

Business Case for Natural Refrigerants







Breaking Boundaries of Hydrocarbon Usage in Light Commercial Applications



#GoNatRefs

SECOP

CONTENTS	Carbon Footprint	4
	Case Study	6
	Break Boundaries	11
	→ Control Flexibilities	12
	\rightarrow System Optimization	15
	Conclusions	16



REDUCING CARBON FOOTPRINT



THE OPTIMAL RECIPE TO MINIMIZE THE CO₂ FOOTPRINT



Hydrocarbons are the best green refrigeration solution for hermetic compressors:

- Low GWP
- Wide application envelope vs A2L refrigerants
- Very high Energy efficiency
- Smaller compressor (downsizing)
- Better noise performances

ELECTRONIC CONTROLLED

Electronic controlled compressors are the best option for maximum system energy optimization:

- Optimized energy consumption
- Low noise
- Wide voltage range
- Temperature stability
- Optimum system control and diagnostics



- Transition from Fix Speed HFC to FSD R290 is a 1st optimization step
- Migration from Fix Speed to Variable Speed is a 2nd step to maximize energy savings
- Combination of R290 and ECC allows you to achieve optimum energy rating green cabinet
- Secop platforms for ECC R290 compressors released up to 18 cc displacement
- Modular electronic can grant solutions to satisfy different systems needs
- Secop simulation tools can support system optimization with semi-empirical approach

* Electronic controlled compressor



CASE STUDY HFC \rightarrow HC \rightarrow ECC



1st Step: R404A FSD to R290 FSD

Baseline

Туре	Vertical multideck cooler
Configuration	Vertical 2 doors Stand Alone or Combined Island
Volume	1,062 liters (37.5 ft ³)
Application	MBP 0°C to +2°C (32°F to 35.6°F)
Defrost	Electrical heater



Compressor

Туре	Fixed Speed		Fixed Speed
Refrigerant	R404A		R290
Weight	17.4 kg (38.4 lbs)		17.4 Kg (38
Height	246 mm (9.7 inch)		246 mm (9.
Displacement	27.8 сс	/	27.8 cc
Refrigerant Charge	405g (14.3 oz)		150g (5.3 o



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New R290 compressor Selected from data simulation

- R290 Low GWP green solution
- System optimized: reduced costs with natural refrigerant fully compliant to regulations
- Energy savings: high efficiency compressor



Definition & optimization with Secop application engineering support

- Refrigerant charge
- Expansion device
- Heat exchangers

3

System Components replacement

 Non-spark and Hydrocarbon proof fans, lights, switches, etc.

Customer Benefits







2nd Step: R290 FSD to R290 ECC

Baseline

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Compressor

Туре	Fixed Speed
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Refrigerant Charge	150g (5.3 oz)



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New compressor

Selected from data simulation

- Variable speed drive green compressor R290
- TOP energy saving settings
- Lower noise level
- Temperature stability control
- Operation in any region (multi-voltage input)



Fine tuning & optimization with Secop application engineering support

- Refrigerant charge
- Expansion device
- Heat exchangers



Components optimization and electronic setting

- Intelligent electronics controlling
- Higher efficiency auxiliary parts selection



Customer Benefits





BREAK BOUNDARIES



Modular Electronics – Make the Controls Smarter



⁽¹⁾ AEO: Adaptive Energy Optimization semi-closed loop control
⁽³⁾ TOOL4COOL: PC software to configure and monitor ECC compressor

⁽²⁾ GFCI: Ground-Fault Circuit Interrupter

⁽⁴⁾ HACCP: Hazard Analysis Critical Control Point



Modular Electronics – Break Existing Boundaries



System Optimization - Traditional Approach



- Select the testing compressors based on baseline cabinet
- Repeat test cycles to define the best compromise compressor vs. system
- 3 Final verification tests

TRADITIONAL APPROACH

Requires many interactions in the labs to find the right compressor to achieve system compromise = long time & heavy resource consumption

Sustainable Cooling Solutions

SEC(

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Secop Approach - Make System Optimization Easier

1. Cooling System Design & Calculation







1 Semi-empirical simulation available for wide range of applications

2 Save >75% of original lab resources, time, cost, etc.

3 Best performances & reliability balance

SECOP SIMULATION APPROACH

Years of data collected testing a wide range of cabinets able to **optimize the system saving a lot of testing time**



CONCLUSIONS

SECCP

Best Options to BREAK BARRIERS

R290 and ECC combined represent a huge system upgrade with lots of benefits Additional cost for ECC will be quickly recovered by ROI and TCO improvements Premium support helps achieve optimal system setting efficiently

With the new **SLVE18CN** compressor + electronics

Break the charging limits boundary to cover up to 30cc FSD capacity Secop Modular Electronics provide you much more flexibility

Break the system limitations with fast ROI and best TCO

Secop offers premium support with **rich R290 & ECC experiences & tools**

Break the traditional approach with optimized resource, time & cost



INTEGRAL TO YOUR SUCCESS

Secop is a reliable and experienced partner for **efficient cooling solutions**



For more details, welcome to visit our website: <u>www.secop.com</u>



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Thank you for listening!