

DATOS DE EQUILIBRIO LÍQUIDO – VAPOR Y ENTÁLPICOS PARA HIDROCARBUROS

Referencias:

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- (2) MAXWELL, J.B., *Data Book on Hydrocarbons*, Ed. Van Nostrand, New York (1955).
- (3) Natural Gasoline Association on American (Ed.), *Equilibrium Ratio Data Book*, Tulsa (1959).
- (4) ROBINSON, C.S., Gilliland, E.R., *Elements of Fractional Distillation*, Mc Graw-Hill, New York (1950).
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DATOS DE EQUILIBRIO

P = 50 psia <> 0,345 MPa <> 3,4 atm [referencia (3)]

$$\left(\frac{K_i}{T}\right)^{1/3} = a_{1,i} + a_{2,i}T + a_{3,i}T^2 + a_{4,i}T^3 \quad (T \text{ en } ^\circ\text{R})$$

Componente	$a_{1,10}$	$a_{2,10^3}$	$a_{3,10^6}$	$a_{4,10^9}$
Metano	5,097584	0,240797	-0,537684	0,235444
Etano	-7,578061	3,602315	-3,955079	1,456571
Propano	-0,124687	4,932274	-5,430016	2,036879
<i>n</i> -Butano	-6,460362	2,319527	-2,058817	0,634184
<i>n</i> -Pentano	-8,381815	2,952740	-2,946740	1,053882
<i>n</i> -Hexano	-2,634813	-0,582076	0,099042	-0,229374
<i>n</i> -Heptano	-0,445627	0,268867	1,065180	-0,581766
500	9,139924	-3,573887	4,539999	-1,810713

P = 120 psia <> 0,827 MPa <> 8,2 atm [referencia (5)]

$$K_r = 0,37088 - 0,55786\left(\frac{T}{100}\right) + 0,44841\left(\frac{T}{100}\right)^2 - 0,03704\left(\frac{T}{100}\right)^3$$

$$\alpha_{i,r} = a_{1,i} + a_{2,i}\left(\frac{T}{100}\right) + a_{3,i}\left(\frac{T}{100}\right)^2 \quad (T \text{ en } ^\circ\text{F})$$

Componente	a_1	a_2	a_3
Propano	11,06095	-5,20067	0,92489
Isobutano	4,69290	-1,82431	0,31755
<i>n</i> -Butano	3,07033	-0,83565	0,12144
Isopentano	1,00000	0,00000	0,00000
<i>n</i> -Pentano	0,73827	0,05246	0,00189

P = 265 psia <> 1,826 MPa <> 18 atm [referencia (4)]

$$K_r = 0,042711 + 0,1258\left(\frac{T}{100}\right) + 0,119241\left(\frac{T}{100}\right)^2 + 0,0037667\left(\frac{T}{100}\right)^3$$

$$\alpha_{i,r} = a_{1,i} + a_{2,i}\left(\frac{T}{100}\right) + a_{3,i}\left(\frac{T}{100}\right)^2 \quad (T \text{ en } ^\circ\text{F})$$

Componente	a_1	a_2	a_3
Hidrógeno	436,36196	-257,95576	38,22382
Metano	63,76528	-29,51969	4,25794
Etano	10,93719	-3,88431	0,55580
Propileno	4,03335	-1,14742	0,17389
Propano	3,64797	-1,06605	0,16197
Isobutano	1,46077	-0,18097	0,02721
<i>n</i> -Butano	1,00000	0,00000	0,00000
Isopentano	0,32688	0,11874	0,00567

<i>n</i> -Pentano	0,17185	0,22019	-0,02826
<i>n</i> -Hexano	0,00541	0,14775	-0,01056
<i>n</i> -Heptano	-0,02141	0,07538	0,00061
<i>n</i> -Octano	-0,01184	0,02524	0,00593
360	-0,00145	-0,00053	0,00430
450	0,01431	-0,02071	0,00637

