



4 Star ACB Refurbishment

Dadanco Pty Ltd



Active Chilled Beam Refurbishment

Project Name:	20 Bond Street Sydney, NSW
Date Completed:	December, 2010
Building Size:	35,000 m ²
Installed Sensible Capacity:	2,420 kW
Engineered By:	Floth Consulting
Installed By:	Triple-M Mechanical (NSW)
System Used:	ACB40 Active Chilled Beam
Number of Units:	1,891
<u>Design Criteria:</u>	
Room Temperature:	23°C / 50%RH
Chilled Water Temperature:	13.0°C
Primary Air Temperature:	13.0°C
Maximum Available:	2,370 l/s per floor

Refurbishment,

sustainability

+ flexibility



20 Bond Street is a 31 story high-profile office building in the former heart of Sydney's financial district with 35,000 m² NLA of high quality office accommodation completed in 2010.

The modernised building required significant perimeter cooling capacity together with the highest possible efficiency and best practice air movement to achieve the goals of 4 Star Green Star rating, minimum 5 Star NABERS energy commitment and PCA 'A Grade' building standard for the base building design.

The Active Chilled Beam perimeter and centre zone solution must deliver best practice air performance, reduced noise and increased cooling capacity using the smallest possible air ductwork and secondary chilled water infrastructure and risers.

Active Chilled Beam

Perimeter System

Inffuser cold air solution

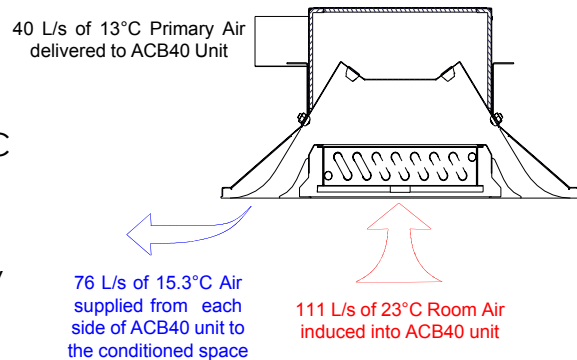


The Challenges

- Required perimeter cooling of 1,659kW with smallest possible infrastructure
- Minimise primary air quantity to achieve 4 Star Green Star rating (Office Design V3) and 5 Star NABERS energy commitment
- Single on-floor air handlers per floor for primary air delivery
- 4-Pipe cooling/heating strategy for maximum diversity between zones
- Compressed programme of 1,891 units delivered over a six month period
- Design must be supported by complete manufacturer's scenario validation tests

The Solution

- Design for primary air pressure of 100Pa
- Deliver uniform 13°C primary air and 13°C secondary water to all ACB units
- Delivered 1,553W of secondary sensible cooling for 92.3 L/s secondary water flow
- Install 1248 High Induction 'ACB40' 2-Way Active Chilled Beams throughout the perimeter zones
- Install 643 High Induction 'ACB40' 2-Way Active Chilled Beams throughout the centre zones
- Perform detailed test lab mock-up scenario analysis of each typical beam layout arrangement for maximum cooling, part-load cooling and heating performance for each typical arrangement



The Benefits

- ✓ Delivered a compact 600x1200 ceiling mounted Active Chilled Beam to fit within tight spatial constraints throughout the building
- ✓ Achieved perimeter cooling of 1,659kW with only 18,044 L/s of primary air
- ✓ Achieved centre zone cooling of 757kW with only 8,515 L/s of primary air
- ✓ Delivered average primary air distribution & ventilation rate of ≥ 2.5 L/s/m²
- ✓ Total secondary sensible cooling capacity of **1,553 kW** (64% of total sensible cooling) and higher total air distribution rates delivered for **NO ADDITIONAL FAN ENERGY** through the induction process of Active Chilled Beams
- ✓ Scenario analysis testing enabled the designers, contractor and builder to validate the design prior to delivery and installation of active chilled beams