



The Business Case Natural Refrigerants



BRUSSELS

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ATMO.org



Safe and efficient use of R-290 on buses

Eberspächer Süttrak GmbH & Co. KG

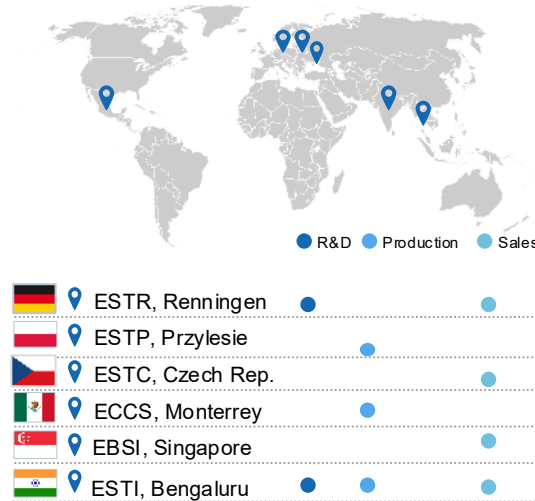
ABOUT EBERSPÄCHER SÜTRAK

Footprint & Product / System Portfolio

- New facility in Przylesie (Poland):
Plus 30% capacity (up to 20,000 units p.a.),
low CO₂ via photovoltaics & heat pump
- ECCS (Mexico): New business model
successfully implemented - lean
structure & faster customer support
- ESTC (CZ): Lean sales & service
hub for Eastern Europe
- 2nd unit India: vertical integration for
intercompany component sourcing



Location / Legal Entities



Factory in Przylesie, Poland







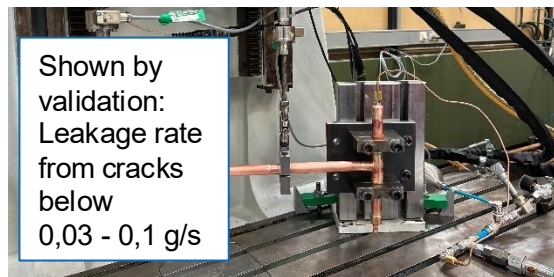
RISK OF R-290 IN BUSES



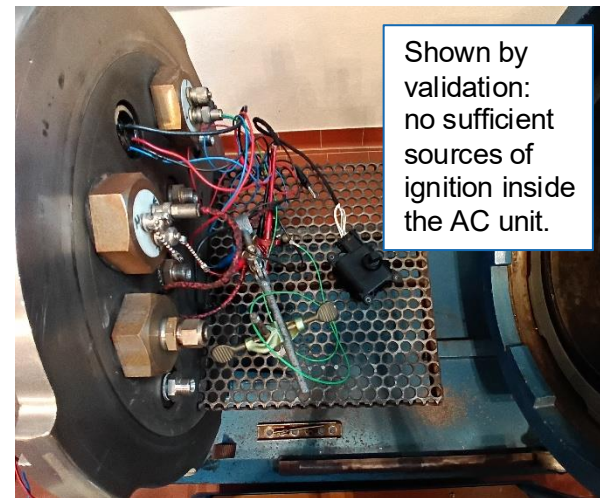
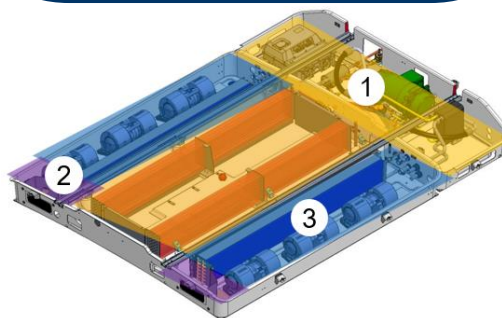
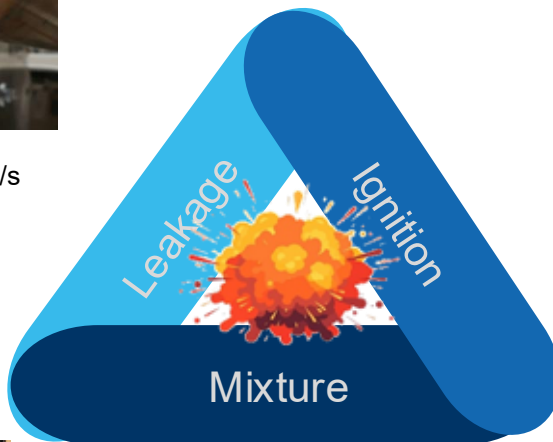
Ca. 50-80 g/s



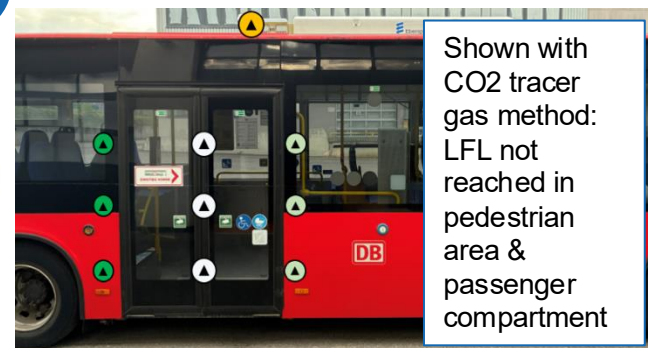
Ca. 0,01 g/s → 3 kg charge leaking
within 4 days!



