



ATMO
sphere

***“R290 LBP VARIABLE SPEED
COMPRESSOR IN A PLUG-IN
ICE-CREAM CONSERVATOR”***

Vicente Guilabert

HUAYI COMPRESSOR BARCELONA, S.L

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compressors
Live the cooling experience



“R290 LBP Variable Speed Compressor in a plug-in ice-cream conservator”

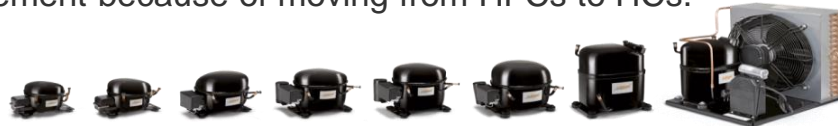
THE PRODUCT

Hermetic Compressors and Condensing units for Light Commercial Refrigeration

- For all types of applications
- High Efficiency Compressors
- Variable Speed Compressors
- DC Compressors
- Green Cooling Ranges

The advanced design of the Green Cooling Ranges allows:

- Efficiency improvement (up to 50% compared to standard versions).
- Lower CO2 emissions to the atmosphere.
- Use of natural refrigerants as R290 with no direct effect on global warming.
- Additional COP improvement because of moving from HFCs to HCs.



jiaxipera

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compressors

Efficiency
improvement
up to

30%

OBJECTIVE OF THE STUDY

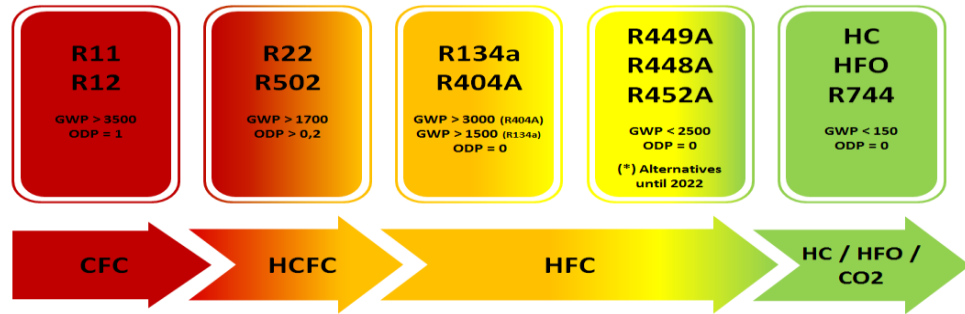
The objective of the study is to reduce the energy consumption on a ice cream conservator using a high efficiency variable speed compressor in R290 LBP.

INFORMATION

- Compressor: HVD70NT
- Displacement: 7 cc
- Speed range: 1200-4000 rpm
- Refrigerant: R290

- Appliance: Ice cream conservator
- Volume: 315 liters
- Ambient temperature: 86°F
- Humidity: 55%
- Average internal temp.: -0,4°F

WHY PROPANE?



SUSTAINABLE COOLING



LOW ENERGY CONSUMPTION



NATURAL REFRIGERANT

EFFICIENCY EVOLUTION

This new variable speed platform offers the lowest applications' energy consumption by means of electronically self-adjusting the compressors speed to the appliance cooling needs, while improving the energy consumption **up to 30%**

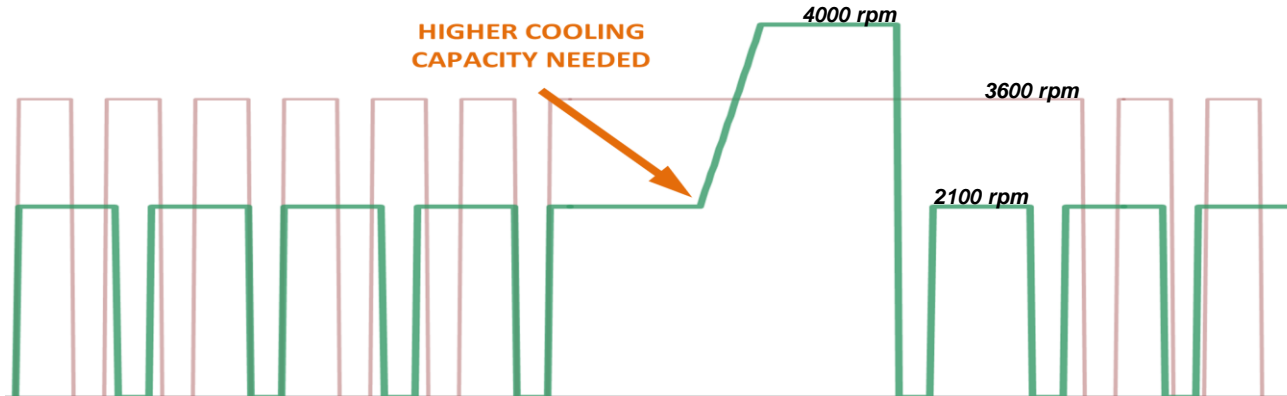


TEST RESULTS

Data	NUT60LRa	NUT60LRb	HVD70NT
Evaporating temperature (°F)	-31,2	-31,8	-31,5
Condensing temperature (°F)	104,4	105,6	104,9
Inlet temperature (°F)	-1,29	-1,32	-1,66
Duty cycle (%)	52,6%	53,2%	79,0%
Energy consumption (kW/24h)	2,75	2,51	2,11
Energy consumption difference vs cabinet with std compressor	-	-8,73%	30,33%



