SOLSTICE® 454B (R-454B)

TECHNICAL DATA SHEET

Solstice® 454B (R-454B) is a non-ozone depleting, zeotropic blend designed as a low GWP alternative to R-410A in comfort air cooling and reversible heating applications.

Solstice® 454B demonstrates improved efficiency and matching capacity to R-410A, with a GWP that is 78% lower. Solstice® 454B (R-454B) is the most optimized R-410A replacement, providing easy conversion with minimal changes from a R-410A design.

Thanks to its high critical temperature and broader operating envelope in low evaporating temperatures, Solstice® 454B outperforms other refrigerant alternatives in normal and high ambient conditions in a variety of applications:

- Direct expansion (DX) chillers
- High-pressure heat pumps
- Residential/light commercial A/C
- Commercial packaged systems



GENERAL PROPERTIES	
Class/Type	Zeotropic Blend
Formula	"R-32 / R-1234yf (68.9% / 31.1%)"
Appearance	Colorless
ODP (ODP-R11=1)	0
GWP (IPCC AR4)	466
Flammability Limits	11.25% (LFL) - 22.00% (UFL)
ASHRAE Standard 34 Class	A2L

IP UNITS	
Property	Refprop result
Molecular weight	62.6 lbm/lb-mol
Boiling temperature @ 0 psig	-58.9 F
Critical temperature	172.6 F
Critical pressure	763.9 psia
Critical volume	0.03616 ft^3/lbm
Critical density	27.7 lbm/ft^3
Saturated liquid pressure @ 77°F	103.5 psia
Saturated vapor pressure @ 77°F	219.9 psia
Vapor density at 0 psig (boiling point)	0.212 lbm/ft^3
Liquid density at 32°F	3.167 lbm/ft^3
Liquid density at 77°F	219.868 psia
Vapor density at 77°F	67.51 lbm/ft^3
Liquid heat capacity at 77°F	61.47 lbm/ft^3
Vapor heat capacity at 77°F	0.43 Btu/lbm-R
Vapor pressure at 77°F	0.343 Btu/lbm-R
Liquid thermal conductivity at 77°F	0.061 Btu/(h-ft-R)
Vapor thermal conductivity at 77°F	0.0087 Btu/h-ft-F
Liquid viscosity at 77°F	7.70E-05 lbm/ft-sec
Vapor viscosity at 77°F	8.60E-06 lbm/ft-sec

* For F-Gas reporting purposes, a different GWP value may be used.

BENEFITS

- Reduced GWP: 78% lower than R-410A
- Closest match to R-410A design with minimal changes
- Excellent performance in normal and high ambient conditions
- Similar discharge temperature to R-410A
- Low temperature glide
- Miscibility with POE lubricants
- Lower mass flow than R-410A and R-32
- Higher critical temperature provides excellent performance in high ambient conditions

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SAFETY AND STORAGE

Solstice Advanced Materials recommends reading the Safety Data Sheet (SDS) before using the product. Solstice® 454B is a mildly flammable refrigerant (ASHRAE class A2L) and should be handled approproately.

MATERIALS COMPATIBILITY

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

DESICCANTS

Desiccant driers compatible with Solstice® 454B are commercially available.

Individual drier manufacturers should be contacted for specific recommendations.

LUBRICANTS

Polyolester (POE) oil is recommended for using Solstice® 454B. 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® 454B is compatible with most common materials. 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.

