

# helium

Other names:	helium-4
Inchi:	InChI=1S/He
InchiKey:	SWQJXJJOGLNCZEY-UHFFFAOYSA-N
Formula:	He
SMILES:	[He]
Mol. weight [g/mol]:	4.00
CAS:	7440-59-7

## Physical Properties

Property code	Value	Unit	Source
affp	177.80	kJ/mol	NIST Webbook
basg	148.50	kJ/mol	NIST Webbook
ie	24.60 ± 0.10	eV	NIST Webbook
ie	24.59	eV	NIST Webbook
ie	24.59 ± 0.03	eV	NIST Webbook
ie	24.59	eV	NIST Webbook
ie	24.59	eV	NIST Webbook
ie	24.59	eV	NIST Webbook
ie	24.56	eV	NIST Webbook
pc	227.40 ± 0.20	kPa	NIST Webbook
rhoc	69.65 ± 0.04	kg/m <sup>3</sup>	NIST Webbook
sgb	126.15 ± 0.00	J/mol×K	NIST Webbook
tc	5.20 ± 0.00	K	NIST Webbook

## Datasets

### Viscosity, Pa\*s

Pressure, kPa - Gas	Temperature, K - Gas	Viscosity, Pa*s - Gas
100.30	296.26	0.0000196
110.10	322.56	0.0000208
111.60	373.12	0.0000231

111.50	472.08	0.0000271
111.10	572.96	0.0000311
332.10	296.26	0.0000198
306.50	322.56	0.0000210
307.10	373.12	0.0000231
313.70	472.08	0.0000273
309.70	572.96	0.0000312
500.30	296.26	0.0000198
521.20	322.56	0.0000210
504.20	373.12	0.0000232
504.90	472.08	0.0000273
514.30	572.96	0.0000312
716.00	296.26	0.0000198
723.00	322.56	0.0000210
698.50	373.12	0.0000232
717.70	472.08	0.0000273
721.70	572.96	0.0000312

Reference

<https://www.doi.org/10.1016/j.jct.2015.04.028>

Temperature, K	Pressure, kPa	Viscosity, Pa*s
293.13	27527.00	0.0000197
293.14	2446.00	0.0000196
293.15	22973.00	0.0000197
293.15	4995.90	0.0000196
293.15	14320.00	0.0000196
293.15	10227.00	0.0000196
293.16	7587.00	0.0000196
293.16	25225.00	0.0000197
293.16	30150.00	0.0000198
293.17	3742.60	0.0000196
293.17	6273.40	0.0000196
293.17	6273.70	0.0000196
293.17	18562.00	0.0000196
293.18	12237.00	0.0000196
293.18	8870.20	0.0000196
293.19	16436.00	0.0000196
293.20	20757.00	0.0000197
293.21	30175.00	0.0000198
293.21	30175.00	0.0000198
293.24	1220.60	0.0000196
293.26	1827.30	0.0000196
293.27	489.97	0.0000196

293.27	613.45	0.0000196
293.28	244.14	0.0000196
293.28	121.33	0.0000195
293.28	366.70	0.0000196

Reference

<https://www.doi.org/10.1021/je900131q>

## Mass density, kg/m<sup>3</sup>

Temperature, K - Gas	Pressure, kPa - Gas	Mass density, kg/m <sup>3</sup> - Gas
223.15	19641.70	37.6511
223.15	3970.00	8.3499
223.15	26025.00	48.1887
223.15	3970.10	8.35
223.15	8133.10	16.6701
223.15	32015.20	57.4679
223.15	32016.60	57.4698
223.15	1881.40	4.0102
223.15	11880.20	23.8089
223.15	15827.60	30.9995
223.15	19641.80	37.6507
223.15	3970.10	8.3501
223.15	19641.50	37.6502
223.15	26023.70	48.1863
223.15	26024.80	48.1881
223.15	8133.10	16.67
223.15	38282.30	66.6131
223.15	11880.10	23.8085
223.15	11880.30	23.8088
223.15	15827.30	30.9985
223.15	15827.60	30.9993
223.15	32014.80	57.4668
223.15	1881.40	4.0102
223.15	32015.80	57.4684
223.15	38283.10	66.614
223.15	11880.20	23.8086
223.15	38281.90	66.6126
223.15	26025.20	48.1886
223.15	8133.10	16.6699
223.15	38281.20	66.6119
223.15	38284.00	66.616

