



**Active Chilled Beam**

Perimeter System

Infuser cold air solution

## Active Chilled Beams

Project Name:	1 Featherston Street, Wellington, New Zealand	
Date Completed:	September 2010	Building Size: 33,000 m <sup>2</sup> NLA
Installed Cooling Capacity:	1,052 kW Perimeter	880 kW Internal Zones
Engineered By:	Aurecom	Installed By: Aquaheat Industries Ltd
System Used:	ACB40 & 50 Active Chilled Beams	Number of Units: 991
	IDL20i Infusers	Number of Units: 1223

### Design Criteria:

Room Temperature:	22°C / 50%RH	Chilled Water Temperature: 13°C
Primary Air Temperature:	12°C	Total Primary Air Quantity: 97,000 L/s

Energy efficiency,

sustainability

+ Quality

One Featherston Development is a 15 story high-profile office building with 33,000 m<sup>2</sup> NLA over 12 floors of high quality office accommodation completed in 2010.

The modern building required significant perimeter cooling capacity for full-height glazing together with the highest possible efficiency and best practice air movement to achieve the goals of 5 Green Star NZ Certified Design rating for both the base building design and the interior fitouts.

The Active Chilled Beam perimeter 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.

Internal zone solution must deliver fitout flexibility and best practice air movement using a cold-air VAV solution for reduced fan energy and ductwork infrastructure requirements.



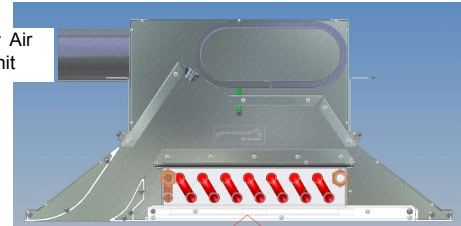
## The Challenges

- Required perimeter cooling of 1,052kW with smallest possible infrastructure
- Minimise primary air quantity to achieve 5 Green Star NZ Certified Design
- Must deliver best practice air movement to meet Green Star NZ requirements
- Limited ceiling space (3250mm slab-to-slab) throughout building
- Active Chilled Beam perimeter must lend itself to integrated fitout solutions
- Centre Zone flexibility needed for integrated fitout options

## The Solution

- Design for primary air pressure of 200Pa
- Select Active Chilled Beam air quantities not to exceed 3 L/s/m<sup>2</sup>
- Install 81 High Induction 'ACB40' 2-Way Active Chilled Beams throughout the South perimeter of 12 floors
- Install 910 High Induction 'ACB50' 1-Way Active Chilled Beams throughout the remaining perimeter zones of 12 floors
- Deliver uniform 12°C primary air to all Active Chilled Beams & Inffusers
- Select & supply 1,223 High Induction Diffusers (Inffusers) in Centre Zones for internal entrainment of room secondary air direct from the conditioned space

40 L/s of 12°C Primary Air delivered to ACB50 Unit



157L/s of 15.2°C Air supplied from ACB50 unit to the conditioned space

117 L/s of 22°C Room Air induced into ACB50 unit

## The Benefits

- ✓ Delivered a compact 600x1200 ceiling mounted Active Chilled Beam to fit within tight spatial constraints throughout the perimeter of the building
- ✓ Achieved perimeter cooling of 1,052kW with only 30,844 L/s of primary air
- ✓ Achieved centre zone cooling of 880kW with only 66,145 L/s of primary air
- ✓ Delivered average primary air distribution & ventilation rate of ≥ 2.5 L/s/m<sup>2</sup>
- ✓ Perimeter secondary sensible cooling capacity of **652 kW** (62% of total sensible cooling) and higher total air distribution rates delivered for **NO ADDITIONAL FAN ENERGY** through induction process of Active Chilled Beams
- ✓ Delivered centre zone integrated fitout flexibility using Inffusers and cold-air VAV centre zone solution