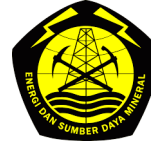




LAPORAN PRAKTIK KERJA LAPANG
PUSAT PENGEMBANGAN SUMBER
DAYA MANUSIA MINYAK DAN GAS
BUMI CEPU



Hari / Tanggal Operasi : Senin, 09.11.2021
Tank Crude Oil : 102

	Tank No	Keadaan Awal	Keadaan Akhir	CM	Ltr Obs	SG / Temp.	VCF	Ltr 15°C	% Vol
CRUDE OIL	102	548	512	26	82.437	836/32	32	0.8471	
	102	522	491	31	98.291	836/31		0.8473	
	102	491	461	30	95.161	836/31	31	0.8473	
	JUMLAH				275.889				
PERTASOL - CA	116	145	175	30	8.457	755/32	34	0.7301	10.27
	116	556	120	64	18.222	732/31		0.7462	18.54
	JUMLAH				26.689				28.81
	JUMLAH								
PERTASOL - CB									
	JUMLAH								
	JUMLAH								
PERTASOL - CC									
	JUMLAH								
	JUMLAH								
SOLAR	124	160	295	135	38.112	860/32	35	0.8391	41.23
	124	295	350	55	15.520				
	126	339	179	136	38.440	822/33		0.8394	54.90
	126	170	350	180	50.801	827/34	34	0.8401	
	127	335	50	165	4.667	813/34	35	0.8421	58.29
	JUMLAH				147.540				53.48
	123	354	101	65	36.810	860/71	73	0.8982	44.15
	123	101	1488	474	26.333	858/72		0.8963	26.79
RESIDU	123	148	221	75	40.701	853/73	76	0.8986	42.77
	JUMLAH				103.844				27.64
	JUMLAH PRODUCT				278.073				100.79
	LOSSES				- 2.184				0.73



LAPORAN PRAKTIK KERJA LAPANG
PUSAT PENGEMBANGAN SUMBER
DAYA MANUSIA MINYAK DAN GAS
BUMI CEPU

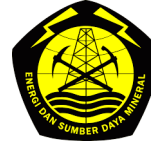


Hari / Tanggal Operasi : Selasa, 05.11.2024
Tank Crude Oil : 102

	Tank No	Keadaan		CM	Ltr Obs	SG / Temp.	VCF	Ltr 15°C	% Vol
		Awal	Akhir						
CRUDE OIL	102	461	435	26	85.188	834/33	33	0.84184	
	102	431	394	37	87.399	837/30		0.8476	100
	102	394	366	28	88.892	845/30		0.8456	
					JUMLAH	301.429			100
PERTASOL - CA	117	0	40	40	11.702	730/36	37	0.7487	12.79
	116	127	80	62	13.020	735/32		0.7501	16.20
	116	80	95	15	9.296	715/30		0.7265	9.77
					JUMLAH	34.968			11.60
PERTASOL - CB									
					JUMLAH				
PERTASOL - CC									
					JUMLAH				
SOLAR	127	50	250	200	56.486	826/39	40	0.8487	54.847
	127	250	350	100	28.182	824/35		0.8379	57.19
	125	322	170	132	38.956	826/32		0.8478	57.11
	125	170	350	180	50.791	826/32			
					JUMLAH	174.365			39.03
RESIDU	123	225	245	20	27.876	865/68	70	0.9011	39.791
	123	1575	2138	563	31.390	868/65		0.9060	26.74
	123	2138	276	62	34.678	865/68		0.9011	39.83
					JUMLAH	93.944			31.17
					JUMLAH PRODUCT	303.277			100.61
					LOSSES	1.848			0.61



LAPORAN PRAKTIK KERJA LAPANG
PUSAT PENGEMBANGAN SUMBER
DAYA MANUSIA MINYAK DAN GAS
BUMI CEPU



Hari / Tanggal Operasi : Rabu, 6 Oktober 2024
Tank Crude Oil : T. 102

	Tank No	Keadaan		CM	Ltr Obs	SG / Temp.	VCF	Ltr 15° C	% Vol
		Awal	Akhir						
CRUDE OIL	102	366	336	30	95.188	830/33	33	0.8422	
	102	336	308	28	88.826	828/31		0.8394	100
	101	826	786	40	109.590	828/31	33	0.8394	
	JUMLAH				294.599				109
PERTASOL - CA	116	95	160	65	18.359	732/36	39	0.7507	19.29
	116	160	195	35	9.861	709/34		0.7262	11.10
	119	40	110	70	20.905	709/34	34	0.7267	18.97
	JUMLAH				49.125				49.36
PERTASOL - CB									
	JUMLAH								
PERTASOL - CC									
	JUMLAH								
SOLAR									
RESIDU	120	13	240	227	53.962	830/39	42	0.8465	56.69
	120	240	415	175	41.619				
	125	282	35	66	18.933				69.94
	115	95	320	225	63.976	826/31	32	0.8371	59.03
RESIDU	123	276	317	42	23.806	815/49	71	0.9116	25.01
	123	220	254	33	18.511				20.84
	113	254	297	43	24.028	873/66	67	0.9076	21.34
	JUMLAH				66.345				22.76
JUMLAH PRODUCT					292.759				100.92
LOSSES					-1.215				0.92



LAPORAN PRAKTIK KERJA LAPANG
PUSAT PENGEMBANGAN SUMBER
DAYA MANUSIA MINYAK DAN GAS
BUMI CEPU



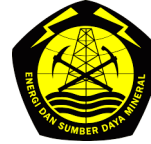
Kamis, 7 November 2024

Hari / Tanggal Operasi :
Tank Crude Oil : 1101

	Tank No	Keadaan		CM	Ltr Obs	SG / Temp.	VCF	Ltr 15° C	% Vol
		Awal	Akhir						
CRUDE OIL	101	785	755	50	83.608	827/34	34	0.8401	
	101	755	724	31	92.634	827/33	30	0.8400	100
	101	724	696	28	83.816	828/30	30	0.8387	
	JUMLAH				266.058				100
PERTASOL - CA	116	30	60	30	8.476	735/39	41	0.7563	25.70
	117	110	115	50	14.557				
	116	60	120	60	16.377	733/39	41	0.7543	18.33
	116	120	158	38	10.729	744/31	31	0.7581	12.73
PERTASOL - CB	JUMLAH				50.739				13.17
	JUMLAH								
PERTASOL - CC									
	JUMLAH								
SOLAR									
RESIDU	125	320	350	30	8.410	826/40	42	0.8472	34.07
	127	513	130	78	22.082				
	127	130	310	180	50.773	829/39	40	0.8455	54.31
	127	310	250	60	11.236	828/28	30	0.8387	26.67
	126	37	175	143	40.919				
RESIDU									
	JUMLAH				132.995				40.99
RESIDU	123	2274	255	676	37.688	872/68	70	0.9000	42.00
	123	42	87	44	25.025	870/66	63	0.9047	27.01
	113	67	125	58	21.716	867/58	58	0.8963	25.30
RESIDU									
	JUMLAH				84.923				31.73
RESIDU	JUMLAH PRODUCT				268.158				100.73
	LOSSES				-2.100				0.79



LAPORAN PRAKTIK KERJA LAPANG PUSAT PENGEMBANGAN SUMBER DAYA MANUSIA MINYAK DAN GAS BUMI CEPU



Hasil Uji Analisa *Feed* dan Produk Hasil Pengolahan Kilang PPSDM Migas Cepu

TGL 6-11-2024

Crude Oil T.101
827/32 = 839.2

IBP = 70	100 = 0.4	Rendermen = 67.0
5 = 108	125 = 11.0	Residu = 31.0
10 = 121	150 = 20.0	losses = 2.0
20 = 150	175 = 28.0	
30 = 188	200 = 33.0	
40 = 222	225 = 35.0	
50 = 255	250 = 40.5	
60 = 282	275 = 57.0	
	300 = 65.0	

