



Marta San Román
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LOW CARBON SUPERMARKET
HFO-1234ze/CO2

Honeywell

Buy Only From Honeywell Authorised Dealers

F-gas

~80% emissions reduction by 2030

- >10mill CO₂ equivalent illegal entries in EU28
 - 5% of quota allowed
 - 5mill cars on the road
- Consequences
 - Unfair competition
 - Missing EU environmental targets
 - No development of more sustainable, more efficient technologies
- Consequences to users
 - Lack of safety
 - High penalties
 - Financial risk
 - Loss of warranties



Avoid black market: Validate the supply chain

R-1234ze With CO₂ In Supermarket (Italy)

Minimum energy, carbon and cost in an integrated cooling system that drives cooling, heating and air conditioning with overall GWP<1

Results

- Integrated cool, heat and A/C system with GWP<1
- Energy consumption reduced by estimated 35 %
- Reduced operating and maintenance costs



Parma, Italy
Sales Surface 1,500m²
Commissioned December, 2014

Supermarket Innovation Through Partnership



Unes / U2 supermarket



Consultant



All building service requirements in one solution

A System Template For The Future

**R-1234ze
GWP<1**

Primary refrigerant cooling a pump CO₂ MT system

**CO₂
GWP=1**

Cascaded to the LT system

**Efficient heat
recovery**

HX* captures energy from Solstice[®] ze fed cooling system to:

