

Marta San Román  
October, 2016

## **SOLSTICE® L40X (R-455A)**

F-gas ready GWP<150 solution for high, medium and low temperature

**Honeywell**

# Buy Only From Authorised Dealers



**PROTECT YOURSELF**

Don't put your business at risk. Purchase F-gas compliant refrigerants here.

**Honeywell**  
Authorised Dealer

 Report Unlawful Distribution



**F-gas target ~80% emissions reduction by 2030**

**>10million CO<sub>2</sub>e illegal entries in EU28**

**Missing EU environmental targets**

**Business and safety risks**

**Delayed development of "greener" technologies**

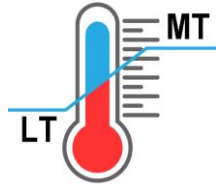
**Avoid black market: Validate the supply chain**

# Solstice<sup>®</sup> L40X (R-455A)

## BENEFITS



No tax, no ban, no quota\*



MT and LT



Larger charge than HC \*\*



Higher efficiency

## APPLICATIONS



- Plug-ins
- Condensing units
- Chillers
- Heat pumps, etc...

## USE



Testing at major components OEM's.  
Operates within requirements / limits.

"Near" drop-in: meets key needs of  
capacity, Tdis, pressure ratio

\*F-gas: GWP<150 for hermetically sealed systems by 2022

\*\* Some changes required to manage A2L

F-gas ready GWP145 solution for MT and LT

# Solstice<sup>®</sup> L40X (R-455A)

	R-455A
<b>Baseline</b>	R-404A (A1, 3922/3943)
<b>Composition</b>	75.5%/21.5%/3% R-1234yf/R-32/CO <sub>2</sub>
<b>GWP 4<sup>th</sup> / 5<sup>th</sup></b>	148 / 145
<b>Class.</b>	A2L
<b>Potential app.</b>	Self-contained Condensing units Chillers/HP, other...
<b>Use</b>	New
<b>Drop-in <sup>(1)</sup> Cap.</b>	4% lower
<b>Drop-in <sup>(1)</sup> Eff.</b>	+3% to +6% LT Above +10% MT
<b>Compressor <sup>(2)</sup></b>	Recip, Rotary, Scroll
<b>Comments</b>	Similar Tdis in LT
<b>Status</b>	Commercial

(1) Drop-in test in non-optimized system

(2) Suitable compressor technology



## Comparison with R-404A

- Better COP than R-404A
- Tdisch within compressor limits

## COP vs. R404A

	-40	-35	-30	-25	-20	-15	-10
30	-1%	2%	5%	7%	9%	11%	12%
35	-1%	3%	6%	8%	10%	11%	12%
40	-1%	3%	7%	9%	11%	12%	13%
45		2%	7%	10%	12%	14%	15%
50		0%	6%	11%	14%	15%	17%
55			4%	10%	15%	18%	19%
60			1%	9%	16%	20%	23%

embraco

POWER IN CHANGE ON

Air-Conditioning, Heating, and Refrigeration  
Institute (AHRI) Low-GWP Alternative Refrigerants  
Evaluation Program (Low-GWP AREP)



