

- Други вежбовни колоквијум из хемијске термодинамике -

II-1. Одређивање фугасности гаса

Упутство за читавање података из таблице:

Податке за моларну запремину или фактор компресибилности из приложене таблице треба читавати за тачно одређену температуру у специфичном опсегу притисака који је задат. Приликом читавања треба водити рачуна да број интервала за интеграцију буде паран, односно да број тачака буде непаран.

Пример:

Ако фугасност треба да се одреди за података за компресибилност за температуру од 330 K и притисак од 80 atm једини начин је да се тачке читавају са кораком од 10 atm као што је приказано у Табели 1.

Табела 1. Зависност фактора компресибилности од притиска на 330 K. Тачке су читане са кораком од 10 atm што резултује непарним бројем тачака и парним бројем интервала за интеграцију.

330 K		
P [atm]	Z	$\frac{Z-1}{P} \left[\text{atm}^{-1} \right]$
1	0,9945	
10	0,9432	
20	0,8821	
30	0,8143	
40	0,7373	Израчунати ове вредности
50	0,6492	
60	0,5413	
70	0,4339	
80	0,3796	

Без обзира на тачке које се користе за интеграцију Симпсоновом методом график зависности $\alpha = f(P)$ односно $(Z-1)/P = f(P)$ конструисати са свим расположивим тачкама из табличних података до притиска до ког се врши интеграција (горње границе интеграла) како би се екстраполација на нулти притисак што боље извршила.

Напомена: У приложеној табlici “.” представља ознаку за децимални сепаратор док “,” представља сепаратор за хиљаде.

Pressure atm	Temperature °K							
	200	210	220	230	240	250	260	270
1	15,991	16,845	17,696	18,545	19,392	20,237	21,080	21,920
2	7,757	8,210	8,658	9,102	9,542	9,978	10,411	10,841
3		5,335	5,644	5,950	6,253	6,553	6,851	7,146
4			4,118	4,364	4,604.5	4,839.5	5,070.1	5,297.2
5				3,412	3,613.8	3,809.8	4,001.0	4,188.2
6				2,761	2,950.4	3,123.1	3,286.9	3,446.6
7					2,477.3	2,629.4	2,775.7	2,917.6
8					2,120.8	2,259.3	2,392.0	2,519.9
9					1,842.0	1,968.6	2,090.4	2,208.1
10						1,737.4	1,855.5	1,962.5
15							1,118.4	1,206.3
20								815.8
25								
30								
35								
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200								
225								
250								
275								
300								
325								
350								
375								
400								
425								
450								
475								
500								

Temperature °K								Pressure atm
280	290	300	310	320	330	340	350	
22,758	23,595	24,430	25,264	26,097	26,929	27,759	28,588	1
11,269	11,695	12,120	12,544	12,967	13,389	13,810	14,229	2
7,439	7,730	8,019	8,306	8,592	8,876	9,159	9,441	3
5,521.5	5,743.7	5,964.2	6,183.3	6,401.1	6,617.7	6,833.2	7,047.7	4
4,372.2	4,553.6	4,733.0	4,911.0	5,087.8	5,263.5	5,438.2	5,611.9	5
3,603.5	3,758.3	3,911.3	4,062.7	4,212.6	4,361.1	4,508.4	4,654.7	6
3,056.0	3,191.7	3,325.2	3,456.9	3,587.1	3,716.0	3,843.7	3,970.4	7
2,644.0	2,765.2	2,884.1	3,001.2	3,116.9	3,231.4	3,344.7	3,457.0	8
2,322.3	2,433.5	2,542.1	2,648.4	2,752.8	2,855.7	2,957.4	3,058.1	9
2,064.4	2,163.5	2,260.7	2,366.4	2,460.9	2,554.4	2,647.0	2,738.7	10
1,288.4	1,366.1	1,440.4	1,512.0	1,581.4	1,649.0	1,715.1	1,780.0	15
890.8	958.8	1,022.1	1,081.9	1,139.0	1,194.0	1,247.3	1,299.2	20
640.0	707.8	767.5	821.4	871.3	919.1	965.3	1,009.9	25
	530.2	589.4	642.5	690.7	735.1	776.7	816.3	30
		457.3	511.8	559.2	601.6	640.6	677.3	35
		343.4	407.9	457.5	489.4	536.7	571.3	40
			319.3	374.5	418.0	455.0	488.6	45
			227.7	304.2	350.6	389.1	423.1	50
			121.5	239.4	294.3	334.0	367.5	55
			105.0	179.6	244.3	287.0	321.7	60
			99.3	138.0	201.6	247.2	281.9	65
			95.4	119.2	166.8	212.6	248.3	70
			93.2	107.1	144.0	184.0	219.9	75
			91.0	104.2	128.5	162.7	195.5	80
			89.3	99.9	118.6	146.2	175.9	85
			87.6	96.8	111.9	134.0	160.1	90
			86.8	94.4	107.0	124.7	147.3	95
			86.4	92.6	103.0	118.0	137.2	100
			81.5	86.1	92.2	100.2	110.3	125
			78.5	82.1	86.5	91.9	98.4	150
			76.1	79.1	82.6	86.7	91.5	175
			74.09	76.69	79.65	83.00	86.80	200
			72.77	75.11	77.69	80.56	83.77	225
			71.69	73.79	76.08	78.61	81.40	250
			70.74	72.66	74.74	77.00	79.45	275
			69.90	71.69	73.59	75.63	77.84	300
			69.15	70.81	72.57	74.45	76.47	325
			68.47	70.02	71.67	73.42	75.27	350
			67.84	69.31	70.84	72.47	74.20	375
			67.26	68.66	70.12	71.64	73.24	400
			66.72	68.04	69.42	70.87	72.38	425
			66.22	67.48	68.79	70.16	71.60	450
			65.75	66.96	68.22	69.53	70.89	475
			65.31	66.48	67.68	68.92	70.22	500

