

R32



REFRIGERANTS

R32

Product information

## Product description

R32 has been used for many years as a component in several blends, e.g. R407 types or R410A. Since 2012 R32 is used as a substitute for R410A in millions of air-conditioners and heat pumps worldwide, due to its lower GWP and its beneficial energy efficiency performance.

## Applications

- Air conditioners, heat pump and refrigeration applications designed for R32
- Refrigerant component for refrigerant blends like R407 types and R410A

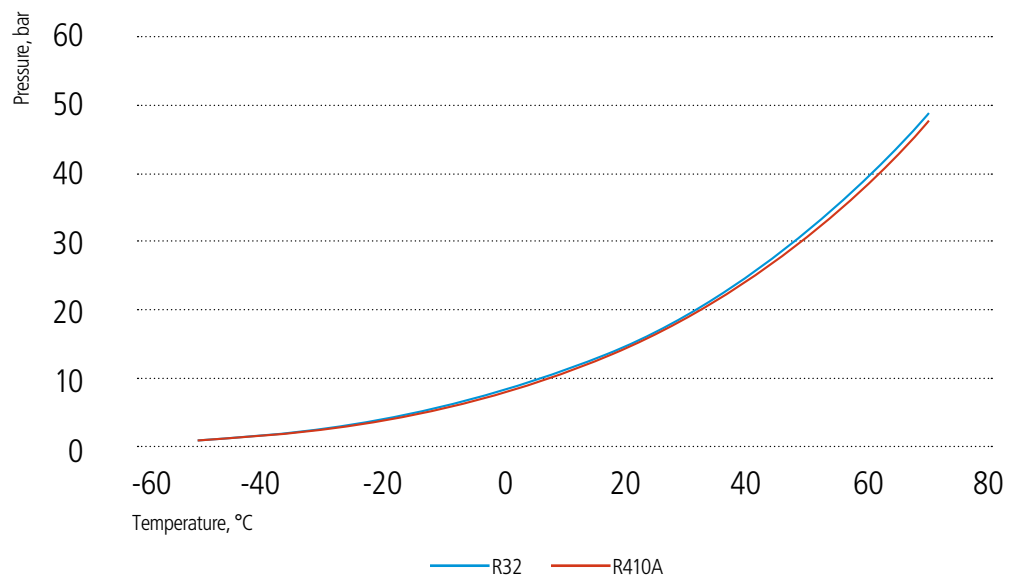
## Environmental aspects

R32 is a refrigerant that addresses a range of environmental and safety considerations:

- Zero Ozone Depletion Potential (ODP)
- Lower Global Warming Potential (GWP) – about one third of R410A
- R32 allows for reduced refrigerant charge, compact design and high energy efficiency
- Easier to charge, recover and reuse because it is not a blend
- Safe to use in many applications because it is an A2L classified refrigerant (low toxicity and lower flammability)