223.15	1881.50	4.0102
223.15	8133.20	16.6699
223.15	8133.20	16.6701
223.15	3970.10	8.3499
223.15	26024.10	48.1868
223.15	1881.40	4.0101
223.15	11880.30	23.8087
223.15	3970.20	8.3499
223.15	1881.40	4.0101
223.15	15827.50	30.999
223.15	19641.50	37.65
223.15	15827.50	30.9989
223.15	32014.40	57.4666
253.15	19865.70	34.0081
253.15	31940.30	51.647
253.15	11895.50	21.2023
253.15	11895.30	21.202
253.15	19865.50	34.0112
253.15	3784.60	7.046
253.15	31938.00	51.6436
253.15	7472.20	13.634
253.15	15957.70	27.8557
253.15	25977.70	43.181
253.15	15957.30	27.8548
253.15	19864.90	34.0064
253.15	31938.50	51.6443
253.15	15957.60	27.8555
253.15	37813.70	59.5664
253.15	37816.90	59.5703
253.15	25976.90	43.179
253.15	25977.50	43.1801
253.15	31939.90	51.6462
253.15	1929.30	3.629
253.15	3784.60	7.0462
253.15	25976.50	43.1785
253.15	7472.30	13.634
253.15	19865.40	34.007
253.15	37812.90	59.5651
253.15	3784.60	7.046
253.15	11895.30	21.2018
253.15	25977.20	43.1796
253.15	3784.60	7.0461
253.15	7472.30	13.634
253.15	11895.60	21.2022

253.15	15957.50	27.8548
253.15	37815.80	59.5686
253.15	1929.30	3.6294
253.15	11895.50	21.2019
253.15	15957.60	27.8552
253.15	37814.80	59.5673
253.15	7472.30	13.634
253.15	31939.50	51.6454
253.15	1929.20	3.629
253.15	1929.20	3.6292
253.15	1929.30	3.6292
273.16	31779.90	48.2235
273.16	20243.10	32.314
273.16	1927.30	3.363
273.16	37201.20	55.1895
273.16	15586.40	25.4234
273.16	935.80	1.6415
273.16	3975.10	6.8634
273.16	31865.40	48.3352
273.16	12056.30	19.9988
273.16	7766.60	13.1563
273.16	1927.30	3.3629
273.16	20242.50	32.313
273.16	31867.00	48.3375
273.16	3952.80	6.8257
273.16	11783.40	19.5715
273.16	11855.00	19.6833
273.16	31864.80	48.3344
273.16	37199.00	55.1865
273.16	11783.30	19.5714
273.16	16078.00	26.164
273.16	19870.20	31.7727
273.16	8006.10	13.5452
273.16	20242.00	32.3121
273.16	25916.00	40.3324
273.16	31777.50	48.22
273.16	37200.60	55.1885
273.16	7916.10	13.3992
273.16	7973.40	13.4923
273.16	16090.40	26.1826
273.16	25914.60	40.3302
273.16	25914.90	40.3307
273.16	37199.80	55.1874
273.16	11854.90	19.6832

273.16	25435.20	39.6682
273.16	31866.70	48.3368
273.16	935.90	1.6416
273.16	3626.70	6.2732
273.16	3626.80	6.2735
273.16	7766.10	13.1555
273.16	16077.70	26.1636
273.16	7764.90	13.1534
273.16	8006.20	13.5452
273.16	19708.70	31.5382
273.16	1956.40	3.4135
273.16	3626.60	6.273
273.16	3952.80	6.8257
273.16	3975.20	6.8633
273.16	7916.00	13.399
273.16	11783.20	19.571
273.16	11829.80	19.6436
273.16	25915.70	40.3317
273.16	32212.50	48.7903
273.16	3975.20	6.8635
273.16	11855.10	19.6835
273.16	15980.50	26.0175
273.16	20242.20	32.3124
273.16	31775.00	48.2167
273.16	3926.10	6.7802
273.16	7973.40	13.4922
273.16	11854.90	19.6831
273.16	16077.30	26.1628
273.16	16090.10	26.1821
273.16	20241.80	32.3117
273.16	25466.10	39.7107
273.16	25915.40	40.3313
273.16	31866.10	48.3358
273.16	935.90	1.6415
273.16	1927.40	3.3629
273.16	8006.10	13.5452
273.16	25464.40	39.7083
273.16	25964.90	40.4011
273.16	32210.10	48.7873
273.16	37536.10	55.6095
273.16	7916.00	13.399
273.16	8006.10	13.5452
273.16	11783.30	19.5712
273.16	11829.90	19.6438

273.16	12056.40	19.999
273.16	19708.70	31.5385
273.16	25466.50	39.7113
273.16	37531.20	55.6035
273.16	3952.90	6.8257
273.16	7765.30	13.1538
273.16	11829.70	19.6434
273.16	11829.80	19.6435
273.16	15586.60	25.4235
273.16	16077.40	26.1631
273.16	25465.50	39.7099
273.16	31577.70	47.9581
273.16	37539.60	55.6136
273.16	1927.40	3.363
273.16	7973.40	13.4921
273.16	8006.10	13.5452
273.16	12056.40	19.9987
273.16	15980.10	26.0168
273.16	16077.60	26.1633
273.16	16090.20	26.1822
273.16	19869.40	31.7712
273.16	25465.00	39.7092
273.16	32213.20	48.7913
273.16	37197.80	55.185
273.16	38113.70	56.3321
273.16	1881.80	3.2839
273.16	3975.20	6.8633
273.16	11855.00	19.6831
273.16	19869.70	31.7718
273.16	25434.10	39.6666
273.16	31778.80	48.2215
273.16	37514.30	55.5816
273.16	37537.40	55.6109
273.16	1927.40	3.3629
273.16	7973.30	13.4919
273.16	11829.80	19.6435
273.16	15586.60	25.4235
273.16	16090.00	26.1818
273.16	19644.90	31.445
273.16	19708.30	31.5381
273.16	37516.60	55.5843
273.16	1956.50	3.4135
273.16	3975.20	6.8635
273.16	11783.30	19.571