Pressure atm	Temperature °K							
	360	370	380	390	400	410	420	430
1	29,416	30,245	31,073	31,900	32,726	33,552	34,378	35,203
2	14,647	15,065	15,482	15,899	16,315	16,731	17,146	17,562
3	9,723	10,004	10,285	10,565	10,845	11,124	11,403	11,681
4	7,261.4	7,474.4	7,686.8	7,898.7	8,110.1	8,321.1	8,531.7	8,742.0
5	5,784.7	5,956.7	6,128.0	6,298.6	6,468.7	6,638.4	6,807.8	6,976.9
6	4,800.1	4,944.7	5,088.6	5,231.9	5,374.7	5,517.1	5,659.2	5,801.0
7	4,096.3	4,221.5	4,346.0	4,469.2	4,593.3	4,716.2	4,838.7	4,960.9
8	3,568.5	3,679.2	3,789.2	3,898.5	4,007.3	4,115.6	4,223.5	4,331.0
9	3,158.0	3,257.2	3,355.8	3,453.8	3,551.3	3,648.3	3,744.8	3,840.9
10	2,829.6	2,919.8	3,009.3	3,098.2	3,186.6	3,274.5	3,362.0	3,449.1
15	1,843.9	1,906.9	1,969.2	2,030.9	2,092.1	2,152.8	2,213.1	2,273.0
20	1,349.9	1,399.6	1,448.5	1,496.8	1,544.5	1,591.7	1,638.4	1,684.7
25	1,053.2	1,095.4	1,136.6	1,176.9	1,216.5	1,255.5	1,294.0	1,332.1
30	854.4	891.4	927.4	962.5	996.9	1,030.7	1,064.0	1,096.8
35	712.2	745.7	777.1	808.6	839.4	869.6	899.3	928.5
40	604.0	635.2	665.3	694.4	722.6	750.0	776.7	802.9
45	519.9	549.5	577.8	605.0	631.2	656.5	681.1	705.1
50	453.7	481.8	508.2	533.5	557.9	581.5	604.4	626.7
55	397.7	425.3	450.9	475.0	498.0	520.2	541.7	562.6
60	351.4	378.3	403.1	426.3	448.3	469.5	490.0	509.8
65	311.9	338.5	362.6	385.0	406.4	426.5	446.0	464.8
70	278.1	304.1	327.7	349.6	370.2	389.7	408.3	426.2
75	249.3	274.9	297.9	319.2	339.2	358.1	376.1	393.3
80	224.5	249.7	272.4	293.2	312.5	330.6	347.8	364.3
85	203.2	227.6	249.6	269.9	288.7	306.3	323.0	339.0
90	185.4	208.8	230.2	249.8	267.9	284.9	301.1	316.6
95	170.6	192.8	213.3	232.2	249.8	266.3	282.0	297.0
100	158.4	178.9	198.4	216.7	233.8	249.9	265.1	279.5
125	122.3	135.5	149.2	163.1	176.7	189.9	202.6	224.8
150	106.1	114.9	124.4	134.4	144.7	155.1	165.3	175.3
175	97.1	103.4	110.4	117.9	125.7	133.7	141.8	150.0
200	91.10	95.95	101.33	107.16	113.35	119.80	126.42	133.14
225	87.36	91.32	95.64	100.30	105.28	110.55	116.07	121.72
250	84.46	87.80	91.43	95.33	99.49	103.87	108.46	113.24
275	82.11	85.00	88.13	91.49	95.06	98.84	102.80	106.89
300	80.23	82.80	85.56	88.50	91.61	94.89	98.32	101.87
325	78.63	80.94	83.40	86.02	88.78	91.68	94.72	97.90
350	77.23	79.33	81.56	83.92	86.41	89.01	91.71	94.50
375	76.03	77.97	80.02	82.17	84.40	86.73	89.16	91.69
400	74.94	76.74	78.63	80.61	82.68	84.83	87.05	89.35
425	73.97	75.65	77.41	79.26	81.18	83.15	85.18	87.28
450	73.11	74.69	76.34	78.06	79.84	81.68	83.57	85.51
475	72.32	73.80	75.35	76.97	78.63	80.35	82.12	83.93
500	71.57	72.98	74.44	75.96	77.53	79.14	80.79	82.48