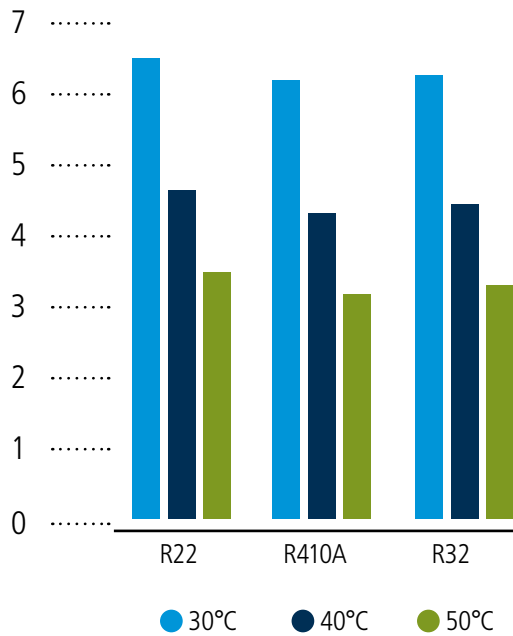
## Range of Applications

### p/t Curve

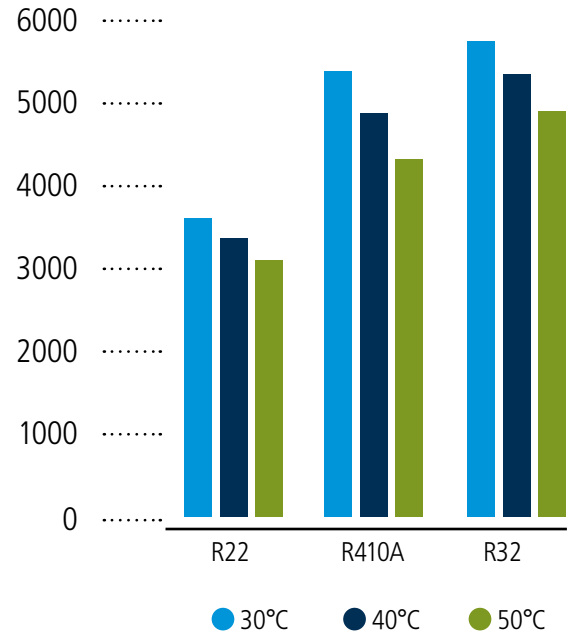


## Theoretical Performance<sup>1</sup>

### COP



### Capacity, kJ/m<sup>3</sup>



<sup>1</sup>Conditions Cycle Simulation:  
 $t_c: 0^\circ\text{C}$ ,  $t_c = \text{variable}$ ,  $T_{\text{superheat}} = 10\text{K}$ ,  $T_{\text{subc.}} = 2\text{K}$ ,  $\text{isent. eff.} = f(p_o/p_c)$

## Physical Properties<sup>2</sup>

		Difluoromethane
Chemical Name		Difluoromethane
Chemical Formula		$\text{CH}_2\text{F}_2$
Molecular Weight	kg/kmol	52.02
GWP <sub>100</sub>	IPCC 4 <sup>th</sup> AR / 5 <sup>th</sup> AR	675 / 677
Boiling Point @ 1.013 bar	°C	-51.6
Critical Temperature	°C	78.1
Critical Pressure	bar	57.8
Critical Density	kg/m <sup>3</sup>	424.0
Critical Volume	dm <sup>3</sup> /kg	2.358
Liquid Density <sup>3</sup>	kg/m <sup>3</sup>	961.0
Sat. Vapour Density <sup>3</sup>	kg/m <sup>3</sup>	47.34
Heat of Vaporization <sup>3</sup>	kJ/kg	270.56
$c_p \text{ liq.}^3$	kJ/(kg K)	1.937
$c_p \text{ vap.}^3$	kJ/(kg K)	1.604
Temp. Glide @ NBP	K	-/-
ASHRAE 34 safety class		A2L
ISO817 safety class		A2L

## Packaging

Type	Loan Steel Container	Iso Tank Containers
Size	859 x 2230 (D x L)	6096 x 2438 x 2591 (L x W x H)
Volume	900 l	18000 l
Tara	~ 500 kg	7300 – 9000 kg
Net Content	720 kg	16500 kg
Connections	Valve DIN4676, W 1-1/4	Flange DIN2635, DN40 / PN40 (liq.), DN40 / PN40 (gas)
Other packaging on request		