Heat the store in winter

Provide hot water

Cool the store in summer

**Compact
design**

Less of expensive supermarket floor space

~~Boiler~~

~~A/C system~~

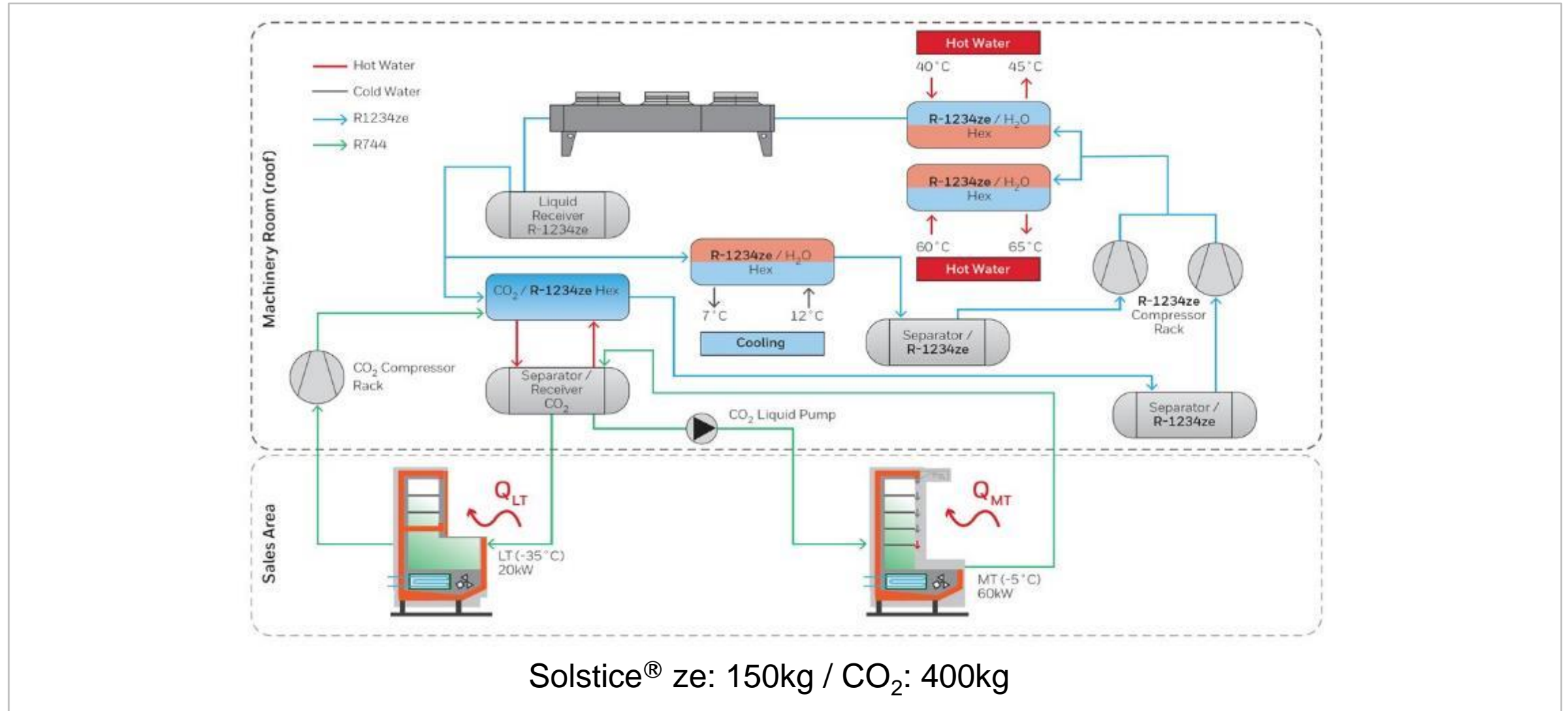
~~A.H.U.**~~

* Heat exchanger

** Air Handling Unit



System Architecture



System Characteristics

	LT pack	MT pack	Air conditioning / Heating
Pack (TDF srl.)	Central eCold multifunction heating/cooling/aircon (TDF srl)		
Cases (De Rigo)	Multideck w/doors (25m) Cold room (10m ³) Cold room (15m ³)	Multidecks (39.25m) Serveover (16.25m) Retrobank (6.25m) 6x Cold rooms (74m ³)	
Compressors (Frascold)	2x D3-6SK2	V25 103E inverter 2x Z30.126E	Z40 154E (off in winter)
		Z40 154E (MT winter / ac in summer)	
T ^a setting Winter (-5°C Tamb)	CO2 -35°C/-5°C	Solstice ze -10°C/+50°C	Solstice ze -10°C/+50°C
T ^a setting Summer (+35°C Tamb)	CO2 -35°C/-5°C	Solstice ze -10°C/+45°C	Solstice ze +2-10°C/+45°C
Cooling capacity	20 kW	60 kW	115 kW / 150 kW
Refrigerant	CO ₂	Solstice ze (R-1234ze)	Solstice ze (R-1234ze)

Compact design with homologated components

Operational Benefits In Numbers

3 in 1

Heating/Cooling/Aircon in one single solution

45 kW

Installed power supply reduced by 45kW

35%

Energy consumption reduced by 220,000kWh* (35%) per year

15,000 €

Maintenance savings estimated at 15,000 €* per year

< 1

Total system GWP of less than 1
- Solstice[®] ze (HFO-1234ze) has GWP<1

100%

F-Gas ready



* Anticipated savings compared to three system architecture (refrigeration/heating/air conditioning)

Minimum energy, carbon footprint and cost

Satisfied Stakeholders

Environmental benefits

Best practice example

The municipality of Parma is interested in assessing the environmental benefits of the installation as an example of best practice for stores across its area, particularly as the new European Directive governing refrigerant leakage (EN378) is likely to permit a higher charge of Solstice[®] ze (up to 70 kg) in public places.

Long Term Investment

Energy efficiency and ultra-low GWP

“The new cascade system in our Parma supermarket drives the entire cooling, heating and air conditioning needs of the store at reduced cost and is a template for a lower carbon and more sustainable solution for our sector. It also future-proofs our investment beyond the change in F-Gas Regulation”

Unes/U2

Dr. Gianfranco Iannace – Arch. Fabio Gabanella

Sustainable solution

Beyond 2022

“This system design, along with Solstice[®] ze, enables commercial enterprises, including supermarkets, to plan beyond 2020, safe in the knowledge that their investment will not only deliver a more sustainable solution it will also stand the test of time.”

TDF Natale Mandelli

Other applications will benefit from innovations linked to Solstice[®] ze

Summary

- All building service requirements (heating/cooling/a/c) in one solution
- 35%* energy consumption reduction per year
- 15,000*€ maintenance savings estimated per year
- Reduced operational costs
- Ultra-low GWP<1 for the total system architecture
- Compact design results in reduced floor area needs
- Available components
- F-gas ready

Environmental benefits

Best practice example

Long Term Investment

**Energy efficiency and
ultra-low GWP**

Sustainable solution

Beyond 2022

* Anticipated savings compared to three system architecture (refrigeration/heating/air conditioning)

Minimum energy, carbon footprint and cost for supermarkets

Wider Industry Impact: Assessed By Users

R-1234ze + CO₂: MT+LT+heat recovery

Bakery plant in Germany

- -18% TEWI **
- -9.1% energy consumption **
- Granted project: Solstice[®] ze = "natural" refrigerant



Hypermarket cash&carry in Czech

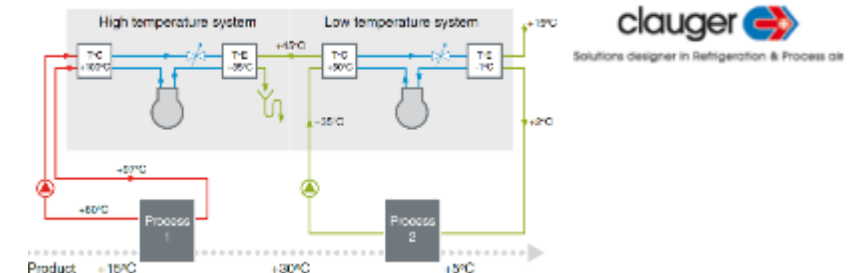
- -20/30% energy consumption *
- A2L uncomplicated to handle
- Lower charge & operational costs **



R-1234ze

Solstice[®] ze in food processing

- Good overall COP
- Single process hot (98°C) and chilled (2°C)



* Anticipated savings compared to three system architecture (refrigeration/heating/air conditioning)

** Compared to traditional R-404A system

Sustainable concept: Solstice[®] ze cascade CO₂

**GWP <150****A1**

Solstice[®] zd (R-1233zd)

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

A2L

Solstice[®] ze (R-1234ze)

Solstice[®] yf (R-1234yf)

Solstice[®] L40X (R-455A)

Thank you!

Questions?

Cool Yourself with Solstice[®] L40X



GWP <150

A1

Solstice[®] zd (R-1233zd)

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

A2L

Solstice[®] ze (R-1234ze)

Solstice[®] yf (R-1234yf)

Solstice[®] L40X (R-455A)

Thank You!

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

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System Scheme