273.16	16090.40	26.1823
273.16	19644.80	31.4447
273.16	25433.80	39.6662
273.16	31776.00	48.2177
273.16	38116.00	56.335
273.16	935.90	1.6416
273.16	1956.50	3.4134
273.16	3952.90	6.8257
273.16	7973.40	13.4922
273.16	15586.50	25.4233
273.16	31776.80	48.2188
273.16	37538.60	55.6125
273.16	3626.60	6.273
273.16	7916.10	13.399
273.16	15980.50	26.0174
273.16	19708.30	31.5379
273.16	19870.10	31.7722
273.16	31576.60	47.957
273.16	32210.80	48.788
273.16	37517.70	55.5858
273.16	1956.40	3.4135
273.16	15980.20	26.017
273.16	31576.40	47.9567
273.16	37515.40	55.5829
273.16	38115.50	56.3346
273.16	935.90	1.6416
273.16	19869.20	31.7709
273.16	25435.00	39.6678
273.16	3626.60	6.2731
273.16	3952.90	6.8257
273.16	19645.20	31.4453
273.16	19709.00	31.5386
273.16	1881.80	3.2839
273.16	3926.20	6.7804
273.16	15586.60	25.4232
273.16	19644.60	31.4443
273.16	25434.50	39.6672
273.16	31577.50	47.9577
273.16	3926.20	6.7802
273.16	7765.70	13.1545
273.16	1881.80	3.2839
273.16	1956.50	3.4135
273.16	3926.20	6.7803
273.16	7916.10	13.3991



273.16	25964.50	40.3998
273.16	25964.90	40.4013
273.16	25965.20	40.4011
273.16	32211.50	48.7886
273.16	38114.30	56.3327
273.16	15980.00	26.0165
273.16	31577.00	47.9575
273.16	1881.80	3.2839
273.16	25965.70	40.402
273.16	3926.20	6.7802
273.16	38114.90	56.3338
273.16	12056.50	19.9988
273.16	1881.80	3.2839
273.16	12056.40	19.9985
273.16	37519.70	55.5878
293.15	11762.10	18.2839
293.15	4007.00	6.4541
293.15	31848.20	45.4862
293.15	4006.90	6.4542
293.15	19905.70	29.8595
293.15	31850.10	45.4879
293.15	1731.60	2.8204
293.15	7883.00	12.4722
293.15	38007.20	52.9958
293.15	3908.90	6.3008
293.15	11762.10	18.2839
293.15	25778.50	37.7301
293.15	19905.80	29.8599
293.15	980.10	1.6025
293.15	11762.10	18.2837
293.15	16004.90	24.4156
293.15	980.20	1.6025
293.15	3908.90	6.3009
293.15	7058.10	11.2089
293.15	7881.30	12.4696
293.15	16004.50	24.4152
293.15	25778.20	37.7298
293.15	980.20	1.6025
293.15	1731.60	2.8205
293.15	4007.00	6.4543
293.15	19905.00	29.8586
293.15	31846.20	45.4829
293.15	38006.10	52.9944
293.15	1731.60	2.8205

293.15	7058.00	11.2086
293.15	3908.90	6.3007
293.15	11761.90	18.2834
293.15	4007.00	6.4543
293.15	7881.60	12.4701
293.15	16004.80	24.4153
293.15	25777.30	37.7285
293.15	29509.60	42.5393
293.15	38003.40	52.9909
293.15	14018.10	21.5714
293.15	29507.20	42.5361
293.15	31847.50	45.4845
293.15	16005.10	24.4159
293.15	24473.60	36.0124
293.15	25779.10	37.7309
293.15	29510.80	42.5405
293.15	38004.40	52.9921
293.15	7882.60	12.4715
293.15	19905.60	29.8592
293.15	24474.90	36.0141
293.15	29508.40	42.5375
293.15	1731.60	2.8207
293.15	11762.00	18.2835
293.15	29508.10	42.5373
293.15	14017.90	21.5709
293.15	14018.10	21.5712
293.15	19905.40	29.8588
293.15	24474.20	36.0133
293.15	29509.00	42.5383
293.15	31846.90	45.4837
293.15	38005.40	52.993
293.15	980.20	1.6025
293.15	3908.90	6.3006
293.15	7058.00	11.2086
293.15	7058.20	11.2089
293.15	10034.70	15.7202
293.15	18019.20	27.2484
293.15	25777.80	37.7293
293.15	29510.00	42.5394
293.15	980.20	1.6026
293.15	7058.10	11.2088
293.15	18018.50	27.2473
293.15	16004.70	24.4152
293.15	18018.10	27.2468

