

BAB XI

KESIMPULAN

11. 1. KESIMPULAN

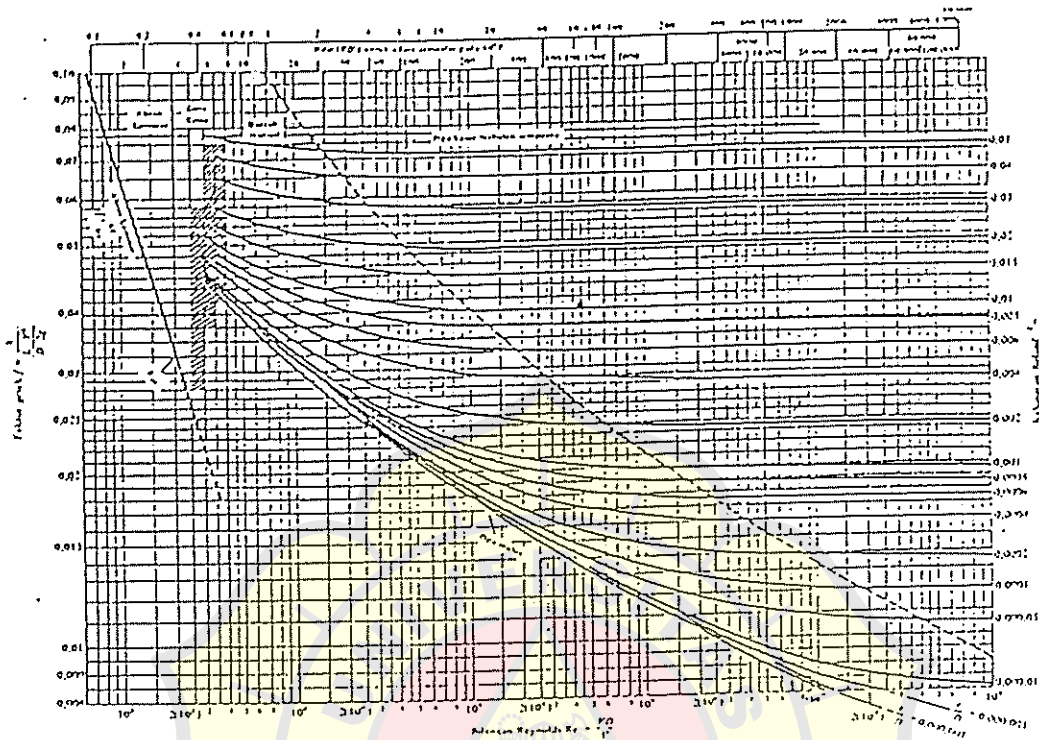
Dari perencanaan dan perhitungan berdasarkan data kapal berikut :

- Type kapal : TANKER
- Lwl : 63,648 m
- Lpp : 62,4 m
- B : 13,8 m
- T : 4 m
- H : 5,5 m
- Cb : 0,599
- Cw : 0,719
- Cp : 0,613
- Cm : 0,977
- Vs : 13 knots (6,6872 m/ dtk)

Maka dapat disimpulkan :

1. Kapal memerlukan tenaga penggerak minimum 1.930,925 HP (1.440,084 kW). Pada perencanaan ini dipilih motor induk dengan daya sebesar 2.180 HP (1.600 kW) pada putaran 250 rpm.
2. Dengan jumlah crew 27 orang dan route pelayaran yang ditempuh lebih kurang 8.589 mil (15.924,006 km), kapasitas maksimum kebutuhan listrik untuk mensuplai peralatan yang ada sebesar 65,976 kW. Dalam perencanaan ini digunakan 3 unit generator yang sama besar dimana 1 unit generator tadi dipakai sebagai generator cadangan ataupun standby generator. Untuk itu dipilih generator dengan kapasitas masing-masing sebesar 35 kW.

LAMPIRAN 1



Gambar 6.13 Dagan Moody untuk gesekan pipa berdinding halus/kasar.

SIFAT-SIFAT ZAT CAIR YANG LAZIM PADA 1 atm DAN 20°C (68°F)

Zat cair	ρ , kg/m ³	μ , (N·s)/m ²	γ , N/m ³ †	ρ_v , N/m ³	Modulus limbak, N/m ²
Amonia	608	2.20 E-4	2.13 E-2	9.10 E+5	
Bensin	881	6.51 E-4	2.88 E-2	1.61 E+4	1.05 E+9
Karbon tetraklorida	1,590	9.67 E-4	2.70 E-2	1.20 E+4	9.65 E+8
Etanol	789	1.20 E-3	2.28 E-2	5.7 E+3	8.96 E+8
Gasolin	680	2.92 E-4	2.16 E-2	5.51 E+4	9.58 E+8
Gliserin	1,260	1.49	6.33 E-2	1.4 E-2	4.34 E+9
Minyak tanah	804	1.92 E-3	2.8 E-2	3.11 E+3	1.43 E+9
Air-raksa	13,550	1.56 E-3	4.84 E-1	1.1 E-3	2.55 E+10
Metanol	791	5.98 E-4	2.25 E-2	1.34 E+4	8.27 E+8
Pelumas SAE 10	917	1.04 E-1	3.6 E-2		1.31 E+9
Pelumas SAE 30	917	2.90 E-1	3.5 E-2		1.38 E+9
Air	998	1.00 E-3	7.28 E-2	2.34 E+3	2.19 E+9
Air laut	1,025	1.07 E-3	7.28 E-2	2.34 E+3	2.28 E+9

† Bersentuhan dengan udara.