TEST REPORT #49

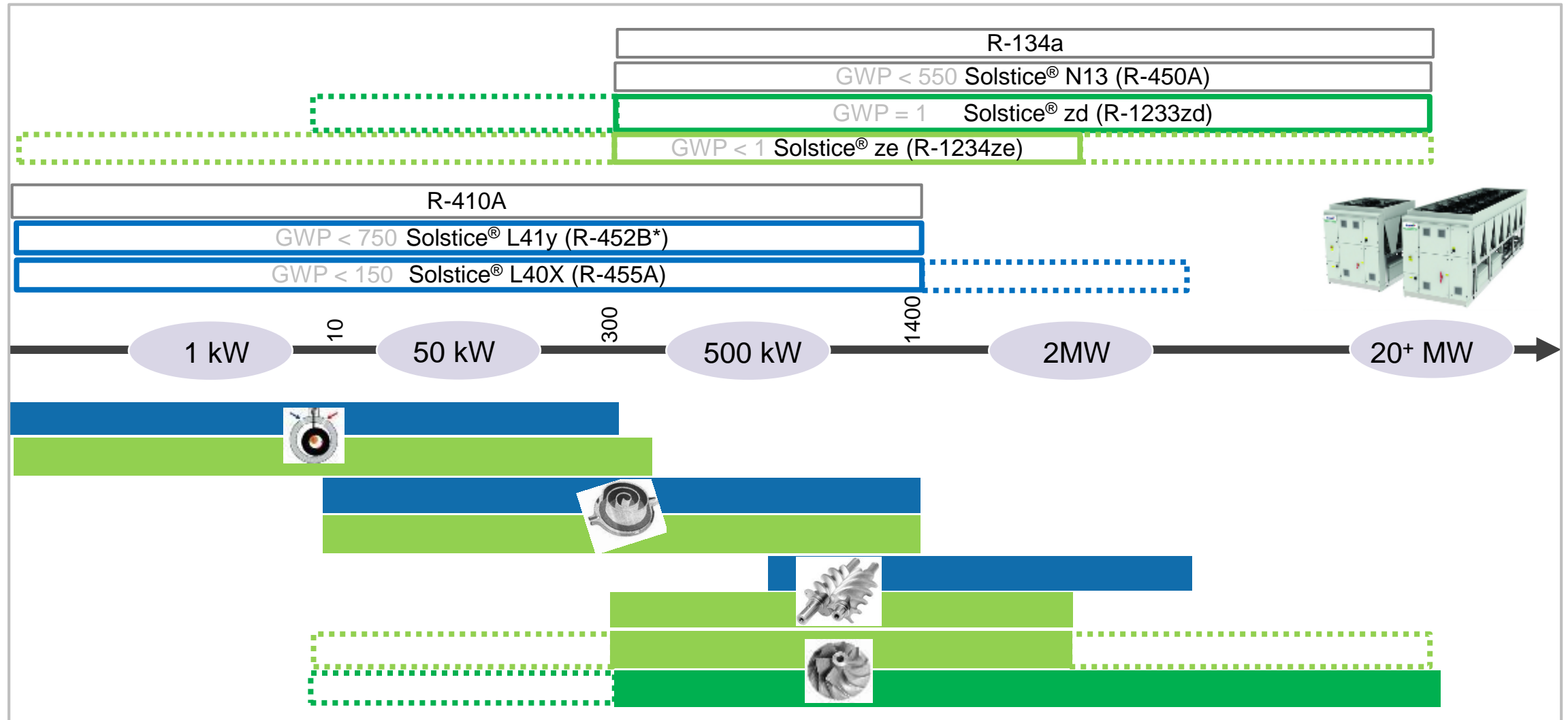
Compressor Calorimeter Test of  
Refrigerant Blend HDR110 in a R-404A  
Reciprocating Compressor

## Comparison with R-404A

- Reasonable candidate to be used in LT systems
- Mid-point comparison: same displacement as R-404A
- Better efficiency
- Glide needs to be managed