293.15	18018.10	27.2464
293.15	14018.20	21.5716
293.15	24475.80	36.0152
293.15	4006.90	6.4542
293.15	29509.30	42.5383
293.15	1731.60	2.8204
293.15	3908.90	6.3007
293.15	18018.80	27.2477
293.15	7882.10	12.4707
293.15	10034.60	15.7202
293.15	18019.10	27.2483
293.15	24473.90	36.0123
293.15	14018.00	21.5709
293.15	4007.00	6.4543
293.15	10034.50	15.7199
293.15	24474.70	36.0137
293.15	24475.10	36.0141
293.15	10034.70	15.7202
293.15	18019.00	27.2479
293.15	4007.00	6.4542
293.15	10034.80	15.7205
293.15	14018.30	21.5716
293.15	14017.80	21.5709
293.15	24473.50	36.0121
293.15	18018.70	27.2474
293.15	14018.20	21.5715
293.16	10034.20	15.7195
323.15	19306.20	26.5662
323.15	15082.00	21.1007
323.15	11648.20	16.523
323.15	19305.50	26.5653
323.15	3959.10	5.7989
323.15	11648.30	16.5232
323.15	1780.10	2.6324
323.15	7974.40	11.4837
323.15	1780.10	2.6323
323.15	7974.40	11.4836
323.15	1780.10	2.6323
323.15	11647.90	16.5226
323.15	19305.40	26.565
323.15	3959.10	5.7989
323.15	7974.30	11.4834
323.15	15081.60	21.1001
323.15	15081.50	21.1

323.15	3959.10	5.7989
323.15	37890.60	48.6888
323.15	7974.30	11.4836
323.15	37892.00	48.6904
323.15	15081.30	21.0997
323.15	7974.40	11.4836
323.15	31796.70	41.7536
323.15	37889.60	48.6876
323.15	15081.40	21.0997
323.15	25679.60	34.4886
323.15	31797.30	41.7543
323.15	1780.10	2.6322
323.15	3959.10	5.7987
323.15	25680.00	34.489
323.15	1780.20	2.6323
323.15	11648.20	16.5228
323.15	19305.00	26.5643
323.15	37888.60	48.6863
323.15	11648.10	16.5227
323.15	31794.80	41.7513
323.15	37887.70	48.6852
323.15	3959.10	5.7989
323.15	19305.30	26.5647
323.15	25678.80	34.4876
323.15	25680.40	34.4895
323.15	25679.30	34.4883
323.15	31796.10	41.7528
323.15	31795.40	41.752

Reference

<https://www.doi.org/10.1016/j.jct.2006.09.012>

Temperature, K	Pressure, kPa	Mass density, kg/m <sup>3</sup>
323.15	37960.80	48.7698
323.15	24300.80	32.8072
323.15	37959.60	48.7683
323.15	15457.50	21.5942
323.15	18569.70	25.6263
323.15	24300.50	32.8067
323.15	24300.70	32.8069
323.15	32137.50	42.1514
323.15	7816.50	11.2639
323.15	11560.60	16.4048
323.15	4851.30	7.0783

323.15	7551.00	10.8932
323.15	15405.90	21.5262
323.15	4851.30	7.0787
323.15	7816.60	11.264
323.15	11516.20	16.3444
323.15	18569.60	25.6261
323.15	32138.00	42.1518
323.15	7816.60	11.264
323.15	25288.80	34.0147
323.15	15457.00	21.5934
323.15	25287.60	34.0134
323.15	30740.40	40.5237
323.15	30739.70	40.5227
323.15	11560.60	16.4063
323.15	15405.90	21.5263
323.15	18569.30	25.6255
323.15	11516.20	16.3445
323.15	15406.00	21.5265
323.15	37958.90	48.7675
323.15	7551.00	10.8928
323.15	11560.60	16.4048
323.15	19211.00	26.4456
323.15	19211.80	26.4466
323.15	25287.30	34.0129
323.15	30738.50	40.5213
323.15	7550.90	10.893
323.15	7551.00	10.8929
323.15	19211.50	26.446
323.15	32138.70	42.1524
323.15	37732.60	48.5152
323.15	4851.30	7.0785
323.15	15457.00	21.5932
323.15	19211.10	26.4456
323.15	24300.70	32.807
323.15	37734.90	48.5178
323.15	37959.50	48.7679
323.15	37733.70	48.5163
323.15	7816.60	11.2637
323.15	15405.90	21.5262
323.15	18569.40	25.6259
323.15	30739.10	40.522
323.15	32137.30	42.1508
323.15	4851.40	7.0788
323.15	25287.10	34.0124