Tanggal : 04-11-2024
No. : L.R/05.02.02/18

LAPORAN HASIL UJI ANALISA FEED DAN PRODUK PERTAMINA
HASIL PENGOLAHAN KILANG PPSDM MIGAS

Shift	04.00	04.00	04.00	04.00	04.00	04.00	04.00	04.00
Jam	04.00	04.00	04.00	04.00	04.00	04.00	04.00	04.00
Nama Contoh	04.00	04.00	04.00	04.00	04.00	04.00	04.00	04.00
Aliran / Tangki	04.00	04.00	04.00	04.00	04.00	04.00	04.00	04.00
No.	Parameter Uji	Metode	ASTM / Lain					
1	Density / Temp °C Obs	D-1298	836/32	720/30	723/30	723/29	836/30	827/32
2	Density 15 °C, Kg/m3		842.0	710.2	712.0	712.2	846.3	830.5
2	Distilasi :							
	IBP		71	71	71	71	71	71
	5 % Vol. rec °C		82	82	82	82	82	82
	10 % Vol. rec °C		86	86	86	86	86	86
	20 % Vol. rec °C		92	92	92	92	92	92
	30 % Vol. rec °C		97	97	97	97	97	97
	40 % Vol. rec °C		104	104	104	104	104	104
	50 % Vol. rec °C		110	110	110	110	110	110
	60 % Vol. rec °C		116	116	116	116	116	116
	70 % Vol. rec °C		124	124	124	124	124	124
	80 % Vol. rec °C		135	135	135	135	135	135
	90 % Vol. rec °C (T.90)		142	142	142	142	142	142
	95 % Vol. rec °C (T.95)		147	147	147	147	147	147
	End Point °C		172	172	172	172	172	172
	Dry Point °C		163	163	163	163	163	163
	% Vol. rec at 200 °C							
	% Vol. rec at 300 °C							
	% Vol. rec at 370 °C							
	Rendermen, % vol							
	Residu, % vol							
	Losses, % vol							
3	Titik Nyala, °C	D-56-93,92						
4	Titik Tuang, °C	D-97						
5	Titik Asap, mm	D-1322						
6	Nilai Jelaga, mg/kg	IP-10						
7	Warna Saybolt/ ASTM	D-156 / 1500						
8	Viskositas, cSt	D-455						
9	Docotor Test	D-4952						
10	Korosi Bilah Tembaga	D-130						
11	Indeks Cetana	D-4737						
12	Kandungan Air, mg/Kg	D-1744						
13	Kandungan Sulfur, %m/m	D-2322/1522						
14	Basisda Karbon, % m/m	D-4550/189						
15	Kandungan Abu, % m/m	D-482						
16	Sediment Content, %m/m	D-473						
17	Nil. Asam Kuat, mg KOH/g	D-664						
18	Nil. Asam Total, mg KOH/g	D-664						
19	Partikulat, mg/l	D-2276						

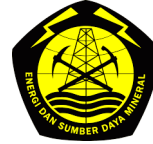
Pengelola Laboratorium

Setyono
NIP.19680412 199303 1 004

Logging Report Unit Distilasi PPSDM Migas Cepu Tanggal 4 November 2024



A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE			
30	101012	OUTLET, HIGH-COOLING	DEGC	3000	50170	2302	2952	2812	281	301	301	301	382	371	362	2902	2904	2912	292	292	292	292	292	292	292	292	292	292	292	292	292		
31	101016	INLET-5	DEGC	3005	4929	2220	177	201	200	224	214	218	218	217	217	207	183	182	182	182	182	182	182	182	182	182	182	182	182	182	182		
32	101018	INLET-5-2	DEGC	3004	6557	424	325	349	355	424	352	34	339	335	340	324	332	325	325	325	325	325	325	325	325	325	325	325	325	325	325		
33	101017	INLET-4	DEGC	3004	14730	3850	424	245	745	785	712	681	656	438	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424		
34	101019	INLET-5-2	DEGC	3005	8470	424	314	424	735	334	316	314	374	379	292	300	353	310	33	335	331	323	45	45	45	345	303	381	398	324	329	356	
35	101020	INLET-5	DEGC	3005	7351	4550	240	261	262	260	260	292	19	238	292	450	300	200	312	336	215	235	316	303	288	277	276	277	276	273	306		
36	101023	INLET-5-7	DEGC	3006	7351	4550	240	261	262	260	260	292	19	238	292	450	300	200	312	336	215	235	316	303	288	277	276	277	276	273	306		
37	101024	INLET-5-8	DEGC	3006	7351	4550	240	261	262	260	260	292	19	238	292	450	300	200	312	336	215	235	316	303	288	277	276	277	276	273	306		
42	101010	FUEL OIL PRESS-CONTROL	KGCMG	43	187	50	49	48	48	48	48	48	48	48	48	50	50	48	48	48	50	48	49	43	49	48	45	49	48	45	49		
43	101011	FUEL PRESS-TO FURNACE	KGCMG	40	07	08	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00		
44	101012	FUEL PRESS-TO FURNACE	KGCMG	67	2092	19	72	81	83	86	87	80	73	78	76	81	73	82	82	85	89	85	86	85	86	87	86	87	86	83	89	80	
45	101013	FUEL PRESS-TO FURNACE	KGCMG	67	2082	19	73	73	75	81	87	88	80	73	78	76	72	83	84	85	89	85	86	85	87	86	87	86	83	89	80	83	
46	101014	STABILIZER PRESSURE	KGCMG	67	855	32	32	32	32	28	26	27	25	46	28	28	26	23	24	24	25	27	27	27	27	28	27	28	27	28	27	28	
47	101015	INLET FURNACE	KGCMG	65	72	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	
48	101017	INLET FURNACE	KGCMG	26	48	24	16	24	23	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	
49	101018	INLET FURNACE	KGCMG	49	187	50	49	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	
50	101019	INLET FURNACE	KGCMG	66	187	50	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	
51	101010	FUEL GAS PRESSURE	KGCMG	40	22	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
52	101011	INLET EVAPORATOR	KGCMG	825	3008	637	004	009	009	005	015	006	007	020	008	004	004	008	009	016	026	040	009	005	007	029	035	004	008	005	008	005	008
53	101012	TOP EVAPORATOR	KGCMG	6375	1591	647	008	002	007	0074	0057	004	0093	0087	0029	001	0037	0096	0086	0067	0047	008	006	0096	005	0047	0055	0056	0005	0087	004	0087	
54	101013	TOP COLUMN	KGCMG	6303	0636	0074	0020	0020	0001	0003	0009	0001	0003	0001	0001	0002	0006	0020	0009	0009	0003	0003	0003	0004	0084	0008	0074	0008	0006	0009	0005	0082	
55	101014	TOP COLUMN	KGCMG	6306	0068	0096	-0.024	0.024	0.006	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	
56	101015	DISCHARGE P. REFUX	KGCMG	91	180	83	01	06	04	06	06	07	07	07	08	08	08	07	07	07	08	08	08	08	08	08	08	08	08	08	08	08	
57	101016	DISCHARGE P. REFUX	KGCMG	11	258	13	09	12	13	12	11	09	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
58	101017	CHARGE OIL PUMP DISCH	KGCMG	100	0000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	
59	101018	TOTAL INLET CHARGE OIL	M3G	3656	37756	4025	3271	4025	4003	3855	3528	3624	3609	3761	3871	3978	3433	3506	3598	3271	3395	3444	3464	3524	3608	3608	3682	3644	3615	3682	3684	3615	
60	101019	INLET FEED FURNACE	M3G	36	4487	316	107	81	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
61	101012	INLET FEED FURNACE	M3G	3175	40336	3907	1473	3881	3922	3719	3650	3494	3657	3887	3827	3934	3907	3827	3838	3828	3834	3838	3838	3838	3838	3838	3838	3838	3838	3838	3838	3838	
62	101013	INLET FEED FURNACE	M3G	3175	40336	3908	1480	3885	3925	3720	3646	3761	3850	3893	3839	3946	3907	3827	3838	3828	3834	3838	3838	3838	3838	3838	3838	3838	3838	3838	3838	3838	
63	101014	INLET FEED FURNACE	M3G	2974	7402	2725	-51	2706	3010	3722	3226	3306	3455	2409	3322	3301	3305	3264	3304	3264	3304	3264	3304	3264	3304	3264	3304	3264	3304	3264	3304	3264	3304
64	101015	REFUX TO COLUMN	M3G	606	1658	9222	60	296	129	445	482	1822	498	1250	539	84	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
65	101016	REFUX TO COLUMN	M3G	60	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	
66	101017	INLET FEED FURNACE	M3G	100	0000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	
67	101018	STEAM FLOW BOILER	KGCMG	1026	248180	1620	4225	4222	4215	4454	4215	4230	356	3953	3907	3747	3777	3827	3620	3777	3817	3818	3818	3818	3818	3818	3818	3818	3818	3818	3818	3818	
68	101019	STEAM FLOW EVAPOR	KGCMG	8964	216888	1627	9252	9251	914	992	972	9420	9420	9420	9420	9420	9420	9420	9420	9420	9420	9420	9420	9420	9420	9420	9420	9420	9420	9420	9420	9420	
69	101012	STEAM FLOW ILIANG	%	82	19812	82	917	825	861	864	827	826	825	826	825	825	826	825	826	825	826	825	826	825	826	825	826	825	826	825	826	825	
70	101013	LEVEL COLUMN	%	543	3543	649	645	644	647	647	646	646	647	647	647	644	644	643	647	647	645	644	643	642	643	644	643	647	647	647	647	647	
71	101014	LEVEL COLUMN	%	543	3543	649	645	644	647	647	646	646	647	647	647	644	644	643	647	647	645	644	643	642	643	644	643	647	647	647	647	647	

