
JAPAN
ATMO
sphere

RAISING EFFICIENY IN BOTTLE COOLERS

by applying R290 Variable Speed Compressors

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Our History – 60 Years at the Heart of Innovation

1956

Danfoss Compressors founded with production facilities in Flensburg, Germany

1993

Introduction of Compressors for **Natural Refrigerants** – R600a & R290

1998

Variable Speed – New standard energy efficiency with **variable speed control**

2010

Acquired by **Aurelius Group** and changed name to **Secop**

2013

Secop acquires **ACC Fürstenfeld** in Austria

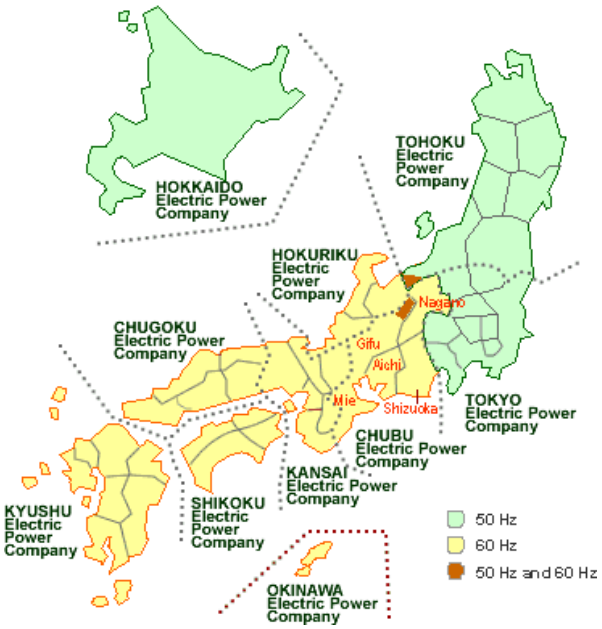
Main market Segments

Household

Light Commercial

DC-Powered

Voltage supply vs. Efficiency



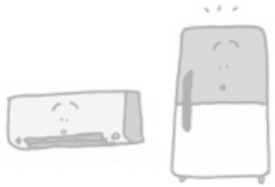
Some appliances cannot be used on different frequencies.

Be careful of using electrical appliances which may not be used in a different frequency area.

- **Appliances which may be used in either area**
  Televisions, Radios,etc.
- **Appliances which may be used in either area but with lower efficiency**
  Refrigerators, Electric fans, Air-conditioners, etc.
- **Appliances which cannot be used in a different frequency area**
  Washing machines, Microwave ovens, Fluorescent lights (except inverter-types), Clothes driers, etc.

※ *These appliances are shown as general examples. There are exceptions, so it is best to check the operating manual or consult with the manufacturer directly.*

Televisions and radios may be used.



Refrigerators and air-conditioners will work but less efficiently.

Washing machines and microwave ovens may not be used.

- **Appliances which may be used in either area but with lower efficiency**
  Refrigerators, Electric fans, Air-conditioners, etc.

www.kepco.co.jp/english/home/denki/01.html

Measures to raise Energy efficiency

Design optimization of the refrigeration system: Improve thermodynamics

Optimization on components: Add intelligent controls

Multiple Vacuum panes (Glass Door)

Vacuum panels (Cabinet Body)

Compressor

Impact on Compressor by changing platform & refrigerant

Q: Why?
A: Meeting EU F-Gas regulations!
(or US SNAP, …)