<sup>2</sup> All thermo-physical data are based on Refprop 9.0

<sup>3</sup> sat. @ 25°C

## Wet-Vapor Table of R32\*

Temp.	p	v'	v''	rho'	rho''	h'	h''	r	s'	s''
°C	bar	dm³/kg	dm³/kg	kg/m³	kg/m³	kJ/kg	kJ/kg	kJ/kg	kJ/kg K	kJ/kg K
-55	0.852	0.818	393.94	1222.14	2.538	109.28	494.74	385.46	0.632	2.3993
-54	0.898	0.820	375.01	1219.40	2.667	110.86	495.26	384.39	0.640	2.3936
-53	0.945	0.822	357.16	1216.65	2.800	112.45	495.77	383.32	0.647	2.3880
-52	0.995	0.824	340.33	1213.90	2.938	114.04	496.27	382.24	0.654	2.3824
-51	1.047	0.826	324.44	1211.13	3.082	115.63	496.78	381.15	0.661	2.3769
-50	1.101	0.828	309.44	1208.36	3.232	117.22	497.27	380.06	0.668	2.3714
-49	1.158	0.829	295.27	1205.58	3.387	118.81	497.77	378.96	0.675	2.3660
-48	1.216	0.831	281.88	1202.79	3.548	120.40	498.26	377.85	0.682	2.3607
-47	1.277	0.833	269.21	1200.00	3.715	122.00	498.74	376.74	0.689	2.3554
-46	1.340	0.835	257.22	1197.19	3.888	123.60	499.23	375.63	0.697	2.3502
-45	1.406	0.837	245.87	1194.37	4.067	125.20	499.70	374.50	0.704	2.3450
-44	1.474	0.839	235.13	1191.55	4.253	126.80	500.17	373.38	0.711	2.3399
-43	1.545	0.841	224.94	1188.72	4.446	128.40	500.64	372.24	0.717	2.3348
-42	1.619	0.843	215.28	1185.87	4.645	130.01	501.11	371.10	0.724	2.3298
-41	1.695	0.845	206.12	1183.02	4.851	131.62	501.56	369.95	0.731	2.3249
-40	1.774	0.847	197.43	1180.16	5.065	133.23	502.02	368.79	0.738	2.3200
-39	1.856	0.849	189.18	1177.28	5.286	134.84	502.47	367.63	0.745	2.3151
-38	1.941	0.851	181.34	1174.40	5.515	136.45	502.91	366.46	0.752	2.3103
-37	2.029	0.854	173.88	1171.51	5.751	138.07	503.35	365.28	0.759	2.3056
-36	2.120	0.856	166.80	1168.60	5.995	139.69	503.78	364.10	0.766	2.3008
-35	2.214	0.858	160.06	1165.69	6.248	141.31	504.21	362.90	0.772	2.2962
-34	2.311	0.860	153.65	1162.76	6.508	142.93	504.63	361.70	0.779	2.2916
-33	2.412	0.862	147.54	1159.83	6.778	144.56	505.05	360.50	0.786	2.2870
-32	2.516	0.864	141.73	1156.88	7.056	146.18	505.47	359.28	0.793	2.2824
-31	2.623	0.867	136.19	1153.92	7.343	147.81	505.87	358.06	0.799	2.2779
-30	2.734	0.869	130.91	1150.95	7.639	149.45	506.27	356.83	0.806	2.2735
-29	2.849	0.871	125.87	1147.97	7.945	151.08	506.67	355.59	0.813	2.2691
-28	2.967	0.873	121.07	1144.97	8.260	152.72	507.06	354.34	0.819	2.2647
-27	3.090	0.876	116.48	1141.97	8.585	154.36	507.45	353.08	0.826	2.2604
-26	3.216	0.878	112.11	1138.95	8.920	156.01	507.83	351.82	0.833	2.2561
-25	3.346	0.880	107.93	1135.92	9.266	157.66	508.20	350.54	0.839	2.2518
-24	3.480	0.883	103.93	1132.87	9.622	159.31	508.57	349.26	0.846	2.2476
-23	3.618	0.885	100.11	1129.81	9.989	160.96	508.93	347.97	0.852	2.2434