P = 300 psia <> 2,070 MPa <> 20,4 atm [referencia (1)]

$$\left(\frac{K_i}{T}\right)^{1/3} = a_{1,i} + a_{2,i}T + a_{3,i}T^2 + a_{4,i}T^3 \quad (T \text{ en } ^\circ\text{R})$$

Componente	$a_1 \cdot 10^2$	$a_2 \cdot 10^5$	$a_3 \cdot 10^8$	$a_4 \cdot 10^{12}$
Metano	32,718139	-9,6951405	6,9229334	-47,361298
Etileno	-5,177995	62,124576	-37,562082	8,0145501
Etano	-9,840021	67,545943	-37,459290	-9,0732459
Propileno	-25,098770	102,39287	-75,221710	153,84709
Propano	-14,512474	53,638924	-5,3051604	-173,58329
Isobutileno	-10,104481	21,400418	38,564266	-353,65419
Isobutano	-18,967651	61,239667	-17,891649	-90,855512
<i>n</i> -Butano	-14,181715	36,866353	16,521412	-248,23843
Isopentano	-7,548840	3,2623631	58,507340	-414,92323
<i>n</i> -Pentano	-7,543539	2,0584231	59,138344	-413,12409
<i>n</i> -Hexano	1,1506919	-33,884839	97,795401	-542,35941
<i>n</i> -Heptano	5,5692758	-50,705967	112,17338	-574,89350
<i>n</i> -Octano	7,1714400	-52,608530	103,72934	-496,46551
400	2,5278960	-17,311330	33,502879	-126,25039
500	3,3123291	-16,652384	24,310911	-64,148982

P = 400 psia <> 2,756 MPa <> 27,1 atm [referencia (3)]

$$\left(\frac{K_i}{T}\right)^{1/3} = a_{1,i} + a_{2,i}T + a_{3,i}T^2 + a_{4,i}T^3 \quad (T \text{ en } ^\circ\text{R})$$

Componente	$a_1 \cdot 10^2$	$a_2 \cdot 10^3$	$a_3 \cdot 10^6$	$a_4 \cdot 10^9$
Metano	-3,2551482	2,3553786	-3,1371170	1,3397973
Etano	-2,7947232	1,4124323	-1,4582948	0,50974162
Propano	-2,7980091	1,1811943	-1,0935041	0,35180421
Isobutano	2,3209137	0,87122379	-0,66100972	0,1667774
<i>n</i> -Butano	-2,3203344	0,83753226	-0,61774360	0,15243376
Isopentano	-0,6981454	-0,088872937	0,39689556	-0,29076073
<i>n</i> -Pentano	0,37103008	-0,36257004	0,99113800	-0,54441110
500	1,9642644	0,81121972	1,0586630	-0,39478662

DATOS DE ENTÁLPICOS

P = 120 psia <> 0,827 MPa <> 8,2 atm [referencia (2)]

$$h_i = c_{1,i} + c_{2,i} \left(\frac{T}{100}\right) + c_{3,i} \left(\frac{T}{100}\right)^2$$

$$H_i = e_{1,i} + e_{2,i} \left(\frac{T}{100}\right) + e_{3,i} \left(\frac{T}{100}\right)^2 \quad (h_i, H_i \text{ en Btu / lbmol}; T \text{ en } ^\circ\text{F})$$

Componente	c_1	c_2	c_3	e_1	e_2	e_3
Propano	0,00000	2521,92	175,417	7488,65	1750,51	79,273
Isobutano	0,00000	3345,00	150,000	9592,01	1843,56	221,433
<i>n</i> -Butano	0,00000	2960,00	400,000	8002,89	4382,70	-401,587
Isopentano	0,00000	3681,33	283,334	11645,77	2770,55	156,345
<i>n</i> -Pentano	0,00000	3845,00	250,000	12004,88	3168,66	67,456

