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Refrigeration | AC & Ventilation | Heat Pumps

13.–15.10.2020

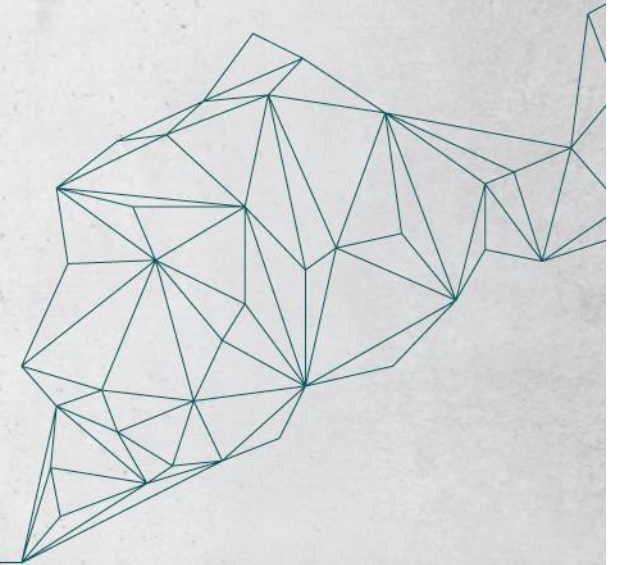
NÜRNBERG MESSE

Emerson R32 fixed and variable speed scrolls.

*The cutting edge of
compression technology for
chillers and heat pumps*

M. Boldrini

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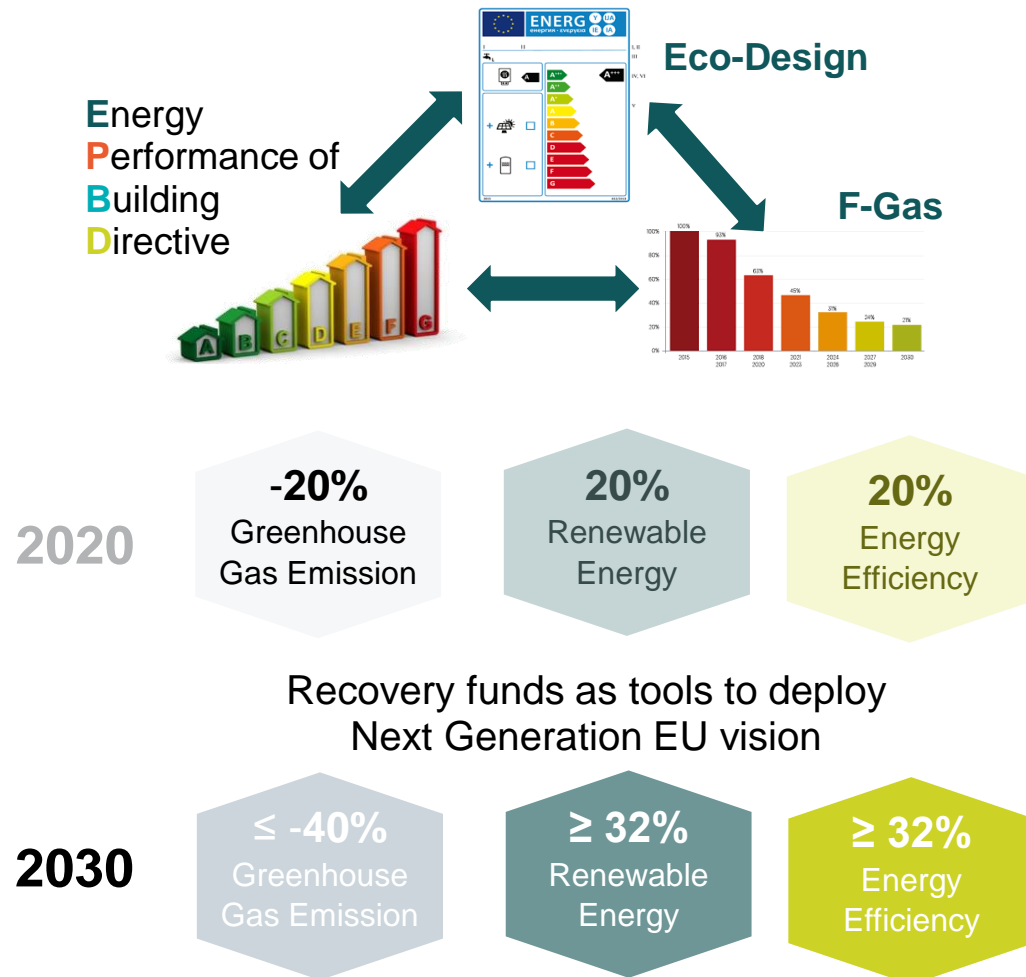
Agenda