LAMPIRAN 2

KEKENTALAN DAN KEKENTALAN KINEMATIK DELAPAN FLUIDA PADA 1 ATM DAN 20°C

Fluida	μ kg/(m·s)	Nisbah $\mu/(H_2)$	ρ kg/m ³	ν m ² /s	Nisbah $\nu/(H_2)$
Hidrogen	8,8 E-6	1,0	0,084	1,05 E-4	920
Udara	1,8 E-5	2,1	1,20	1,51 E-5	130
Bensin	2,9 E-4	33	680	4,22 E-7	3,7
Air	1,0 E-3	114	998	1,01 E-6	8,7
Ethanol	1,2 E-3	135	789	1,52 E-6	13
Air-raksa	1,5 E-3	170	13.580	1,16 E-7	1,0
Minyak pelumas SAE	0,29	33.000	891	3,25 E-4	2.850
Gliserin	1,5	170.000	1.264	1,18 E-3	10.300

† 1 kg/(m·s) = 0,0209 slug/(ft·s); 1 m²/s = 10,76 ft²/s.

CONTOH GRAVITASI JENIS BEBERAPA ZAT CAIR PADA 20°C (68°F)

Zat Cair	Gravitasi Jenis
Bensin	0,66 - 0,69
Alkohol denaturasi	0,80
Minyak tanah	0,80 - 0,84
Minyak mentah	0,80 - 0,92
Minyak kastor	0,97
Air laut	1,025
Karbon tetraklorida	1,594
Asetilena tetrabromida	2,962
Air raksa (Hg)	13,546

BERAT JENIS BEBERAPA FLUIDA YANG LAZIM

Fluida	Berat jenis ρ pada 68°F - 20°C	
	lb/ft ³	N/m ³
Udara (pada 1 atm)	0,0752	11,8
Etanol	49,2	7.733
Minyak pelumas SAE 30	57,3	8.996
Air	62,4	9.790
Air laut	64,0	10.050
Gliserin	78,7	12.360
Karbon tetraklorida	99,1	15.570
Air-raksa	846	133.100

LAMPIRAN 3

Pumps

Hose diameter d_H , mm	Hose length l_H , m	Nozzle orifice diameter d_n , mm				Hose diameter d_H , mm	Hose length l_H , m	Nozzle orifice diameter d_n , mm			
		10	13	16	19			10	13	16	19
		Characteristic B						Characteristic B			
50	0	0.121	0.346	0.793	1.577	65	0	0.121	0.346	0.793	1.577
	10	0.119	0.331	0.722	1.320		10	0.1205	0.342	0.776	1.51
	20	0.118	0.318	0.622	1.130		20	0.120	0.339	0.758	1.44
	40	0.114	0.304	0.568	0.882		40	0.1195	0.332	0.726	1.33
	60	0.111	0.274	0.498	0.723		60	0.1185	0.326	0.696	1.23
	80	0.108	0.257	0.442	0.612		80	0.118	0.320	0.669	1.15
	100	0.105	0.241	0.398	0.531		100	0.117	0.314	0.644	1.08

Tank capacity, tons	Inside diameter of pipe and fittings, mm	Tank capacity, tons	Inside diameter of pipe and fittings, mm
Up to 20	60	265 to 360	125
20 to 40	70	360 to 460	140
40 to 75	80	460 to 620	150
75 to 120	90	620 to 800	160
120 to 190	100	800 to 1000	175
190 to 265	110	1000 to 1300	200

Inside diameter of the drainage main, mm	Capacity of each drainage pump, cu m per h	Inside diameter of the drainage main, mm	Capacity of each drainage pump, cu m per h
50	15	133	103
57	19	140	113
64	23	146	124
70	28	152	135
76	34	158	146
82	40	165	158
89	46	171	171
95	53	178	183
103	60	184	197
108	68	190	210
114	76	197	224
120	84	205	240
127	93		

