

## Characteristics

Solstice® L41y (R-452B) is a non-ozone-depleting, zeotropic blend designed to serve as a low global warming potential (GWP) alternative to R-410A in positive displacement comfort air cooling and reversible heating applications. A key feature of Solstice L41y is its 67 % lower GWP with similar efficiency and matching capacity to R-410A, helping to further minimize the re-design costs and capital expenditures. The design compatibility of Solstice L41y enables OEMs to transition their R-410A equipment to a lower GWP alternative faster. Solstice L41y discharge temperature is much lower than R-32 and very close to R-410A indicating that discharge temperature mitigation may not be required. Solstice L41y has lower mass flow rate than R-410A, which leads to a lower pressure drop and eliminates potential design cost increase in the heat exchanger.

## Applications

Solstice L41y is the most optimized R-410A replacement that provides the best energy performance and lowest A2L flammability characteristics. Even though both R-32 and Solstice L41y are classified as A2L "mildly flammable", lower flammability properties of Solstice L41y become important especially in product selection process for larger charge size equipment such as rooftop units, VRF systems, etc. Thanks to its higher critical temperature (77.1 °C) and broader operating envelope in low evaporating temperatures, Solstice L41y outperforms other alternatives such as R-32 in heating mode and in high ambient conditions in a variety of applications such as:

- Direct expansion (DX) chillers
- High pressure heat pumps (lower case air source and ground source)
- Split Air-Conditioning units
- Commercial packaged systems (such as rooftop units, VRF)

## Physical Properties

Class/Type	Zeotropic blend
Formula	67 %/7 %/26 % R-32/R-125/R-1234yf
Kind	HFC/HFO
Appearance	Colourless
ODP	0
GWP (AR4/AR5)	698/676
ASHRAE Std. 34 Safety Class	A2L
ATEL/ODL (kg/m <sup>3</sup> )	0.467
Practical Limit kg/m <sup>3</sup>	0.062
LFL (% VOL)	11.9
<b>Units</b>	<b>SI</b>
Molecular weight	63.5 kg/kmol
Boiling temperature	-51.0 to -50.3 °C
Critical temperature	77.1 °C
Critical pressure	52.2 bar
Critical volume	0.00225 m <sup>3</sup> /kg
Critical density	443.77 kg/m <sup>3</sup>
Vapour density at boiling point	3.62 kg/m <sup>3</sup>
Liquid density at 0 °C	1092.0 kg/m <sup>3</sup>
Liquid density at 25 °C	993.5 kg/m <sup>3</sup>
Vapour density at 25 °C	52.4 kg/m <sup>3</sup>
Liquid heat capacity at 25 °C	1.79 kJ/kg-K
Vapour heat capacity at 25 °C	1.44 kJ/kg-K
Vapour pressure at 25 °C	1537.4 kPa
Liquid thermal conductivity at 25 °C	103.5 mW/m-K
Vapour thermal conductivity at 25 °C	15.0 mW/m-K
Liquid viscosity at 25 °C	114.9 µPa sec
Vapour viscosity at 25 °C	12.9 µPa sec

## Key benefits of Solstice L41y

- GWP of 698 (IPCC 4), 67 % reduction vs. R-410A
- Closest match to R-410A with minimal changes
- Mimics R-410A performance both in heating/cooling
- Capacity matches R-410A with positive displacement
- Similar discharge temperature to R-410A
- Lower mass flow than R-410A
- Higher critical temperature provides excellent performance in high ambient conditions