Temperature °K							Pressure atm
440	450	460	470	480	490	500	
36,029	36,854	37,679	38,503	39,328	40,152	40,976	1
17,977	18,392	18,806	19,221	19,635	20,049	20,462	2
11,960	12,238	12,515	12,793	13,070	13,347	13,624	3
8,951.9	9,161.5	9,370.8	9,579.8	9,788.5	9,996.9	10,205	4
7,145.7	7,314.2	7,482.5	7,650.5	7,818.3	7,985.9	8,153.2	5
5,942.5	6,083.7	6,224.6	6,355.2	6,505.5	6,645.6	6,785.6	6
5,082.7	5,204.2	5,325.5	5,446.6	5,567.4	5,688.1	5,808.7	7
4,438.2	4,545.1	4,651.7	4,758.1	4,864.3	4,970.3	5,076.1	8
3,936.6	4,032.0	4,127.2	4,222.2	4,317.0	4,411.7	4,506.3	9
3,535.8	3,622.2	3,708.4	3,794.2	3,879.8	3,965.2	4,050.4	10
2,332.5	2,391.6	2,450.4	2,508.9	2,567.2	2,625.3	2,683.2	15
1,730.6	1,776.1	1,821.3	1,866.3	1,911.1	1,955.6	1,999.9	20
1,369.8	1,407.2	1,444.3	1,481.1	1,517.6	1,553.9	1,590.0	25
1,129.2	1,161.2	1,192.9	1,224.3	1,255.4	1,286.3	1,317.0	30
957.3	985.6	1,013.5	1,041.7	1,068.2	1,095.2	1,122.1	35
828.7	854.0	878.9	903.5	927.9	952.1	976.1	40
728.6	751.7	774.5	796.9	819.0	840.9	862.6	45
648.5	669.9	690.9	711.5	731.8	751.9	771.8	50
583.0	603.0	622.6	641.8	660.7	679.3	697.7	55
529.0	547.7	566.0	583.9	601.5	618.9	636.1	60
483.0	500.7	518.0	534.9	551.5	567.9	584.0	65
443.6	460.5	477.0	493.1	508.9	524.3	539.4	70
409.9	426.0	441.7	457.0	471.9	486.5	500.9	75
380.3	395.8	410.8	425.4	439.7	453.7	467.4	80
354.4	369.3	383.7	397.7	411.4	424.8	437.9	85
331.5	345.9	359.8	373.3	386.4	399.2	411.8	90
311.3	325.1	338.5	351.5	364.1	376.4	388.5	95
293.3	306.6	319.5	332.0	344.1	355.9	367.5	100
236.5	247.8	258.7	269.3	279.6	289.6	289.4	125
185.1	194.6	203.9	213.0	221.9	230.6	239.0	150
158.2	166.3	174.2	182.0	189.6	197.1	204.4	175
139.90	146.67	153.43	160.13	166.74	173.24	179.64	200
127.44	133.19	138.96	144.71	150.42	156.10	161.75	225
118.17	123.18	128.18	133.17	138.15	143.13	148.11	250
111.09	115.37	119.71	124.10	128.53	133.00	137.49	275
105.53	109.29	113.14	117.07	121.04	125.03	129.01	300
101.21	104.61	108.07	111.55	115.04	118.54	122.04	325
97.39	100.37	103.43	106.56	109.74	112.98	116.26	350
94.32	97.03	99.81	102.65	105.54	108.48	111.47	375
91.72	94.17	96.69	99.27	101.91	104.60	107.35	400
89.46	91.70	94.01	96.38	98.80	101.28	103.80	425
87.51	89.56	91.67	93.83	96.05	98.33	100.66	450
85.79	87.70	89.66	91.67	93.72	95.81	97.95	475
84.21	85.97	87.77	89.61	91.50	93.43	95.40	500