LAMPIRAN 4

Jangkai, jumlah dan tall

No. Urut Reg	Angka Persegi	Jangkai (mm)			Rantai (mm)				Kawat atau rantai besi	Kapasitas (kg)	Tall (mm)		Lubang (mm)		
		Jangkai	Berat setu	Jangkai	Rantai						Panjang	Bahan	Jumlah	Jarak	Bahan
					1	2	3	4							
101	50	2	120	40	165	12,5			00	6.000	180	10.000	2	160	3.500
102	54 - 78	2	180	60	220	14	12,5		05	6.000	180	10.000	2	100	3.500
103	78 - 98	2	240	80	220	16	14		05	7.500	180	10.000	2	160	3.750
104	98 - 118	2	300	100	247,5	17,5	16		00	8.300	180	10.000	2	110	4.000
105	118 - 138	2	360	120	247,5	18	17,5		00	9.100	180	10.000	2	110	4.500
106	138 - 158	2	420	140	275	20,5	17,5		00	10.000	180	10.000	2	120	5.000
107	158 - 175	2	480	165	275	22	18		00	11.000	180	10.000	2	120	5.500
108	175 - 205	2	570	190	302,5	24	20,5		00	12.000	180	11.000	2	120	6.000
109	205 - 240	2	660		302,5	26	22				180	12.200	2	120	6.600
110	240 - 280	2	780		330	28	24				180	13.300	2	120	7.250
111	280 - 320	2	900		357,5	30	26				180	17.700	2	110	8.000
112	320 - 360	2	1.020		357,5	32	28				180	21.100	2	110	8.750
113	360 - 400	2	1.140		385	34	30				180	22.800	2	110	9.500
114	400 - 450	2	1.290		385	36	32				180	25.500	2	110	10.250
115	450 - 500	2	1.440		412,5	38	34				180	28.200	2	110	11.000
116	500 - 550	2	1.590		412,5	40	34				180	31.200	2	160	11.500
117	550 - 600	2	1.740		440	42	36				180	34.500	2	160	12.000
118	600 - 660	2	1.920		440	44	38				180	37.800	2	160	12.500
119	660 - 720	2	2.160		440	46	40				180	41.400	2	160	13.000
120	720 - 780	2	2.250		467,5	48	42				180	45.000	2	170	13.500
121	780 - 840	2	2.460		467,5	50	44				180	48.900	2	170	14.000
122	840 - 910	2	2.640		467,5	52	46	40			180	52.800	2	170	14.500
123	910 - 980	2	2.850		495	54	48	42			180	57.000	2	170	15.000
124	980 - 1.060	2	3.060		495	56	50	44			200	61.500	2	180	16.000
125	1.060 - 1.140	2	3.300		495	58	50	46			200	66.000	2	180	17.000
126	1.140 - 1.220	2	3.540		522,5	60	52	48			200	70.500	2	180	18.000
127	1.220 - 1.300	2	3.780		522,5	62	54	48			200	75.300	2	180	19.000
128	1.300 - 1.390	2	4.050		522,5	64	56	50			200	80.400	2	180	20.000
129	1.390 - 1.480	2	4.320		550	66	58	50			200	85.700	2	180	21.000
130	1.480 - 1.570	2	4.590		550	68	60	52			220	90.000	2	190	22.000
131	1.570 - 1.670	2	4.890		550	70	62	54			220	96.000	2	190	23.000
132	1.670 - 1.780	2	5.250		577,5	72	64	56			220	104.000	2	190	24.000
133	1.780 - 1.900	2	5.610		577,5	76	66	58			220	113.100	2	190	25.000
134	1.900 - 2.040	2	6.000		577,5	78	68	60			220	119.100	2	190	26.000
135	2.040 - 2.200	2	6.450		605	81	70	62			240	128.400	2	200	27.000
136	2.200 - 2.380	2	6.900		605	84	72	64			240	138.300	2	200	28.000
137	2.380 - 2.580	2	7.350		605	87	76	66			240	148.200	2	200	29.000
138	2.580 - 2.790	2	7.800		632,5	90	78	68			260	159.000	2	200	30.000
139	2.790 - 2.970	2	8.300		632,5	92	81	70			260	169.000	2	200	31.000
140	2.970 - 3.040	2	8.700		632,5	95	84	72			260	179.000	2	260	32.000
141	3.040 - 3.210	2	9.200		660	97	84	70			280	190.000	2	260	33.000
142	3.210 - 3.400	2	9.800		660	100	87	78			280	199.000	2	260	34.000
143	3.400 - 3.600	2	10.500		660	107	90	78			280	210.000	2	260	35.000
144	3.600 - 3.800	2	11.100		687,5	105	92	81			300	220.000	2	260	36.000
145	3.800 - 4.000	2	11.700		687,5	107	95	84			300	230.000	2	260	37.000
146	4.000 - 4.200	2	12.300		687,5	111	97	87			300	240.000	2	260	38.000
147	4.200 - 4.400	2	12.900		715	114	100	87			300	250.000	2	260	39.000
148	4.400 - 4.600	2	13.500		715	117	102	90			300	260.000	2	260	40.000
149	4.600 - 4.800	2	14.100		715	120	105	92			300	270.000	2	260	41.000
150	4.800 - 5.000	2	14.700		742,5	122	107	95			300	280.000	2	260	42.000
151	5.000 - 5.200	2	15.400		742,5	124	111	97			300	290.000	2	260	43.000
152	5.200 - 5.500	2	16.100		742,5	127	114	97			300	300.000	2	260	44.000
153	5.500 - 5.800	2	16.800		742,5	130	114	100			300	310.000	2	260	45.000
154	5.800 - 6.100	2	17.500		742,5	132	117	102			300	320.000	2	260	46.000
155	6.100 - 6.500	2	18.200		742,5	132	120	107			300	330.000	2	260	47.000
156	6.500 - 6.900	2	20.000		770	134	111				300	340.000	2	260	48.000
157	6.900 - 7.400	2	21.500		770	137	114				300	350.000	2	260	49.000
158	7.400 - 7.900	2	23.000		770	137	117				300	360.000	2	260	50.000
159	7.900 - 8.400	2	24.500		770	137	122				300	370.000	2	260	51.000
160	8.400 - 8.900	2	26.000		770	142	127				300	380.000	2	260	52.000
161	8.900 - 9.400	2	27.500		770	147	132				300	390.000	2	260	53.000
162	9.400 - 9.900	2	29.000		770	152	132				300	400.000	2	260	54.000