Temp.	p	v'	v''	rho'	rho''	h'	h''	r	s'	s''
°C	bar	dm³/kg	dm³/kg	kg/m³	kg/m³	kJ/kg	kJ/kg	kJ/kg	kJ/kg K	kJ/kg K
-22	3.760	0.888	96.46	1126.74	10.367	162.62	509.28	346.66	0.859	2.2392
-21	3.907	0.890	92.97	1123.66	10.756	164.28	509.63	345.35	0.865	2.2351
-20	4.058	0.892	89.63	1120.56	11.157	165.94	509.97	344.03	0.872	2.2310
-19	4.213	0.895	86.43	1117.45	11.570	167.61	510.31	342.70	0.878	2.2269
-18	4.373	0.897	83.37	1114.32	11.995	169.28	510.64	341.36	0.885	2.2229
-17	4.537	0.900	80.43	1111.18	12.433	170.95	510.96	340.01	0.891	2.2189
-16	4.707	0.903	77.62	1108.03	12.883	172.63	511.28	338.65	0.898	2.2149
-15	4.881	0.905	74.93	1104.86	13.346	174.31	511.58	337.28	0.904	2.2109
-14	5.060	0.908	72.34	1101.67	13.823	175.99	511.89	335.90	0.911	2.2070
-13	5.244	0.910	69.87	1098.47	14.313	177.68	512.18	334.50	0.917	2.2031
-12	5.433	0.913	67.49	1095.25	14.818	179.37	512.47	333.10	0.924	2.1992
-11	5.627	0.916	65.20	1092.01	15.336	181.07	512.75	331.68	0.930	2.1954
-10	5.826	0.918	63.01	1088.76	15.870	182.76	513.02	330.25	0.937	2.1915
-9	6.031	0.921	60.91	1085.49	16.418	184.47	513.28	328.82	0.943	2.1877
-8	6.241	0.924	58.89	1082.21	16.982	186.18	513.54	327.37	0.949	2.1839
-7	6.457	0.927	56.94	1078.91	17.561	187.89	513.79	325.90	0.956	2.1802
-6	6.679	0.930	55.08	1075.58	18.157	189.60	514.03	324.43	0.962	2.1764
-5	6.906	0.933	53.28	1072.25	18.769	191.33	514.26	322.94	0.968	2.1727
-4	7.139	0.936	51.55	1068.89	19.398	193.05	514.49	321.44	0.975	2.1690
-3	7.378	0.939	49.89	1065.51	20.044	194.78	514.70	319.92	0.981	2.1653
-2	7.623	0.942	48.29	1062.11	20.708	196.52	514.91	318.40	0.987	2.1616
-1	7.874	0.945	46.75	1058.70	21.390	198.26	515.11	316.85	0.994	2.1580
0	8.131	0.948	45.27	1055.26	22.091	200.00	515.30	315.30	1.000	2.1543
1	8.395	0.951	43.84	1051.80	22.811	201.75	515.48	313.73	1.006	2.1507
2	8.665	0.954	42.46	1048.32	23.550	203.50	515.65	312.15	1.013	2.1471
3	8.941	0.957	41.14	1044.82	24.310	205.26	515.81	310.55	1.019	2.1434
4	9.225	0.960	39.86	1041.29	25.090	207.03	515.96	308.93	1.025	2.1399
5	9.514	0.964	38.62	1037.75	25.891	208.80	516.11	307.31	1.031	2.1363
6	9.811	0.967	37.43	1034.18	26.714	210.58	516.24	305.66	1.038	2.1327
7	10.115	0.970	36.29	1030.58	27.559	212.36	516.36	304.00	1.044	2.1291
8	10.426	0.974	35.18	1026.96	28.426	214.15	516.47	302.32	1.050	2.1256
9	10.744	0.977	34.11	1023.32	29.317	215.94	516.57	300.63	1.057	2.1220
10	11.069	0.981	33.08	1019.65	30.232	217.74	516.66	298.92	1.063	2.1185