323.15	4247.30	6.2128
323.15	4247.30	6.2127
323.15	15456.80	21.5932
323.15	37736.40	48.5195
323.15	4247.30	6.2128
323.15	4247.20	6.2127
350.00	15078.80	19.5795
350.00	37805.60	45.3936
350.00	30656.00	37.6893
350.00	37806.50	45.3946
350.00	24052.00	30.2468
350.00	11158.30	14.7003
350.00	15078.30	19.5787
350.00	7452.50	9.9569
350.00	4685.10	6.3268
350.00	11158.20	14.7004
350.00	11158.30	14.7004
350.00	24051.80	30.2462
350.00	30657.90	37.6913
350.00	7452.50	9.9569
350.00	18991.50	24.313
350.00	18991.60	24.3135
350.00	37805.10	45.3931
350.00	15078.50	19.579
350.00	4685.10	6.3265
350.00	7452.50	9.9566
350.00	18991.10	24.3127
350.00	4685.20	6.3269
350.00	18991.40	24.3128
350.00	7452.50	9.9568
350.00	15078.30	19.5788
350.00	30655.90	37.6888
350.00	4685.20	6.3267
350.00	24052.40	30.2471
350.00	24051.70	30.2461
350.00	11158.50	14.7008
350.00	37804.50	45.3924
350.00	30655.40	37.6887
375.00	30461.80	35.2524
375.00	30460.30	35.251
375.00	24590.80	28.9966
375.00	30461.20	35.2518
375.00	30462.80	35.2534
375.00	24590.80	28.9964

375.00	30460.70	35.2512
375.00	4669.40	5.8931
375.00	24590.70	28.9965
375.00	24590.90	28.9964
375.00	37971.50	42.9339
375.00	4669.40	5.893
375.00	7673.40	9.5815
375.00	24590.50	28.996
375.00	7673.40	9.5814
375.00	14992.40	18.2509
375.00	14992.80	18.2512
375.00	19144.60	22.9817
375.00	37969.10	42.9318
375.00	37972.80	42.9352
375.00	4669.40	5.8932
375.00	11339.30	13.9783
375.00	4669.40	5.893
375.00	4669.40	5.8932
375.00	19144.60	22.9816
375.00	14992.50	18.2507
375.00	37969.90	42.9322
375.00	37970.80	42.9332
375.00	11339.30	13.9779
375.00	19144.40	22.9816
375.00	19144.10	22.9811
375.00	7673.30	9.581
375.00	7673.50	9.5816
375.00	14992.70	18.2509
375.00	19144.20	22.981
375.00	7673.30	9.5809
375.00	14992.60	18.2509
375.00	11339.20	13.9779
375.00	11339.40	13.9781
375.00	11339.30	13.9779
400.00	19143.10	21.6425
400.00	29990.70	32.8101
400.00	29990.10	32.8093
400.00	14776.90	16.9375
400.00	19142.50	21.6423
400.00	23883.80	26.6117
400.00	37941.00	40.56
400.00	7571.40	8.883
400.00	11460.30	13.2766
400.00	14776.90	16.9377

400.00	19142.20	21.6418
400.00	7571.30	8.8831
400.00	11460.50	13.2769
400.00	37942.00	40.5606
400.00	7571.30	8.8829
400.00	14777.30	16.9379
400.00	37940.30	40.5595
400.00	11460.40	13.2767
400.00	23883.50	26.6114
400.00	5058.30	5.9845
400.00	11460.40	13.2769
400.00	5058.30	5.9842
400.00	14776.80	16.9373
400.00	29989.00	32.8083
400.00	7571.40	8.8833
400.00	19141.90	21.6416
400.00	23882.50	26.6105
400.00	5058.30	5.9844
400.00	5058.30	5.9843
400.00	29989.60	32.8086
400.00	37939.10	40.5581
400.00	23883.20	26.6111
425.00	11517.00	12.5867
425.00	37913.10	38.4326
425.00	19133.30	20.4427
425.00	31604.60	32.5929
425.00	7875.40	8.7027
425.00	15540.90	16.7806
425.00	19133.60	20.4431
425.00	37907.70	38.4278
425.00	15540.40	16.7803
425.00	15540.80	16.7809
425.00	7875.80	8.7031
425.00	31605.50	32.5939
425.00	37906.40	38.4268
425.00	7875.60	8.703
425.00	25119.70	26.3801
425.00	11516.50	12.586
425.00	25120.20	26.3808
425.00	11516.50	12.5859
425.00	11516.70	12.5863
425.00	19133.10	20.4422
425.00	25119.10	26.3797
425.00	37909.10	38.4293