[illegible]

LAMPIRAN DATA LITERATUR

Figure 12.8 (Edmister, 1961)

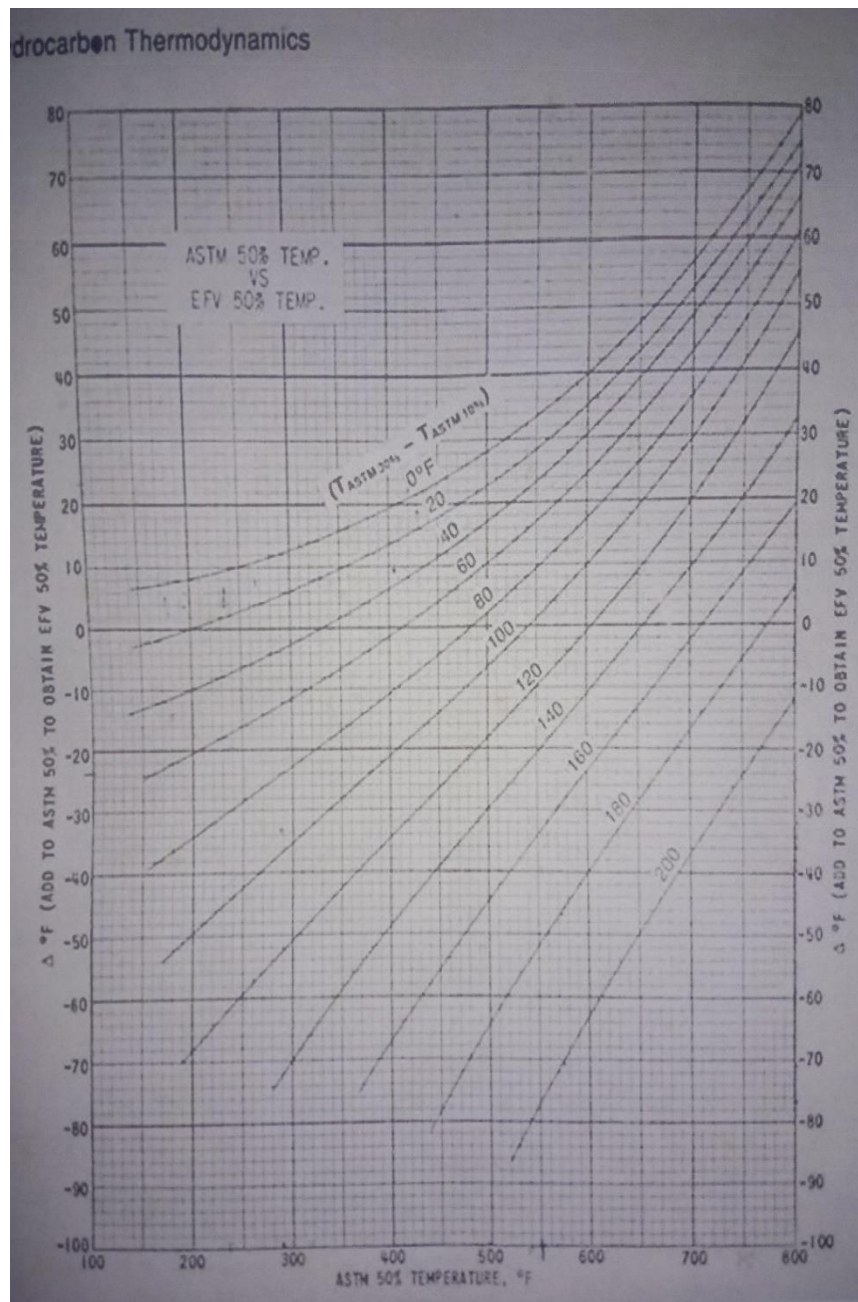


Figure 12.9 (Edmister, 1961)

