



VAV Cold Air Delivery System

Project Name:	40 Mount Street 'The Ark' North Sydney, NSW
Date Completed:	2010
Sensible Capacity Installed:	1,830 kW
Building Size:	28,500m ²
D&C Designed By:	Hastie Australia
Installed By:	Hastie Australia
System Used:	Inffuser IDL10e & IDL20e
Number of Units:	1,916
<u>Design Criteria:</u>	
Room Temp:	23°C / 50%RH
Primary Air Temperature:	8.0°C
Sensible Cooling Load:	40-145 W/m ²
Total Primary Air Quantity:	104,000 L/s

active chilled beam

Perimeter system

Energy,

efficiency

+ with all air



Typical Perimeter Inffusers

The Ark at 40 Mount Street, North Sydney is a new generation 21 story 28,500m² A-Grade Office tower with a 6 star Green Star V2 design rating and 5 star NABERS energy rating requiring a delicate balance between high efficiency, thermal comfort and capital cost in a design & construct project.

Meeting these targets required an optimised cold-air VAV system designed to deliver best practice air distribution rates while minimising air processed at the air handlers to achieve the lowest possible fan energy and smallest possible installed ductwork infrastructure.

VAV design required capacityturndown to 30% without compromising grille performance or air Coanda.

High induction 'Inffusers' were chosen to deliver the on-floor air distribution solution.

Inffuser cold air solution



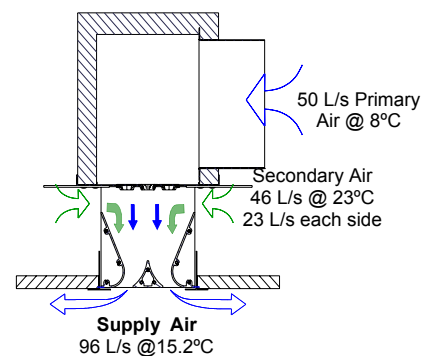
The Challenges

- Project requires a capital cost competitive D&C 6 star Green Star rating
- Conventional heating & cooling loads
- Need to minimise air quantities for smallest possible air risers & on-floor ductwork
- Provide medium & long term tenant flexibility
- Safely deliver cold primary air while guaranteeing on-floor air distribution rates and acceptable ceiling Coanda through an air turndown rate to 30%
- Safely deliver cold air without air diffusion performance problems (dumping)
- Solution must deliver best practice air distribution rates to suit modern tenancies

The Solution

INFFUSER provided a solution for the delivery of low temperature primary air by inducing secondary room air from the conditioned space to be mixed with cold primary air before discharging the combined mixed warmer air streams through the air outlet. Air flow rates and mixed temperatures are easily determined.

- Install 1,916 IDL10e & IDL20e 1400mm long linear style Inffusers throughout the building
- Provide linear style 1-way discharge Inffusers in the perimeter and 2-way discharge terminals in centre zones
- Deliver 8.0°C primary air to all Inffusers (centre zones & perimeter zones)
- Entrain secondary air from the conditioned space to increase air delivery per Inffuser
- Allow smaller but conventional VAV boxes for individual zone control to be used



Typical Centre Zone Inffuser
air performance values

The Benefits

- ✓ Deliver architecturally pleasing cold air terminal solution (linear grille)
- ✓ Safe Delivery of low temperature 8.0°C primary air
- ✓ Provide separate optimised perimeter and centre zone air delivery solutions
- ✓ Deliver integrated fitout 6 Star Green Star Office Design V2 rating
- ✓ Air distribution rates of ≥ 4.8 L/s/m² achieved for the entire building from typical minimum 2.5 L/s/m² primary air processed at the air handlers
- ✓ Enable smaller infrastructure (flexible ducts, on-floor ductwork, VAV boxes, air risers and air handlers) to be used for maximum space savings
- ✓ Deliver real comfort (Humidity, temperature control & air movement)
- ✓ Deliver air performance at conventional terminal pressures of ≤ 50 Pa