PACKAGE SIZES

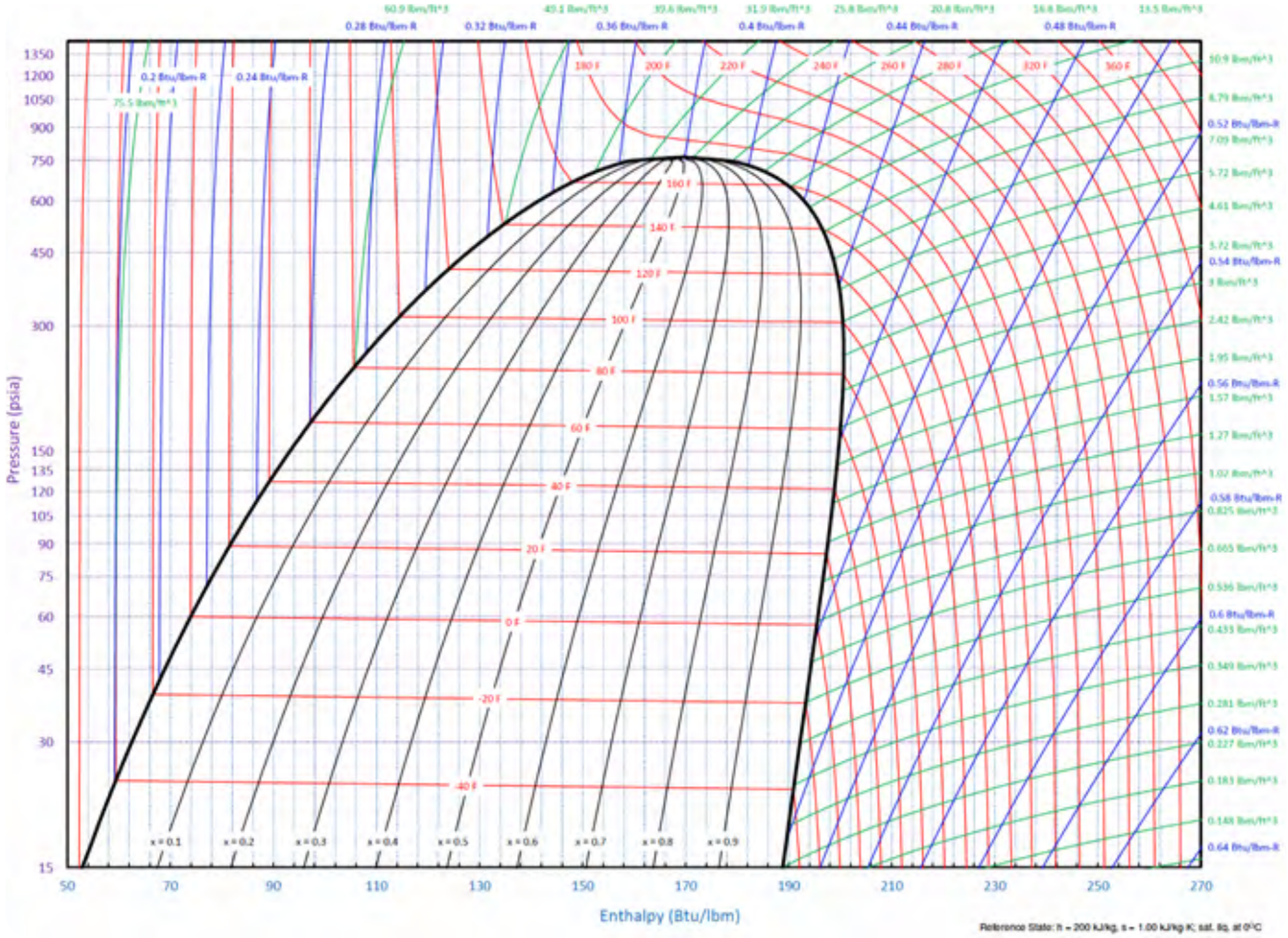
Solstice® 454B is available in a variety of packaging containers in the US. These include disposable 20 lb jugs, returnable 100 lb cylinders, half ton and one ton tanks. Iso tanks and bulk trailers of material are also available. Please consult your Solstice sales representative if a bulk container is required for your application.

LEAK DETECTION

Leak detectors can be used for pinpointing specific leaks or for monitoring an entire room on a continual basis. Leak detection is important for refrigerant conservation, equipment protection and performance, reduction of emissions and protection in case of contact with the system. Customers should consult the equipment manufacturer for appropriate detectors.

PRESSURE AND ENTHALPY

Solstice® 454B (R-454B)



R-454B			
	TEMPERATURE (°F)		
PRESSURE (PSIG)	AVERAGE	BUBBLE	DEW
0	-58.1	-59.0	-57.3
20	-24.3	-25.2	-23.3
40	-3.6	-4.6	-2.6
60	11.9	10.9	13.0
70	18.5	17.4	19.6
80	24.5	23.4	25.6
90	30.0	29.0	31.1
95	32.7	31.6	33.8
100	35.2	34.1	36.3
105	37.7	36.6	38.8
110	40.0	38.9	41.1
115	42.3	41.2	43.4
120	44.6	43.5	45.7
125	46.7	45.6	47.9
130	48.9	47.7	50.0
135	50.9	49.8	52.1
140	52.9	51.8	54.1
145	54.9	53.8	56.0
150	56.8	55.7	58.0
155	58.7	57.6	59.8
160	60.5	59.4	61.7
170	64.1	63.0	65.2
180	67.5	66.4	68.6
190	70.8	69.6	71.9
200	73.9	72.8	75.1
210	77.0	75.9	78.1
220	80.0	78.8	81.1
240	85.6	84.5	86.7
260	90.9	89.8	92.0
270	93.4	92.3	94.6
280	95.9	94.8	97.0
290	98.3	97.2	99.5
300	100.7	99.6	101.8

R-454B			
	TEMPERATURE (°F)		
PRESSURE (PSIG)	AVERAGE	BUBBLE	DEW
310	103.0	101.9	104.1
320	105.2	104.2	106.3
330	107.4	106.4	108.5
340	109.6	108.5	110.7
345	110.7	109.6	111.7
350	111.7	110.6	112.8
355	112.7	111.7	113.8
360	113.8	112.7	114.8
365	114.8	113.7	115.8
370	115.8	114.7	116.8
375	116.8	115.7	117.8
380	117.8	116.7	118.8
385	118.7	117.7	119.8
390	119.7	118.7	120.7
395	120.7	119.6	121.7
400	121.6	120.6	122.6
405	122.5	121.5	123.6
410	123.5	122.5	124.5
415	124.4	123.4	125.4
420	125.3	124.3	126.3
425	126.2	125.2	127.2
430	127.1	126.1	128.1
435	128.0	127.0	129.0
440	128.9	127.9	129.9
445	129.8	128.8	130.7
450	130.6	129.7	131.6
460	132.3	131.4	133.3
470	134.0	133.1	135.0
480	135.7	134.7	136.6
490	137.3	136.4	138.2
500	138.9	138.0	139.8
510	140.5	139.6	141.4
520	142.1	141.2	142.9
530	143.6	142.7	144.5

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