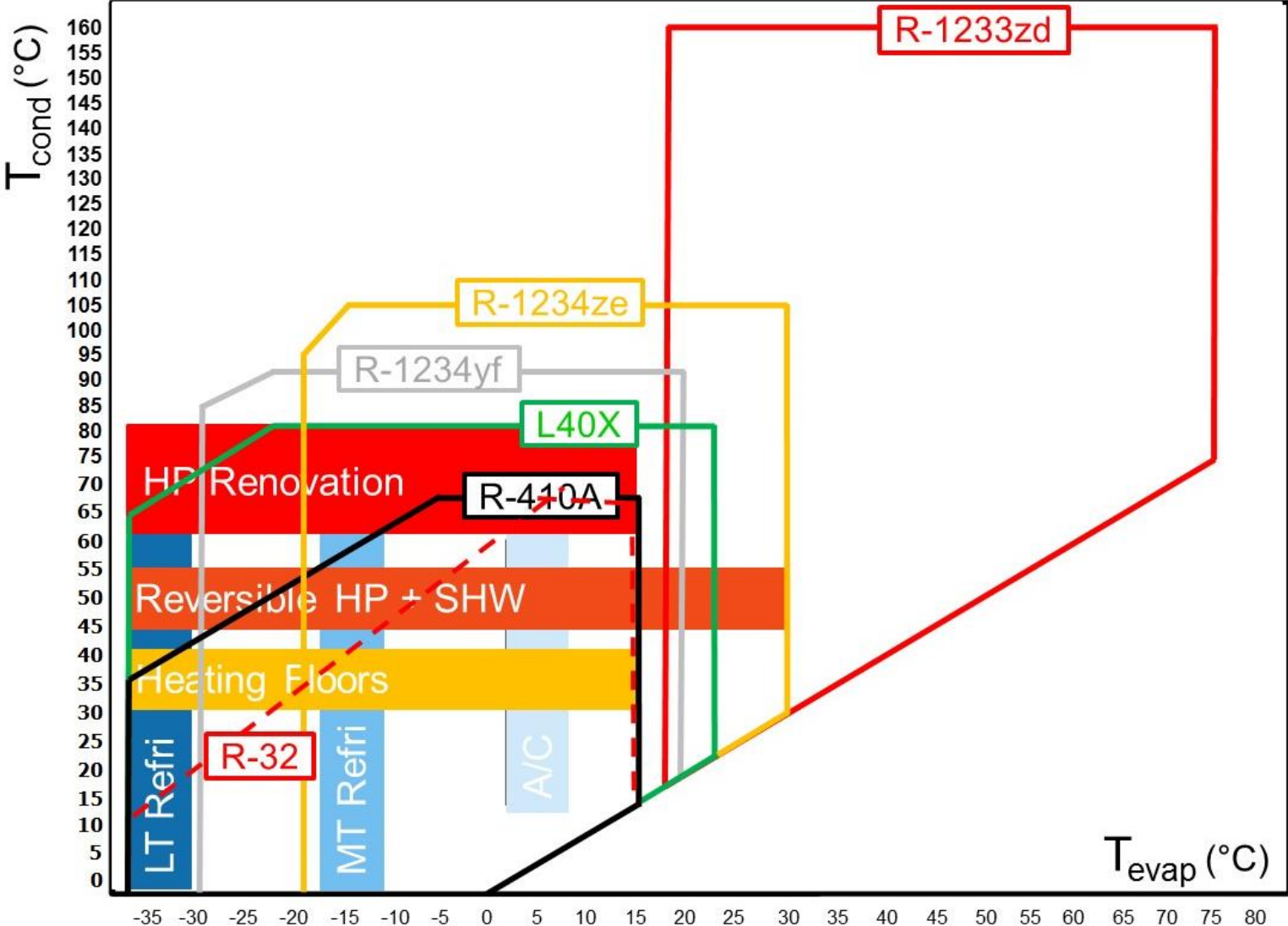
Components validation ongoing for LT applications

