



LOW GWP HFO BLEND ALTERNATIVE FOR R-134a

**The R-134a replacement with  
further reduced GWP and even  
better energy efficiency**

# Where Energy Efficiency Meets Environmental Benefits

**Solstice® N13 (R-450A) is an excellent medium pressure, low GWP, high efficiency and non-flammable refrigerant.**

- Similar system operating characteristics as R-134a → **easy to use / apply**
- Compressors: up to 2 Bar lower discharge temperature than R-134a → **longer life**
- Larger operating map → **flexibility to apply**
- Higher COP at higher ambient temperatures → **energy savings**
- When capacity allows, it can be used in existing systems with little/no design change → **ease of use**
- Maintain A1 Safety Class / Non flammable → **ease of use**

## Applications

As an energy-efficient alternative to R-134a, Solstice N13 can be used in a wide variety of medium temperature systems, including

- Primary stage of CO<sub>2</sub> cascade systems
- DX medium temperature refrigeration
- Heat pumps
- Air-cooled and water-cooled chillers
- District heating and cooling
- Vending machines and beverage dispensers

## Performance

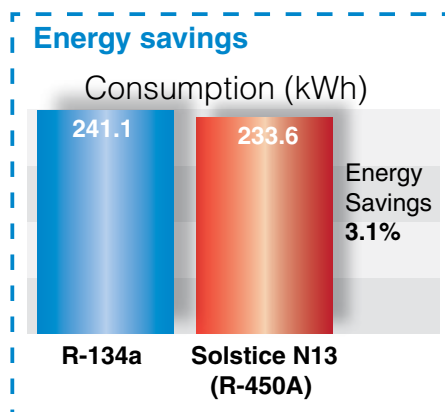
Supermarket trials held across Europe in countries such as UK, France, Spain, Germany and Italy confirm N13 offers similar performance as 134a, but with 58% lower GWP of only 604.

## Safety and Storage

Honeywell recommends reading the Material Safety Data Sheet (MSDS) before using the product. Solstice N13 (R-450A) has similar storage and handling requirements to R-134a in bulk and cylinder, since according to the compressed gas classification it is nonflammable.

## Independent Studies (many studies completed)

In laboratory and supermarket trials conducted in various European countries, Solstice N13 demonstrated >3% lower energy consumption in medium-temperature applications as compared to R-134a in the same ambient temperature and humidity conditions. The tests were conducted by Tewis, one of the leading energy consulting firms with operations in five countries on three continents.



## Physical properties

Solstice® N13 (R-450A)	
Class/Type	Zeotropic blend
Formula	42%/58% (R-134a/R-1234ze)
Kind	HFC / HFO
Appearance	Colourless
ODP (ODP-R11=1)	0
GWP rev 3rd/4th/5th IPCC	546 / 604 / 547
ASHRAE Std. 34 Safety Class	A1
ATEL/ODL (kg/m <sup>3</sup> )	0.330
Practical limit kg/m <sup>3</sup>	0.320
LFL (% vol)	Non flammable
REACH	Registered

## Thermodynamic Performance

- Offers a 58% reduction of GWP.
- Shows 87% theoretical capacity with similar efficiency (100%) with regard to R-134a. In field tests in different systems, reported capacity by end users in air-conditioning and refrigeration it is between 97% and the theoretical value.
- Small glide (0.4°C) can be easily addressed during system design. Can be used in flooded systems.

## Materials compatibility

Honeywell does not recommend the use of chlorinated solvents to clean refrigeration systems or components.

### Desiccants

Desiccant driers compatible with Solstice® N13 are commercially available.

Individual drier manufacturers should be contacted for specific recommendations.

### Lubricants

POE (polyol ester) oil is recommended for use with R-450A.

Compressor manufacturers typically qualify specific lubricants for use with their products. Users should check with the equipment manufacturer for the recommended lubricants for their system.

### Plastics and elastomers

Solstice N13 is compatible with most common materials. Since there are many different grades and formulations of these materials, we recommend that compatibility testing be performed on the specific grade of materials under consideration and at the conditions of use when designing new systems. Customers should consult the manufacturer or conduct further independent testing.

