“In Daikin we take the challenge to apply heat pump technology in multi-family (high-rise) building. With the new Daikin Altherma 3 WS, Daikin wants to get one step closer to a decarbonized future.”

Mauro Biancucci holds a degree in Mechanical engineering with master in Renewable Energy engineering from Università degli Studi di Padova, Italy. He started at Daikin Europe in 2017. After a first experience in the Sales & Marketing team of the Heating department, he moved to the Heating Product Management team as Product Manager & Application Engineer for Collective solutions in 2018. He is today responsible for the business development in collective heating market (residential / commercial) and studies new renewable heating solutions for multi-family house and commercial applications.
Daikin Altherma 3 WS
for Collective Housing

Mauro Biancucci
Daikin Europe

22/10/2020
The use of renewable energy sources in collective application is restricted due to practical concerns.
Practical concerns

Limited installation space

1. Reluctance to occupy balcony space
2. Limited space on the roof
Practical concerns

Sound restrictions

To avoid disturbing neighbours
Practical concerns

**Large DHW demand**
From single-family house to multi-family house

- Space heating demand
- DHW demand
Practical concerns

60°C tapping water

To cope with regulations
Practical concerns

Heat distribution losses
For large buildings

Higher flow temperature increases heat distribution losses in the system
Water Loop Heat Pump
Solution for High-rise building

Central water loop distributes low grade heat around the building
Water Loop Heat Pump
Solution for High-rise building

Central water loop distributes low grade heat around the building

Reversible Air-To-Water Heat Pump maintains the central water loop between +10°C / +30°C

R32 HP is the best solution to heat the central energy loop

SMALL
Daikin Altherma 3 H HT
< 80 kW

LARGE
Air cooled Heat Pump
80 - 700 kW
Water Loop Heat Pump
Solution for High-rise building

Central water loop distributes low grade heat around the building

Reversible Air-To-Water Heat Pump maintains the central water loop between +10°C / +30°C

Water-source Daikin Altherma upgrades heat in each apartment

Daikin Altherma 3 WS small capacity
Water Loop Heat Pump
Solution for High-rise building

- Central water loop distributes low grade heat around the building
- Reversible Air-To-Water Heat Pump maintains the central water loop between +10°C / +30°C
- Water-source Daikin Altherma upgrades heat in each apartment

Any type of Daikin emitters can be connected to Daikin Altherma 3 WS
Water Loop Heat Pump
Solution for High-rise building

Central water loop distributes low grade heat around the building

Reversible Air-To-Water Heat Pump maintains the central water loop between +10°C / +30°C

Water-source Daikin Altherma upgrades heat in each apartment

Any type of emitters can be connected to Daikin Altherma 3 WS

Water-source heat pump solution for commercial spaces
Water Loop Heat Pump
Solution for High-rise building

Central water loop distributes low grade heat around the building

Due to wide temperature range the central water loop can be warmed or cooled via several different means:
**Space Heating**
Leaving water temperature up to 65°C
60°C by heat pump only

**Domestic hot water**
Integrated 180L stainless steel tank
A+ efficiency with L tapping pattern

**(optional) Cooling**
Active cooling with high SEER

**Low noise**
Sound power down to 39 dBA
Sound pressure @1m = 27 dBA

**High performance**
COP up to 13.4 with 25°C inlet water temperature

**Easy installation**
Top connections & integrated handles
Small footprint = 597 x 660 mm
Removable compressor module
Minimise heat loss and risk of overheating

Compared with the high distribution losses that occur in typical communal heating systems – which lead to overheated buildings and wasted energy - the low ambient loop means that heat losses are reduced by more than 90%.

Hence it is a much more economical solution, that reduces the carbon footprint of the entire building.
**Installation space**

**Save space on the balcony**

Outdoor unit is not needed for each apartment

**Minimum installation space for internal unit**

The Daikin Altherma 3 WS can easily be installed in confined spaces thanks to his small volume required (60 x 66 cm), making such solution suitable for standard size utility cupboard.

All operations are possible from top and front.
The floorstanding unit contains both heat pump module and hot water tank (180 lt).

*Clearance for service:*

- 660 mm
- 597 mm

*Example of cupboard installation*
Sound level

Extra quiet unit

Sound power down to **39dBA**
(at 2.1 kW)

- **Close hydro module**
- **Sound absorbing material**
- **Stop sound radiation**
- **Swing inverter compressor**
- **Reduce sound generation**
- **Compressor vibration damping**
- **Limit vibration propagation**
Hydraulics

Reduce hydraulic costs in the building

Distributing energy throughout the building using near ambient water temperatures reduces pipes’ diameter size and requires smaller insulation on pipework compared to a traditional system.

Heating, hot water & cooling are provided via 2 pipe network instead of traditional 4 pipe solutions.

A low temperature heat pump solution offers capital saving on the distribution network over traditional high temperature heating systems.
Emitters

Compatible with any type of emitters

*Hydronic emitters*

- **Heating only**
  - > 55°C

- **Heating / Cooling**
  - 45 – 35 °C / 20 – 7 °C

- **Heating / Cooling**
  - 35 °C / 18 °C
Heat recovery

Reduce primary energy consumption

When heating & cooling occur simultaneously across the system, energy can be recovered from one heat pump to another via the common water loop. Heat recovery **further enhances the efficiency of the system** as a whole by reducing the loads placed upon the central plant.

Heat recovery is only possible with heat pump technology.
Clean air

Reduce CO₂ emissions

Daikin low carbon heat pump solution demonstrates **significant CO₂ reductions** over traditional CHP/Boiler/HIU systems and helps to reduce carbon offset payments.

There is no impact on local air quality, zero NOX & particulates.

<table>
<thead>
<tr>
<th>Global warming potential (GWP)</th>
<th>Charge volume</th>
<th>CO₂ eq</th>
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<tbody>
<tr>
<td>R-410A 2088</td>
<td>100% 2.05 kg</td>
<td>4280</td>
</tr>
<tr>
<td>R-32 675</td>
<td>83% 1.7 kg</td>
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<tr>
<td>R-410A</td>
<td>R-32</td>
<td>1150</td>
</tr>
<tr>
<td>R-32</td>
<td>R-410A</td>
<td>4280</td>
</tr>
</tbody>
</table>
**Purpose of development:**

- Moving towards online pre-sales material
  - More powerful on the visuals and graphics
  - Easier to keep updated and to add reference sites
  - Faster for the dealer to find engineering data
  - Possibilities to link with HSN for sizing and equipment list preparation
- **Free access website:** to have a wide and deep connection in the sector of HVAC consultants
- **Target audience:** consultants, architects, project developer, engineers...
- **No product selection**
- **Demonstrate** to consultants and project developers (professionals), the strengths and benefits of our new concept
- **Interactive way** to make the tool understandable to the audience
Thank you