

# NATIONAL<sup>®</sup>

# 454B

DIFLUOROMETHANE  
2,3,3,3 - TETRAFLUOROPROPENE

## BENEFITS / FEATURES

- Eco-Friendly: 78% lower GWP than R-410A
- High Performance: Excels in normal and high ambient conditions
- Energy Efficient: Superior efficiency over R-410A
- User-Friendly: Low-temp glide allows easy top-offs
- Durable: High critical temp excels in hot conditions

## PRIMARY USES

National 454B (R-454B) is the ideal replacement for R-410A, offering superior energy efficiency and eco-friendliness.

### Applications:

- Chillers
- Industrial Air Conditioning
- Residential & Commercial Air Conditioning and Heat Pumps
- Commercial Ice Machines
- Industrial Refrigeration
- Residential Dehumidifiers

## AVAILABLE SIZES

Cylinder	20 lb
Cylinder	90 lb
Cylinder	750 lb
Cylinder	1250 lb

### HFC-HFO REFRIGERANT

Replaces: R-410A

Compatible Oil(s): Polyolester Oil (POE)

Retrofitting R410a or R22 systems with this refrigerant is strictly prohibited.



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### Physical Properties of Refrigerants

	National R-454B
Refrigerant Classification	HFC-HFO
Molecular Weight (lb/lbmol)	62.614
Boiling Point (1atm, °F)	-58.9
Critical Pressure (psia)	763.9
Critical Temperature (°F)	172.59
Critical Density (lb./ft <sup>3</sup> )	27.658
Liquid Density (77°F, lb./ft <sup>3</sup> )	61.468
Vapor Density (77°F, lb./ft <sup>3</sup> )	3.1666
Heat of Vaporization (bp, BTU/lb.)	143.7971
Specific Heat Liquid (77°F, BTU/lb.°F)	0.42998
Specific Heat Vapor (1atm, 77°F, BTU/lb.°F)	0.20674
Ozone Depletion Potential (CFC11 = 1.0)	0
Global Warming Potential (CO <sub>2</sub> = 1.0)	466
ASHRAE Standard 34 Safety Rating	A2L

### Temperature Glide (°F)

1.7

### PRESSURE-TEMPERATURE CHART

TEMP (°F)	National R-454B	
	Liquid Pressure (psig)	Vapor Pressure (psig)
-60	-0.91	-2.34
-55	1.66	0.9
-50	4.02	3.1
-45	6.64	5.6
-40	9.53	8.4
-35	12.72	11.4
-30	16.24	14.8
-25	20.09	18.5
-20	24.31	22.6
-15	28.92	27.0
-10	33.93	31.8
-5	39.37	37.0
0	45.27	42.7
5	51.66	48.8
10	58.54	55.4
15	65.96	62.6
20	73.94	70.3
25	82.50	78.5
30	91.68	87.4
35	101.49	96.9
40	111.97	107.0
45	123.14	117.8
50	135.04	129.3
55	147.70	141.6
60	161.14	154.6
65	175.40	168.5
70	190.50	183.1
75	206.48	198.7
80	223.38	215.2
85	241.22	232.6
90	260.05	251.0
95	279.88	270.4
100	300.78	290.9
105	322.76	312.5
110	345.88	335.2
115	370.16	359.1
120	395.66	384.3
125	422.42	410.8
130	450.48	438.7
135	479.89	468.0
140	510.72	498.8
145	543.01	531.3
150	576.83	565.4
155	612.25	601.4
160	649.34	639.3
165	688.20	679.7
170	728.85	723.1

Values from NIST Refprop 10.0

\* Represented in Hg



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## National R-454B Thermal Dynamic Properties