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| | F-Gas & Eco Design |
| | Why R32 |
| | The Emerson technology |
| | Emerson R32 optimized fixed and variable speed solutions |

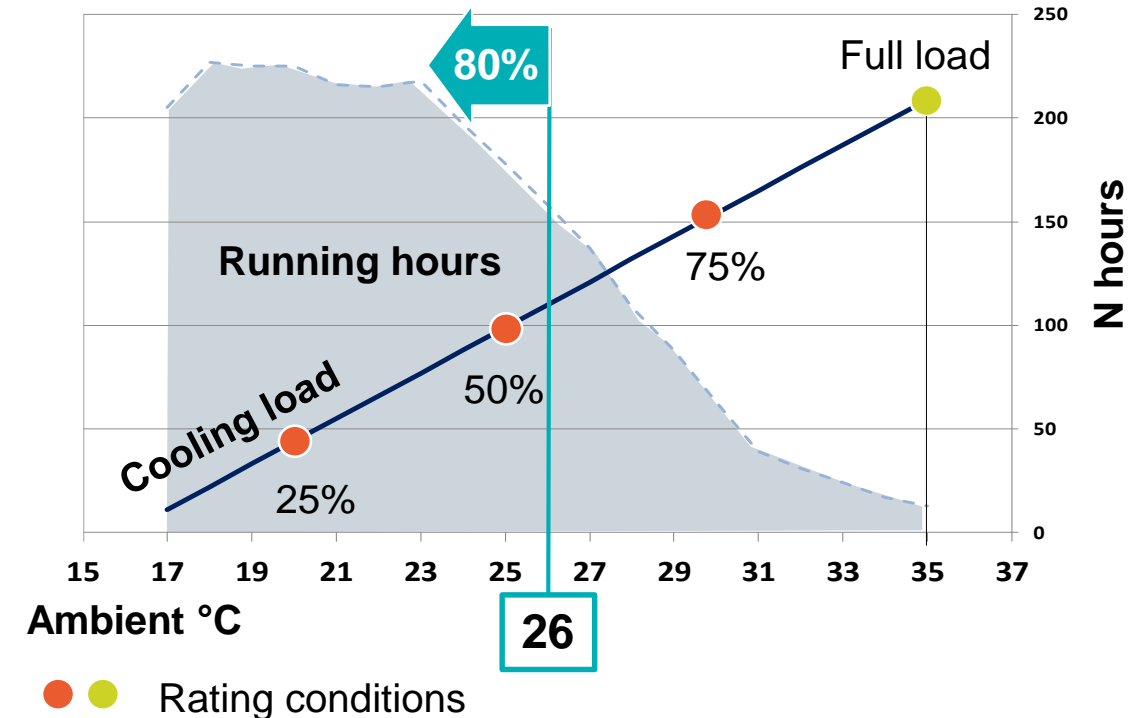
F-Gas & Eco Design

The introduction of seasonal performance indicator

EU Target are getting more ambitious – Next Generation EU



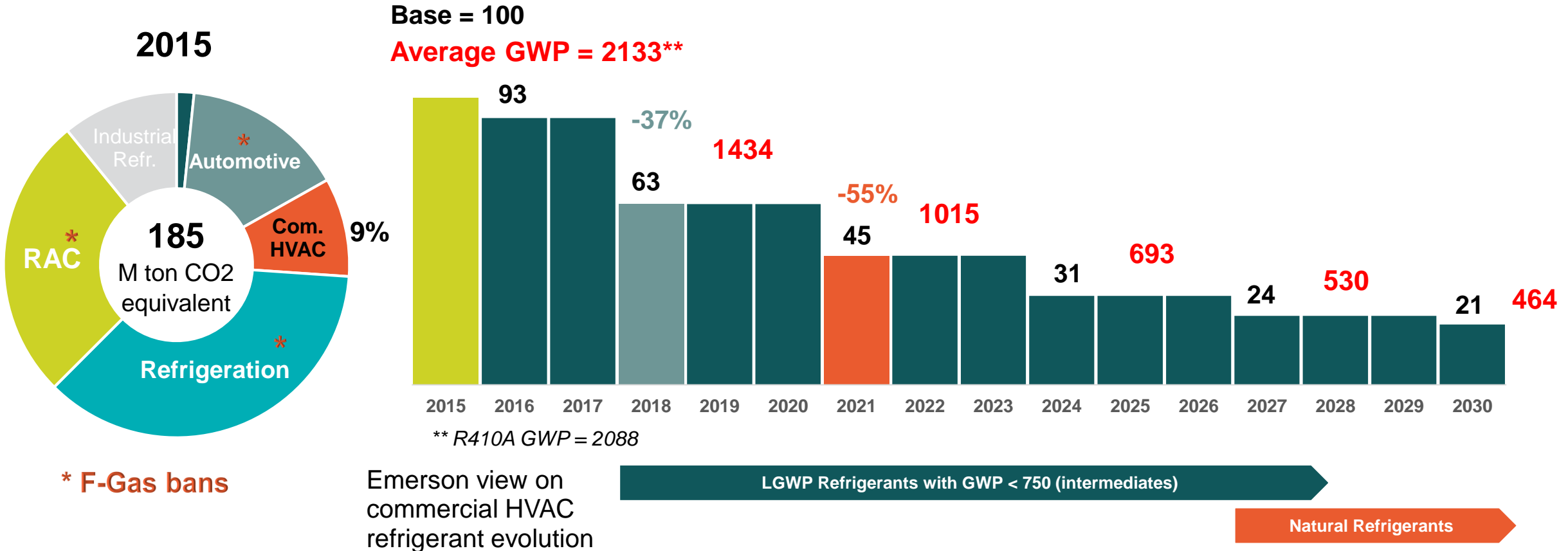
Eco – Design: increasing the performance of HVAC systems



- **Eco Design** has set a min performance requirement for HVAC **SEER and SCOP as seasonal efficiencies**
- OEMs need to design a system for full load while maximizing efficiency at part load

F-Gas & Eco Design

The phase down of high GWP refrigerant



- **Commercial HVAC market** represent approx. **9%** of the overall refrigerant market and **it doesn't have any ban**
- **Refrigerant price** is driven by GWP and quotas
- **Local regulation** are emerging to limit the usage of high GWP refrigerant
- Trend in favor of **natural refrigerants** as possible landing scenario