Shown by
validation:
Leakage rate
from cracks
below
0,03 - 0,1 g/s



Shown by
validation:
no sufficient
sources of
ignition inside
the AC unit.



Shown with
CO2 tracer
gas method:
LFL not
reached in
pedestrian
area &
passenger
compartment

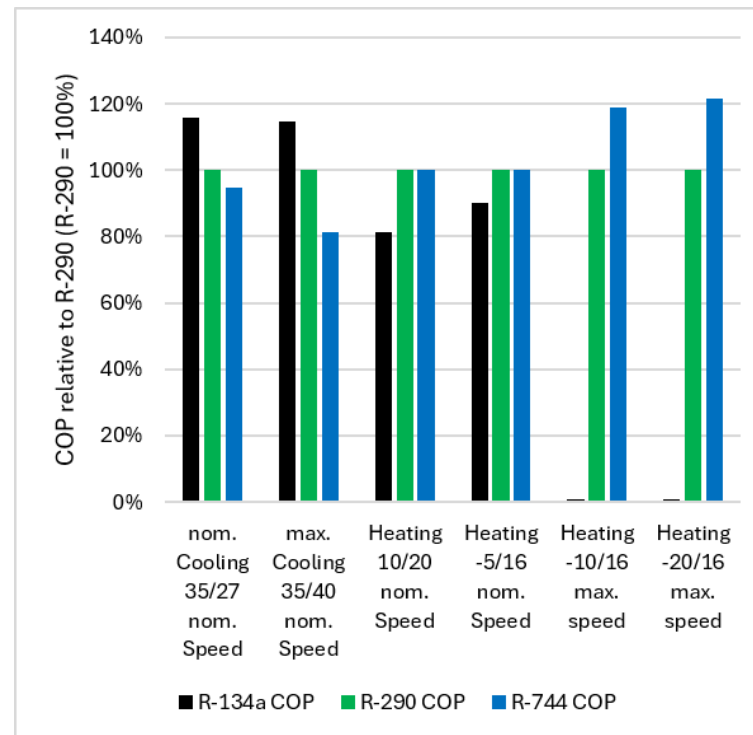
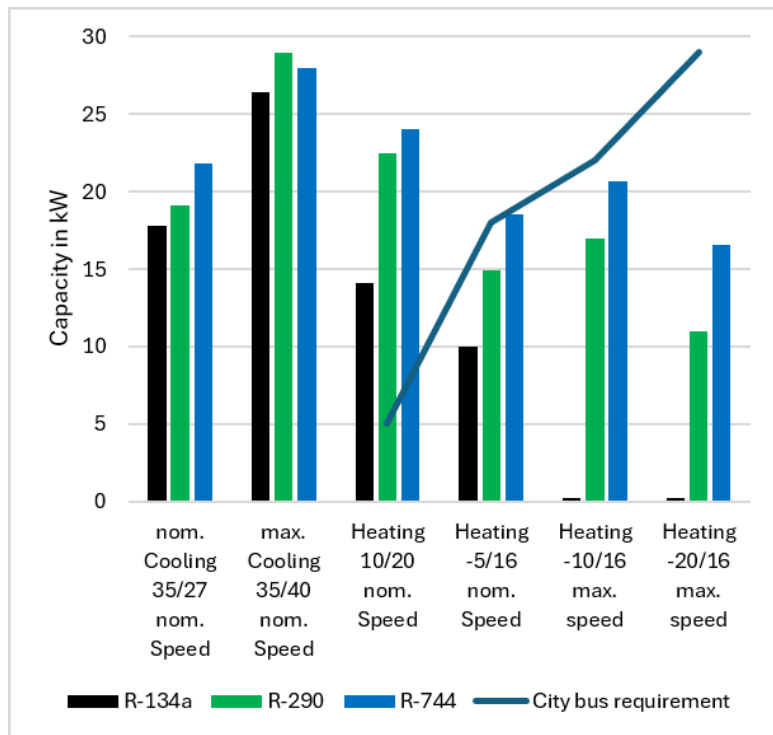


PERFORMANCE & EFFICIENCY

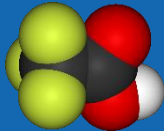
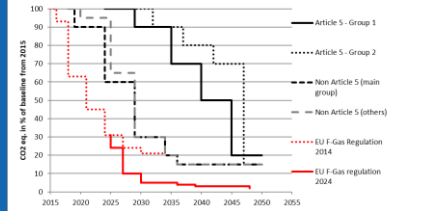
	R-134a	R-290	R-744
Unit type	AC135HP	AC135HP	AC138EVO
Target bus type	12 m city bus		
Compressor type	Scroll		Piston
Heat pump concept	Refrigerant reversal		Air reversal
Refrigerant charge	6 kg	2,4 kg	4 kg

PERFORMANCE & EFFICIENCY

Capacity & COP in comparison to R-134a and R-744 – measurement data







SUMMARY & OUTLOOK

- Risk can be handled and extensive validation shows, that the risk is very often much lower than expected.
- R-290 is well suitable for Europe with hot summers, few very cold winter days and can cope with R-744 in most winter conditions.
- A natural refrigerant solution for ICE as well as electric buses is available and first fleets of will be equipped with R-290 starting in 2027.



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