



Promouvoir
une attitude
responsable

HVAC

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

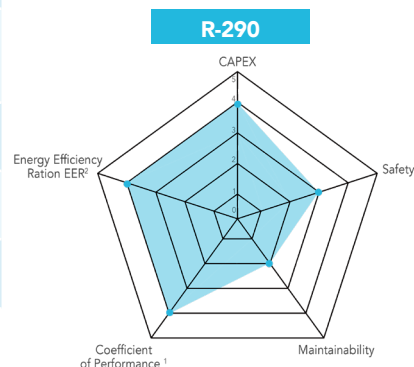
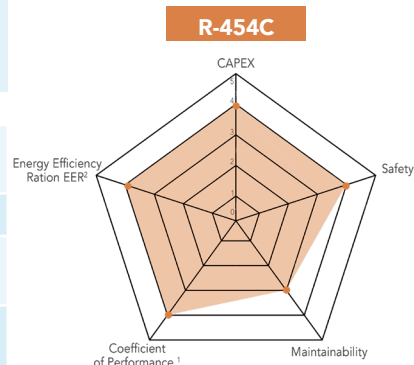


POSSIBLE SOLUTIONS

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	++	+++
Maintenance complexity (training, safety, tooling, Personal Protection Equipment PPE ..)	Training is mandatory Specific tooling PPE	Training is mandatory Specific tooling 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.