Why R32

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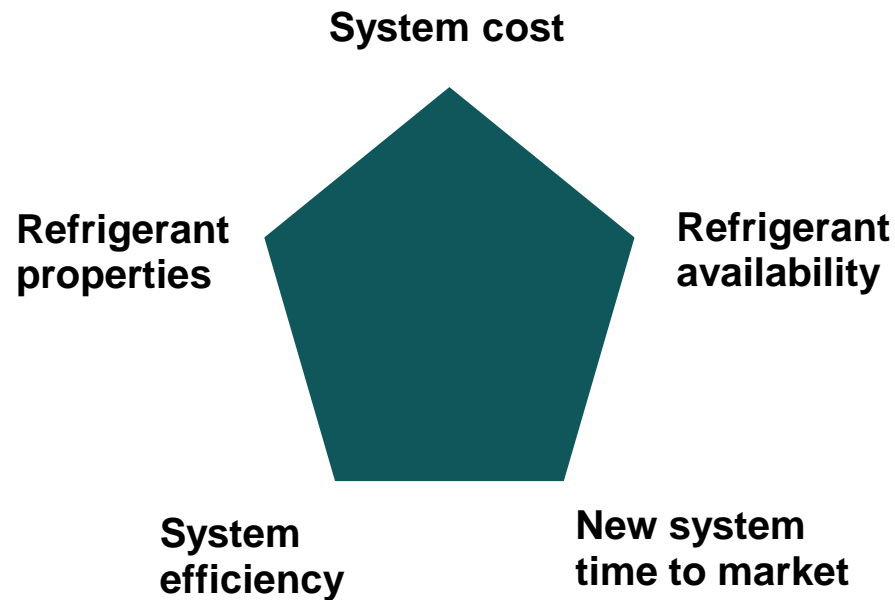
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Why R32

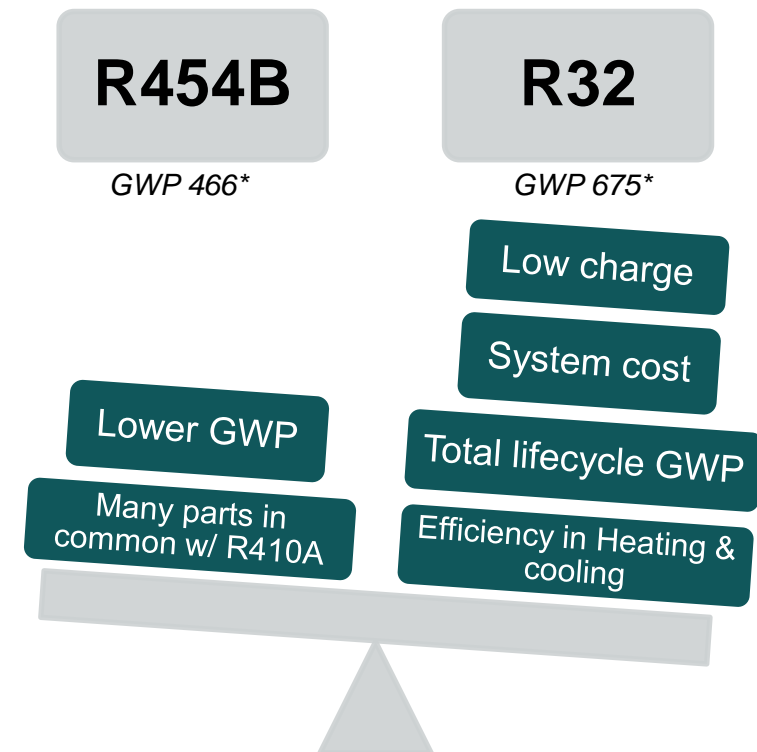
The best low GWP refrigerant to replace R410A

The best refrigerant is a multi criteria choice



- **2 main R410A alternatives: R454B & R32**
- **R454B** implies today less design efforts
- **R32** optimized systems reach best performance with lower applied costs