Етан, C₂H₆

COMPRESSIBILITY FACTOR $Z = PV/RT$

Pressure atm	Temperature °K									
	200	210	220	230	240	250	260	270	280	290
1	0.9744	0.9775	0.9802	0.9826	0.9847	0.9865	0.9881	0.9894	0.9905	0.9915
2	0.9487	0.9546	0.9600	0.9648	0.9690	0.9727	0.9759	0.9786	0.9809	0.9829
3		0.9298	0.9388	0.9461	0.9526	0.9584	0.9634	0.9676	0.9711	0.9742
4			0.9158	0.9261	0.9355	0.9437	0.9506	0.9564	0.9613	0.9655
5				0.9038	0.9177	0.9286	0.9376	0.9451	0.9514	0.9568
6				0.8778	0.8994	0.9131	0.9243	0.9336	0.9413	0.9479
7					0.8807	0.8973	0.9107	0.9218	0.9311	0.9389
8					0.8615	0.8811	0.8968	0.9098	0.9207	0.9298
9					0.8419	0.8644	0.8825	0.8975	0.9100	0.9205
10						0.8469	0.8678	0.8849	0.8990	0.9109
15							0.7862	0.8172	0.8413	0.8609
20								0.7364	0.7754	0.8058
25									0.6964	0.7436
30										0.6684
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475										
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Temperature °K										Pressure atm
300	310	320	330	340	350	360	370	380	390	
0.9924	0.9932	0.9939	0.9945	0.9950	0.9954	0.9958	0.9962	0.9965	0.9968	1
0.9847	0.9863	0.9877	0.9889	0.9899	0.9908	0.9916	0.9923	0.9930	0.9936	2
0.9769	0.9793	0.9814	0.9832	0.9848	0.9862	0.9874	0.9885	0.9895	0.9904	3
0.9692	0.9724	0.9751	0.9775	0.9796	0.9815	0.9832	0.9847	0.9860	0.9872	4
0.9614	0.9654	0.9688	0.9718	0.9745	0.9769	0.9790	0.9809	0.9825	0.9840	5
0.9536	0.9584	0.9624	0.9661	0.9694	0.9723	0.9747	0.9770	0.9791	0.9809	6
0.9456	0.9513	0.9561	0.9604	0.9642	0.9676	0.9705	0.9732	0.9756	0.9777	7
0.9375	0.9441	0.9497	0.9547	0.9591	0.9630	0.9663	0.9694	0.9721	0.9745	8
0.9294	0.9369	0.9433	0.9489	0.9539	0.9583	0.9621	0.9655	0.9686	0.9713	9
0.9210	0.9296	0.9369	0.9432	0.9487	0.9536	0.9579	0.9617	0.9651	0.9681	10
0.8775	0.8915	0.9034	0.9134	0.9220	0.9295	0.9363	0.9421	0.9472	0.9518	15
0.8302	0.8508	0.8677	0.8821	0.8943	0.9046	0.9141	0.9221	0.9291	0.9354	20
0.7786	0.8067	0.8297	0.8492	0.8655	0.8789	0.8912	0.9017	0.9108	0.9189	25
0.7197	0.7582	0.7889	0.8143	0.8354	0.8523	0.8678	0.8809	0.8922	0.9022	30
0.6502	0.7042	0.7449	0.7771	0.8038	0.8247	0.8436	0.8596	0.8733	0.8853	35
0.5580	0.6415	0.6966	0.7373	0.7704	0.7961	0.8187	0.8378	0.8541	0.8682	40
	0.5648	0.6421	0.6948	0.7350	0.7663	0.7930	0.8154	0.8344	0.8509	45
	0.4477	0.5792	0.6492	0.6971	0.7354	0.7665	0.7924	0.8144	0.8334	50
	0.2627	0.5015	0.5978	0.6574	0.7034	0.7396	0.7693	0.7944	0.8160	55
	0.2476	0.4105	0.5413	0.6165	0.6708	0.7124	0.7461	0.7745	0.7988	60
	0.2539	0.3415	0.4839	0.5750	0.6379	0.6857	0.7237	0.7553	0.7820	65
	0.2627	0.3175	0.4339	0.5333	0.6052	0.6590	0.7012	0.7359	0.7651	70
	0.2732	0.3150	0.3990	0.4946	0.5733	0.6326	0.6791	0.7171	0.7487	75
	0.2849	0.3175	0.3796	0.4656	0.5432	0.6076	0.6575	0.6986	0.7327	80
	0.2975	0.3234	0.3722	0.4455	0.5175	0.5848	0.6374	0.6809	0.7170	85
	0.3109	0.3316	0.3718	0.4328	0.4981	0.5650	0.6191	0.6643	0.7022	90
	0.3250	0.3415	0.3748	0.4258	0.4853	0.5488	0.6030	0.6493	0.6888	95
	0.3396	0.3526	0.3796	0.4229	0.4777	0.5352	0.5893	0.6363	0.6770	100
	0.4009	0.4097	0.4253	0.4489	0.4821	0.5176	0.5578	0.5983	0.6371	125
	0.4621	0.4673	0.4770	0.4921	0.5138	0.5389	0.5677	0.5986	0.6302	150
	0.5231	0.5254	0.5315	0.5420	0.5566	0.5747	0.5959	0.6193	0.6440	175
	0.5839	0.5841	0.5879	0.5950	0.6049	0.6180	0.6335	0.6512	0.6705	200
	0.6444	0.6435	0.6453	0.6496	0.6562	0.6653	0.6767	0.6901	0.7052	225
	0.7046	0.7026	0.7025	0.7043	0.7084	0.7144	0.7227	0.7329	0.7447	250
	0.7645	0.7611	0.7592	0.7590	0.7607	0.7644	0.7700	0.7774	0.7864	275
	0.8241	0.8189	0.8152	0.8132	0.8130	0.8146	0.8179	0.8229	0.8294	300
	0.8833	0.8764	0.8710	0.8672	0.8652	0.8649	0.8662	0.8691	0.8734	325
	0.9420	0.9334	0.9263	0.9208	0.9172	0.9150	0.9145	0.9155	0.9179	350
	0.0001	0.9899	0.9811	0.9740	0.9688	0.9650	0.9627	0.9619	0.9626	375
	0.0576	1.0459	1.0356	1.0269	1.0201	1.0147	1.0109	1.0085	1.0075	400
	1.1146	1.1014	1.0896	1.0794	1.0711	1.0642	1.0588	1.0549	1.0524	425
	1.1713	1.1566	1.1433	1.1317	1.1221	1.1137	1.1068	1.1013	1.0972	450
	1.2276	1.2114	1.1966	1.1835	1.1723	1.1627	1.1545	1.1476	1.1420	475
	1.2836	1.2658	1.2496	1.2351	1.2225	1.2116	1.2021	1.1939	1.1868	500

