



## Perimeter Induction Unit Refurbishment

Project Name:	385 Bourke Street Melbourne, VIC
Date Completed:	Ongoing
Building Size:	58,500 m <sup>2</sup>
Installed Sensible Capacity:	5,091 kW
Engineered By:	Umow Lai & Assoc
System Used:	CM10 Ceiling Mounted Perimeter Terminal Units
Number of Units:	3,840
<u>Design Criteria:</u>	
Room Temperature:	24°C / 50%RH
Chilled Water Temperature:	9.5°C
Primary Air Temperature:	14.0°C
Maximum Available:	2,265 l/s per floor

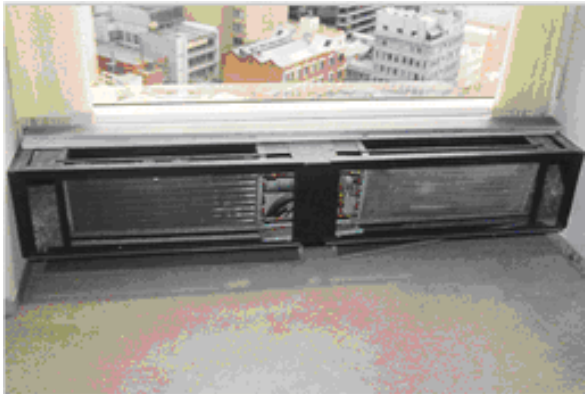
Active Chilled Beam

Perimeter System

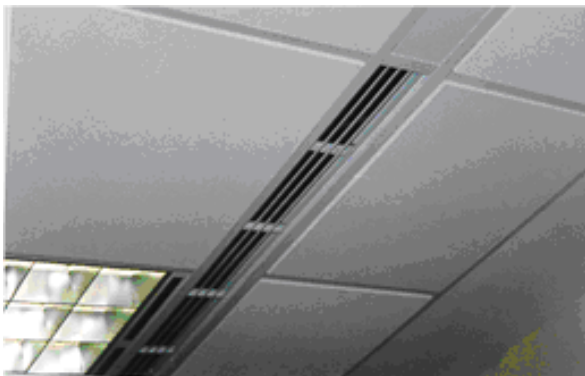
Refurbishment,

# sustainability

## + flexibility



**Before:** 'Sinko' Under-Sill Units



**After:** Ceiling Mounted Units

44 story high-profile multi-tenancy Melbourne CBD office building with approximately 1330m<sup>2</sup> net lettable area per typical floor.

Building originally installed with Sinko parapet mounted perimeter induction terminal units.

Building required significant increase in delivered perimeter cooling capacity of +28% together with desirable reductions in air noise levels to suit modern occupancies.

Existing chilled water HVAC systems, on-floor infrastructure and existing perimeter induction units not capable of delivering higher cooling capacities to each floor. Solution must deliver best practice air performance, reduced noise and increased cooling capacity using existing primary air ductwork and secondary chilled water infrastructure and risers.

Infuser cold air solution

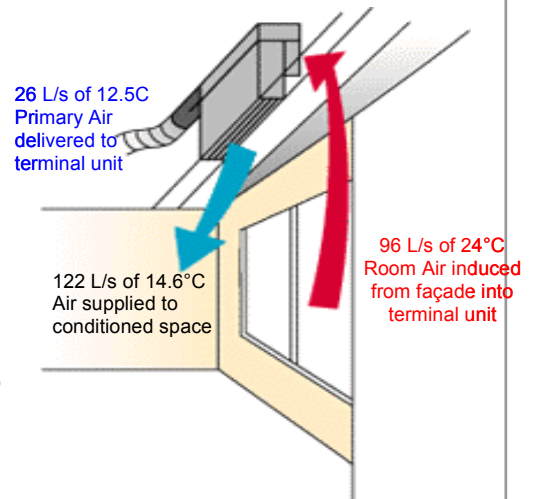


## The Challenges

- Insufficient on-floor perimeter cooling capacity
- Existing perimeter induction units at the end of their useful life
- Existing air risers, chilled water loop and on-floor ductwork could not be changed
- Required increase in perimeter cooling per floor from 89,900W to 115,700W (+28%)
- Perimeter zones Primary Air quantity limited to 2,265 L/s maximum available air per floor
- Existing primary air temperature of 14°C and secondary water temperature of 9.5°C must be retained until completion of project
- On-floor HVAC must be refurbished as and when tenancies are vacated

## The Solution

- Re-route primary air & secondary chilled water infrastructure through the slab to the ceiling space of each refurbished floor below
- Install 96 High Induction 'CM10' ceiling mounted perimeter terminal units per floor
- Retain primary air pressure of 180Pa
- Retain primary air quantity of 2,665 L/s per floor
- Deliver uniform 12.7°C primary air temperature to all perimeter units
- Increase secondary chilled water flow by 4%



## The Benefits

- ✓ Achieved perimeter capacity of 115,700W sensible cooling (28% increase) per typical floor using only 2,265 L/s of primary air
- ✓ Achieved NR35 noise level in the conditioned perimeter space
- ✓ Delivered reduction in air generated noise for the same primary air quantity and pressure as previously installed
- ✓ Delivered increased air distribution rate for perimeter zones
- ✓ Delivered a compact ceiling mounted induction unit to fit within tight spatial constraints between mullions
- ✓ Enabled refurbishment work to be performed selectively on each floor on an 'as needed' basis

\* By retaining the existing secondary water temperature of 9.5°C, secondary cooling coil condensation was accepted as unwanted but necessary in preserving the existing operating parameters throughout the refurbishment program. To accommodate this condensation, a perimeter condensate removal drain was installed to safely remove condensate.