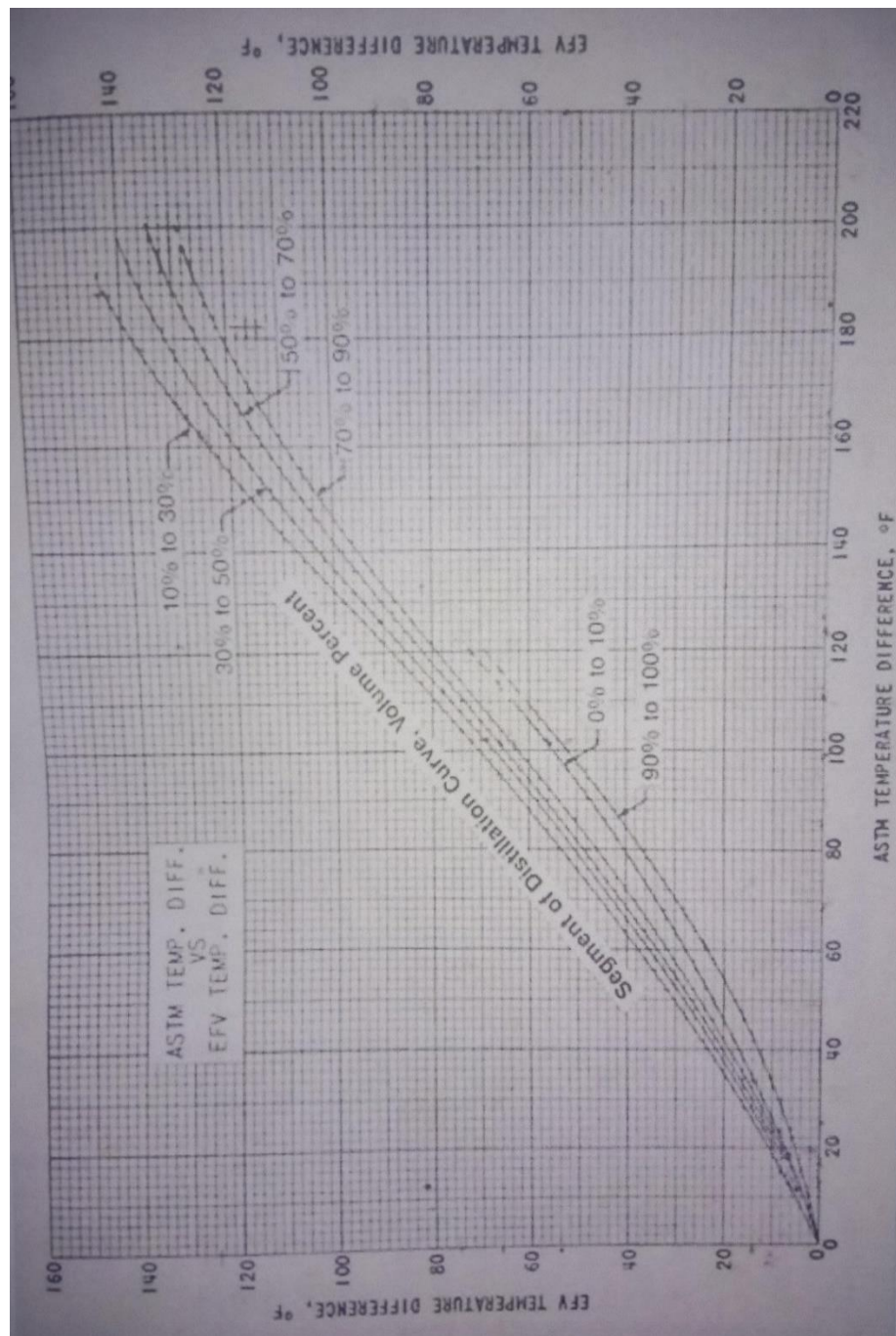


Figure 5-27 (Nelson, 1958)

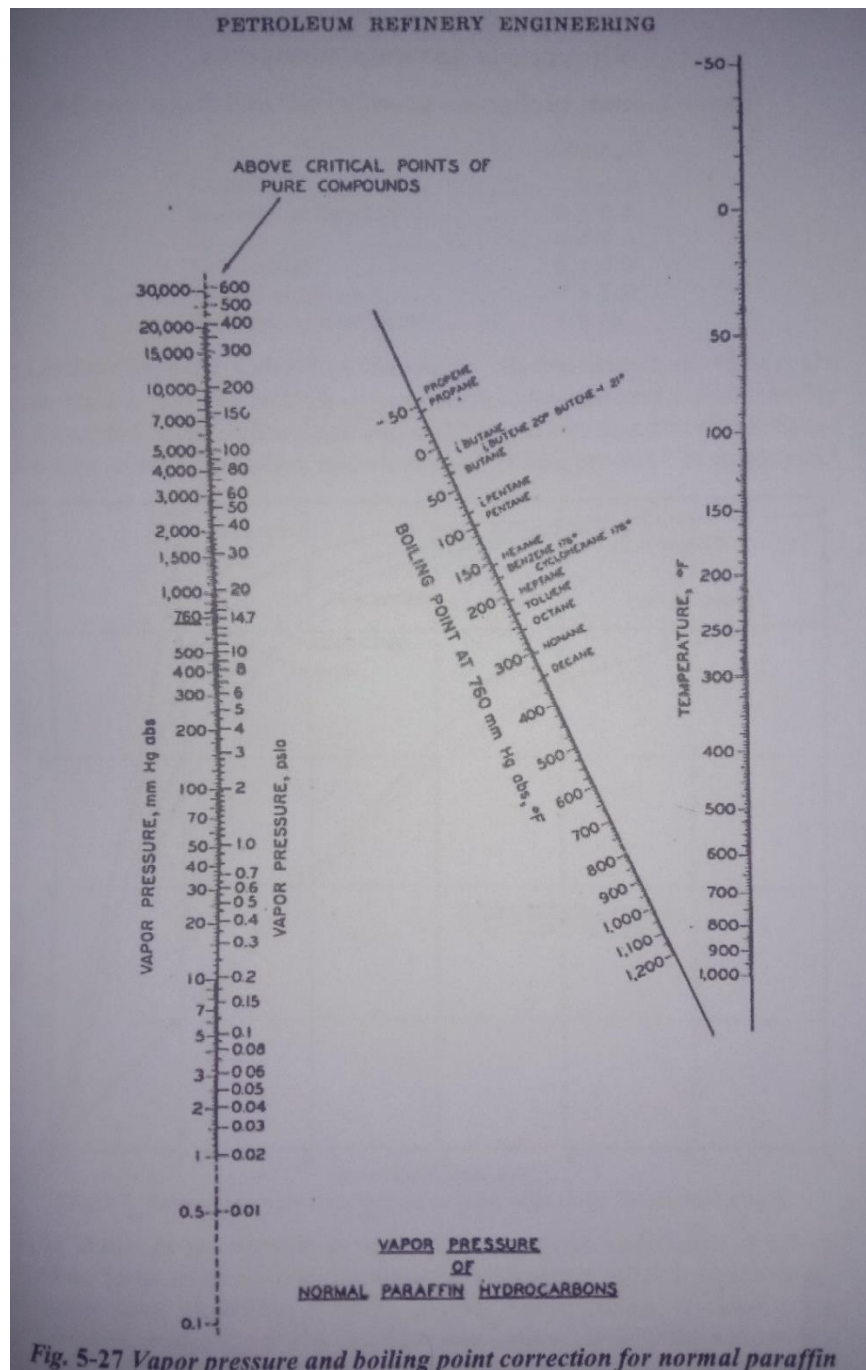
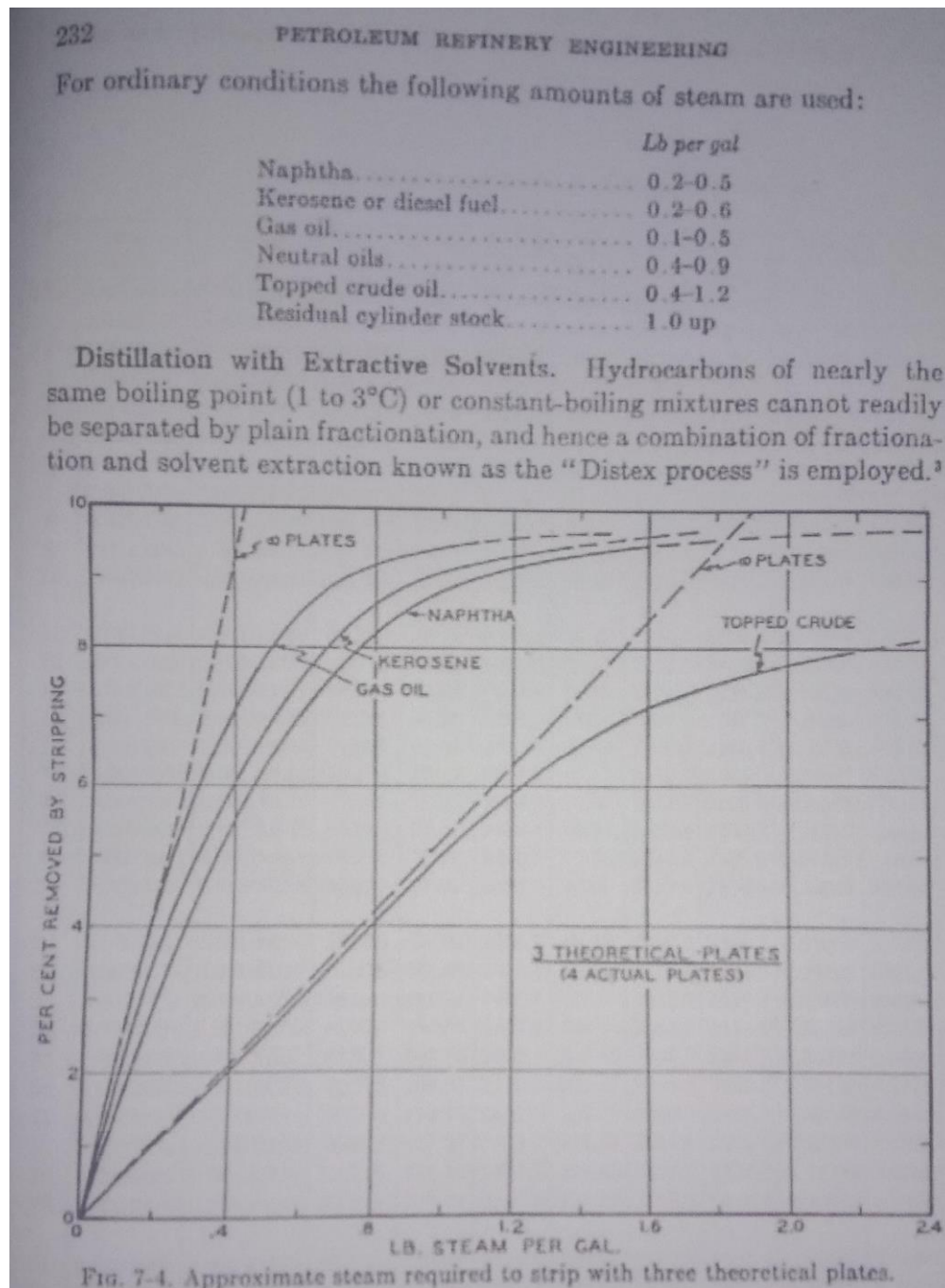
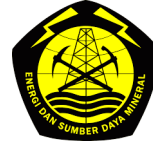