425.00	7875.70	8.703
425.00	31606.90	32.5953
425.00	25118.50	26.3791
425.00	31603.90	32.5927
450.00	31394.90	30.7683
450.00	37608.00	36.2728
450.00	37611.40	36.2757
450.00	37613.30	36.2772
450.00	24940.20	24.8633
450.00	24940.70	24.8636
450.00	24943.40	24.8658
450.00	31395.80	30.7693
450.00	37609.80	36.274
450.00	18965.50	19.2158
450.00	18966.20	19.2164
450.00	31397.50	30.7705
450.00	18965.50	19.2154
450.00	24939.70	24.8624
450.00	31393.90	30.7672
450.00	15358.00	15.7167
450.00	11907.00	12.3041
450.00	7656.00	8.0084
450.00	18965.30	19.2155
450.00	4775.30	5.0371
450.00	4775.40	5.0373
450.00	11907.00	12.3042
450.00	15358.20	15.7171
450.00	4775.40	5.0374
450.00	7655.90	8.0083
450.00	15357.90	15.7166
450.00	7656.00	8.0084
450.00	15358.30	15.7173
450.00	7656.00	8.0085
450.00	11906.90	12.3038
450.00	11906.70	12.3037
475.00	18996.20	18.2908
475.00	37994.10	34.8888
475.00	37996.50	34.891
475.00	37991.70	34.8873
475.00	31121.50	29.0604
475.00	37989.60	34.8852
475.00	18995.10	18.29
475.00	11474.50	11.2698
475.00	11474.70	11.2697

475.00	31118.70	29.0583
475.00	4812.40	4.813
475.00	15102.50	14.6905
475.00	25698.50	24.3237
475.00	31117.60	29.0576
475.00	7937.70	7.8707
475.00	18995.30	18.2901
475.00	25699.20	24.3246
475.00	18994.80	18.2895
475.00	25697.90	24.3233
475.00	11474.40	11.2694
475.00	15102.30	14.6903
475.00	15102.70	14.6908
475.00	15102.00	14.69
475.00	31116.40	29.0563
475.00	7937.90	7.871
475.00	4812.40	4.8133
475.00	11474.70	11.2696
475.00	7938.00	7.8709
475.00	4812.40	4.8131
499.99	37867.60	33.2206
500.00	37865.40	33.2203
500.00	37869.80	33.2239
500.00	37863.60	33.2185
500.00	11580.10	10.8213
500.00	11580.60	10.8215
500.00	4928.00	4.6849
500.00	4928.00	4.6846
500.00	15421.80	14.2732
500.00	19581.30	17.9371
500.00	7887.30	7.4406
500.00	11580.30	10.8221
500.00	7887.10	7.4404
500.00	4928.00	4.685
500.00	11579.90	10.8212
500.00	7887.10	7.4403
500.00	15421.00	14.2721
500.00	25162.20	22.7413
500.00	19583.00	17.9388
500.00	25166.10	22.7445
500.00	19580.70	17.9369
500.00	15421.60	14.2727
500.00	15421.40	14.2719
500.00	25163.10	22.7419

500.00	30654.00	27.3459
500.00	30650.60	27.3437
500.00	30651.70	27.3446
500.00	30652.90	27.3454

Reference

<https://www.doi.org/10.1016/j.jct.2010.02.015>

Temperature, K	Pressure, kPa	Mass density, kg/m <sup>3</sup>
363.28	5072.37	6.5893
353.39	4938.67	6.5971
343.51	4808.07	6.6049
333.58	4675.08	6.6128
323.68	4542.52	6.6206
363.28	5072.37	6.5893
363.29	3356.70	4.387
353.39	3267.16	4.3896
343.51	3177.00	4.3922
333.58	3086.71	4.3949
323.67	2996.72	4.3975
363.29	3356.70	4.387
363.29	2225.04	2.9208
353.40	2165.81	2.9225
343.52	2106.03	2.9243
333.59	2046.28	2.926
323.67	1986.44	2.9278
363.20	2225.05	2.9208
363.28	1476.93	1.9446
353.40	1437.49	1.9455
343.50	1397.80	1.9464
333.58	1357.98	1.9472
323.68	1318.21	1.9481
363.28	1476.94	1.9446
363.29	981.18	1.2947
353.40	954.95	1.2953
343.51	928.60	1.2959
333.58	901.91	1.2964
323.66	875.31	1.297
363.29	981.18	1.2947
363.29	652.06	0.8620
353.39	634.63	0.8624
343.50	616.99	0.8628
333.62	599.50	0.8631
323.68	581.96	0.8635

363.29	652.07	0.8620
363.29	433.46	0.5739
353.39	421.94	0.5741
343.52	410.10	0.5742
333.58	398.41	0.5744
323.67	386.60	0.5746
363.29	433.47	0.5739

Reference

<https://www.doi.org/10.1016/j.jct.2019.02.028>

## Amount density, mol/m<sup>3</sup>

Temperature, K - Gas	Pressure, kPa - Gas	Amount density, mol/m <sup>3</sup> - Gas
373.15	6822.83	2146.79
373.15	4562.05	1446.72
373.15	3058.34	974.95
373.15	2053.73	657.02
373.15	1380.67	442.77
373.15	928.86	298.38
373.15	625.20	201.08
373.15	420.93	135.51
373.16	6447.88	2031.86
373.16	4313.21	1369.18
373.16	2892.19	922.63
373.16	1942.54	621.72
373.16	1306.00	418.95
373.16	878.69	282.31
373.16	591.44	190.24
373.16	398.19	128.19