## Safety and Storage

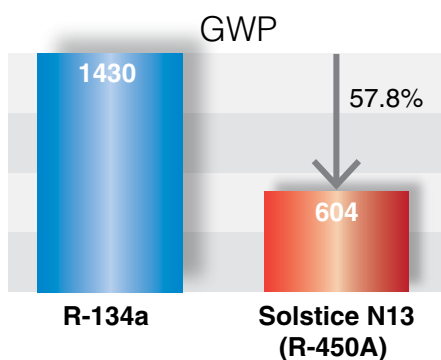
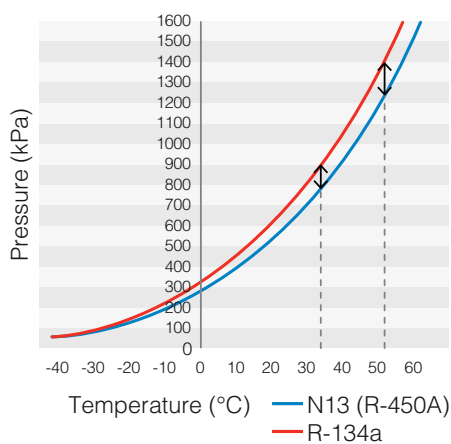
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### Package Sizes

Solstice N13 is available in 950 kg vertical rolldrum and ISO bulk. For other packing sizes please contact Honeywell distribution network.

## Leaks and leak detection

If a large release of Solstice N13 vapour occurs, the same measures as with R-134a need to be taken. Hand-held leak detectors can be used for pinpointing leaks. For monitoring an entire room on a continual basis, leak monitors are available. Leak detection is important for protection of those in proximity of the system, refrigerant conservation, equipment protection and performance, and reduction of emissions. Customers should consult the equipment manufacturer for appropriate detectors.



## Pressure and temperature

P (1)	LT °C (2)	VT °C (3)
100	-23.7	-23.0
200	-7.0	-6.3
300	4.1	4.7
400	12.6	13.2
500	19.6	20.2
600	25.6	26.2
700	30.9	31.5
800	35.6	36.2
900	39.9	40.6
1000	43.9	44.5
1100	47.6	48.2
1200	51.0	51.7
1300	54.3	54.9
1400	57.3	57.9
1500	60.2	60.8
1600	63.0	63.6
1700	65.6	66.2
1800	68.1	68.7
1900	70.5	71.1
2000	72.9	73.4
2100	75.1	75.6
2200	77.2	77.8
2300	79.3	79.8
2400	81.3	81.8
2500	83.3	83.7
2600	85.2	85.6
2700	87.0	87.4
2800	88.8	89.2
2900	90.5	90.9
3000	92.2	92.6
3100	93.8	94.2
3200	95.4	95.7
3300	96.9	97.3
3400	98.5	98.7
3500	99.9	100.2
3600	101.4	101.6
3700	102.8	102.9
3800	104.1	104.2

