

Solstice® N13 (R-450A)

Honeywell

Characteristics

Solstice N13 (R-450A) is a zeotropic blend of R-134a and HFO-1234ze (Solstice® ze) designed to serve as an alternative to R-134a, offering similar performance but with a lower global warming potential of only 547 (a reduction of almost 60% of GWP).

Applications

Solstice N13 (R-450A) is an excellent medium pressure, low GWP, high efficiency and non-flammable refrigerant. It is an energy-efficient alternative to R-134a in different medium temperature systems:

- Heat pumps
- Air-cooled and water-cooled chillers
- District heating and cooling
- Vending machines and beverage dispensers
- High stage of CO2 cascade systems
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- DX medium temperature refrigeration, etc.

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 ³)	0.330
Practical limit kg/m ³	0.320
LFL (% vol)	Non flammable
REACH	Registered
Units	SI
Molecular weight	108.6 kg/mol
Boiling temperature	-23.1°C
Critical temperature	104.4°C
Critical pressure	38.2 bar
Critical volume	0.002032 m ³ /kg
Critical density	492.2 kg/m ³
Vapour density at boiling point	5.443 kg/m ³
Liquid density at 0°C	1257.7 kg/m ³
Liquid density at 25°C	1175.1 kg/m ³
Vapour density at 25°C	29.6 kJ/kg °K
Liquid heat capacity at 25°C	1.404 kJ/kg °K
Vapour heat capacity at 25°C	1.000 kJ/kg °K
Heat of vaporisation at boiling point	203.64 kJ/kg
Vapour pressure at 25°C	584.4 kPa
Liquid thermal conductivity at 25°C	76.4 W/m °K
Vapour thermal conductivity at 25°C	13.9 W/m °K
Liquid viscosity at 25°C	194.2 µPa sec
Vapour viscosity at 25°C	12.2 µPa sec

Thermodynamic Performance

- Offers a 60% reduction of GWP
- Shows 87% capacity with similar efficiency (100%)
- Small glide (0.4°C) can be easily addressed during system design

Pressure and temperature

Pressure (absolute)kPa	Liquid (bubble) Temperature°C	Vapor (Dew) Temperature°C
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

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

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.

