



Promouvoir
une attitude
responsable

HVAC

AIR-TO-AIR SOLUTIONS - STATIONARY RESIDENTIAL HEATING AND COOLING

POSSIBLE SOLUTIONS



DESIGN OF THE SYSTEM (ACCORDING TO EN 378 GUIDANCE)

R-454C

R-290

Class III
In technical room or open range
(Full cooling piping)

Air-to-water heat pump / Aircon

Air-to-water heat pump / Aircon

Refrigerant type (HFC/HFO/HC/Inorganic)

HFC/HFO

HC

GWP (according to F-Gas UE/2024/573)

146

0.02

**Safety classification
Lower Flammability Level LFL**

A2L - 0.293 kg/m³

A3 - 0.038 kg/m³

**Classification
(according to Pressure Equipment Directive PED)**

1

1

F-gas quotas

Applicable

Non-applicable

Specific regulatory constraints

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**Maintenance complexity
(training, safety, tooling, Personal
Protection Equipment PPE ..)**

Training is mandatory
Specific tooling
PPE

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PPE

**Coefficient of Performance
COP (theoretical)¹**

7.0

7.1

**Energy Efficiency
Ratio EER (theoretical)²**

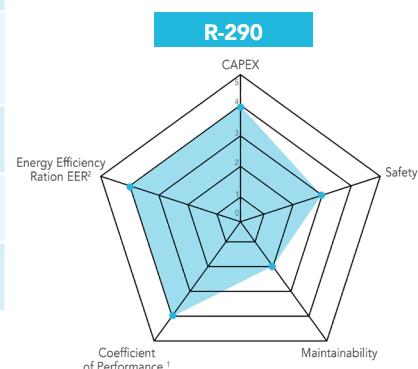
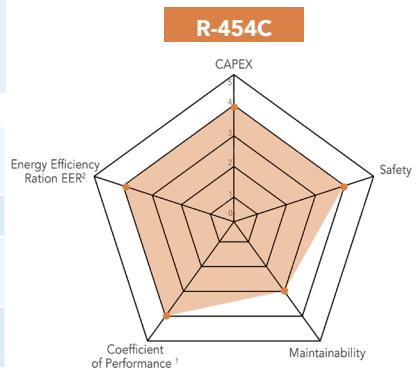
5.1

5.2

**Technology readiness
(prototyping, field test, availability)**

Under development

Monoblock : available
Multi-split : under development



¹ Tk = 40°C - To = 2°C - SC = 5K - SR = 3K - Isentropic efficiency = 100%

² Tk = 45°C - To = 2°C - SC = 5K - SR = 3K - Isentropic efficiency = 100%

CONCLUSION

Class II : R-32 is the most-commonly used refrigerant in this type of application. Flammability is the main blocking point to a wider usage of low-GWP refrigerants, which are actually limited to « monosplit » units, due to their refrigerant charge limit. « Multi-split » are under development.