

DADANCO SOLUTIONS DELIVERY

HVAC REFURBISHMENT FOR BUILDINGS WITH EXISTING PERIMETER INDUCTION UNITS

WHAT CAN BE DONE WITH THOSE OLD INDUCTION UNITS?

Perimeter induction systems have been widely used as system of preference for almost all buildings built between 1940s and 1970s. As such, those buildings are usually located within the central business district areas of all major cities around the world. Most of those induction units are still in reasonable working condition; however some are in a need of major upgrade.

Common issues with old induction systems:

- High noise level
- High energy consumption
- Lack of cooling capacity
- Fouling of secondary heat exchangers (coils)
- Mechanical failure of units due to age
- Poor and/or inflexible control system

Typical constraints found in those existing buildings are:

- Units are usually located in the window sills occupying valuable net lettable area
- There is no capability to introduce more air through existing risers
- Minimal ceiling space available for extra ducts
- Limited ability to move more air or cooling water through the building

BACKGROUND TO THE TECHNOLOGY

DADANCO developed a new STARLINE nozzle which, due to its inherent design characteristics, emanates very low noise level. The use of the DADANCO STARLINE nozzles results in a higher entrainment of room air through the secondary heat exchanger increasing both air flow and cooling capacity. Additionally the specifically designed mixing chamber within each of the new STARLINE units further promotes the entrainment ratio, therefore improving overall efficiency of the DADANCO STARLINE induction units.

There are three cost-effective methods to upgrade existing induction units:

- Replacing existing nozzles with new DADANCO STARLINE nozzles
- Replacing existing units, with the like-style DADANCO STARLINE units
- Remove existing under sill units and install new DADANCO STARLINE induction units in the ceiling space.

ENGINEERING APPROACH

In all of the above situations, DADANCO takes an active role in each project. It is imperative to understand existing system performance, site limitations and other client requirement as well as the design parameters for the newly refurbished system. DADANCO has significant expertise in site surveying and understands a wide variety of issues which are commonly associated with old induction systems, and which are commonly overlooked or understated in current modern buildings. DADANCO can then engineer a solution to suit particular project demands by means of providing a detailed DADANCO STARLINE unit specification which addresses the project brief.

Upon finalisation of the engineering process, DADANCO then builds a prototype unit which is tested and verified in the DADANCO laboratory after which it can be installed at site for the purposes of evaluation of its actual operating performance vis-à-vis the original unit.

NOZZLE REPLACEMENT

Nozzle replacement falls into a so-called ‘quick fix’ category, whereby immediate benefits can be realised in cases where existing induction units are in good working condition without any physical damage or fouled coils.

DADANCO engineering team developed a “Refurbishment Kit” for many makes of induction units that are common in the marketplace.

Once the DADANCO team establishes the desired criteria, design of a ‘refurbishment kit’ is a fairly straightforward process.

Refurbishment Kit contains a set of DADANCO STARLINE nozzles, a set of sealing plugs as well as a specially designed profiled sidewall for insertion into the mixing chamber of an induction unit where suitable. The most common induction unit brands that can be successfully refurbished are:

ENVIRON	Worthington/Frigrite
Barber-Coleman	Dunnair / Muller

Other brands of induction units require considerably more site work in order to be able to be refurbished successfully, or are not suitable for refurbishment, in which case DADANCO recommends replacement of the older units with more modern STARLINE induction terminal units.

Benefits of replacing induction unit nozzles with DADANCO STARLINE nozzles for any given performance are as follows:

- Reduced noise level
- Reduced primary air pressure
- Reduced energy consumption
- Improved secondary air flow (subject to a type of unit being refurbished)



Case Study:

Capita Building, Adelaide

11,000 m² of office space

1999: Replacement of old Environ nozzles with DADANCO refurbishment kit on 546 Units

Benefits from 1999 Refurbishment:

- Pressure reduced from 375Pa to 250 Pa
- Noise reduced by 8 dB(A)
- Air flow Performance increased by 30%
- Refurbishment completed within a single weekend

2009: Replacement of existing induction units with new ACB50 Active Chilled Beams

Benefits from 2009 Refurbishment:

- Pressure reduced from 250Pa to 150 Pa
- Noise reduced by a further 4 dB(A)
- Cooling Performance increased by 20%

INDUCTION UNIT REPLACEMENT

In cases where existing induction units are at the end of their useful life, or where significant increase in cooling capacity is required for given project constraints or tenancy variations, the optimal solution is to replace the existing units with new DADANCO STARLINE induction units. Essentially replacement of like-for-like unit, whether they are located within the ceiling void or within the parapet under the windows.

In the long run, it makes more sense, when considering a major refurbishment of an existing building, to seriously consider replacement of units, as often it is not worth keeping 30-year old casings and secondary heat exchangers with a limited life expectancy.

The new DADANCO STARLINE induction units are equipped with a powerful two-row secondary heat exchanger which can deliver significant increase in total cooling capacity when compared with older, outdated induction units. The new increased cooling capacity can be delivered for much lower static pressure in the ducts which leads ultimately to significant energy savings on the primary air fans.

To date, DADANCO STARLINE units have been successfully used to replace the following makes of induction units on many projects around the world:

- Carrier
- Trane
- York
- Worthington
- Environ
- Barber-Coleman
- Dunnair/ Muller, etc

Benefits achieved when replacing the above unit makes are:

- Lower primary air flow (if required) for an equivalent cooling capacity
- Lower primary air pressure
- Increase in delivered cooling capacity to the space
- Increase in water temperature difference
- Reduced noise level
- Improved air circulation in the conditioned space.



Case study:

360 Collins Street, Melbourne (Collins Wales Place)

33,000 m² of office space

Replacement of aged York induction units with 1350 STARLINE CM10 ceiling mounted units

Benefits:

Increased cooling capacity by 30%

Reduced static pressure from 750 Pa to 250 Pa

Reduced noise from NR 55 to NR 40

REMOVAL OF PARAPET INDUCTION UNITS AND INSTALLATION OF NEW CEILING MOUNTED INDUCTION UNITS

Under sill style induction units are used where the primary concern of air conditioning system design is heating. When designing an HVAC system for cooling, having parapet style outlets which blow cold air vertically along the perimeter windows results in undesirable air flow patterns and usually result in the main cause of tenants' discomfort.

Major issues with this type of induction unit installation in addition to the usual performance issues are:

- Parapet style units occupy valuable floor area
- Casings of the units are usually used as bookshelves, therefore restricting the air flow to the conditioned space
- Maintenance is usually very high due to location of secondary heat exchanger near floor level where it is easily blocked by carpet lint
- Perception of noise is higher than for the ceiling type units

To date, DADANCO STARLINE units successfully replaced the following makes of parapet under-sill induction units on many projects around the world:

- Carrier
- Trane
- York
- Velovent
- Worthington/Frigrite

Performance benefits achieved when replacing the above unit makes are:

- Lower primary air flow (if required) for an equivalent cooling capacity
- Lower primary air pressure
- Increase in delivered cooling capacity to the space
- Increase in water temperature difference
- Reduced noise level
- Improved air circulation in the conditioned space



Case Study:

385 Bourke Street, Melbourne

44,000 m² of premium office space

Removal of Sinko parapet style units

Installation of 4,000 STARLINE CM10 ceiling mounted units

Benefits:

Reduced noise level to NR 38

Increased cooling capacity by 20%

Reduced static pressure down to 180 Pa

For more information about induction unit refurbishment possibilities, contact:

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