Figure 7-4 (Nelson, 1958)



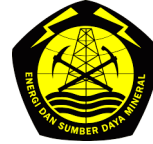
LAPORAN PRAKTIK KERJA LAPANG
PUSAT PENGEMBANGAN SUMBER
DAYA MANUSIA MINYAK DAN GAS
BUMI CEPU



Steam Table (Thermodynamic Properties of Ordinary Water Substance)



LAPORAN PRAKTIK KERJA LAPANG
PUSAT PENGEMBANGAN SUMBER
DAYA MANUSIA MINYAK DAN GAS
BUMI CEPU

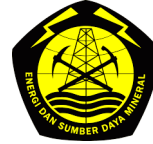


Saturated Water and Steam (Temperature-based), Contd.

T °C	p_{sat} MPa	Volume, m ³ /kg		Energy, kJ/kg		Enthalpy, kJ/kg			Entropy, kJ/(kg K)		
		v_f	v_g	u_f	u_g	h_f	h_g	h_{fg}	s_f	s_g	s_{fg}
80	0.047414	0.00102905	3.4052	334.96	2481.5	335.01	2643.0	2308.0	1.0756	7.6111	6.5355
81	0.049367	0.00102972	3.2789	339.16	2482.8	339.21	2644.7	2305.5	1.0874	7.5973	6.5099
82	0.051387	0.00103038	3.1581	343.36	2484.1	343.41	2646.4	2302.9	1.0993	7.5837	6.4844
83	0.053476	0.00103106	3.0425	347.55	2485.3	347.61	2648.0	2300.4	1.1111	7.5702	6.4591
84	0.055635	0.00103174	2.9318	351.75	2486.6	351.81	2649.7	2297.9	1.1229	7.5567	6.4339
85	0.057867	0.00103243	2.8258	355.95	2487.8	356.01	2651.3	2295.3	1.1346	7.5434	6.4088
86	0.060173	0.00103312	2.7244	360.16	2489.1	360.22	2653.0	2292.8	1.1463	7.5302	6.3838
87	0.062556	0.00103382	2.6271	364.36	2490.3	364.42	2654.6	2290.2	1.1580	7.5170	6.3590
88	0.065017	0.00103452	2.5340	368.56	2491.5	368.63	2656.3	2287.6	1.1696	7.5040	6.3343
89	0.067558	0.00103524	2.4447	372.76	2492.7	372.83	2657.9	2285.1	1.1813	7.4910	6.3097
90	0.070182	0.00103595	2.3591	376.97	2493.9	377.04	2659.5	2282.5	1.1929	7.4781	6.2853
91	0.072890	0.00103668	2.2770	381.17	2495.2	381.25	2661.2	2279.9	1.2044	7.4653	6.2609
92	0.075684	0.00103741	2.1982	385.38	2496.4	385.46	2662.8	2277.3	1.2160	7.4526	6.2367
93	0.078568	0.00103814	2.1227	389.59	2497.6	389.67	2664.4	2274.7	1.2275	7.4400	6.2126
94	0.081541	0.00103888	2.0502	393.80	2498.8	393.88	2666.0	2272.1	1.2389	7.4275	6.1886
95	0.084608	0.00103963	1.9806	398.00	2500.0	398.09	2667.6	2269.5	1.2504	7.4151	6.1647
96	0.087771	0.00104038	1.9137	402.21	2501.2	402.30	2669.2	2266.9	1.2618	7.4027	6.1409
97	0.091030	0.00104114	1.8496	406.43	2502.4	406.52	2670.8	2264.3	1.2732	7.3904	6.1172
98	0.094390	0.00104191	1.7879	410.63	2503.6	410.73	2672.4	2261.7	1.2846	7.3783	6.0937
99	0.097852	0.00104268	1.7287	414.85	2504.8	414.95	2674.0	2259.0	1.2959	7.3661	6.0702
100	0.10142	0.00104346	1.6718	419.06	2506.0	419.17	2675.6	2256.4	1.3072	7.3541	6.0469
101	0.10509	0.00104425	1.6171	423.28	2507.2	423.39	2677.1	2253.8	1.3185	7.3422	6.0237
102	0.10887	0.00104504	1.5644	427.50	2508.4	427.61	2678.7	2251.1	1.3297	7.3303	6.0006
103	0.11277	0.00104583	1.5139	431.71	2509.6	431.83	2680.3	2248.5	1.3410	7.3185	5.9775
104	0.11678	0.00104664	1.4652	435.93	2510.7	436.05	2681.8	2245.8	1.3522	7.3068	5.9546
105	0.12090	0.00104744	1.4184	440.14	2511.9	440.27	2683.4	2243.1	1.3633	7.2952	5.9318
106	0.12515	0.00104826	1.3733	444.37	2513.0	444.50	2684.9	2240.4	1.3745	7.2836	5.9091
107	0.12952	0.00104908	1.3300	448.59	2514.2	448.73	2686.5	2237.7	1.3856	7.2721	5.8865
108	0.13401	0.00104991	1.2882	452.81	2515.4	452.95	2688.0	2235.1	1.3967	7.2607	5.8640
109	0.13863	0.00105074	1.2480	457.03	2516.5	457.18	2689.5	2232.4	1.4078	7.2493	5.8416
110	0.14338	0.00105158	1.2093	461.27	2517.7	461.42	2691.1	2229.6	1.4188	7.2381	5.8193
111	0.14826	0.00105243	1.1720	465.49	2518.8	465.65	2692.6	2226.9	1.4298	7.2269	5.7970
112	0.15328	0.00105328	1.1361	469.72	2520.0	469.88	2694.1	2224.2	1.4408	7.2157	5.7749
113	0.15844	0.00105414	1.1014	473.95	2521.1	474.12	2695.6	2221.5	1.4518	7.2047	5.7529
114	0.16374	0.00105500	1.0680	478.18	2522.2	478.35	2697.1	2218.7	1.4628	7.1937	5.7309
115	0.16918	0.00105588	1.0358	482.41	2523.4	482.59	2698.6	2216.0	1.4737	7.1828	5.7091
116	0.17477	0.00105675	0.99522	486.65	2526.2	486.83	2700.1	2213.2	1.4846	7.1719	5.6873
117	0.18052	0.00105764	0.97486	490.89	2525.5	491.08	2701.5	2210.5	1.4954	7.1611	5.6657
118	0.18641	0.00105853	0.94598	495.12	2526.7	495.32	2703.0	2207.7	1.5063	7.1504	5.6441
119	0.19246	0.00105942	0.91811	499.36	2527.8	499.56	2704.5	2204.9	1.5171	7.1397	5.6226
120	0.19867	0.00106033	0.89121	503.60	2528.8	503.81	2705.9	2202.1	1.5279	7.1291	5.6012



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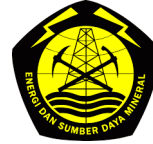


Saturated Water and Steam (Temperature-based), Contd.