Pressure atm	Temperature °K										
	400	410	420	430	440	450	460	470	480	490	500
1	0.9971	0.9973	0.9975	0.9977	0.9979	0.9981	0.9982	0.9984	0.9985	0.9986	0.9987
2	0.9941	0.9946	0.9951	0.9955	0.9958	0.9962	0.9965	0.9968	0.9970	0.9972	0.9974
3	0.9912	0.9919	0.9926	0.9932	0.9937	0.9942	0.9947	0.9951	0.9955	0.9959	0.9962
4	0.9883	0.9893	0.9902	0.9910	0.9917	0.9923	0.9930	0.9935	0.9940	0.9945	0.9949
5	0.9854	0.9866	0.9877	0.9887	0.9896	0.9904	0.9912	0.9919	0.9925	0.9931	0.9936
6	0.9825	0.9839	0.9852	0.9864	0.9875	0.9885	0.9895	0.9903	0.9910	0.9917	0.9923
7	0.9796	0.9813	0.9828	0.9842	0.9854	0.9866	0.9877	0.9886	0.9895	0.9803	0.9910
8	0.9767	0.9786	0.9804	0.9820	0.9834	0.9847	0.9860	0.9870	0.9880	0.9889	0.9898
9	0.9738	0.9759	0.9779	0.9797	0.9813	0.9828	0.9842	0.9854	0.9865	0.9875	0.9885
10	0.9708	0.9732	0.9754	0.9774	0.9792	0.9809	0.9824	0.9838	0.9850	0.9861	0.9872
15	0.9561	0.9598	0.9632	0.9662	0.9690	0.9715	0.9737	0.9758	0.9777	0.9794	0.9810
20	0.9413	0.9464	0.9510	0.9551	0.9588	0.9621	0.9651	0.9679	0.9705	0.9728	0.9749
25	0.9264	0.9329	0.9387	0.9439	0.9486	0.9528	0.9566	0.9601	0.9634	0.9663	0.9689
30	0.9113	0.9193	0.9264	0.9328	0.9385	0.9436	0.9482	0.9524	0.9563	0.9598	0.9630
35	0.8961	0.9057	0.9142	0.9217	0.9285	0.9346	0.9399	0.9448	0.9493	0.9534	0.9572
40	0.8808	0.8921	0.9019	0.9107	0.9186	0.9256	0.9317	0.9373	0.9424	0.9471	0.9515
45	0.8654	0.8784	0.8898	0.8998	0.9087	0.9166	0.9236	0.9299	0.9356	0.9409	0.9459
50	0.8500	0.8646	0.8775	0.8889	0.8989	0.9077	0.9155	0.9225	0.9289	0.9349	0.9405
55	0.8347	0.8509	0.8652	0.8780	0.8891	0.8989	0.9075	0.9153	0.9225	0.9291	0.9352
60	0.8196	0.8373	0.8531	0.8672	0.8794	0.8902	0.8997	0.9083	0.9162	0.9234	0.9301
65	0.8047	0.8240	0.8412	0.8565	0.8699	0.8817	0.8921	0.9015	0.9101	0.9179	0.9251
70	0.7899	0.8110	0.8296	0.8460	0.8606	0.8734	0.8848	0.8950	0.9042	0.9126	0.9203
75	0.7754	0.7983	0.8183	0.8359	0.8515	0.8653	0.8775	0.8886	0.8985	0.9075	0.9157
80	0.7612	0.7859	0.8073	0.8262	0.8428	0.8575	0.8706	0.8824	0.8931	0.9027	0.9113
85	0.7475	0.7740	0.7969	0.8169	0.8345	0.8501	0.8639	0.8765	0.8879	0.8980	0.9071
90	0.7346	0.7627	0.7870	0.8081	0.8267	0.8431	0.8577	0.8709	0.8828	0.8935	0.9031
95	0.7228	0.7522	0.7778	0.7999	0.8194	0.8365	0.8517	0.8655	0.8779	0.8892	0.8993
100	0.7122	0.7428	0.7694	0.7924	0.8125	0.8302	0.8460	0.8603	0.8733	0.8851	0.8957
125	0.6729	0.7056	0.7350	0.7612	0.7843	0.8047	0.8228	0.8394	0.8547	0.8688	0.8818
150	0.6614	0.6914	0.7197	0.7455	0.7685	0.7894	0.8089	0.8270	0.8438	0.8594	0.8739
175	0.6692	0.6950	0.7202	0.7439	0.7659	0.7862	0.8057	0.8239	0.8410	0.8570	0.8720
200	0.6908	0.7123	0.7336	0.7546	0.7751	0.7947	0.8130	0.8302	0.8463	0.8617	0.8763
225	0.7217	0.7393	0.7573	0.7755	0.7936	0.8112	0.8279	0.8437	0.8585	0.8730	0.8867
250	0.7578	0.7719	0.7868	0.8023	0.8179	0.8332	0.8482	0.8624	0.8761	0.8895	0.9025
275	0.7967	0.8080	0.8202	0.8330	0.8461	0.8592	0.8722	0.8849	0.8974	0.9096	0.9216
300	0.8373	0.8463	0.8561	0.8664	0.8771	0.8880	0.8991	0.9103	0.9214	0.9324	0.9433
325	0.8790	0.8856	0.8930	0.9011	0.9098	0.9190	0.9285	0.9380	0.9475	0.9571	0.9668
350	0.9215	0.9261	0.9315	0.9377	0.9445	0.9517	0.9595	0.9674	0.9755	0.9837	0.9921
375	0.9646	0.9673	0.9708	0.9750	0.9800	0.9855	0.9917	0.9981	1.0047	1.0116	1.0188
400	1.0078	1.0088	1.0105	1.0129	1.0161	1.0200	1.0247	1.0297	1.0350	1.0406	1.0466
425	1.0510	1.0504	1.0504	1.0512	1.0527	1.0551	1.0583	1.0619	1.0659	1.0703	1.0751
450	1.0943	1.0920	1.0905	1.0898	1.0898	1.0907	1.0923	1.0946	1.0974	1.1006	1.1042
475	1.1375	1.1337	1.1308	1.1287	1.1273	1.1267	1.1269	1.1278	1.1293	1.1313	1.1337
500	1.1807	1.1755	1.1712	1.1677	1.1650	1.1631	1.1619	1.1614	1.1616	1.1624	1.1636

