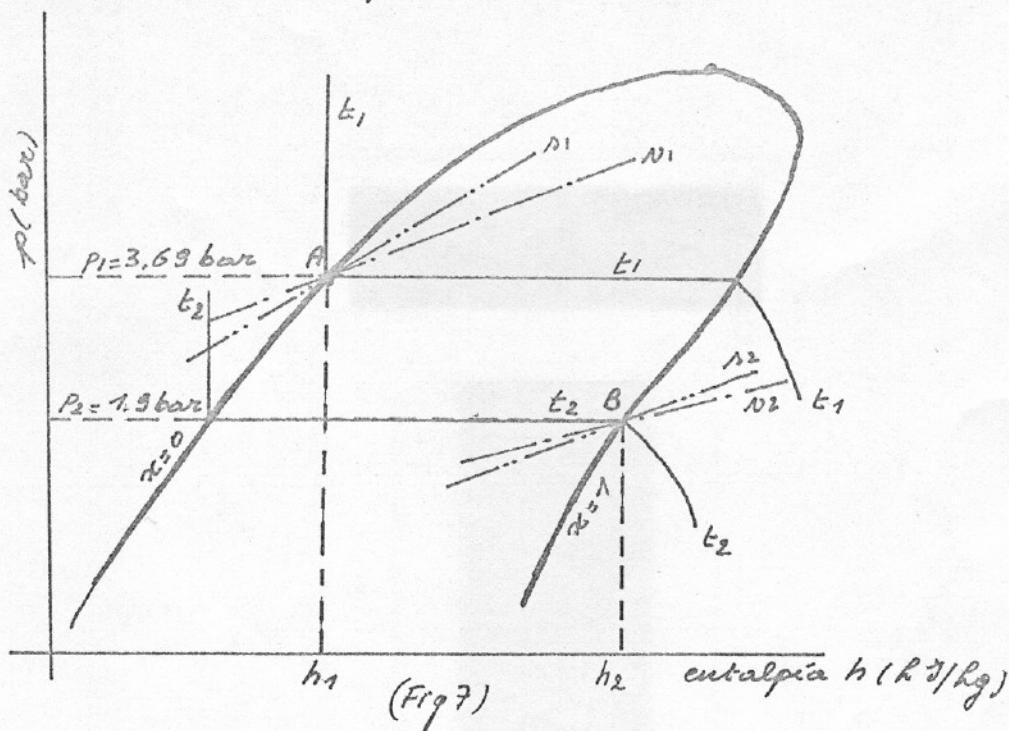


TRABAJAR CON EL DIAGRAMA $p-h$.

EJEMPLO 1 (refrigerante Amoníaco NH_3)



- dado: punto A: líquido saturado a una presión $p_1 = 3,69 \text{ bar}$
según la tabla I: $p_1 = 3,69 \text{ bar} \longrightarrow t_1 = -4^\circ\text{C}$

$$\longrightarrow x = 0$$

$$\longrightarrow h_1 = 181,56 \text{ kJ/kg}$$

$$\longrightarrow s_1 = 0,9324 \text{ kJ/kg}\cdot\text{K}$$

$$\longrightarrow v_1 = 0,0015528 \text{ m}^3/\text{kg}$$

: punto B: vapor saturado a una presión $p_2 = 1,9 \text{ bar}$
según la tabla I : $p_2 = 1,9 \text{ bar} \longrightarrow t_1 = -20^\circ\text{C}$