T °C	p_{sat} MPa	Volume, m ³ /kg		Energy, kJ/kg		Enthalpy, kJ/kg			Entropy, kJ/(kg K)		
		v_f	v_g	u_f	u_g	h_f	h_g	h_{fg}	s_f	s_g	s_{fg}
160	0.61823	0.00110199	0.30678	674.79	2567.7	675.47	2757.4	2082.0	1.9426	6.7491	4.8066
161	0.63412	0.00110318	0.29951	679.12	2568.6	679.82	2758.5	2078.7	1.9525	6.7406	4.7880
162	0.65033	0.00110438	0.29245	683.45	2569.4	684.17	2759.6	2075.5	1.9625	6.7320	4.7695
163	0.66686	0.00110559	0.28559	687.78	2570.3	688.52	2760.7	2072.2	1.9725	6.7235	4.7511
164	0.68373	0.00110680	0.27892	692.12	2571.1	692.88	2761.8	2068.9	1.9824	6.7150	4.7327
165	0.70093	0.00110803	0.27243	696.46	2571.8	697.24	2762.8	2065.6	1.9923	6.7066	4.7143
166	0.71848	0.00110926	0.26612	700.80	2572.7	701.60	2763.9	2062.3	2.0022	6.6982	4.6960
167	0.73638	0.00111050	0.25999	705.14	2573.4	705.96	2764.9	2058.9	2.0121	6.6898	4.6778
168	0.75462	0.00111175	0.25403	709.49	2574.2	710.33	2765.9	2055.6	2.0220	6.6815	4.6596
169	0.77322	0.00111300	0.24823	713.85	2575.0	714.71	2766.9	2052.2	2.0318	6.6732	4.6414
170	0.79219	0.00111427	0.24259	718.20	2575.7	719.08	2767.9	2048.8	2.0417	6.6650	4.6233
171	0.81152	0.00111554	0.23710	722.55	2576.5	723.46	2768.9	2045.4	2.0515	6.6567	4.6053
172	0.83122	0.00111682	0.23176	726.92	2577.3	727.85	2769.9	2042.0	2.0613	6.6485	4.5872
173	0.85130	0.00111811	0.22656	731.28	2577.9	732.23	2770.8	2038.6	2.0711	6.6404	4.5693
174	0.87176	0.00111941	0.22150	735.65	2578.7	736.63	2771.8	2035.1	2.0809	6.6322	4.5514
175	0.89260	0.00112072	0.21658	740.02	2579.4	741.02	2772.7	2031.7	2.0906	6.6241	4.5335
176	0.91384	0.00112204	0.21179	744.39	2580.1	745.42	2773.6	2028.2	2.1004	6.6161	4.5157
177	0.93547	0.00112336	0.20712	748.77	2580.7	749.82	2774.5	2024.7	2.1101	6.6080	4.4979
178	0.95751	0.00112470	0.20258	753.15	2581.4	754.23	2775.4	2021.2	2.1198	6.6000	4.4802
179	0.97995	0.00112604	0.19815	757.54	2582.1	758.64	2776.3	2017.7	2.1296	6.5920	4.4625
180	1.0028	0.00112740	0.19384	761.92	2582.8	763.05	2777.2	2014.2	2.1392	6.5840	4.4448
181	1.0261	0.00112876	0.18964	766.31	2583.5	767.47	2778.1	2010.6	2.1489	6.5761	4.4272
182	1.0498	0.00113013	0.18555	770.71	2584.1	771.90	2778.9	2007.0	2.1586	6.5682	4.4096
183	1.0739	0.00113151	0.18157	775.10	2584.8	776.32	2779.8	2003.4	2.1683	6.5603	4.3921
184	1.0985	0.00113290	0.17769	779.51	2585.4	780.75	2780.6	1999.8	2.1779	6.5525	4.3746
185	1.1235	0.00113430	0.17390	783.92	2586.0	785.19	2781.4	1996.2	2.1875	6.5447	4.3571
186	1.1489	0.00113571	0.17021	788.33	2586.6	789.63	2782.2	1992.6	2.1971	6.5369	4.3397
187	1.1748	0.00113713	0.16662	792.73	2587.3	794.07	2783.0	1988.9	2.2067	6.5291	4.3223
188	1.2011	0.00113856	0.16311	797.15	2587.9	798.52	2783.8	1985.3	2.2163	6.5213	4.3050
189	1.2280	0.00114000	0.15969	801.57	2588.4	802.97	2784.5	1981.6	2.2259	6.5136	4.2877
190	1.2552	0.00114145	0.15636	806.00	2589.0	807.43	2785.3	1977.9	2.2355	6.5059	4.2704
191	1.2830	0.00114291	0.15311	810.42	2589.6	811.89	2786.0	1974.1	2.2450	6.4982	4.2532
192	1.3112	0.00114438	0.14994	814.86	2590.1	816.36	2786.7	1970.4	2.2546	6.4906	4.2360
193	1.3399	0.00114586	0.14685	819.29	2590.6	820.83	2787.4	1966.6	2.2641	6.4830	4.2188
194	1.3691	0.00114736	0.14383	823.74	2591.2	825.31	2788.1	1962.8	2.2736	6.4754	4.2017
195	1.3988	0.00114886	0.14089	828.18	2591.7	829.79	2788.8	1959.0	2.2832	6.4678	4.1846
196	1.4290	0.00115037	0.13802	832.64	2592.3	834.28	2789.5	1955.2	2.2926	6.4602	4.1676
197	1.4597	0.00115189	0.13522	837.09	2592.7	838.77	2790.1	1951.4	2.3021	6.4527	4.1505
198	1.4909	0.00115343	0.13248	841.54	2593.3	843.26	2790.8	1947.5	2.3116	6.4451	4.1335
199	1.5227	0.00115497	0.12982	846.00	2593.7	847.76	2791.4	1943.6	2.3211	6.4376	4.1166
200	1.5549	0.00115653	0.12721	850.47	2594.2	852.27	2792.0	1939.7	2.3305	6.4302	4.0996



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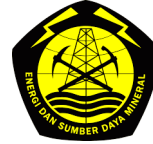


