally appealing, custom designed diffuser faces with validated performance that was in no way impaired by the modifications.



---

## The Solution: Price Designs Custom Displacement Ventilation System

---

The high ceilings of T2 meant that Displacement Ventilation (DV) would be an ideal solution, providing the ability to condition only the occupied zone and not the large space above it. This approach reduces the supply air volume required, allowing the mechanical equipment servicing the space to be downsized, thereby reducing utility costs.

The higher supply air temperature of DV (around 65 °F) also enables the building to utilize economizer hours to take advantage of "free cooling," which further improves energy efficiency by enabling the HVAC system to increase the outdoor air supplied to the space when the outdoor environment compliments the goals of the air distribution system.

These energy savings were critical to the terminal achieving its sustainable design goals and LEED targets. LEED points were also awarded for the high levels of thermal comfort and air quality provided by the DV system.

The architectural firm, Gensler, had previously collaborated with Price and Norman S. Wright to develop custom displacement diffusers for the

---

The higher supply air temperature of DV (around 65 °F) also enables the building to utilize economizer hours to take advantage of "free cooling,"

---



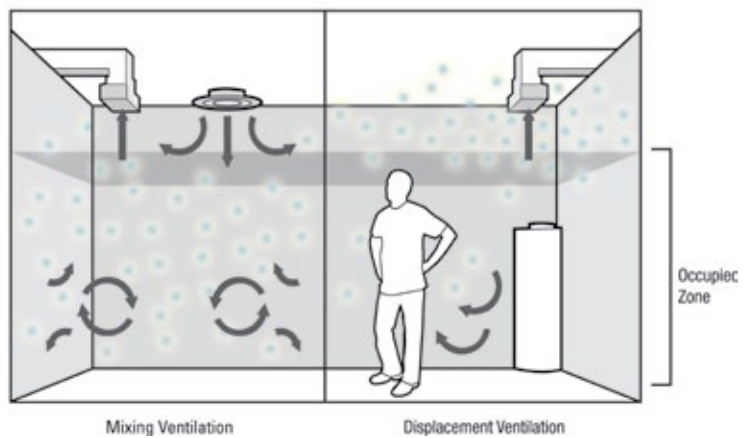
Terminal B Concourse at San Jose Mineta International Airport. Armed with a new vision, the firms again collaborated to design diffusers that would complement the aesthetic of the new terminal. The T2 baggage claim area features a displacement diffuser with a custom linear bar grille selected by the architect. Throughout the rest of the facility, a custom face featuring a narrow perforated pattern help the diffusers compliment the interior design of the terminal. Price validated the performance of these custom solutions at the state-of-the-art



*A variety of architectural coverings were used to help the diffusers integrate into the architecture of the terminal*

testing facilities at Price Research Center North. Smoke test videos demonstrated to the entire design team that the performance of the displacement diffusers is in no way hindered by the enhancements. Satisfied that the custom diffusers would perform as expected and integrate well into the design of the terminal, the team approved them for installation.

As expected, the displacement diffusers are contributing to the sustainable design vision for the building. When compared to traditional overhead mixing systems, they are reducing energy consumption by 20 percent.



*The general upward motion of air causes contaminants in a DV system to concentrate within the upper unoccupied zone, improving air quality within the breathing zone.*



*Displacement is used throughout the terminal, as seen here in the ticketing area*

## Design Team Profile

---

### Gensler

---

Gensler is a design, planning and strategic consulting firm networked across 38 locations on five continents. Consistently ranked by U.S. and international industry surveys as a leading architecture and interior design firm, Gensler leverages its deep resources and diverse expertise to develop design solutions for industries across the globe. For its longstanding commitment to the advancement of sustainable design, Gensler received the Leadership Award from the U.S. Green Building Council in 2005. Visit [www.gensler.com](http://www.gensler.com) for more information, including an interactive map of SFO T2.

---

### SJ Engineers

---

Driven by a design philosophy that emphasizes energy efficiency and sustainability, SJ Engineers has designed numerous high performance projects in the San Francisco Bay Area. They deliver cost effective mechanical, plumbing and fire protection solutions for a variety of building types, ranging from commercial to healthcare facilities.

---

[www.price-hvac.com/sustainable](http://www.price-hvac.com/sustainable)