$$\longrightarrow x = 1$$

$$\longrightarrow h_2 = 1437,23 \text{ kJ/kg}$$

$$\longrightarrow s_2 = 5,9025 \text{ kJ/kg}\cdot\text{K}$$

$$\longrightarrow v_2 = 0,622122 \text{ m}^3/\text{kg}$$

TABLA I: AMONÍACO NH₃

LIQUIDO Y VAPOR SATURADO

TEMPERATURA t °C	PRESIÓN P kN/m ²	ENTALPIA h kJ/kg		ENTROPÍA s kJ/kg K		VOLUMEN ESPECÍFICO v dm ³ /kg		t °C	P kN/m ²	h kJ/kg		s kJ/kg K		v dm ³ /kg	
		h _L	h _V	s _L	s _V	v _L	v _V			h _L	h _V	s _L	s _V	v _L	v _V
-60	21.99	-69.5330	1373.19	-0.10909	6.6592	1.4010	4685.08	21	886.57	298.527	1480.48	1.34452	5.3626	1.6426	144.578
-55	30.29	-47.5062	1382.01	-0.00717	6.5454	1.4126	3474.22	22	915.03	303.300	1481.18	1.36055	5.3512	1.6466	140.214
-50	41.03	-25.4342	1390.64	0.09264	6.4382	1.4245	2614.51	23	944.18	308.081	1481.87	1.37654	5.3399	1.6507	136.006
-45	54.74	-3.3020	1399.07	0.19049	6.3369	1.4367	1998.91	24	974.03	312.870	1482.53	1.39250	5.3286	1.6547	131.950
-40	72.01	18.9024	1407.26	0.28651	6.2410	1.4493	1547.36	25	1004.6	317.667	1483.18	1.40843	5.3175	1.6588	128.037
-35	93.49	41.1883	1415.20	0.38082	6.1501	1.4623	1212.49	26	1035.9	322.471	1483.81	1.42433	5.3063	1.6630	124.261
-30	119.90	63.5629	1422.86	0.47351	6.0636	1.4757	960.867	27	1068.0	327.284	1484.42	1.44020	5.2953	1.6672	120.610
-28	132.02	72.5387	1425.84	0.51015	6.0302	1.4811	878.100	28	1100.7	332.104	1485.01	1.45604	5.2843	1.6714	117.103
-26	145.11	81.5300	1428.76	0.54655	5.9974	1.4867	803.761	29	1134.3	336.933	1485.59	1.47185	5.2733	1.6757	113.708
-24	159.22	90.5370	1431.64	0.58272	5.9652	1.4923	736.868	30	1168.6	341.769	1486.14	1.48762	5.2624	1.6800	110.430
-22	174.41	99.5600	1434.46	0.61865	5.9336	1.4980	676.570	31	1203.7	346.614	1486.67	1.50337	5.2516	1.6844	107.263
-20	190.74	108.599	1437.23	0.65436	5.9025	1.5037	622.122	32	1239.6	351.466	1487.18	1.51908	5.2408	1.6888	104.205
-18	208.26	117.656	1439.94	0.68984	5.8720	1.5096	572.875	33	1276.3	356.326	1487.66	1.53477	5.2300	1.6932	101.248
-16	227.04	126.729	1442.60	0.72511	5.8420	1.5155	528.257	34	1313.9	361.195	1488.13	1.55042	5.2193	1.6977	98.3913
-14	247.14	135.820	1445.20	0.76016	5.8125	1.5215	487.769	35	1352.2	366.072	1488.57	1.56605	5.2086	1.7023	95.6290
-12	268.63	144.747	1447.74	0.79501	5.7835	1.5276	450.971	36	1391.5	370.957	1488.99	1.58165	5.1980	1.7069	92.9579
-10	291.57	154.056	1450.22	0.82965	5.7550	1.5338	417.477	37	1431.5	375.851	1489.39	1.59722	5.1874	1.7115	90.3743
-9	303.60	158.628	1451.44	0.84690	5.7409	1.5369	401.460	38	1472.4	380.754	1489.76	1.61276	5.1768	1.7162	87.8748
-8	316.02	163.204	1452.64	0.86410	5.7269	1.5400	386.944	39	1514.3	385.666	1490.10	1.62828	5.1663	1.7209	85.4561
-7	328.84	167.785	1453.83	0.88125	5.7131	1.5432	372.692	40	1557.0	390.587	1490.42	1.64377	5.1558	1.7257	83.1150