R32 as the best compromise among R410A candidates



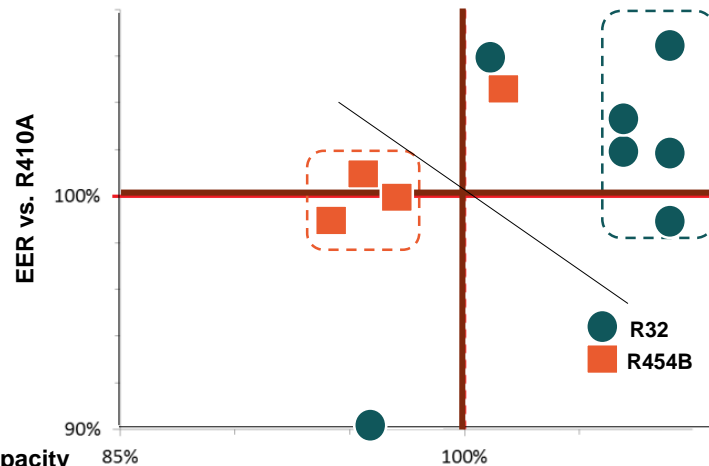
* GWP according to IPCC AR4

Why R32

R32 is widely available, well known, more efficient

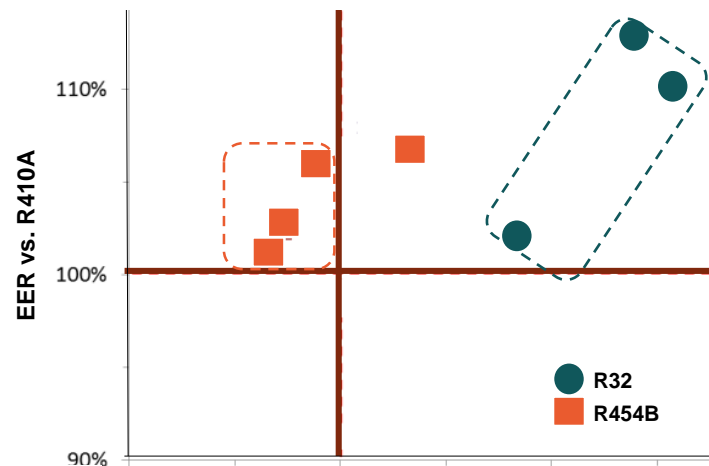
R32 delivers the best efficiency

Relative Cooling performance to R410A at 35°C Ambient



Cooling capacity
vs. R410A

Relative Cooling performance to R410A at 52°C Ambient

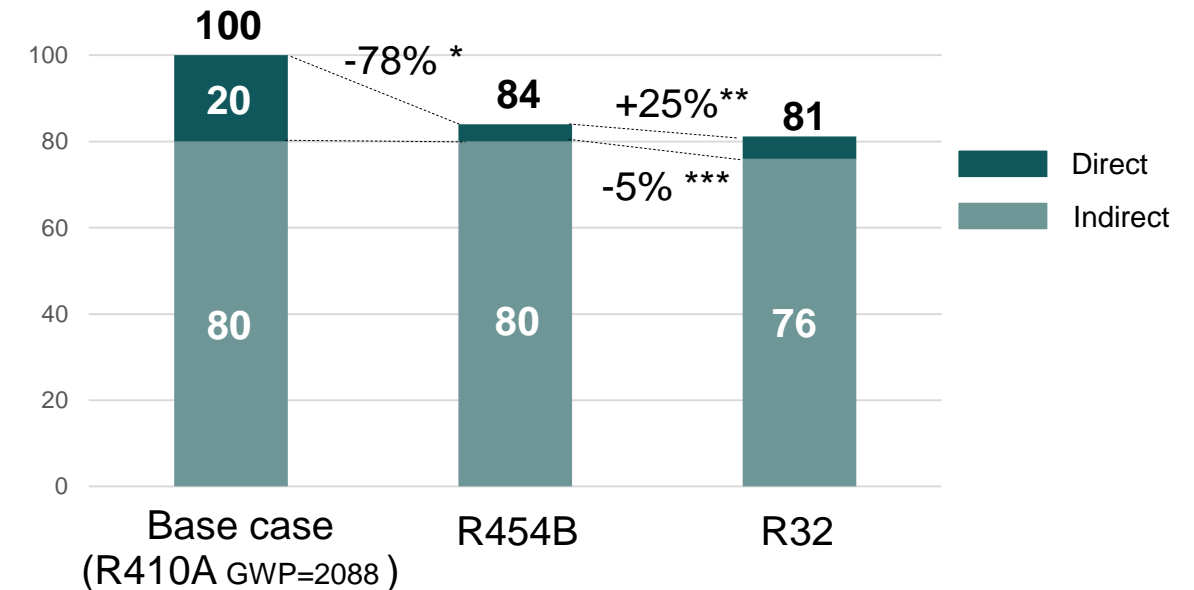


Cooling capacity
vs. R410A

source : AHRI AREP Conferences & reports

R32 as the best sustainable solution

System Lifespan CO2 emissions: – Indirect related to system efficiency - Direct due to refrigerant's charge