# Comfort A/C: Technology Projection



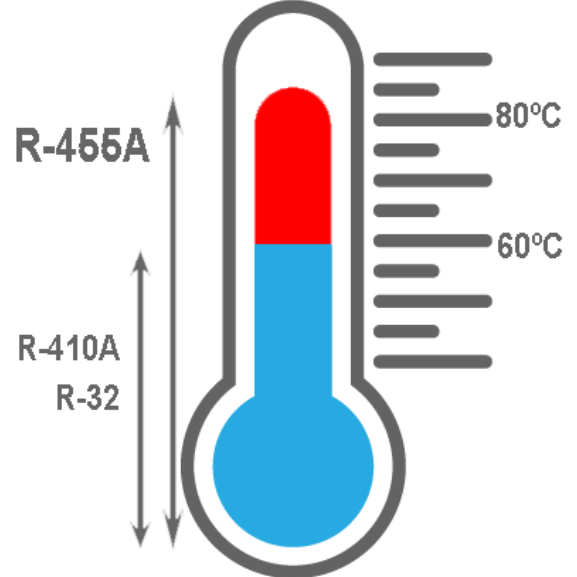
\* Provisional Ashrae number

# Solstice<sup>®</sup> L40X Extends Operating Map



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**R-410A Platform**



**Solstice<sup>®</sup> L40X can provide higher water temperature**

**Solstice<sup>®</sup> L40X has potential to use in comfort applications**

# Solstice® Refrigerants Roadmap

## AIR CONDITIONING / INDUSTRIAL

**TRADITIONAL:** R-407C / R-410A / R-134a / R-22 / R-123

USE

- Chillers
- Roof tops
- Split systems
- VRF
- Data centers
- District cooling
- Milk cooling
- Apple storage ...

FUTURE

- **R-1234ze** (<1, A2L)\*
- **R-1233zd** (1, A1)
- **R-455A** (145, A2L)
- **R-452B** (698, A2L)
- **R-444B** (295, A2L)

**TRADITIONAL:** R-404A / R-507 / R-134a / R-22

USE

- Supermarkets
- Cold rooms
- Self-contained
- Process chiller
- Ice machine
- Warehouses
- Food processing
- Food-service
- Transport ...

FUTURE

- **R-407F** (1674, A1)
- **R-448A** (1273, A1)
- **R-455A** (145, A2L)
- **R-1234ze** (<1, A2L)
- **R-450A** (546, A1)

## REFRIGERATION

## HEAT PUMPS / INDUSTRIAL

**TRADITIONAL:** R-410A / R-134a

USE

- District heating
- Boilers
- Water heaters
- Distillation
- Sterilization
- Laundrying
- Clothes driers ...

FUTURE

- **R-1234ze** (<1, A2L)
- **R-1233zd** (1, A1)
- **R-455A** (145, A2L)

**TRADITIONAL:** R-134a / R-245fa

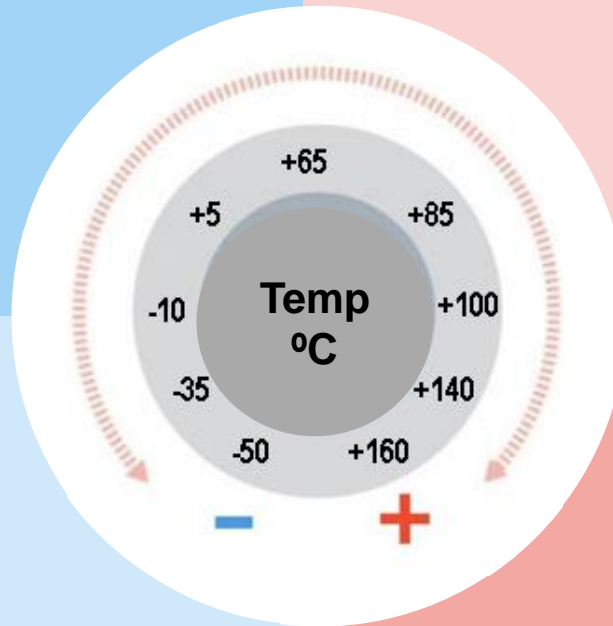
USE

- ORC
- Drying
- Cooking
- Vaporizing
- Distillation
- Food processes
- Chemical processes ...

FUTURE

- **R-1233zd** (1, A1)

## ORC / INDUSTRIAL



# Ice Creams Chest Freezer

- Manufacturer Frost-Trol
- Compressor Embraco VNEK217U
- Description Freezer island
- Refrigerant Solstice<sup>®</sup> L40X (R-455A)
- Charge 230 g
- Test Climate class L1 at 25°C and 60% R.H.  
Capillary adjustment