-6	342.07	172.371	1455.00	0.89835	5.6993	1.5464	359.071	41	1600.6	395.519	1490.71	1.65924	5.1453	1.7305	80.8484
-5	355.71	176.962	1456.15	0.91541	5.6856	1.5496	346.046	42	1645.1	400.462	1490.98	1.67470	5.1349	1.7354	78.6536
-4	369.77	181.559	1457.29	0.93242	5.6721	1.5528	333.589	43	1690.6	405.416	1491.21	1.69013	5.1244	1.7404	76.5276
-3	384.26	186.161	1458.42	0.94938	5.6586	1.5561	321.670	44	1737.0	410.382	1491.41	1.70554	5.1140	1.7454	74.4678
-2	399.20	190.768	1459.53	0.96630	5.6453	1.5594	310.263	45	1784.3	415.362	1491.58	1.72095	5.1036	1.7504	72.4716
-1	414.58	195.381	1460.62	0.98317	5.6320	1.5627	299.340	46	1832.6	420.358	1491.72	1.73635	5.0932	1.7555	70.5365
0	430.43	200.000	1461.70	1.00000	5.6189	1.5660	288.880	47	1881.9	425.369	1491.83	1.75174	5.0827	1.7607	68.6602
1	446.74	204.625	1462.76	1.01679	5.6058	1.5694	278.858	48	1932.2	430.399	1491.88	1.76714	5.0723	1.7659	66.8403
2	463.53	209.256	1463.80	1.03354	5.5929	1.5727	269.253	49	1983.5	435.450	1491.91	1.78255	5.0618	1.7712	65.0746
3	480.81	213.892	1464.83	1.05024	5.5800	1.5762	260.046	50	2035.9	440.523	1491.89	1.79798	5.0514	1.7766	63.3608
4	498.59	218.535	1465.84	1.06691	5.5672	1.5796	251.216	51	2089.2	445.623	1491.83	1.81343	5.0409	1.7820	61.6971
5	516.87	223.185	1466.84	1.08353	5.5545	1.5831	242.745	52	2143.6	450.751	1491.73	1.82891	5.0303	1.7875	60.0813
6	535.67	227.841	1467.82	1.10012	5.5419	1.5866	234.618	53	2199.1	455.913	1491.58	1.84445	5.0198	1.7931	58.5114
7	555.00	232.503	1468.78	1.11667	5.5294	1.5901	226.817	54	2255.6	461.112	1491.38	1.86004	5.0092	1.7987	56.9855
8	574.87	237.172	1469.72	1.13317	5.5170	1.5936	219.326	55	2313.2	466.353	1491.12	1.87571	4.9985	1.8044	55.5019
9	595.28	241.848	1470.64	1.14964	5.5046	1.5972	212.132								
10	616.25	246.531	1471.57	1.16607	5.4924	1.6008	205.221								
11	637.78	251.221	1472.46	1.18246	5.4802	1.6045	198.580								
12	659.89	255.918	1473.34	1.19882	5.4681	1.6081	192.196								
13	682.59	260.622	1474.20	1.21515	5.4561	1.6118	186.058								
14	705.88	265.334	1475.05	1.23144	5.4441	1.6156	180.154								
15	729.79	270.053	1475.88	1.24769	5.4322	1.6193	174.475								
16	754.31	274.779	1476.69	1.26391	5.4204	1.6231	169.009								
17	779.46	279.513	1477.48	1.28010	5.4087	1.6269	163.748								
18	805.25	284.255	1478.25	1.29626	5.3971	1.6308	158.683								
19	831.69	289.005	1479.01	1.31238	5.3855	1.6347	153.804								
20	858.79	293.762	1479.75	1.32847	5.3740	1.6386	149.106								

h_L = entalpía líquido saturado

h_V = entalpía vapor saturado

s_L = entropía líquido saturado

s_V = entropía vapor saturado

v_L =

v_L = volumen específico de líquido saturado

v_V = volumen específico de vapor saturado