Reference

<https://www.doi.org/10.1016/j.fluid.2017.12.030>

Temperature, K	Pressure, kPa	Amount density, mol/m <sup>3</sup>
353.16	1131.20	383.5
353.16	808.40	274.4
353.16	577.90	196.4
353.16	413.20	140.5
353.16	295.50	100.5
353.16	211.40	71.93
373.17	1143.70	367.1

373.17	817.40	262.7
373.17	584.30	187.9
373.17	417.90	134.5
373.17	298.80	96.21
373.17	213.80	68.84
393.12	1196.90	364.7
393.12	855.40	260.9
393.12	611.50	186.7
393.12	437.30	133.6
393.12	312.70	95.57
393.12	223.70	68.38
413.13	1249.50	362.3
413.13	893.00	259.2
413.13	638.50	185.5
413.13	456.60	132.7
413.13	326.50	94.96
413.13	233.60	67.95

Reference

<https://www.doi.org/10.1021/acs.jced.7b00263>

## Thermal conductivity, W/m/K

Pressure, kPa - Fluid (supercritical or subcritical phases)	Temperature, K - Fluid (supercritical or subcritical phases)	Thermal conductivity, W/m/K - Fluid (supercritical or subcritical phases)
5030.00	323.20	0.1674
5030.00	323.20	0.1675
5030.00	323.20	0.1677
5030.00	323.19	0.1676
10055.00	323.19	0.1696
10055.00	323.19	0.1695
10055.00	323.19	0.1695
10055.00	323.19	0.1694
29887.00	323.19	0.1783
29886.00	323.19	0.1782
29885.00	323.19	0.1784
29885.00	323.19	0.1786
50067.00	323.21	0.1870
50070.00	323.21	0.1872
50072.00	323.21	0.1872
50075.00	323.21	0.1870
70102.00	323.21	0.1960

70105.00	323.21	0.1960
70109.00	323.21	0.1961
70112.00	323.21	0.1964
98251.00	323.21	0.2089
98254.00	323.21	0.2085
98259.00	323.21	0.2085
98263.00	323.21	0.2086
5137.00	373.23	0.1850
5137.00	373.22	0.1853
5137.00	373.23	0.1845
10114.00	373.23	0.1866
10114.00	373.23	0.1868
10114.00	373.23	0.1866
30214.00	373.22	0.1948
30214.00	373.22	0.1945
30213.00	373.22	0.1948
49994.00	373.22	0.2033
49992.00	373.22	0.2028
49990.00	373.22	0.2028
69937.00	373.23	0.2140
69936.00	373.23	0.2139
69936.00	373.23	0.2138
97514.00	373.23	0.2284
97516.00	373.23	0.2277
97527.00	373.23	0.2275
5261.00	473.28	0.2173
5261.00	473.27	0.2169
5260.00	473.27	0.2166
10173.00	473.27	0.2193
10172.00	473.27	0.2187
10172.00	473.27	0.2183
30084.00	473.28	0.2252
30085.00	473.28	0.2251
30085.00	473.28	0.2260
50076.00	473.27	0.2321
50078.00	473.27	0.2322
50080.00	473.27	0.2317
70131.00	473.27	0.2428
70135.00	473.27	0.2422
70138.00	473.27	0.2419
99160.00	473.29	0.2472
99148.00	473.27	0.2558
99151.00	473.27	0.2549
99156.00	473.27	0.2552

5197.00	573.25	0.2478
5199.00	573.25	0.2472
5200.00	573.25	0.2477
10292.00	573.25	0.2503
10294.00	573.25	0.2496
10295.00	573.25	0.2496
30146.00	573.25	0.2552
30146.00	573.24	0.2549
30149.00	573.25	0.2558
50095.00	573.25	0.2609
50100.00	573.25	0.2599
50100.00	573.24	0.2618
70129.00	573.24	0.2675
70160.00	573.25	0.2680
70165.00	573.25	0.2662
97066.00	573.24	0.2798
97071.00	573.24	0.2805
97072.00	573.24	0.2792
5413.00	672.90	0.2765
5416.00	672.90	0.2770
5417.00	672.89	0.2774
10409.00	672.89	0.2788
10412.00	672.89	0.2790
10414.00	672.89	0.2784
30054.00	672.89	0.2843
30064.00	672.88	0.2852
30085.00	672.88	0.2823
50178.00	672.89	0.2895
50182.00	672.89	0.2888
50184.00	672.88	0.2882
70068.00	672.88	0.2930
70074.00	672.88	0.2949
70081.00	672.88	0.2948
98224.00	672.87	0.3057
98231.00	672.87	0.3054
98230.00	672.87	0.3055
1059.00	771.94	0.2998
1068.00	771.94	0.3028
1071.00	771.94	0.3022
1074.00	771.94	0.3040
3001.00	771.94	0.3012
3003.00	771.94	0.3055
3005.00	771.93	0.3046
3008.00	771.93	0.3049