\*based on Refprop 9.0

Temp.	p	v'	v''	rho'	rho''	h'	h''	r	s'	s''
°C	bar	dm³/kg	dm³/kg	kg/m³	kg/m³	kJ/kg	kJ/kg	kJ/kg	kJ/kg K	kJ/kg K
11	11.402	0.984	32.08	1015.96	31.172	219.55	516.74	29719	1.069	2.1149
12	11.742	0.988	31.12	1012.23	32.137	221.36	516.80	295.44	1.075	2.1114
13	12.089	0.992	30.19	1008.48	33.128	223.18	516.86	293.68	1.082	2.1078
14	12.445	0.995	29.29	1004.70	34.145	225.01	516.90	291.89	1.088	2.1043
15	12.808	0.999	28.42	1000.89	35.190	226.84	516.93	290.09	1.094	2.1008
16	13.179	1.003	27.58	997.06	36.264	228.68	516.95	288.27	1.100	2.0972
17	13.559	1.007	26.76	993.19	37.366	230.53	516.96	286.43	1.107	2.0937
18	13.946	1.011	25.98	989.28	38.498	232.39	516.95	284.57	1.113	2.0902
19	14.342	1.015	25.21	985.35	39.661	234.25	516.93	282.68	1.119	2.0866
20	14.746	1.019	24.48	981.38	40.856	236.12	516.90	280.78	1.125	2.0831
21	15.158	1.023	23.76	977.38	42.083	238.00	516.85	278.85	1.132	2.0795
22	15.579	1.027	23.07	973.34	43.344	239.89	516.79	276.90	1.138	2.0760
23	16.009	1.032	22.40	969.27	44.639	241.78	516.71	274.93	1.144	2.0724
24	16.448	1.036	21.75	965.16	45.971	243.69	516.62	272.93	1.150	2.0688
25	16.896	1.041	21.12	961.01	47.339	245.60	516.51	270.91	1.157	2.0652
26	17.353	1.045	20.51	956.82	48.745	247.53	516.39	268.86	1.163	2.0616
27	17.819	1.050	19.92	952.58	50.190	249.46	516.25	266.79	1.169	2.0580
28	18.295	1.055	19.35	948.31	51.676	251.40	516.09	264.69	1.175	2.0544
29	18.780	1.059	18.80	943.99	53.205	253.35	515.92	262.56	1.182	2.0507
30	19.275	1.064	18.26	939.62	54.776	255.32	515.72	260.41	1.188	2.0471
31	19.780	1.069	17.73	935.21	56.393	257.29	515.51	258.22	1.194	2.0434
32	20.294	1.074	17.22	930.75	58.056	259.28	515.29	256.01	1.201	2.0397
33	20.819	1.080	16.73	926.24	59.768	261.27	515.04	253.77	1.207	2.0360
34	21.353	1.085	16.25	921.67	61.530	263.28	514.77	251.49	1.213	2.0322
35	21.898	1.090	15.79	917.05	63.343	265.30	514.48	249.18	1.220	2.0285
36	22.454	1.096	15.33	912.37	65.211	267.34	514.17	246.83	1.226	2.0246
37	23.020	1.102	14.90	907.63	67.135	269.38	513.84	244.46	1.233	2.0208
38	23.597	1.108	14.47	902.83	69.118	271.45	513.49	242.04	1.239	2.0169
39	24.184	1.114	14.05	897.97	71.161	273.52	513.11	239.59	1.246	2.0130
40	24.783	1.120	13.65	893.04	73.268	275.61	512.71	237.09	1.252	2.0091
41	25.393	1.126	13.26	888.04	75.441	277.72	512.28	234.56	1.258	2.0051
42	26.014	1.133	12.87	882.96	77.684	279.84	511.82	231.99	1.265	2.0011
43	26.647	1.139	12.50	877.81	79.998	281.98	511.34	229.37	1.272	1.9970
44	27.292	1.146	12.14	872.58	82.389	284.13	510.83	226.70	1.278	1.9929