LAMPIRAN 5

Moorling and Warpling Ropes

Characteristic	Towing rope			Warpling hawsers									
	Length, m	Circumference of hemp rope, mm	Diameter of steel rope, mm	Total length, m	Number of ropes	Circumference of hemp rope, mm	Diameter of steel rope, mm	Cable wires					
								Total length, m	Number of wires	Circumference of hemp rope, mm	Diameter of steel rope, mm		
50	50	75	—	50	1	65	—	—	—	—	—	—	—
75	50	90	11	50	1	65	—	—	—	—	—	—	—
100	75	90	11	75	1	65	8.5	—	—	—	—	—	—
150	75	100	12	75	1	75	9.5	—	—	—	—	—	—
200	100	100	12	100	2	75	9.5	—	—	—	—	—	—
250	100	125	15	140	2	100	12	—	—	—	—	—	—
300	110	125	15	160	2	100	12	—	—	—	—	—	—
350	110	150	17.5	160	2	100	12	—	—	—	—	—	—
400	135	150	17.5	180	2	125	15	60	1	100	12	—	—
450	135	150	17.5	180	2	125	15	80	1	100	12	—	—
500	135	150	17.5	200	2	125	15	85	1	100	12	—	—
550	135	175	19.5	200	2	125	15	85	1	100	12	—	—
600	135	175	19.5	220	2	150	17.5	90	1	100	12	—	—
650	135	175	19.5	240	2	150	17.5	90	1	100	12	—	—
700	150	200	21.5	240	2	150	17.5	90	1	100	12	—	—
750	150	200	21.5	360	4	150	17.5	90	1	125	15	—	—
800	150	200	21.5	360	4	150	17.5	90	1	125	15	—	—
850	175	200	21.5	360	4	150	17.5	90	1	125	15	—	—
900	175	225	24	360	4	175	19.5	120	2	125	15	—	—
950	175	225	24	360	4	175	19.5	120	2	125	15	—	—
1000	175	225	24	360	4	175	19.5	120	2	150	17.5	—	—
1100	175	225	24	360	4	175	19.5	140	2	150	17.5	—	—
1200	190	250	26	350	4	175	19.5	140	2	150	17.5	—	—
1300	190	250	26	400	4	200	21.5	150	2	150	17.5	—	—
1400	190	275	28	400	4	200	21.5	150	2	150	17.5	—	—
1500	190	275	28	430	4	200	21.5	150	2	150	17.5	—	—
1600	200	300	30	480	4	200	21.5	180	2	150	17.5	—	—
1700	200	300	30	430	4	200	21.5	180	2	150	17.5	—	—
1850	200	325	32.5	540	4	200	21.5	180	2	175	19.5	—	—
2000	200	350	34.5	540	4	200	21.5	180	2	175	19.5	—	—
2150	200	350	34.5	540	4	200	21.5	180	2	175	19.5	—	—
2300	220	350	34.5	540	4	225	24	180	2	175	19.5	—	—
2500	220	350	34.5	640	4	225	24	200	2	175	19.5	—	—
2700	220	350	34.5	640	4	225	24	200	2	200	21.5	—	—
3000	220	350	34.5	640	4	225	24	200	2	200	21.5	—	—
3300	240	375	39	640	4	250	26	200	2	200	21.5	—	—
3600	240	375	39	640	4	250	26	200	2	200	21.5	—	—
3900	240	400	43.5	640	4	250	26	200	2	200	21.5	—	—
4200	240	400	43.5	640	4	250	26	200	2	225	24	—	—
4500	240	425	48.5	720	4	250	26	200	2	225	24	—	—
4800	240	425	48.5	720	4	250	26	200	2	225	24	—	—
5100	240	—	53	720	4	275	28	240	2	225	24	—	—
5400	240	—	53	800	4	275	28	240	2	250	26	—	—
5800	240	—	53	880	4	275	28	240	2	250	26	—	—
6200	240	—	57	960	6	300	30	240	2	250	26	—	—
6600	240	—	57	960	6	300	30	240	2	250	26	—	—
7000	240	—	57	960	6	300	30	240	2	250	26	—	—
7400	240	—	57	960	6	300	30	480	4	250	26	—	—
7800	240	—	57	960	6	300	30	480	4	250	26	—	—
8200	240	—	61.5	960	6	300	30	480	4	250	26	—	—
8600	240	—	61.5	960	6	325	32	480	4	250	26	—	—
9000	240	—	61.5	960	6	325	32	480	4	250	26	—	—
9600	240	—	61.5	960	6	325	32	480	4	250	26	—	—