5202.00	771.93	0.3079
5204.00	771.92	0.3065
10197.00	771.91	0.3094
10199.00	771.91	0.3093
30345.00	771.90	0.3126
30348.00	771.90	0.3102
30350.00	771.90	0.3130
50118.00	771.89	0.3162
50125.00	771.89	0.3184
50128.00	771.89	0.3182
70299.00	771.89	0.3237
70303.00	771.89	0.3173
70305.00	771.89	0.3224
99452.00	771.89	0.3302
99460.00	771.89	0.3299
99462.00	771.89	0.3321

Reference

<https://www.doi.org/10.1007/s10765-011-1052-5>

## Sources

Solubilities of gases in cycloethers. The solubility of 13 nonpolar gases in 2,2,6,6-tetramethylpiperidine (C<sub>10</sub>H<sub>16</sub>N) mixtures from 0.1 to 20 MPa at T = 298.15 to 375 K. Wide-ranging, high-accuracy fluid (p,q,T) determinations based on a compact dielectric fluoromethane's Diffusion Coefficient of Hydrogen, Helium, Nitrogen, and Air by Reverse Mixtures of Measured Gas Diffusion Thermal Conductivity at High Pressure and High Temperature. pVTx measurements of binary mixtures of difluoromethane (R22) and 1,1,1,3,3,3-hexafluoroisopropane (R125) in liquid chlorinated hydrocarbons. Diffusion Coefficient Data of Various Gas Systems Determined Using a Dissolved Polyacetic acid) on the solubility of He, Ne, and H<sub>2</sub> gases in 1,1,1,3,3,3-hexafluoroisopropane. Solubility of gases in fluoroorganic alcohols. Part II. Solubilities of noble gases. A wide data to accurately determine the fourth density virial coefficients of the noble gases, and Diffusion Coefficients of Some Metal Measurements of vapor pressure and densities of C<sub>3</sub>O<sub>2</sub> for trans-1,3,3,3-tetrafluoropropene. rho., T) and critical coefficients for the viscosity and thermal conductivity of hydrogen at high temperatures up to 573 K by a curved tungsten wire method:

<https://www.doi.org/10.1016/j.jct.2018.12.037>

<https://www.doi.org/10.1016/j.jct.2019.07.011>

<https://www.doi.org/10.1016/j.jct.2006.09.012>

<https://www.doi.org/10.1021/acs.jced.8b01229>

<https://www.doi.org/10.1016/j.jct.2015.12.006>

<https://www.doi.org/10.1007/s10765-011-1052-5>

<https://www.doi.org/10.1016/j.jct.2019.02.028>

<https://www.doi.org/10.1021/je800200j>

<https://www.doi.org/10.1007/s10765-015-1981-5>

<https://www.doi.org/10.1021/acs.jced.5b00268>

<https://www.doi.org/10.1021/acs.jced.7b00263>

<https://www.doi.org/10.1016/j.jct.2011.11.019>

<https://www.doi.org/10.1016/j.jct.2010.02.015>

<https://www.doi.org/10.1021/je9006822>

<https://www.doi.org/10.1016/j.fluid.2017.12.030>

<https://www.doi.org/10.1016/j.jct.2016.05.024>

<https://www.doi.org/10.1016/j.jct.2015.04.028>

<http://webbook.nist.gov/cgi/cbook.cgi?ID=C7440597&Units=SI>

Density Data of Two (H<sub>2</sub> + CO<sub>2</sub>) Mixtures and a (H<sub>2</sub> + CO<sub>2</sub> + CH<sub>4</sub>) Simultaneous Measurements on Helium and Nitrogen with a New Designed Viscometer-Densimeter over a Wide Range of Temperature and Pressure:

<https://www.doi.org/10.1021/acs.jced.8b01206>

<https://www.doi.org/10.1021/je900131q>



Solubilities of Nonpolar Gases in  
Triethylene Glycol Dimethyl Ether,  
Combined experiments to measure low  
solubility of carbon dioxide, ethane,  
propane, and diffusions  
coefficients at 298 K and 101.33 kPa  
Partial Pressure of Gas:

<https://www.doi.org/10.1021/je020199q>

<https://www.doi.org/10.1016/j.tca.2006.10.021>

## Legend

<b>affp:</b>	Proton affinity
<b>basg:</b>	Gas basicity
<b>dvisc:</b>	Dynamic viscosity
<b>ie:</b>	Ionization energy
<b>pc:</b>	Critical Pressure
<b>rhoc:</b>	Critical density
<b>rhog:</b>	Gas Density
<b>rhomg:</b>	Gas Amount Density
<b>sgb:</b>	Molar entropy at standard conditions (1 bar)
<b>tc:</b>	Critical Temperature
<b>tcondl:</b>	Liquid thermal conductivity

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