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T °C	p _{sat} MPa	Volume, m ³ /kg		Energy, kJ/kg		Enthalpy, kJ/kg			Entropy, kJ/(kg K)		
		v _f	v _g	u _f	u _g	h _f	h _g	h _{fg}	s _f	s _g	s _{fg}
240	3.3469	0.00122946	0.059705	1033.5	2603.2	1037.6	2803.0	1765.4	2.7020	6.1423	3.4403
241	3.4062	0.00123160	0.058654	1038.1	2603.1	1042.3	2802.9	1760.5	2.7111	6.1353	3.4241
242	3.4662	0.00123376	0.057623	1042.8	2603.0	1047.1	2802.7	1755.6	2.7203	6.1282	3.4079
243	3.5270	0.00123594	0.056613	1047.5	2602.9	1051.9	2802.6	1750.7	2.7295	6.1212	3.3918
244	3.5887	0.00123813	0.055624	1052.3	2602.8	1056.7	2802.4	1745.7	2.7386	6.1142	3.3756
245	3.6512	0.00124035	0.054654	1057.0	2602.6	1061.5	2802.2	1740.7	2.7478	6.1072	3.3594
246	3.7145	0.00124259	0.053703	1061.8	2602.5	1066.4	2802.0	1735.6	2.7569	6.1002	3.3432
247	3.7786	0.00124484	0.052771	1066.5	2602.4	1071.2	2801.8	1730.6	2.7661	6.0931	3.3270
248	3.8436	0.00124712	0.051857	1071.3	2602.2	1076.1	2801.5	1725.5	2.7752	6.0861	3.3109
249	3.9095	0.00124941	0.050961	1076.0	2602.0	1080.9	2801.2	1720.3	2.7844	6.0791	3.2947
250	3.9762	0.00125173	0.050083	1080.8	2601.8	1085.8	2800.9	1715.2	2.7935	6.0721	3.2785
251	4.0438	0.00125407	0.049222	1085.5	2601.6	1090.6	2800.6	1710.0	2.8027	6.0650	3.2624
252	4.1122	0.00125643	0.048377	1090.3	2601.4	1095.5	2800.3	1704.7	2.8118	6.0580	3.2462
253	4.1815	0.00125881	0.047548	1095.1	2601.1	1100.4	2799.9	1699.5	2.8210	6.0510	3.2300
254	4.2518	0.00126121	0.046736	1099.9	2600.8	1105.3	2799.5	1694.2	2.8301	6.0439	3.2138
255	4.3229	0.00126364	0.045938	1104.7	2600.5	1110.2	2799.1	1688.8	2.8392	6.0369	3.1977
256	4.3949	0.00126609	0.045156	1109.6	2600.1	1115.2	2798.6	1683.5	2.8484	6.0298	3.1815
257	4.4679	0.00126856	0.044389	1114.4	2599.9	1120.1	2798.2	1678.1	2.8575	6.0228	3.1653
258	4.5417	0.00127106	0.043637	1119.2	2599.5	1125.0	2797.7	1672.6	2.8667	6.0157	3.1491
259	4.6165	0.00127358	0.042898	1124.1	2599.1	1130.0	2797.1	1667.2	2.8758	6.0087	3.1329
260	4.6923	0.00127612	0.042173	1129.0	2598.7	1135.0	2796.6	1661.6	2.8849	6.0016	3.1167
261	4.7689	0.00127869	0.041462	1133.8	2598.3	1139.9	2796.0	1656.1	2.8941	5.9945	3.1004
262	4.8466	0.00128128	0.040764	1138.7	2597.8	1144.9	2795.4	1650.5	2.9032	5.9874	3.0842
263	4.9252	0.00128390	0.040079	1143.6	2597.4	1149.9	2794.8	1644.9	2.9124	5.9804	3.0680
264	5.0047	0.00128655	0.039406	1148.5	2597.0	1154.9	2794.2	1639.2	2.9215	5.9732	3.0517
265	5.0853	0.00128922	0.038746	1153.4	2596.5	1160.0	2793.5	1633.5	2.9307	5.9661	3.0354
266	5.1668	0.00129192	0.038098	1158.3	2596.0	1165.0	2792.8	1627.8	2.9398	5.9590	3.0192
267	5.2494	0.00129465	0.037462	1163.2	2595.4	1170.0	2792.1	1622.0	2.9490	5.9519	3.0029
268	5.3329	0.00129740	0.036837	1168.2	2594.9	1175.1	2791.3	1616.2	2.9582	5.9447	2.9866
269	5.4174	0.00130019	0.036223	1173.2	2594.3	1180.2	2790.5	1610.3	2.9673	5.9376	2.9703
270	5.5030	0.00130300	0.035621	1178.1	2593.7	1185.3	2789.7	1604.4	2.9765	5.9304	2.9539
271	5.5896	0.00130584	0.035029	1183.1	2593.0	1190.4	2788.8	1598.5	2.9857	5.9232	2.9376
272	5.6772	0.00130871	0.034448	1188.1	2592.4	1195.5	2788.0	1592.5	2.9948	5.9160	2.9212
273	5.7659	0.00131161	0.033877	1193.0	2591.8	1200.6	2787.1	1586.5	3.0040	5.9088	2.9048
274	5.8556	0.00131455	0.033317	1198.0	2591.0	1205.7	2786.1	1580.4	3.0132	5.9016	2.8884
275	5.9464	0.00131751	0.032766	1203.1	2590.4	1210.9	2785.2	1574.3	3.0224	5.8944	2.8720
276	6.0383	0.00132051	0.032225	1208.1	2589.6	1216.1	2784.2	1568.1	3.0316	5.8871	2.8555
277	6.1312	0.00132354	0.031693	1213.2	2588.8	1221.3	2783.1	1561.9	3.0408	5.8798	2.8390
278	6.2252	0.00132661	0.031171	1218.1	2588.1	1226.4	2782.1	1555.6	3.0500	5.8725	2.8225
279	6.3203	0.00132971	0.030657	1223.3	2587.2	1231.7	2781.0	1549.3	3.0592	5.8652	2.8060
280	6.4166	0.00133284	0.030153	1228.3	2586.4	1236.9	2779.9	1543.0	3.0685	5.8579	2.7894