LAMPIRAN 6

Self-Propelled Transport Ships with an Unlimited Region of Navigation

No.	Charac- teris- tic X	Anchors			Chain cable for bow anchors		Chain or steel rope for the stream anchor		
		Bow		Stream Anchor, kg	Total length of two ca- bles, m	Anchor chain size, mm	Length, m	Anchor chain size, mm	Diameter of steel rope, mm
		Quan- tity	Total weight, kg						
1	50	2	150	25	100	12	50	—	8.8
2	75	2	200	25	125	13	50	—	8.8
3	100	2	250	50	125	15	50	—	11
4	150	2	300	50	150	16	50	—	11
5	200	2	350	50	175	17	75	—	11
6	250	2	450	75	200	18	75	11	13
7	300	2	500	75	225	19	75	13	13
8	350	2	600	100	250	20	75	14	15.5
9	400	2	700	100	275	21	75	14	15.5
10	450	2	750	125	300	22	100	15	17.5
11	500	2	800	150	300	24	100	16	17.5
12	550	2	900	175	325	25	100	16	17.5
13	600	3	1500	200	350	27	100	17	17.5
14	650	3	1700	225	350	28	100	18	19.5
15	700	3	1800	250	375	29	100	18	20.5
16	750	3	2100	250	375	30	100	19	20.5
17	800	3	2250	250	375	31	125	19	20.5
18	850	3	2400	275	375	32	125	20	22
19	900	3	2700	300	375	33	125	21	24
20	950	3	3000	300	400	34	125	21	24
21	1000	3	3200	350	400	35	125	22	24
22	1100	3	3500	400	400	37	125	23	26
23	1200	3	3750	400	420	38	150	25	26
24	1300	3	4100	450	450	40	150	25	28
25	1400	3	4250	450	450	41	150	25	28
26	1500	3	4500	500	450	42	150	26	28
27	1600	3	4750	500	450	43	150	26	28
28	1700	3	5250	600	450	45	150	28	30
29	1850	3	5500	600	450	46	150	28	30
30	2000	3	5750	700	450	46	150	29	31.5
31	2150	3	6000	700	475	48	175	29	31.5
32	2300	3	6500	800	500	49	175	29	32.5
33	2500	3	6750	800	500	50	175	29	32.5
34	2700	3	7500	900	500	52	175	30	33.5
35	3000	3	8250	1000	500	53	200	31	33.5
36	3300	3	9000	1000	500	55	200	31	33.5
37	3600	3	9750	1250	525	57	200	33	34.5
38	3900	3	10500	1250	550	59	225	33	34.5
39	4200	3	11000	1400	550	61	225	34	37
40	4500	3	11500	1500	550	62	225	35	37
41	4800	3	12900	1650	550	65	225	36	—
42	5100	3	13500	1750	550	67	250	37	—
43	5400	3	14500	1750	575	68	250	37	—
44	5800	3	15000	2000	600	70	250	40	—
45	6200	3	15800	2000	600	72	250	40	—
46	6600	3	16300	2250	600	74	275	43	—
47	7000	3	17600	2250	600	76	275	43	—
48	7400	3	18000	2250	600	77	275	44	—
49	7800	3	19500	2500	600	80	275	46	—
50	8200	3	20300	2700	600	82	275	48	—
51	8600	3	21000	2800	600	83	275	49	—
52	9000	3	22000	3000	600	85	275	50	—
53	9500	3	23000	3000	600	87	275	50	—

" STANDAR UKURAN SEKCCI OLEH BOT (BOARD CF TRADE) ENGLAND "

D. B. H (m)	L. B. H (ft ³)	A. Kapasitas (ft ³)	Jumlah orang	berat- koci (kg)	Berat O- rang (kg)	berat- perlangs- kapam(kg)	Total Be- rat (kg).
3,4 x 2,74 x 1,11	30 x 3 x 3,75	607	60	2205	4500	356	7061
3,84 x 2,74 x 1,10	29 x 3,75 x 3,60	545	54	1976	4050	356	5382
3,53 x 2,59 x 1,07	28 x 3,50 x 3,50	500	50	1824	3750	330	5694
3,23 x 2,51 x 1,04	27 x 3,25 x 3,40	454	45	1646	3376	330	5351
2,92 x 2,44 x 0,99	26 x 3,00 x 3,25	405	40	473	3000	305	4778
2,62 x 2,36 x 0,96	25 x 2,75 x 3,15	366	36	1326	2700	305	4331
2,31 x 2,29 x 0,91	24 x 2,50 x 3,0	324	32	1160	2400	254	3843
2,01 x 2,29 x 0,88	23 x 2,50 x 2,90	300	30	1067	2250	254	3591
1,71 x 2,21 x 0,84	22 x 2,25 x 2,75	256	26	955	1950	229	3134
1,40 x 2,13 x 0,82	21 x 2,0 x 2,70	238	23	864	1725	229	2818
1,10 x 2,06 x 0,79	20 x 1,75 x 2,60	210	21	762	1575	203	2540
0,79 x 1,98 x 0,75	19 x 1,50 x 2,50	182	18	650	1350	178	2178
0,49 x 1,90 x 0,73	18 x 1,25 x 2,40	162	16	590	1200	152	1942
0,18 x 1,83 x 0,715	17 x 1,0 x 2,30	143	14	508	1050	152	1710
0,88 x 1,75 x 0,70	16 x 0,75 x 2,30	127	12	452	900	127	1484