* -10% charge vs. R410A & GWP = 466

** -20% charge vs. R410A & GWP = 675

*** Average seasonal efficiency gain of R32 optimized system

- **R32** is also a constituent of the **R410A** blend
- **R32** is already **widely applied** in RAC system worldwide

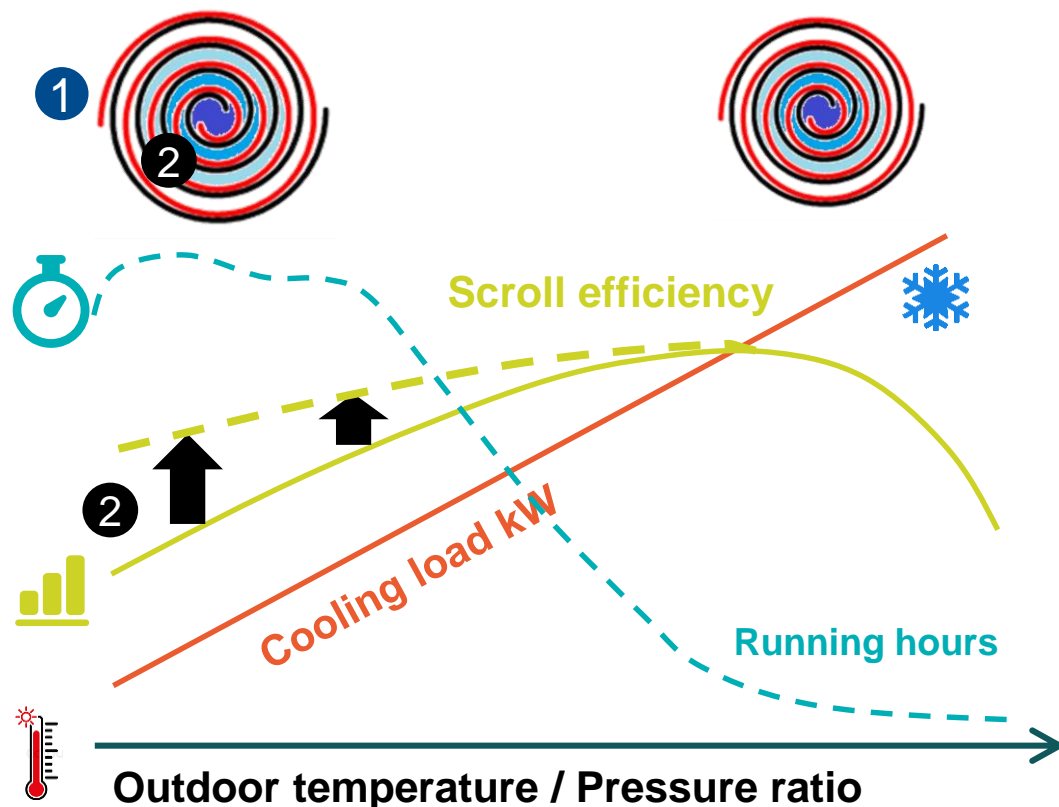


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The Emerson technology

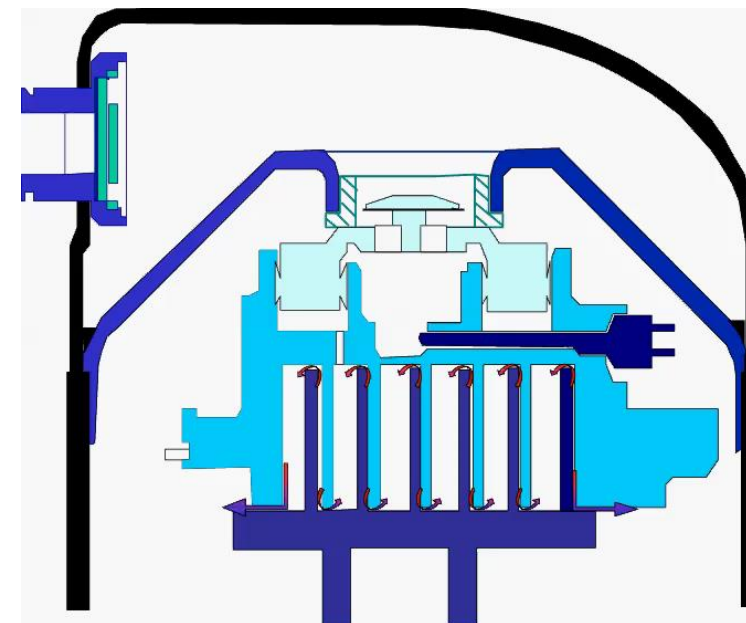
Increasing the efficiency thanks to Variable Compression Ratio valving