COP: + 19%

Cost: - 15%

R134a

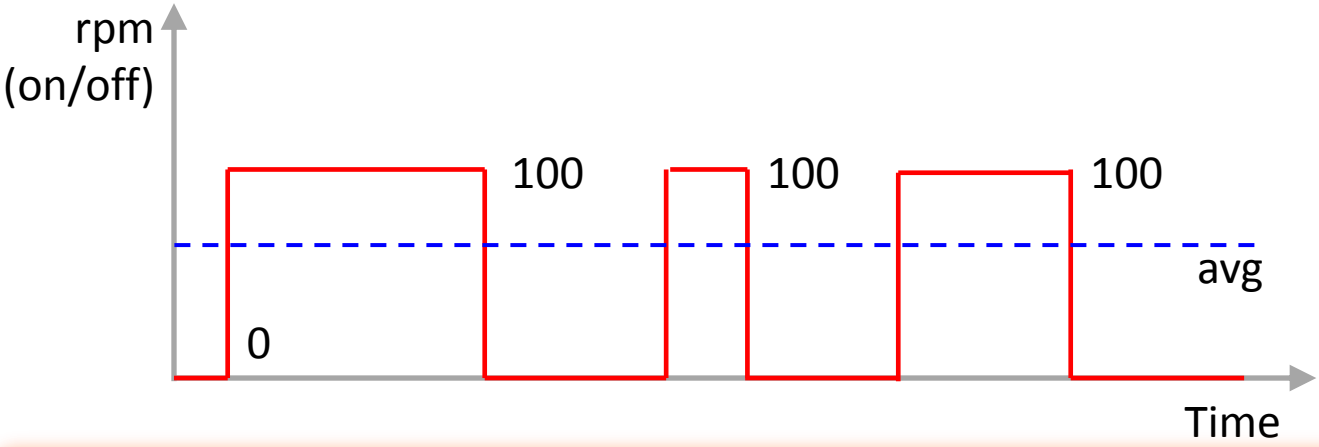
R290

Bottle Cooler

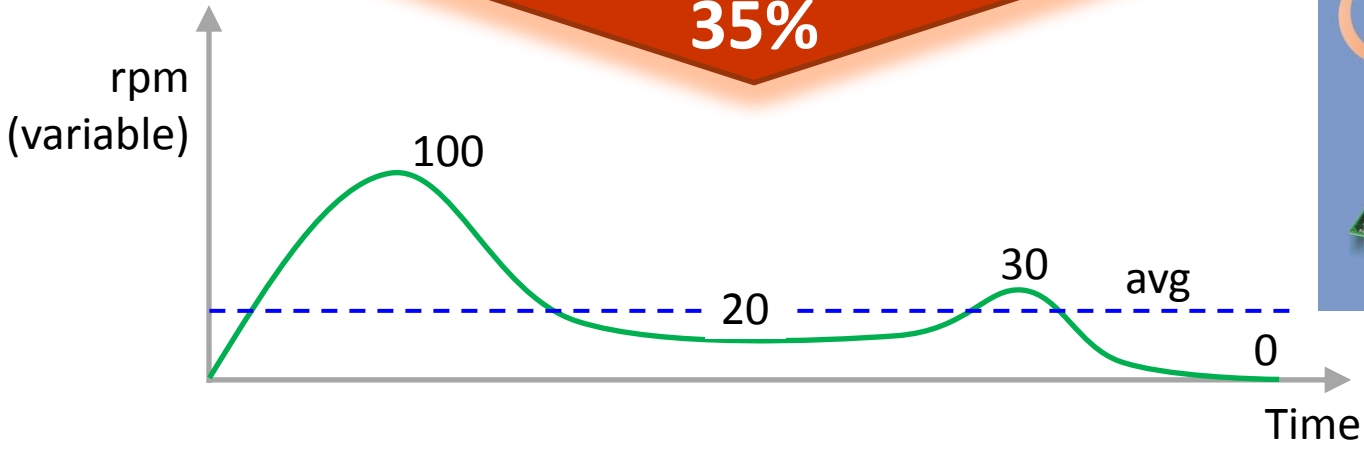
Characteristics R134a	
Volume	380 L (470 cans)
Energy consumption	1135 kWh/year

Characteristics R290	
Energy consumption	990 kWh/year (-13%)
Cost (compressor)	- 15%