ОБЩЕОБРАЗОВАТЕЛЬНЫЙ ХИМИЧЕСКИЙ ЗАВОД
БИБЛИОТЕКА

Pressure atm	Temperature °K								
	130	140	150	160	170	180	190	200	210
1	10,414	11,267	12,115	12,960	13,801	14,639	15,474	16,307	17,138
2	5,093	5,535	5,972	6,405	6,834	7,260	7,683	8,103	8,521
3	3,310	3,617	3,918	4,214	4,506	4,795	5,082	5,367	5,650
5		2,076	2,268	2,456	2,641	2,823	3,002	3,178	3,352
7			1,557	1,702	1,841	1,976	2,108	2,237	2,364
10			1,018	1,128	1,233	1,335	1,434	1,531	1,626
15				669	759	836·7	909·3	979·3	1,048
20					519	584·5	645·7	703·7	759·0
25						429·2	486·4	538·5	587·0
30						320·3	378·7	427·0	469·4
35							296·0	344·8	386·8
40							214·8	279·3	321·8
45								○	270·0
50									225·6
60									156·9
70									117·3
80									90·8
90									80·3
100									72·32
120									64·60
140									60·54
160									57·70
180									55·68
200									54·01
250									51·38
300									49·50
350									48·05
400									46·83
450									45·80
500									44·93
550									44·18
600									43·53
650									42·95
700									42·43
750									41·95
800									41·50
850									41·07
900									40·67
950									40·30
1,000									39·96