Double compliance to reach the best reliability in every transient conditions

Emerson Variable Compression Ratio technology



- 1 At part load (low pressure ratio) the gas is over compressed
- 2 Emerson **Variable Compression Ratio** valve opens before it

Emerson double compliance (radial & axial)

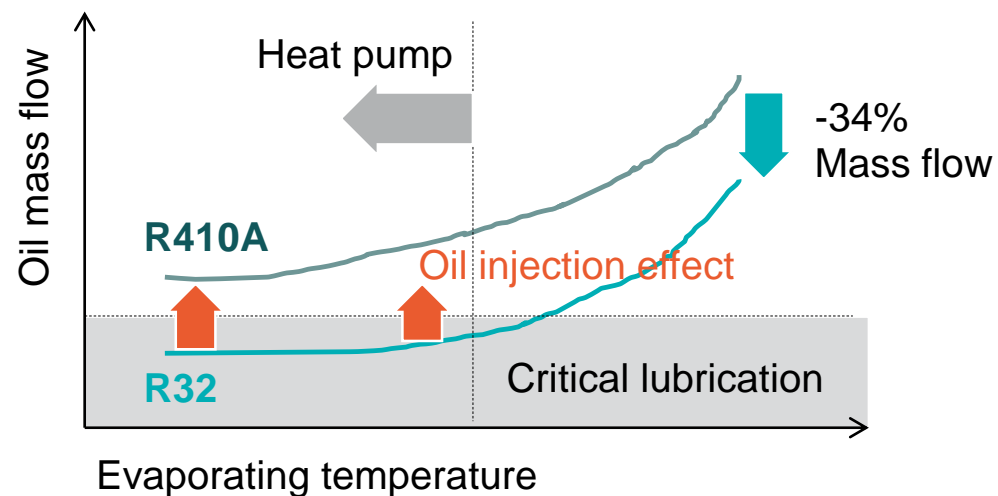


- **Superior resistance** to droplets back to scroll's inlet during transients (defrosting, ...) or cold start-ups
- **Low superheat operation** is possible without compromising in reliability

