



Induction Unit Perimeter System Upgrade to Active Chilled Beams

Project Name: Royal Exchange
50 Pitt Street,
Sydney, NSW

Date Completed: February, 2008

Building Size: 9,100 m² NLA

Designed By: Norman Disney & Young

Installed By: FDC Mechanical

System Used: ACB50 Perimeter

Number of Units: 448

Design Criteria:

Room Temperature: 24°C / 50%RH

Chilled Water Temp: 13°C

Primary Air Temperature: 14°C

Maximum Available Air: 2,360 l/s per floor

Property Council of Australia A Grade rating

ABGR 4 Star Rating 4 Star (Green Star)

Active Chilled Beam

Perimeter System

Refurbishment,

sustainability

+ flexibility



50 Pitt Street, a 15 story multi-tenancy Sydney CBD office building with approximately 9,100m² net lettable area, required a significant HVAC upgrade to achieve A Grade property rating plus 4 Star ABGR & Green Star ratings for a refurbishment project.

The design target was not achievable with the existing outdated on-floor Carrier 36SV induction units operating high static pressure and unacceptable noise levels for an A Grade building.

Solution must deliver best practice air conditioning and increased cooling capacity while using on-floor ductwork and chilled water infrastructure no larger than the previous on-floor infrastructure.

Infuser cold air solution



The Challenges

- Existing plantrooms and on-floor ductwork could not be changed or expanded
- Insufficient on-floor cooling capacity
- High fan energy consumption from existing floor mounted induction units
- On-Floor air quantity limited due to existing air risers and tight ceiling spatial constraints
- Relocate perimeter units from floor mounted to ceiling mounted (modernise building)
- New on-floor HVAC system must fit within tight spatial constraints
- Achieve A Grade rating from The Property Council of Australia
- Achieve 4.5 Star ABGR rating for a refurbished office building
- Achieve 4 Star Green Star rating for a refurbished office building

The Solution

- Retain existing air and water risers
- Develop 226mm height Active Chilled Beam to fit tight ceiling spatial constraints
- Modify & re-route floor mounted primary air and secondary chilled water infrastructure for ceiling installation of perimeter Active Chilled Beams
- Install 448 High Induction ACB50 (600x1800) Low-Profile Active Chilled Beam units throughout the perimeter of the 14 refurbished office floors
- Reduce primary air system pressure from maximum of 325Pa to a uniform 200Pa for all new Active Chilled Beam units
- Upgrade existing perimeter air handler for new capacities, air flows and fan selections

The Benefits

- ✓ Delivered necessary increases in cooling capacity using existing air & water risers
- ✓ Retained & re-used main branches of existing on-floor water infrastructure
- ✓ Recovered valuable net lettable area by relocating perimeter units to the ceiling space
- ✓ New perimeter zone cooling capacity of 700kW delivered for only 16,500 L/s of primary air
- ✓ Delivered perimeter load diversity control through the secondary chilled water cooling process of Active Chilled Beam units
- ✓ Delivered 77% of perimeter sensible cooling capacity through the secondary cooling process of Active Chilled Beams for **NO ADDITIONAL FAN ENERGY REQUIREMENT**
- ✓ Modernised building interior achieved Property Council of Australia 'A Grade' rating
- ✓ Achieved 4 Star Green Star certificate from the Green Building Council of Australia for being Sydney's first refurbished office building to pursue this path