LOW ENERGY CONSUMPTION



TEST RESULTS



PAYBACK ACCUMULATED IN 5 YEARS

Accumulated in 5 years			
Data	NUT60LRa	NUT60LRb	HVD70NT
Total energy consumption (kWh)	5019	4581	3851
Total energy consumption savings vs std (kWh)	-	438	1168
Total energy cost savings (*)	-	\$57.38	\$153.01
Savings per day vs std (dollars)	-	\$0.03	\$0.08
CO2 emissions (kg CO2) (***)	2258	2061	1733
CO2 emissions reduction vs std (kg CO2) (***)	-	-8.73%	-23.27%

(*) 0,131 \$/kWh average energy cost in USA

(***) Supposing 0,45kg CO2 emissions for each kWh



Sustainable Cooling



ADVANTAGES OF VARIABLE SPEED COMPRESSORS



Maximum
Effi.
ciency

Increased efficiency up to 30% compared with a high efficiency ON-OFF compressor.



Completely
Silent

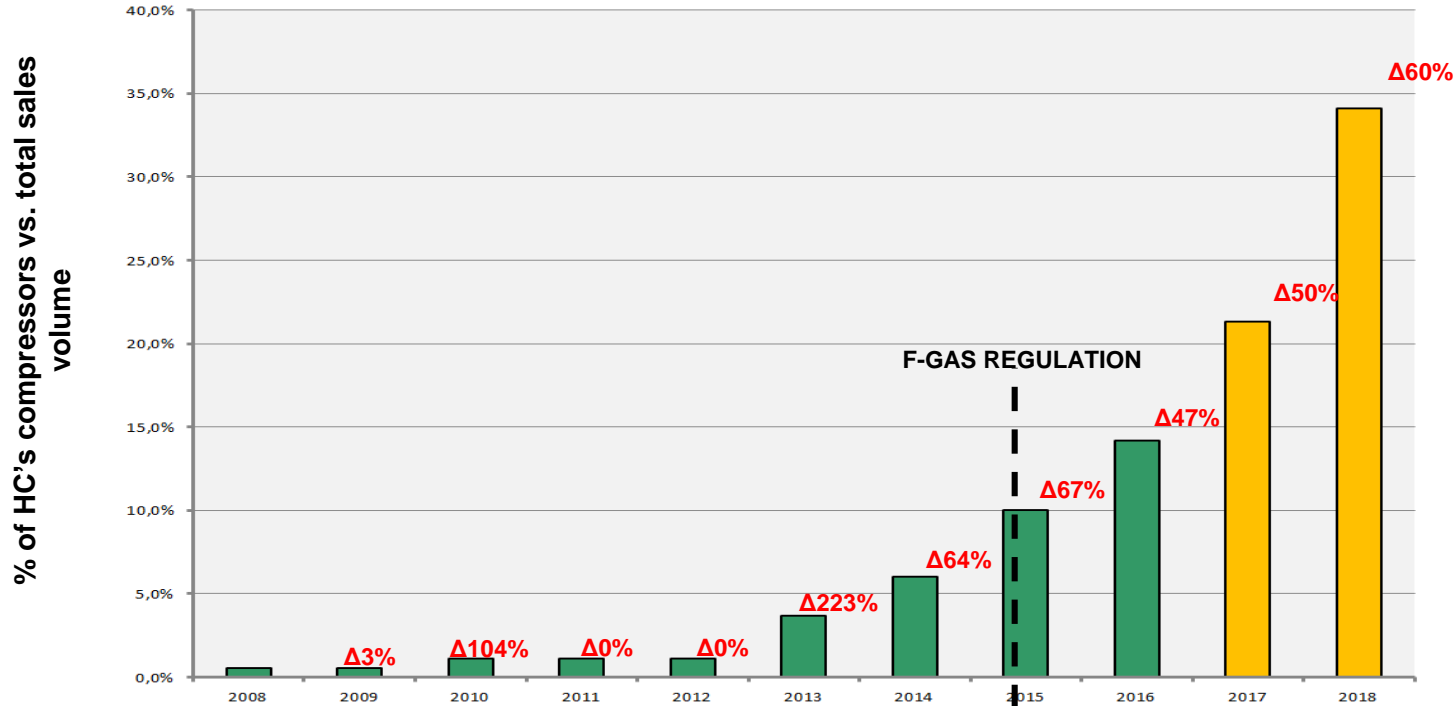
Lower Sound Power Level due to system is usually running at lower speed.



Minimum
size

New shell of 129,5mm of height.

MARKET EVOLUTION



R290 ADVANTAGES VS OTHER REFRIGERANTS FOR LIGHT COMMERCIAL REFRIGERATION

- R290 one of the best environment friendly alternatives (excellent GWP).
- R290 already EPA SNAP approved: Global refrigerant solution.
- R290 applied in the most efficient appliances produced in Europe from last years with very positive results with million units running.
- R290 systems do not requires significant changes vs current HFC's and vs other ecological alternatives (CO2) (Reasonable working pressures).
- R290 allows the use of lower displacement compressors vs R134a and R1234yf to get equivalent cooling capacity.
- Weak point of R290 is the limitation of 150 g charge per circuit (which cover most of light commercial appliances charge). Restriction under discussion to extend the maximum charge but estimated to middle term.



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Thank you very much!

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