Temp (°F)	Pressure Liquid Phase (psia)	Pressure Vapor Phase (psia)	Density Liquid (lbm/ft <sup>3</sup> )	Density Vapor (lbm/ft <sup>3</sup> )	Enthalpy Liquid (BTU/lbm)	Enthalpy Vapor (BTU/lbm)	Entropy Vapor (BTU/lbm)	Entropy Vapor (BTU/lbm-°R)
-60	14.25	13.55	77.43	0.21	-7.08	129.0	-0.017	0.324
-55	16.36	15.57	76.95	0.23	-5.32	129.7	-0.013	0.322
-50	18.72	17.82	76.46	0.27	-3.55	130.3	-0.009	0.319
-45	21.33	20.32	75.96	0.30	-1.78	130.9	-0.004	0.317
-40	24.23	23.09	75.46	0.34	0.00	131.5	0.000	0.314
-35	27.42	26.15	74.95	0.38	1.79	132.2	0.004	0.312
-30	30.93	29.51	74.44	0.43	3.58	132.8	0.008	0.310
-25	34.79	33.21	73.92	0.48	5.38	133.3	0.013	0.308
-20	39.01	37.25	73.40	0.54	7.19	133.9	0.017	0.306
-15	43.61	41.67	72.87	0.60	9.01	134.5	0.021	0.304
-10	48.62	46.48	72.33	0.66	10.84	135.0	0.025	0.302
-5	54.07	51.71	71.79	0.73	12.68	135.5	0.029	0.300
0	59.97	57.38	71.24	0.81	14.53	136.1	0.033	0.298
5	66.35	63.52	70.68	0.90	16.39	136.6	0.037	0.296
10	73.24	70.14	70.11	0.99	18.26	137.0	0.041	0.294
15	80.66	77.29	69.54	1.09	20.15	137.5	0.045	0.293
20	88.64	84.97	68.95	1.19	22.05	137.9	0.049	0.291
25	97.20	93.23	68.36	1.31	23.96	138.4	0.053	0.289
30	106.37	102.08	67.76	1.43	25.89	138.8	0.057	0.288
35	116.18	111.55	67.14	1.56	27.83	139.1	0.060	0.286
40	126.66	121.68	66.52	1.71	29.79	139.5	0.064	0.284
45	137.84	132.49	65.88	1.86	31.77	139.8	0.068	0.283
50	149.74	144.01	65.23	2.03	33.76	140.1	0.072	0.281
55	162.40	156.28	64.57	2.20	35.78	140.4	0.076	0.280
60	175.84	169.31	63.90	2.40	37.81	140.6	0.080	0.278
65	190.09	183.16	63.20	2.60	39.87	140.8	0.084	0.277
70	205.20	197.84	62.49	2.83	41.95	141.0	0.087	0.275
75	221.18	213.39	61.77	3.07	44.06	141.2	0.091	0.273
80	238.08	229.86	61.02	3.32	46.19	141.2	0.095	0.272
85	255.92	247.27	60.25	3.60	48.35	141.3	0.099	0.270
90	274.74	265.66	59.46	3.91	50.54	141.3	0.103	0.269
95	294.58	285.08	58.64	4.23	52.77	141.2	0.107	0.267
100	315.47	305.56	57.79	4.59	55.04	141.1	0.111	0.265
105	337.46	327.15	56.91	4.97	57.35	141.0	0.115	0.263
110	360.57	349.89	55.99	5.40	59.70	140.7	0.119	0.261
115	384.86	373.83	55.03	5.86	62.11	140.4	0.123	0.260
120	410.36	399.03	54.02	6.36	64.57	140.0	0.127	0.258
125	437.11	425.53	52.96	6.92	67.11	139.5	0.131	0.255
130	465.17	453.41	51.83	7.54	69.72	138.8	0.136	0.253
135	494.59	482.72	50.62	8.24	72.43	138.1	0.140	0.251
140	525.41	513.54	49.31	9.03	75.26	137.1	0.144	0.248
145	557.70	545.96	47.88	9.93	78.23	135.9	0.149	0.245
150	591.52	580.09	46.29	10.99	81.38	134.5	0.154	0.242
155	626.94	616.05	44.48	12.26	84.79	132.7	0.160	0.238
160	664.04	654.04	42.34	13.86	88.57	130.3	0.165	0.233
165	702.90	694.36	39.63	16.03	93.01	127.0	0.172	0.227
170	743.54	737.80	35.43	19.75	99.19	121.2	0.182	0.217

One atmosphere = 14.696 psia

Reference point for enthalpy and entropy:

0.0 Btu/lb at -40°F

0.0 Btu/lb °R at -40°F



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