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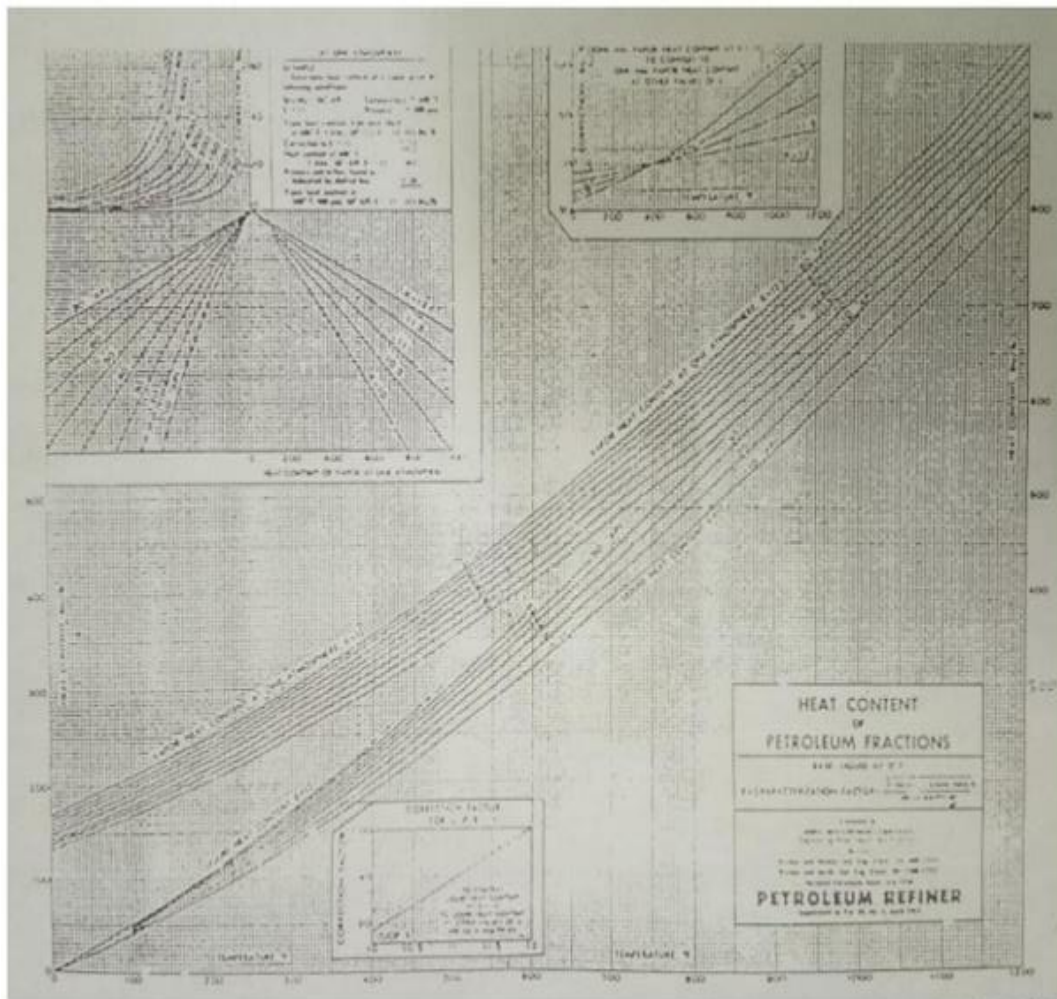
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		v _f	v _g	u _f	u _g	h _f	h _g	h _{fg}	s _f	s _g	s _{fg}
280	6.4166	0.00133284	0.030153	1228.3	2586.4	1236.9	2779.9	1543.0	3.0685	5.8579	2.7894
281	6.5139	0.00133602	0.029657	1233.4	2585.5	1242.1	2778.7	1536.6	3.0777	5.8506	2.7729
282	6.6124	0.00133922	0.029169	1238.5	2584.6	1247.4	2777.5	1530.1	3.0869	5.8432	2.7563
283	6.7120	0.00134247	0.028690	1243.7	2583.7	1252.7	2776.3	1523.6	3.0962	5.8358	2.7396
284	6.8128	0.00134575	0.028219	1248.7	2582.7	1257.9	2775.0	1517.1	3.1054	5.8284	2.7229
285	6.9147	0.00134907	0.027756	1253.9	2581.8	1263.2	2773.7	1510.5	3.1147	5.8209	2.7062
286	7.0177	0.00135243	0.027301	1259.1	2580.8	1268.6	2772.4	1503.8	3.1240	5.8135	2.6895
287	7.1220	0.00135584	0.026853	1264.2	2579.8	1273.9	2771.0	1497.1	3.1333	5.8060	2.6727
288	7.2274	0.00135928	0.026413	1269.5	2578.7	1279.3	2769.6	1490.4	3.1426	5.7985	2.6559
289	7.3340	0.00136277	0.025981	1274.6	2577.7	1284.6	2768.2	1483.5	3.1519	5.7909	2.6390
290	7.4418	0.00136630	0.025555	1279.8	2576.5	1290.0	2766.7	1476.7	3.1612	5.7834	2.6222
291	7.5508	0.00136987	0.025136	1285.1	2575.4	1295.4	2765.2	1469.7	3.1705	5.7758	2.6052
292	7.6610	0.00137349	0.024724	1290.4	2574.2	1300.9	2763.6	1462.7	3.1799	5.7681	2.5883
293	7.7725	0.00137716	0.024319	1295.6	2573.0	1306.3	2762.0	1455.7	3.1892	5.7605	2.5712
294	7.8852	0.00138087	0.023921	1300.9	2571.8	1311.8	2760.4	1448.6	3.1986	5.7528	2.5542
295	7.9991	0.00138464	0.023529	1306.2	2570.5	1317.3	2758.7	1441.4	3.2080	5.7451	2.5371
296	8.1143	0.00138845	0.023143	1311.5	2569.2	1322.8	2757.0	1434.2	3.2174	5.7373	2.5199
297	8.2308	0.00139231	0.022763	1316.8	2567.8	1328.3	2755.2	1426.9	3.2268	5.7295	2.5027
298	8.3485	0.00139623	0.022390	1322.1	2566.5	1333.8	2753.4	1419.5	3.2362	5.7217	2.4854
299	8.4676	0.00140020	0.022022	1327.5	2565.0	1339.4	2751.5	1412.1	3.2457	5.7138	2.4681
300	8.5879	0.00140423	0.021660	1332.9	2563.6	1345.0	2749.6	1404.6	3.2552	5.7059	2.4507
301	8.7095	0.00140831	0.021304	1338.3	2562.2	1350.6	2747.7	1397.1	3.2647	5.6979	2.4333
302	8.8325	0.00141245	0.020953	1343.8	2560.6	1356.3	2745.7	1389.4	3.2742	5.6899	2.4158
303	8.9568	0.00141665	0.020608	1349.2	2559.1	1361.9	2743.7	1381.7	3.2837	5.6819	2.3982
304	9.0824	0.00142091	0.020268	1354.7	2557.5	1367.6	2741.6	1374.0	3.2932	5.6738	2.3806
305	9.2094	0.00142524	0.019933	1360.2	2555.8	1373.3	2739.4	1366.1	3.3028	5.6657	2.3629
306	9.3378	0.00142963	0.019604	1365.7	2554.1	1379.0	2737.2	1358.2	3.3124	5.6575	2.3452
307	9.4675	0.00143408	0.019279	1371.2	2552.5	1384.8	2735.0	1350.2	3.3220	5.6493	2.3273
308	9.5986	0.00143861	0.018960	1376.8	2550.7	1390.6	2732.7	1342.1	3.3316	5.6411	2.3094
309	9.7311	0.00144320	0.018645	1382.4	2549.0	1396.4	2730.4	1334.0	3.3413	5.6327	2.2915
310	9.8651	0.00144787	0.018335	1387.9	2547.0	1402.2	2727.9	1325.7	3.3510	5.6244	2.2734
311	10.000	0.00145261	0.018029	1393.6	2545.2	1408.1	2725.5	1317.4	3.3607	5.6159	2.2553
312	10.137	0.00145743	0.017728	1399.2	2543.3	1414.0	2723.0	1309.0	3.3704	5.6074	2.2370
313	10.275	0.00146232	0.017431	1404.9	2541.3	1419.9	2720.4	1300.5	3.3802	5.5989	2.2187
314	10.415	0.00146730	0.017139	1410.5	2539.3	1425.8	2717.8	1291.9	3.3900	5.5903	2.2003
315	10.556	0.00147236	0.016851	1416.3	2537.2	1431.8	2715.1	1283.2	3.3998	5.5816	2.1818
316	10.699	0.00147751	0.016567	1422.0	2535.0	1437.8	2712.3	1274.5	3.4097	5.5729	2.1632
317	10.843	0.00148275	0.016287	1427.8	2532.9	1443.9	2709.5	1265.6	3.4195	5.5641	2.1445
318	10.989	0.00148809	0.016011	1433.6	2530.7	1450.0	2706.6	1256.6	3.4293	5.5552	2.1257
319	11.136	0.00149351	0.015739	1439.5	2528.3	1456.1	2703.6	1247.5	3.4394	5.5462	2.1068
320	11.284	0.00149904	0.015471	1445.3	2526.0	1462.2	2700.6	1238.4	3.4494	5.5372	2.0878

Figure 5-3 (Nelson, 1958)



LAPORAN PRAKTIK KERJA LAPANG
PUSAT PENGEMBANGAN SUMBER
DAYA MANUSIA MINYAK DAN GAS
BUMI CEPU

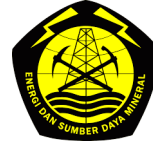


LAMPIRAN KEGIATAN

Unit Kilang PPSDM Migas Cepu



LAPORAN PRAKTIK KERJA LAPANG
PUSAT PENGEMBANGAN SUMBER
DAYA MANUSIA MINYAK DAN GAS
BUMI CEPU



Bahan Baku dan Produk Kilang PPSDM Migas Cepu



Proses Maintenance Heat exchanger



LAPORAN PRAKTIK KERJA LAPANG
PUSAT PENGEMBANGAN SUMBER
DAYA MANUSIA MINYAK DAN GAS
BUMI CEPU



Alat Centrifuge untuk Uji BS&W (Base Sediment & Water) Crude Oil