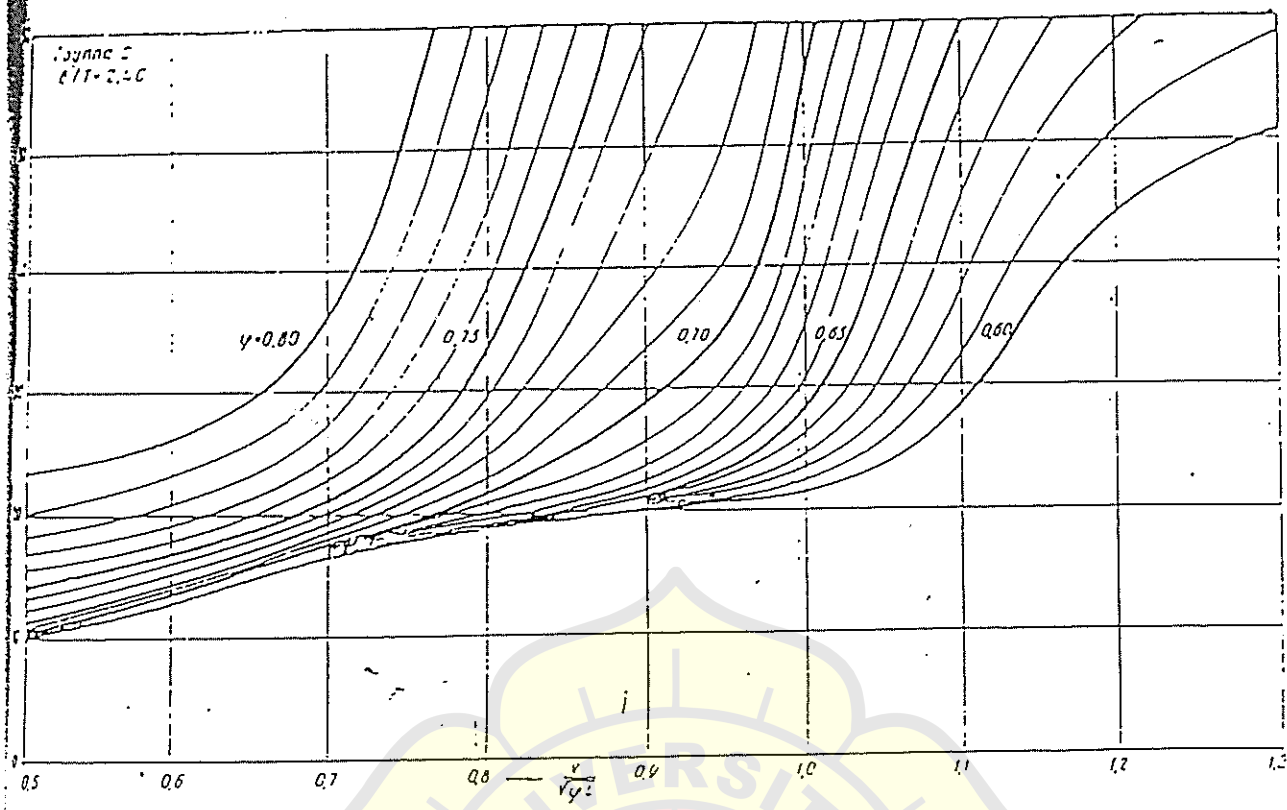


Рис. 6. Диаграмма А. И. Б. Лапа, группа С = 60.3.9
26

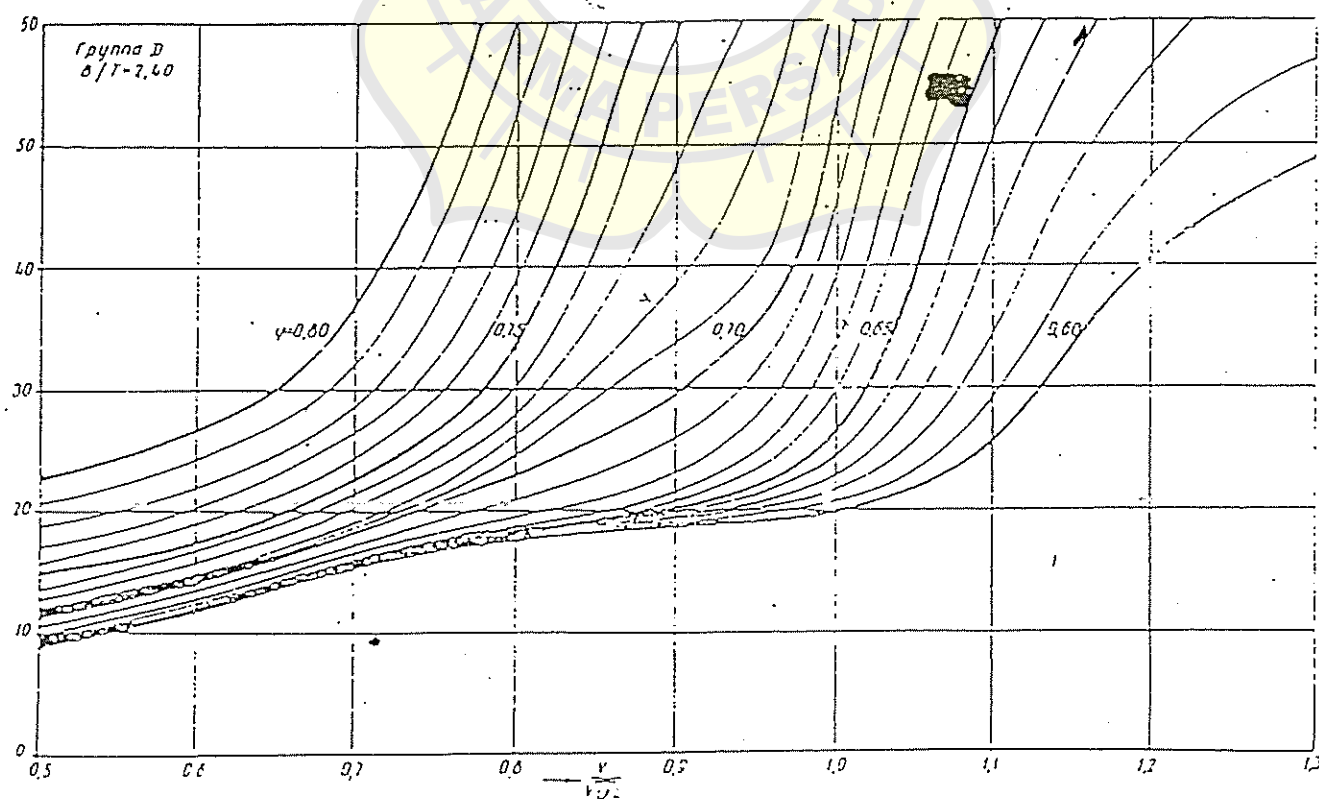
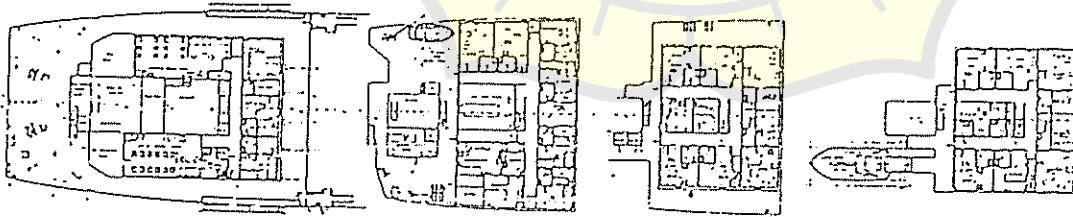
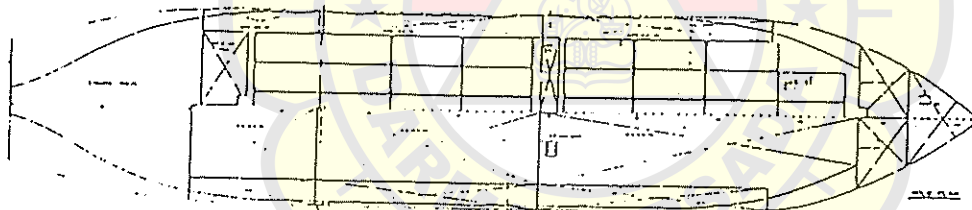
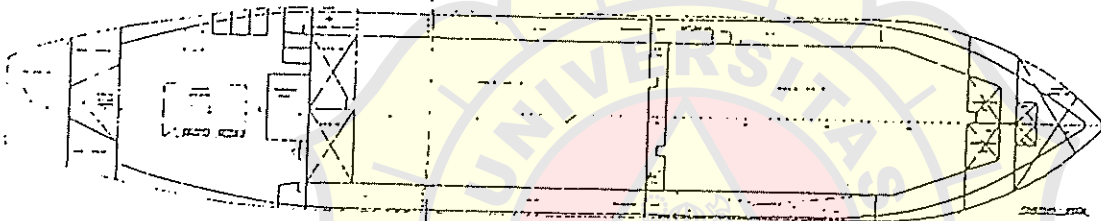