Temperature °K									Pressure atm
220	230	240	250	260	270	280	290	300	
17,968	18,796	19,623	20,450	21,276	22,101	22,926	23,750	24,574	1
8,938	9,355	9,771	10,187	10,603	11,019	11,434	11,850	12,265	2
5,932	6,113	6,393	6,773	7,052	7,330	7,608	7,886	8,163	3
3,525	3,696	3,866	4,035	4,204	4,373	4,542	4,711	4,880	5
2,490	2,616	2,741	2,865	2,988	3,110	3,231	3,353	3,474	7
1,719	1,810	1,900	1,988	2,075	2,161	2,247	2,333	2,419	10
1,114	1,179	1,242	1,304	1,364	1,423	1,482	1,541	1,599	15
812.0	863.2	913.2	962.5	1,009	1,055	1,100	1,144	1,189	20
632.5	675.5	716.3	755.6	794.0	831.9	869.3	906.2	942.8	25
509.2	546.7	582.4	616.7	650.0	682.7	715.0	746.9	778.5	30
424.0	457.8	489.4	519.7	549.2	578.2	606.7	634.7	662.3	35
355.8	387.2	417.0	445.3	472.5	498.9	524.7	550.0	574.8	40
304.8	334.8	361.5	396.0	418.7	441.1	463.3	485.3	507.1	45
261.5	290.8	317.5	342.3	365.7	388.1	409.9	431.2	452.0	50
196.2	225.7	251.2	274.4	295.6	315.1	333.2	352.2	370.4	60
149.5	177.4	201.9	223.7	243.5	262.0	279.5	296.1	312.2	70
118.5	144.9	167.9	188.0	206.2	223.2	239.3	254.7	269.5	80
101.1	121.7	142.0	161.3	178.3	193.8	208.5	222.6	236.2	90
87.72	104.8	123.9	140.6	156.1	170.7	184.6	197.8	210.4	100
73.03	83.42	97.23	111.6	124.9	137.4	149.3	160.7	171.6	120
66.59	73.44	83.39	95.00	105.7	116.1	126.1	135.8	145.2	140
62.50	68.30	75.35	83.94	92.58	101.2	109.7	118.1	126.4	160
59.64	64.33	70.18	76.61	83.40	90.44	97.67	105.1	112.4	180
57.61	61.73	66.35	71.47	77.12	83.25	89.65	95.98	102.3	200
54.05	57.00	60.25	63.80	67.68	71.86	76.27	80.83	85.47	250
51.63	53.88	56.32	59.03	61.99	65.19	68.55	72.03	75.61	300
49.91	51.84	53.88	56.05	58.36	60.83	63.48	66.34	69.29	350
48.40	50.09	51.87	53.75	55.74	57.84	60.05	62.35	64.73	400
47.29	48.81	50.36	51.96	53.65	55.44	57.33	59.31	61.37	450
46.23	47.58	48.98	50.45	51.98	53.57	55.23	56.95	58.74	500
45.38	46.61	47.88	49.19	50.55	51.98	53.48	55.04	56.66	550
44.62	45.75	46.91	48.12	49.37	50.68	52.04	53.44	54.90	600
43.94	44.98	46.06	47.19	48.35	49.55	50.80	52.07	53.39	650
43.34	44.30	45.31	46.36	47.44	48.54	49.69	50.87	52.07	700
42.80	43.69	44.63	45.61	46.61	47.64	48.70	49.80	50.92	750
42.31	43.15	44.02	44.93	45.86	46.83	47.82	48.85	49.91	800
41.85	42.64	43.47	44.32	45.19	46.11	47.04	48.01	49.01	850
41.42	42.19	42.98	43.78	44.61	45.48	46.35	47.27	48.21	900
41.03	41.78	42.54	43.31	44.11	44.93	45.76	46.62	47.50	950
40.67	41.40	42.14	42.90	43.67	44.46	45.26	46.06	46.87	1,000

Метан, CH₄

VOLUME CUBIC CENTIMETRES/MOLE—cont.

Pressure atm	Temperature °K								
	310	320	330	340	350	360	370	380	390
1	25,398	26,222	27,046	27,870	28,693	29,516	30,339	31,162	31,985
2	12,681	13,096	13,510	13,923	14,335	14,747	15,159	15,571	15,983
3	8,440	8,716	8,992	9,268	9,544	9,820	10,096	10,372	10,648
5	5,048	5,216	5,383	5,550	5,717	5,884	6,050	6,217	6,383
7	3,595	3,715	3,835	3,955	4,075	4,195	4,315	4,434	4,554
10	2,505	2,590	2,675	2,760	2,845	2,930	3,014	3,099	3,183
15	1,657	1,715	1,772	1,830	1,888	1,946	2,003	2,060	2,117
20	1,234	1,278	1,322	1,366	1,409	1,453	1,497	1,540	1,583
25	979.1	1,015	1,051	1,087	1,123	1,159	1,194	1,229	1,264
30	809.8	840.8	871.5	901.8	931.8	961.6	991.3	1,021	1,050
35	689.5	716.3	742.8	769.1	795.3	821.3	847.1	872.8	898.4
40	599.1	623.0	646.5	669.8	693.0	716.0	738.9	761.7	784.3
45	528.8	550.3	571.6	592.7	613.6	634.3	654.9	675.4	695.7
50	472.3	492.1	511.6	530.9	550.0	569.0	587.8	606.5	625.0
60	388.0	405.2	422.1	438.7	455.1	471.3	486.3	503.2	518.9
70	328.0	343.4	358.4	373.1	387.4	401.7	415.3	429.7	443.4
80	283.8	297.6	311.0	324.1	337.0	349.7	362.2	374.6	386.8
90	249.3	261.9	274.2	286.2	297.9	309.5	320.9	332.1	343.1
100	222.3	233.8	245.0	256.0	266.8	277.4	287.8	298.1	308.2
120	182.1	192.2	201.9	211.4	220.7	229.8	238.8	247.6	256.2
140	154.4	163.3	171.9	180.3	188.5	196.5	204.3	211.9	219.4
160	134.5	142.4	150.0	157.4	164.6	171.7	178.7	185.6	192.4
180	119.6	126.7	133.5	140.2	146.7	153.1	159.4	165.6	171.7
200	108.6	114.8	120.9	126.9	132.8	138.6	144.3	149.9	155.4
250	90.16	94.88	99.62	104.3	109.0	113.6	118.2	122.7	127.2
300	79.27	82.98	86.71	90.45	94.19	97.92	101.6	105.3	109.0
350	72.28	75.30	78.33	81.37	84.42	87.47	90.53	93.60	96.68
400	67.18	69.68	72.21	74.77	77.35	79.94	82.54	85.15	87.77
450	63.50	63.68	67.90	70.14	72.39	74.64	76.88	79.13	81.39
500	60.58	62.46	64.37	66.31	68.27	70.24	72.23	74.24	76.26
550	58.31	59.97	61.64	63.33	65.04	66.78	68.54	70.33	72.14
600	56.38	57.88	59.40	60.93	62.48	64.05	65.64	67.24	68.85
650	54.74	56.11	57.51	58.93	60.37	61.82	63.24	64.69	66.14
700	53.31	54.58	55.88	57.20	58.53	59.85	61.18	62.50	63.83
750	52.07	53.25	54.45	55.66	56.88	58.09	59.32	60.54	61.77
800	50.99	52.08	53.18	54.29	55.40	56.52	57.65	58.79	59.94
850	50.02	51.03	52.04	53.06	54.08	55.13	56.18	57.25	58.33
900	49.15	50.09	51.03	51.97	52.92	53.90	54.89	55.90	56.91
950	48.38	49.26	50.14	51.02	51.92	52.84	53.77	54.72	55.68
1,000	47.69	48.52	49.36	50.21	51.07	51.94	52.82	53.72	54.63

