

29-31 Brindabella Circuit Case Study — New Construction with Low Temperature VAV System

Overview

The 29-31 Brindabella Circuit project was a new construction 4 story multi-tenanted office building in Canberra, Australia. Each of the floors had approximately 26,600 sq. ft. of rentable area (106,500 sq. ft. total).

The sensible cooling loads were 640 Mbh per floor (2,560 Mbh total) for an average of 24 Btuh/sq. ft. The sensible cooling loads varied from 15 – 50 Btuh/sq. ft.



System Design Issues

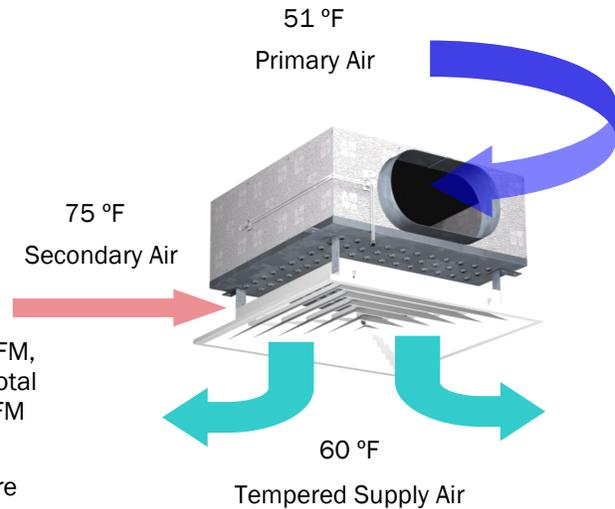
- The design team's objective was to achieve the energy efficiency targets for a 5-star GBCA Green Star certification (Australia's equivalent to a LEED certification as administered in the US by the USGBC).
- The new building's installed cost budget was \$100/sq. ft.
- The project was on a tight time schedule and needed to be completed in 6 months.
- The use of the office spaces would change often over time and the installed HVAC system must have the flexibility to relatively easily accommodate these changes.
- The system design should provide a supply airflow circulation rate of at least 1.2 CFM/sq. ft.

Design Solution



Dadanco was able to offer a new low temperature VAV system design using Inffusers that met the design objectives.

- A single duct VAV system was selected in the perimeter and interior zones.
- Primary air temperature was set at 51 °F (24 °F ΔT) as opposed to the more conventional 55 °F (20 °F ΔT).
- (554) square 4-way discharge Inffusers™ were used to distribute the air from the single duct VAV terminal units. Secondary room air was induced into the Inffuser from the return air ceiling plenum and mixed with the cold primary air. The tempered mixed supply air was then delivered to the zones.
- Primary airflow from the central air handler was 102,000 CFM, the secondary induced room air was 65,000 CFM and the total tempered supply air delivered to the zones was 167,000 CFM (1.5 CFM/sq. ft. supply air circulation rate).
- The supply air was delivered at a constant 60 °F temperature throughout the VAV terminals modulation range as the induction ratio remains constant alleviating concerns about cold drafts or dumping.



Benefits

- Primary airflow from the central air handler was reduced from 118,000 CFM to 102,000 CFM (17% reduction) through the use of the colder 51 °F primary air temperature.
- Fan power consumption was reduced by 17% through the reduction in the primary airflow.
- Installed cost savings were realized through a smaller air distribution system (central air handlers, ductwork, VAV boxes, etc.)
- Moving the Inffuser locations to accommodate tenant/use changes was relatively simple as compared to a water-piped system (fan coils, water source heat pumps, active chilled beams, etc.).

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