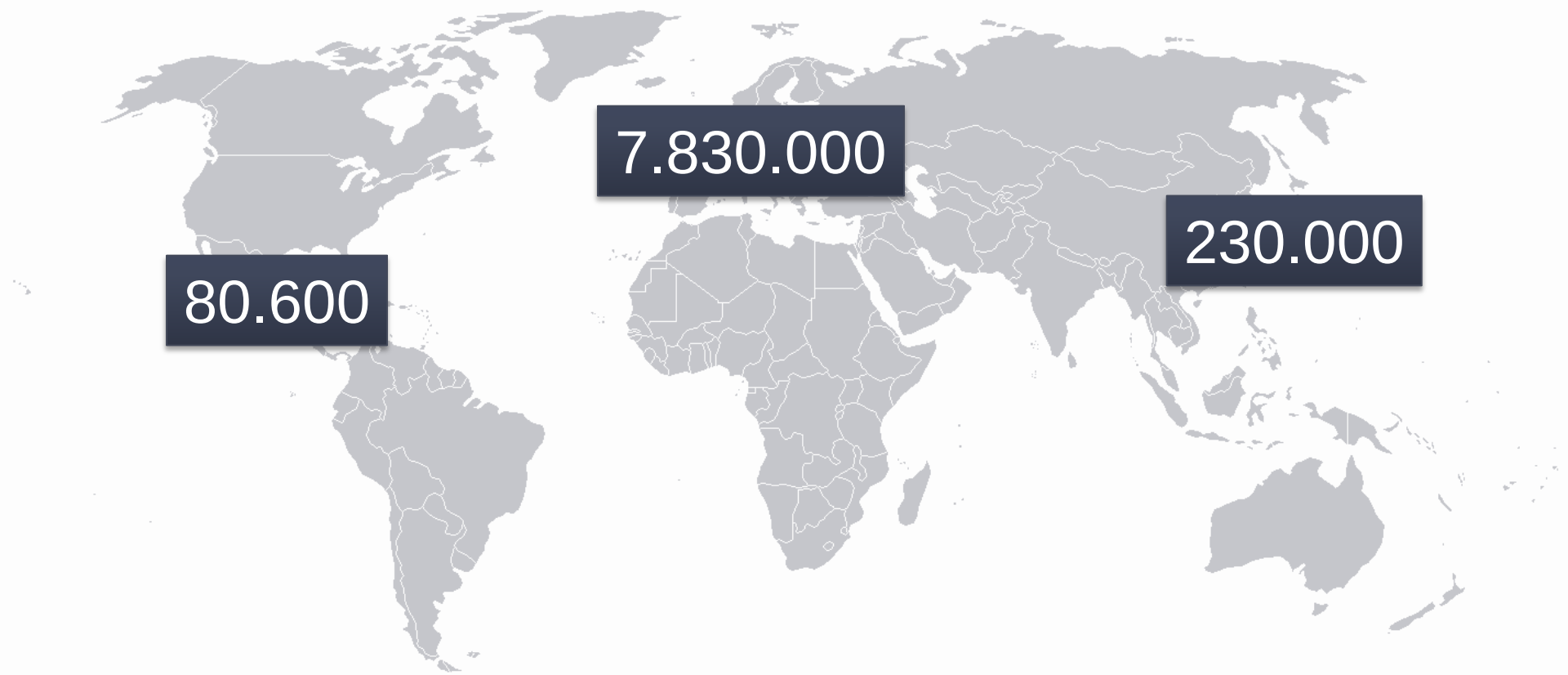
Technical Principle



Increasing run-time at lower speed
can save energy by
35%



Secop‘s R600a & R290 footprint 2015/16



Total: 8.400.000

Conclusion

- R290 is the #1 choice refrigerant for low GWP & efficiency
- Adjustable cooling capacity for actual system demand
- bi-frequency 50-60 Hz at 220-240V and 100-115V
- regions of unstable power supply and tropical environments
- smaller compressor in terms of displacement and dimensions
- lower noise emission due to lower speed - minus 5 dB(A)
- HST features; no pressure equalization needed to start the compressor

Q & A?

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Thank you very much!