Package Sizes

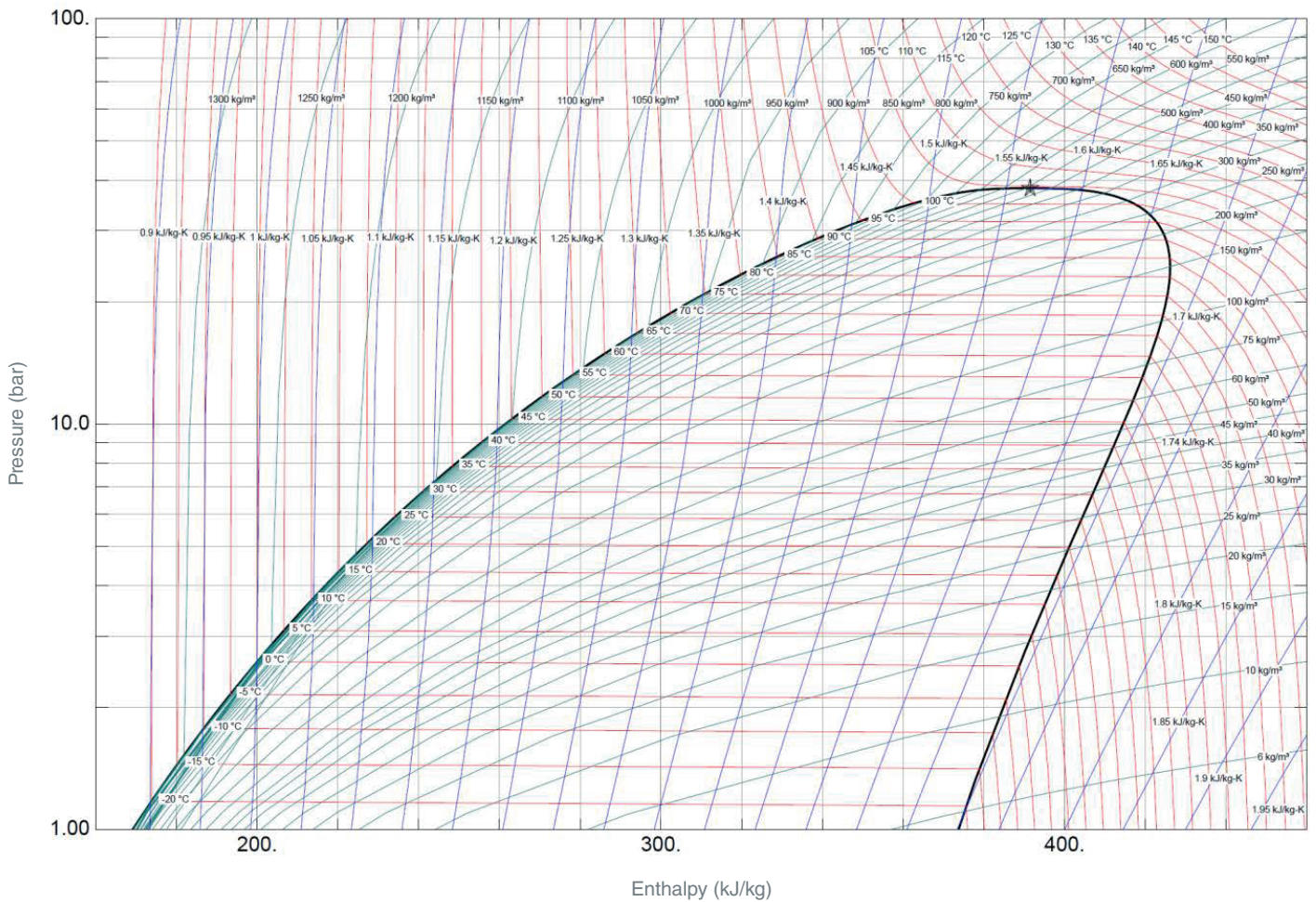
Solstice N13 is available in 950 kg vertical rolldrum and ISO bulk. For other packing sizes please contact Honeywell distribution network.

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.

Substrate	Comments
ABS	Satisfactory
Delrin® Acetal	Satisfactory
HDPE	Satisfactory
NYLON 66	Satisfactory
ULTEM® Polyetherimide	Satisfactory
Teflon®	Satisfactory
HIPS	Satisfactory
PET	Satisfactory
SBR/CR/NBR	Satisfactory
Buna-Nitrile	Satisfactory
EPDM	Satisfactory
Epichlorohydrin	Satisfactory
Silicone	Satisfactory
Natural Rubber (Gum)	Satisfactory
Texin® (Thermoplastic) Polyurethane 390	Satisfactory
Butyl Rubber	Satisfactory
PVC-TYPE 1	Marginal
Polycarbonate	Marginal
Polypropylene	Marginal
Kynar® PVDF	Marginal
Neoprene	Marginal
Viton® B COMM. GRADE	Marginal
Kalrez® 6375	Unsatisfactory
Acrylic	Unsatisfactory

Pressure and enthalpy



Available tools

Simulation software

Simulation software Honeywell's refrigerants modelling software is a free-download software program that eliminates the guesswork involved in selecting a refrigerant by allowing refrigeration engineers to run simulations based on actual data. The tool runs property calculations of refrigerants, conducts thermodynamic evaluations of air conditioning and refrigeration cycles, and provides a first principle thermodynamic comparison of new alternative refrigerants for retrofit applications or new system designs. The software models systems from simplified basic cycles to large, complex refrigeration systems. The results can be exported to Microsoft Excel, where the data can be manipulated in a variety of ways. The software also creates typical Mollier diagrams (Pressure-Enthalpy, Temperature- Entropy). You can download the Genetron Refrigerants Modelling Software at

<https://www.honeywell-refrigerants.com/europe/genetron-refrigerants-modeling-software-download/>

Smart phones apps

Download **Honeywell PT chart ruler application** for **iOS** and **Android** free



Literature

Honeywell has a wide range of literature available on Solstice N13 including case studies, customers references, etc.

Information and contact

For information and support on new applications, contact your local

Honeywell representative, visit

www.honeywell-refrigerants.com/europe

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RESPONSIBLE CARE

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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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