Test results Satisfactory



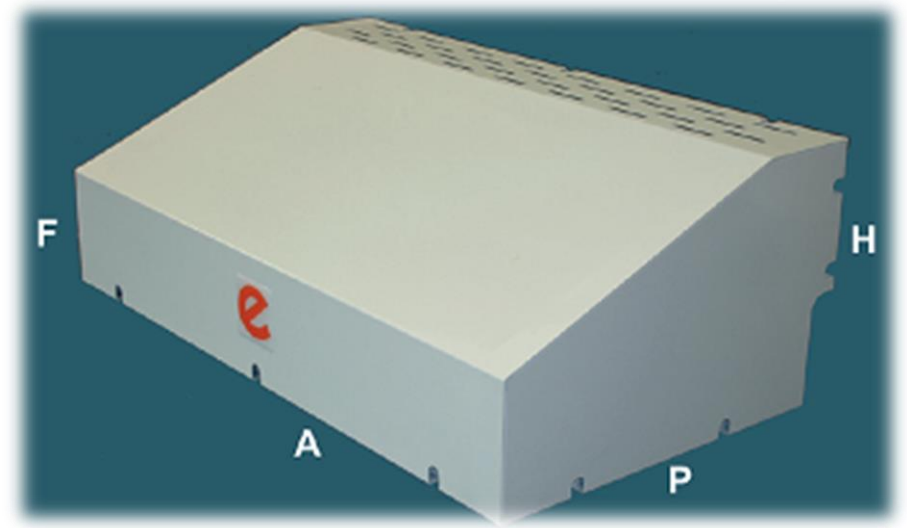


# Water-loop Equipment

- Manufacturer Ecliman
- Compressor Hitachi scroll
- Description Water loop AQUA
- Refrigerant Solstice<sup>®</sup> L40X (R-455A)
- Charge 2 kg

Test results Satisfactory

Aqua equipment is already installed with R-407F and Solstice<sup>®</sup> N40 in many supermarkets

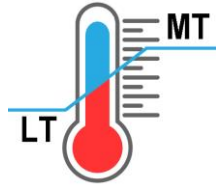


# Solstice<sup>®</sup> L40X (R-455A) in a shot

## BENEFITS



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## USE



Testing at major components OEM's.  
Operates within requirements / limits.

"Near" drop-in: meets key needs of  
capacity, T<sub>dis</sub>, pressure ratio

\*F-gas: GWP<150 for hermetically sealed systems by 2022

Only the HFC part needs to be accounted

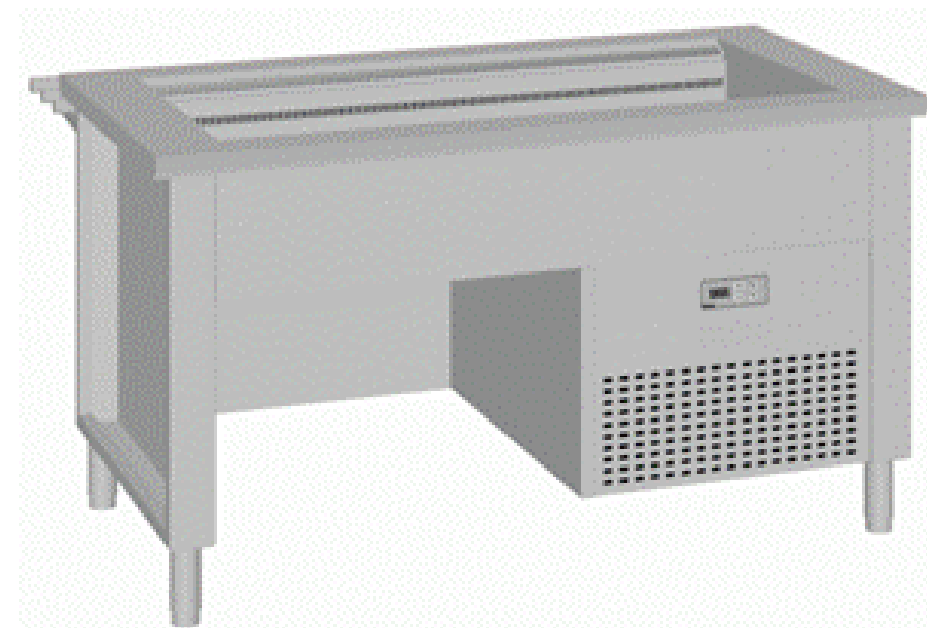
\*\* Some changes required to manage A2L