P = 265 psia <> 1,826 MPa <> 18 atm [referencia (2)]

$$h_i = c_{1,i} + c_{2,i} \left(\frac{T}{100} \right) + c_{3,i} \left(\frac{T}{100} \right)^2$$

$$H_i = e_{1,i} + e_{2,i} \left(\frac{T}{100} \right) + e_{3,i} \left(\frac{T}{100} \right)^2 \quad (h_i, H_i \text{ en Btu / lbmol}; T \text{ en } ^\circ\text{F})$$

Componente	c_1	c_2	c_3	e_1	e_2	e_3
Hidrógeno	285,48	151,52	7,377	687,00	99,64	1,9395
Metano	1840,25	1345,33	-11,110	4864,17	773,26	19,0294
Etano	3147,12	2222,47	10,935	8384,48	1280,67	65,9954
Propileno	4213,82	2874,12	40,076	11254,87	1746,81	102,5564
Propano	4425,16	2968,64	48,868	11806,71	1797,38	112,6239
Isobutano	5320,76	3525,03	90,076	13726,02	2261,20	167,3186
<i>n</i> -Butano	5553,24	3641,27	90,076	14851,06	2312,00	155,9965
<i>n</i> -Pentano	6663,21	4161,81	160,848	18757,52	2903,45	233,0578
<i>n</i> -Hexano	7661,12	4658,30	231,661	20445,36	3207,59	287,9913
<i>n</i> -Heptano	8676,69	5066,88	310,574	23038,41	3713,28	328,7941
<i>n</i> -Octano	9845,04	5353,77	403,497	25539,97	4119,20	405,9716
360	11509,74	6023,85	599,071	30246,89	5121,06	524,2676
450	13897,03	6634,93	880,067	35971,05	6455,20	669,7070

P = 300 psia <> 2,070 MPa <> 20,4 atm [referencia (2)]

$$h_i = \left[c_{1,i} + c_{2,i}T + c_{3,i}T^2 \right]^2; \quad H_i = \left[e_{1,i} + e_{2,i}T + e_{3,i}T^2 \right]^2 \quad (h_i, H_i \text{ en Btu / lbmol}; T \text{ en } ^\circ\text{R})$$

Componente	c_1	$c_2 \cdot 10$	$c_3 \cdot 10^5$	e_1	$e_2 \cdot 10^4$	$e_3 \cdot 10^6$
Metano	-17,89921	1,7395763	-3,7596114	44,445874	501,04550	7,3207219
Etileno	-7,29150	1,5411962	-1,6088376	56,796380	615,93154	2,4088730
Etano	-8,48570	1,6286636	-1,9498601	61,334520	588,75430	11,948654
Propileno	-12,42790	1,8834652	-2,4839140	71,828480	658,55130	11,299585
Propano	-14,50006	1,9802223	-2,9048837	81,795910	389,18919	36,470900
Isobutileno	-16,55345	2,1618650	-3,1476209	139,17444	-822,39488	120,39298
Isobutano	-16,55345	2,1618650	-3,1476209	147,65414	-1185,2942	152,87778
<i>n</i> -Butano	-20,29811	2,3005743	-3,9663417	152,66798	-1153,4842	146,64125
Isopentano	-23,35646	2,5017453	-4,3917897	130,96679	-197,98604	82,549947
<i>n</i> -Pentano	-24,37154	2,5636200	-4,6499694	128,90152	-2,0509603	64,501496
<i>n</i> -Hexano	-23,87041	2,6768089	-4,4197793	85,83495	1522,3917	-34,018595
<i>n</i> -Heptano	-25,31453	2,8246389	-4,5418718	94,68262	1479,5387	-19,105299
<i>n</i> -Octano	-22,23505	2,8478429	-3,8850819	106,32806	1328,3949	1,6230737
400	-6,63698	2,8400262	-2,7927554	122,35402	1299,6587	17,03455
500	1,92053	3,0179232	-2,2183809	138,49658	1497,8171	18,641269