

NEW TRIER HIGH SCHOOL (CHILLED BEAM SYSTEM)



Pic 1: Addition to Existing School & New Entry



Pic 2: Typical Classroom in Lower Level

DESCRIPTION

- Central cooling is provided by two (2) 500-ton rotary screw chillers and fiberglass cooling towers utilizing direct drive fan motors for best efficiency and least maintenance. The chilled water loop also utilizes a water side economizer to take advantage of free cooling during shoulder months.
- Central heating is provided by four (4) 6,000 MBH condensing boilers, operating at or around 95% efficiency with maximum loop temperature of 140°F. HW system utilizes variable primary pumping through variable frequency drives.
- Most of the addition utilizes two dedicated OA units, sized at 40,000 cfm each to serve the OA and primary air needs of the chilled beams and fan coils for the addition. These units are equipped with total energy recovery wheels with 75% effectiveness. Heating and cooling coils are optimized for delta T to maximize pumping efficiency. These units are also equipped with MERV-8 and MERV-13 filters as required for IAQ.
- All the classrooms and offices are provided with induction style chilled beams that utilize primary air from the DOAS units through VAV boxes with HW reheat for heating needs. The induction beams use 55°F water and have condensate routed to hub drains in the basement mechanical rooms.

INNOVATIVE DESIGN FEATURES

- This building has been awarded LEED rating of Gold with 63 points awarded out of 65 attempted. Out of these, 25 points were directly attributed to the HVAC system through innovations in energy efficiency and indoor air quality performance.
- This is one of the largest educational facilities in Chicagoland area and State of IL to utilize the active chilled (induction) beams technology. One of the biggest advantages of using this technology was the elimination of large air handling units, ductwork, and savings in fan energy due to smaller and fewer fans as part of the heating and cooling systems.
- Some of the specialty classrooms in this project were very challenging from an HVAC perspective, especially the glass arts studio. This classroom utilized a large hood above kilns used for glass molding that operate above 1200°F. Also, tables within these classrooms used torches with natural gas-oxygen mixture that generated fumes which had to be exhausted very close to the countertop of the table.
- Extensive underground ductwork for make-up air to atrium exhaust of 200,000 cfm and stage exhaust of 50,000 cfm. Exhaust fans were located on roof in a way to preserve the aesthetics of the architectural design.
- All of the interior lighting is high efficiency long lasting LED. The lighting fixtures on/off functions are controlled by switches in series with dual technology occupancy sensors. The light levels for the interior lighting are controlled slide dimmers located on the walls. The building is 100% daylight lit, monitored by BAS system to save lighting energy.

ENERGY EFFICIENCY

- Building systems selected were 30% better than ASHRAE 90.1-2007 baseline used for LEED 2009 compliance
- DOAS units utilized total energy wheels and VFD's for supply and exhaust fans
- Facility utilized most efficient chiller-cooling tower combination, and boiler plant
- Facility utilized LED lighting throughout, automatic daylighting controls, low flow fixtures

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