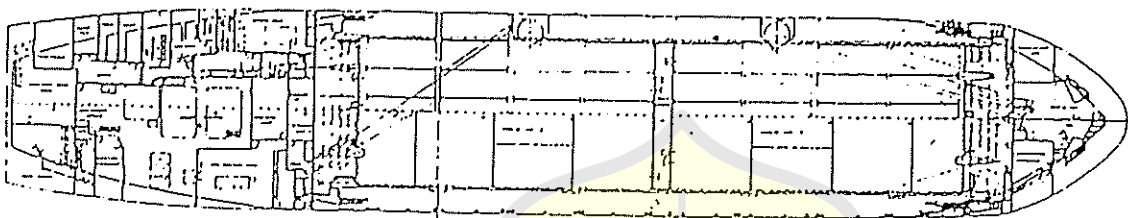
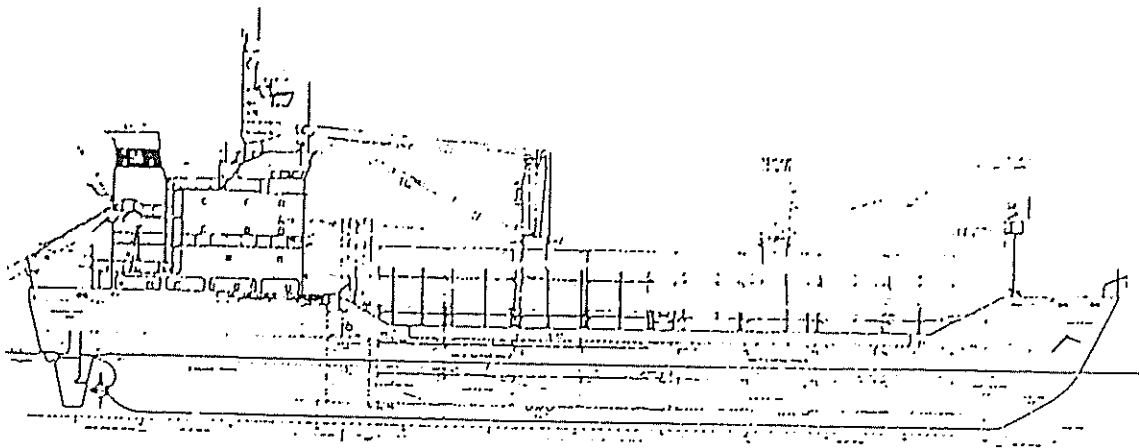
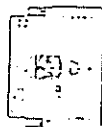


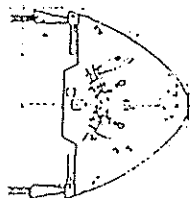
Рис. 7. Диаграммы А. И. В. Лапа, группа D = 60.3.10
22