Temp.	p	v'	v''	rho'	rho''	h'	h''	r	s'	s''
°C	bar	dm³/kg	dm³/kg	kg/m³	kg/m³	kJ/kg	kJ/kg	kJ/kg	kJ/kg K	kJ/kg K
45	27.948	1.153	11.78	867.26	84.859	286.31	510.29	223.99	1.285	1.9888
46	28.616	1.160	11.44	861.86	87.412	288.50	509.72	221.22	1.291	1.9845
47	29.296	1.168	11.10	856.36	90.053	290.71	509.12	218.41	1.298	1.9802
48	29.989	1.175	10.78	850.77	92.786	292.95	508.48	215.54	1.305	1.9759
49	30.694	1.183	10.46	845.07	95.617	295.21	507.81	212.61	1.312	1.9715
50	31.412	1.192	10.15	839.26	98.550	297.49	507.10	209.62	1.318	1.9670
51	32.143	1.200	9.84	833.33	101.592	299.79	506.36	206.57	1.325	1.9624
52	32.887	1.209	9.55	827.28	104.749	302.12	505.57	203.45	1.332	1.9578
53	33.644	1.218	9.26	821.10	108.029	304.48	504.74	200.26	1.339	1.9530
54	34.415	1.227	8.97	814.78	111.439	306.87	503.86	196.99	1.346	1.9482
55	35.199	1.237	8.70	808.31	114.989	309.29	502.93	193.64	1.353	1.9432
56	35.997	1.247	8.43	801.68	118.687	311.74	501.95	190.21	1.360	1.9382
57	36.809	1.258	8.16	794.88	122.546	314.22	500.92	186.69	1.368	1.9330
58	37.635	1.269	7.90	787.90	126.577	316.75	499.82	183.07	1.375	1.9277
59	38.476	1.281	7.65	780.71	130.794	319.32	498.67	179.35	1.382	1.9222
60	39.332	1.293	7.40	773.31	135.213	321.93	497.44	175.51	1.390	1.9166
61	40.203	1.306	7.15	765.67	139.853	324.59	496.14	171.56	1.397	1.9108
62	41.089	1.320	6.91	757.78	144.734	327.30	494.76	167.46	1.405	1.9048
63	41.991	1.334	6.67	749.60	149.881	330.07	493.29	163.23	1.413	1.8986
64	42.909	1.349	6.44	741.10	155.322	332.90	491.73	158.83	1.421	1.8922
65	43.843	1.366	6.21	732.26	161.092	335.80	490.05	154.25	1.429	1.8855
66	44.793	1.383	5.98	723.02	167.230	338.78	488.26	149.48	1.438	1.8785
67	45.761	1.402	5.75	713.34	173.788	341.85	486.33	144.48	1.446	1.8711
68	46.745	1.422	5.53	703.16	180.828	345.02	484.25	139.23	1.455	1.8634
69	47.748	1.444	5.31	692.39	188.427	348.31	481.99	133.68	1.464	1.8552
70	48.768	1.469	5.08	680.93	196.688	351.73	479.52	127.78	1.474	1.8464
71	49.808	1.496	4.86	668.66	205.748	355.32	476.80	121.48	1.484	1.8370
72	50.866	1.526	4.63	655.38	215.796	359.11	473.77	114.66	1.495	1.8268
73	51.946	1.561	4.40	640.82	227.110	363.15	470.35	107.20	1.506	1.8155
74	53.046	1.601	4.16	624.57	240.125	367.53	466.41	98.88	1.518	1.8027
75	54.168	1.650	3.91	605.89	255.587	372.39	461.72	89.33	1.531	1.7880
76	55.315	1.714	3.64	583.32	274.998	378.03	455.86	77.83	1.547	1.7699
77	56.489	1.809	3.31	552.89	302.381	385.26	447.64	62.38	1.567	1.7452
78	57.697	2.063	2.72	484.61	367.245	400.38	428.90	28.52	1.610	1.6907

# R32

Product information

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