(1) Pressure (absolute) kPa

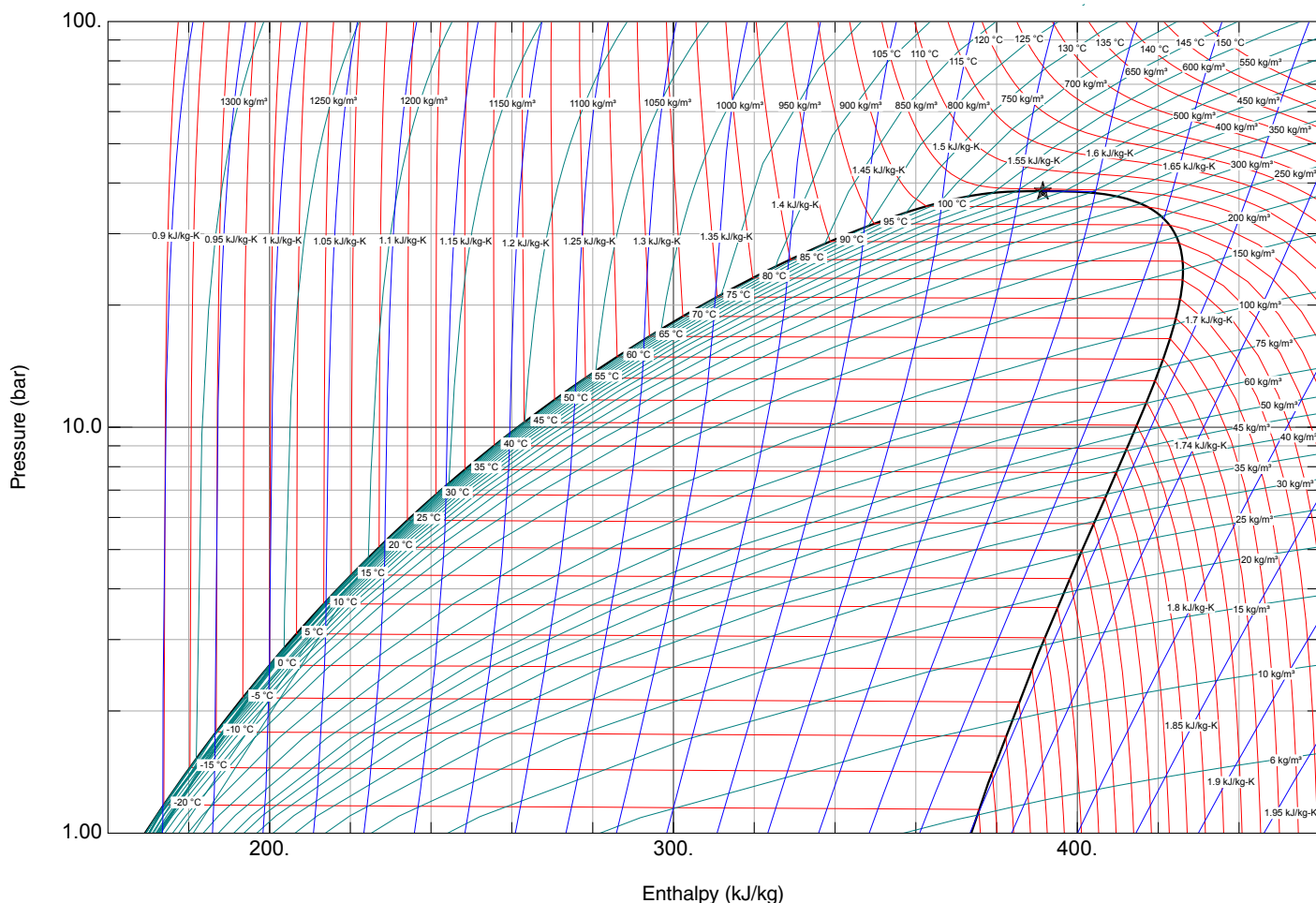
(2) Liquid (bubble) Temperature °C

(3) Vapor (dew) Temperature °C

“Our aim was to successfully trial the new HFO blend N13 in a flagship store and to prove it’s operational and energy saving credentials. The results speak for themselves.”

Jean-Michel Deroo, Groupe Auchan

## Pressure and enthalpy Solstice® N13 (R-450A)



## Available tools

### Simulation software

Honeywell's Genetron Properties Suite – for refrigerants modelling – allows you to simulate your system with the right refrigerant and export the results to Excel. It has recently been updated to include both N40 and N13, so you can compare performance of multiple refrigerants, learn the line sizing and many more – all for free. It is available in English, German, Spanish, Portuguese and Italian.

Download the software from <http://www.honeywell-refrigerants.com/europe>

### Smart phones apps

Download **Honeywell PT Chart Refrigerants EU** applications for **iOS and Android** free



Solstice® Low GWP Refrigerants:

**Winner of the  
Low Carbon Achievement  
of the Year**



**RESPONSIBLE CARE®**  
OUR COMMITMENT TO SUSTAINABILITY

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#### Our commitments:

- The safety of our employees
- The quality of our products
- Being responsible stewards for the protection of the environment, the communities in which we operate and our customers

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