# Self-service Catering Equipment

- Manufacturer Tournus
- Compressor Tecumseh
- Description Self-service catering equipment, self-contained
- Refrigerant Solstice<sup>®</sup> L40X (R-455A)
- Charge 600 g



Test results Satisfactory



# Monoblock

- Manufacturer Zanotti
- Compressor Tecumseh
- Description Monoblock MGM10602F
- Refrigerant Solstice<sup>®</sup> L40X (R-455A)
- Charge 380 g

Test results Satisfactory

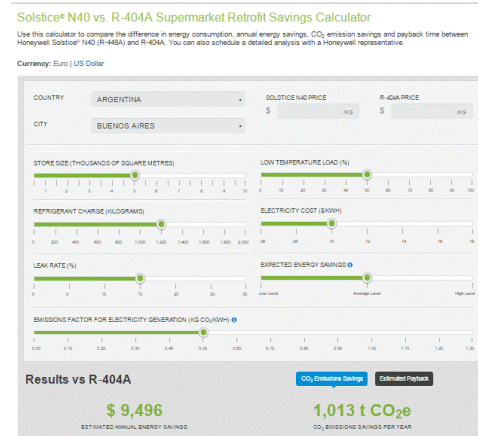
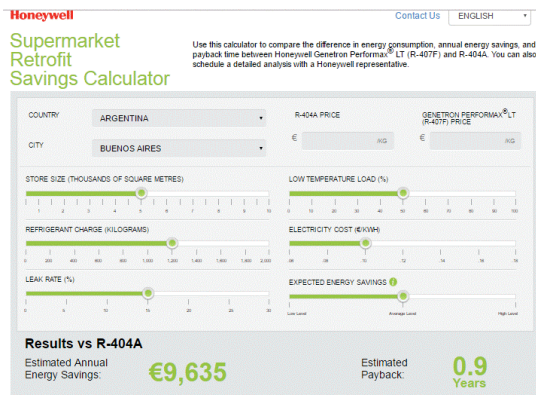


# Honeywell Apps, Online And Software Tools

- Genepro simulation software
- PT chart app
- Refrigerants selection app
- Components chart for Solstice<sup>®</sup>
- Savings calculator Performax<sup>®</sup> LT
- Savings calculator Solstice<sup>®</sup> N40
- Website
- LinkedIn
- Slideshare...

## GET ACCURATE DATA

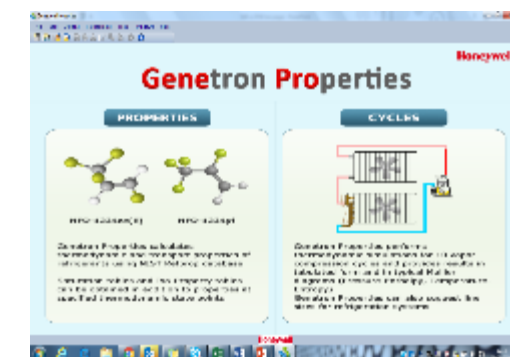
For decision-making on the go with Honeywell mobile applications.



## Understanding Your Refrigerant Choices

Availability of certain refrigerants will diminish with F-gas quota phase-down. Use this app to understand the available choices to replace high GWP products with new technology with both performance and environmental benefits.

[EXPLORE ALL REFRIGERANTS](#)



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**Best digital tools for your business**

**Thank you!**

**Questions?**

# Cool Yourself With Solstice<sup>®</sup> L40X



**GWP <150**

**A1**

Solstice<sup>®</sup> zd (R-1233zd)

Watch for our new A1,  
GWP<150 refrigerants  
under development

**A2L**

Solstice<sup>®</sup> ze (R-1234ze)

Solstice<sup>®</sup> yf (R-1234yf)

Solstice<sup>®</sup> L40X (R-455A)

<http://www.honeywell-refrigerants.com/europe/>

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