The Emerson technology

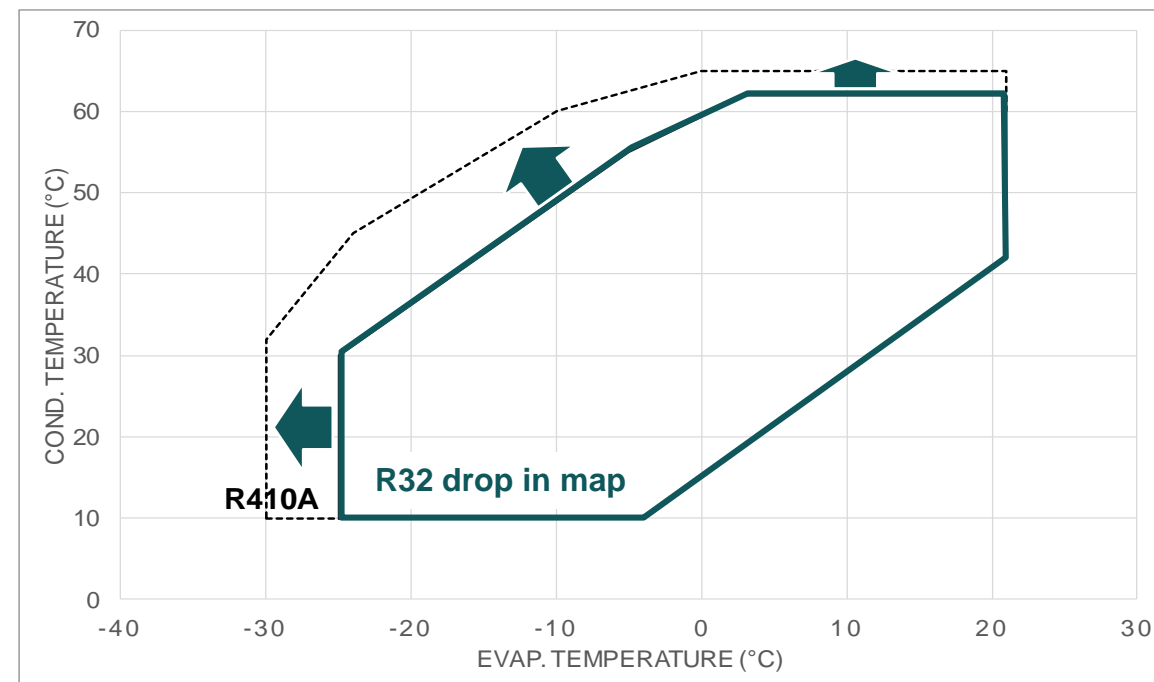
Optimized scroll design for R32 to keep the same operating map and reliability of R410A scrolls

R32 Low mass flow may have impact on reliability



- **Emerson R32 optimized compressor with oil injection**
 - The best compressor reliability while
 - Limiting the **oil circulation ratio below 1%**, and therefore
 - Maximizing **system efficiency & reliability**

R32 High heat of compression limiting operating map



- **Emerson R32 optimized compressors** achieve the same operating map of R410A Emerson scrolls thanks to
 - Perfect motor sizing vs. scroll's displacement
 - New R32 dedicated oil
 - Scroll design optimization
 - **Superheat management**

Emerson YP & YPV range

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Emerson YP & YPV range

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Emerson offers the **widest R32 optimized fixed and variable speed scroll compressor range** for HVAC systems Eco Design complaint



| MINI SYSTEMS | | LIGHT COMMERCIAL | | | LARGE SYSTEMS | |
|---|---|---|--|---|---|---|
| Var. Speed | YP K1 | YP K1 | YP K1 | Variable Speed | YP K1 | YP K1 |
| 4-5HP | 7-7.5 HP | 9-10HP | 12-15HP | 10-15HP | 20-25HP | 30-40HP |
|  |  |  |  |  |  |  |
| 3 – 25 kW | 18- 20 kW | 23-27 kW | 31-41 kW | 7.5 – 63 kW | 52-65 kW | 84-108 kW |
| Single | Single & tandems | Single & tandems | Single & tandems | Single & tandems with YP 9-25HP | Single, tandems and trios | Single, tandems, trios & quad |
| Manufactured in Europe | | | | | | |

- All the YP(V) are equipped with the Emerson technologies of **Variable Compression Ratio, double compliance** and **oil injection**
- All the Emerson compressors don't exceed **PED Cat III** to ease OEM design and manufacturing process
- Emerson continuously invests in **European factories** and suppliers' base to assure the **best in class** and **resilient supply chain**

**Thank you for your
attention.**

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