Energy Efficiency and new integrated solutions in HVAC
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There is no favorable wind for the sailor who doesn’t know where to go
(Seneca)
Who we are?

- **GROUP TURNOVER** 400 M€
- **> 1600 EMPLOYEES**
- **55 YEARS HISTORY**
- **72 R&D STAFF**
- **300 HVAC PRODUCTS**

DATA CENTER
PROCESS COOLING
AIR CONDITIONING
CONFORT COOLING

1961

2018

Thousand of projects realised all over the world

Capillar distributors and subsidiaries network
Who we are?

Full range air cooled chiller

Up to 56°C!

Full range water cooled chiller

Modular solutions

Efficiency test as standard for every model

The biggest testing chamber in Europe!

1° in Europe

Full range FCUs
Global Scenario and HVAC driving forces

ECODESIGN EU 2016/2281
GWP = GLOBAL WARNING POTENTIAL = TONS OF CO2 EQUIVALENT

Global warming potential (GWP) is a relative measure of how much heat a greenhouse gas traps in the atmosphere. It compares the amount of heat trapped by a certain mass of the gas in question to the amount of heat trapped by a similar mass of carbon dioxide.
**Global Scenario and HVAC driving forces**

### Main refrigerants in Play

<table>
<thead>
<tr>
<th>Density</th>
<th>R134a</th>
<th>R404A</th>
<th>R452A</th>
<th>R22</th>
<th>R407A/R407F</th>
<th>R410A</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 4000</td>
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<td>&lt;150</td>
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</tr>
</tbody>
</table>

- **R134a**: Standard refrigerant
- **R404A**: New refrigerant
- **R410A**: New refrigerant

### Refrigerants comparison with R134a (gwp 1430)

<table>
<thead>
<tr>
<th>Refrigerant</th>
<th>Capacity</th>
<th>Efficiency</th>
<th>GWP</th>
</tr>
</thead>
<tbody>
<tr>
<td>XP10</td>
<td>100%</td>
<td>-4%</td>
<td>7</td>
</tr>
<tr>
<td>R1234ze</td>
<td>75%</td>
<td>100%</td>
<td>573</td>
</tr>
</tbody>
</table>

Our model are available with the 3 options!
Global Scenario and HVAC driving forces

From standard refrigerants to the ecological (R32, R1234ze, r513)

Reduced quantity of refrigerant

The primary energy demand must be reduced optimising the management

Reduced TEWI

Total equivalent warming impact

$$TEWI = M \cdot GWP + \alpha_{CO2} \cdot E$$

REDUCE THE REFRIGERANT CHARGE BY 25% WITH BETTER EFFICIENCY AND PERFORMANCES
Enhanced Energy Efficiency

The part load efficiency describes better the real performance of the unit on field. The EER is just a picture at the 100%.

The chillers management assumes a crucial role everytime we have a multichiller system.

How assess the real performance of the system on field?
The yearly performance can be simulated, giving precise information about the overall prices in the whole Life cycle of the unit.
Enhanced Energy Efficiency

Methodology

Technical and Economic comparison in the whole working time; we can verify, along the year, which scenario is the best in a given climatic profile!
The key to MULTICHLILLER EVO is its intrinsic logic based on the chiller’s actual working data, an asset not available to those working in the control regulation field, without a complete knowledge of HVAC systems.
Enhanced Energy Efficiency

Optimisation logic

1. Interval acquisition demand power: 300 s
2. Interval stable demand power: 60 s
3. % stable power: 5.0%
4. % save power to switch: 5.0%

- **Sampling rate**
- **Minimum time to consider the load as “stable”**
- **Tolerance accepted of the stable load**
- **It indicates the minimum energy gain percentage in order to make effective the chiller configuration change possibly proposed by the optimisation algorithm**

Efficiency in a reliable way!
Up to 10% of saving in comparison with a standard sequential set up!
Predictive maintenance

AerNet uses the «CLOUD»

All the information recorded and elaborated
Predictive maintenance

At the assignment of a library for the chosen unit, the Aernet makes available automatically a standard visualisation called «AerNet Pro» allowing a general overview of the installation.
- The **data analysis** allows us to collect and to monitor the unit from the beginning.

- The **sensibility analysis** allows us a continuous development.

**The best performance is ensured for the entire life of the unit.**
Reduced the environmental impact providing chiller with ecological refrigerants

Optimised and dedicated management logic to reduce the request of primary energy

Highest level of reliability thanks to the monitoring
Thanks!