Temperature °K								Pressure atm
400	410	420	430	440	450	460	470	
32,808	33,680	34,453	35,275	36,097	36,919	37,740	38,562	1
16,395	16,807	17,219	17,631	18,043	18,455	18,868	19,280	2
10,923	11,199	11,475	11,750	12,026	12,302	12,578	12,853	3
6,549	6,715	6,881	7,047	7,213	7,378	7,543	7,708	5
4,673	4,792	4,911	5,030	5,149	5,267	5,286	5,504	7
3,267	3,351	3,435	3,519	3,603	3,686	3,769	3,852	10
2,173	2,230	2,286	2,343	2,399	2,455	2,510	2,566	15
1,626	1,669	1,712	1,755	1,797	1,839	1,881	1,923	20
1,298	1,333	1,367	1,402	1,436	1,470	1,504	1,538	25
1,080	1,109	1,138	1,167	1,196	1,225	1,253	1,282	30
923.9	949.5	975.0	1,000	1,025	1,049	1,074	1,099	35
806.8	829.2	851.4	873.5	895.5	917.4	939.1	960.7	40
715.9	736.0	756.0	775.9	795.6	815.2	834.6	853.9	45
643.4	661.6	679.6	697.5	715.3	733.1	750.8	768.4	50
534.5	550.0	565.3	580.5	595.6	610.6	625.5	640.3	60
457.0	470.5	483.8	497.0	510.1	523.1	536.1	549.0	70
398.9	410.9	422.8	434.5	446.1	457.7	469.2	480.6	80
354.0	364.8	375.5	386.1	396.6	407.0	417.3	427.5	90
318.2	328.0	337.7	347.4	357.0	366.5	375.9	385.2	100
264.7	273.1	281.4	289.6	297.7	305.8	313.8	321.7	120
226.9	234.3	241.6	248.9	256.1	263.2	270.2	277.1	140
199.1	205.7	212.2	218.7	225.1	231.4	237.6	243.7	160
177.7	183.6	189.4	195.2	200.9	206.6	212.2	217.8	180
160.8	166.2	171.5	176.7	181.9	187.1	192.2	197.4	200
131.6	135.9	140.2	144.4	148.6	152.7	156.8	160.9	250
112.7	116.3	119.9	123.4	127.0	130.5	133.9	137.3	300
99.77	102.9	105.9	108.9	111.9	114.9	117.8	120.8	350
90.40	93.03	95.67	98.30	100.9	103.5	106.1	108.7	400
83.66	85.94	88.23	90.52	92.81	95.09	97.36	99.62	450
78.28	80.30	82.32	84.34	86.37	88.39	90.43	92.43	500
73.96	75.78	77.59	79.41	81.23	83.04	84.86	86.68	550
70.47	72.10	73.74	75.38	77.03	78.67	80.31	81.96	600
67.60	69.07	70.55	72.04	73.54	75.03	76.53	78.03	650
65.15	66.48	67.82	69.18	70.55	71.93	73.30	74.68	700
63.00	64.23	65.47	66.72	67.98	69.25	70.53	71.82	750
61.10	62.26	63.43	64.61	65.79	66.97	68.15	69.33	800
59.42	60.52	61.62	62.72	63.83	64.93	66.04	67.14	850
57.94	58.97	60.01	61.04	62.08	63.12	64.17	65.21	900
56.65	57.62	58.60	59.57	60.55	61.53	62.52	63.51	950
55.54	56.45	57.37	58.29	59.21	60.14	61.07	62.00	1,000