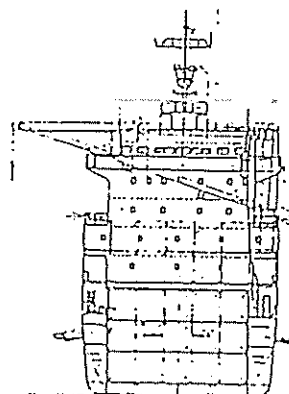
DECK PLAN



DECK PLAN



DECK PLAN



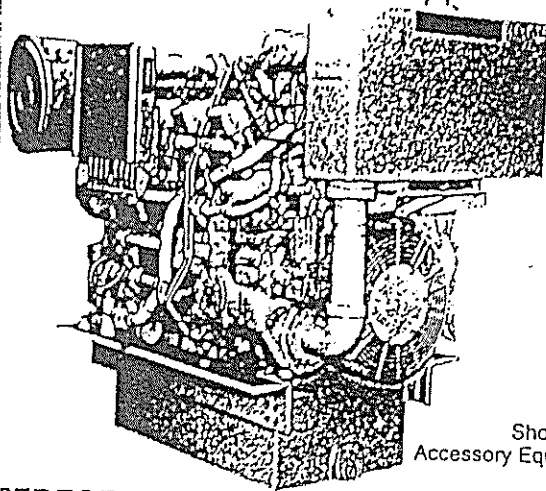
DECK PLAN

CATERPILLAR™

Marine Engine

3508

786-1168 mhp/775-1150 bhp
1600-1800 rpm



Shown with
Accessory Equipment

SPECIFICATIONS

V8, 4-Stroke-Cycle Diesel
 Bore—mm (in)..... 170 (6.7)
 Stroke—mm (in)..... 190 (7.5)
 Displacement—L (cu in)..... 34.5 (2,105)
 Rotation
 (from flywheel end) ccw or cw
 Compression Ratio..... 13.0:1
 Capacity for Liquids — L (U.S. gal)
 Cooling System 285 (75.3)
 Lube Oil System (refill) 223 (58.9)
 Oil Change Interval..... 500 hrs
 Engine Weight, Net Dry (approx) — kg (lb) 5,216 11,500

PERFORMANCE DATA*

Turbocharged-Aftercooled

Rating Level	D			C			B			A			A		
Rated rpm	1800			1800			1800			1800			1800		
Engine Power @ rpm	858 kW (1150 bhp) 1166 mhp			746 kW (1000 bhp) 1014 mhp			716 kW (960 bhp) 973 mhp			638 kW (855 bhp) 867 mhp			578 kW (775 bhp) 786 mhp		

rpm	1800	1600	1200	1800	1600	1200	1800	1600	1200	1800	1600	1200	1800	1600	1200
kW	858	602	254	746	524	221	716	503	212	638	448	189	578	406	171
l/kW-hr	220	220	228	223	221	228	223	222	229	224	222	232	227	225	234
l/hr	225.0	157.7	68.9	198.0	138.2	60.0	190.5	133.0	57.8	170.5	118.6	52.2	156.3	108.7	47.8

hp	1150	808	341	1000	703	296	960	674	284	855	600	253	775	544	230
l/hp-hr	361	361	374	366	362	374	366	364	376	367	364	380	372	369	384
l/hr	59.4	41.7	18.2	52.3	36.5	15.9	50.3	35.1	15.3	45.0	31.3	13.8	41.3	28.7	12.6

Rating Level	C			B			A			A		
Rated rpm	1600			1600			1600			1600		
Engine Power @ rpm	701 kW (940 bhp) 953 mhp			675 kW (905 bhp) 917 mhp			638 kW (855 bhp) 867 mhp			578 kW (775 hp) 786 mhp		

rpm	1600	1400	1200	1600	1400	1200	1600	1400	1200	1600	1400	1200
kW	701	470	296	675	452	285	638	427	269	578	387	244
l/kW-hr	215	221	225	216	221	225	216	222	225	220	218	226
l/hr	180.0	123.8	79.2	173.7	119.3	76.4	164.5	113.0	72.2	151.8	100.7	65.8

hp	940	630	397	905	606	382	855	573	361	775	519	327
l/hp-hr	353	362	369	354	362	369	354	364	369	361	358	371
l/hr	47.6	32.7	20.9	45.9	31.5	20.2	43.5	29.8	19.1	40.1	26.6	17.4

* Represents performance along a typical fixed pitch propeller curve.

RATING LEVEL DEFINITIONS

D — For use in patrol, customs, police and some fire boats.

C — For use in yachts with displacement hulls, as well as ferries with speeds less than one hour, fish boats with higher speed journey out and back (e.g., some lobster, crayfish, and tuna), and short trip coastal freighters.

B — For use in midwater trawlers, purse seiners, crew and supply boats, ferry boats with trips longer than one hour, and towboats in rivers where locks, sandbars, curves, or traffic dictate frequent slowing.

A — For use with little load cycling in oceangoing displacement hulls such as freighters, tugboats, and bottom-drag trawlers, and deep river towboats.

TRDCK - MARINE ENGINE PERFORMANCE DATA

SALES MODEL	COMB SYS	ASP SYS TYPE	AFTERCOOLER		EXH MFLD TYPE	COMP RATIO	GOV TYPE	APPLICATION TYPE	RATING TYPE	ENGINE FLYWHEEL		EFFECTIVE SERIAL NUMBER	PERF DATA REF NO.
			TYPE	WATER TEMP						POWER HP	SPEED RPH		
3412C	DI	TA	JWAC	F	W/C	14.2:1		H PROP ENG	E-HIGH PERF	1250	932.0	2300 3JK	DM0645-00
3412C	DI	TA	JWAC	F	W/C	14.5:1		H PROP ENG	A-CONT	624	465.0	1800 60M05355	TH0008-04
3412C	DI	TA	JWAC	F	W/C	14.5:1		H PROP ENG	B-MED DUTY	671	500.0	1800 60M05355	TH1675-04
3508	DI	TA	JWAC	180F	ASWC	13.0:1		H PROP ENG	A-CONT	600	447.5	1200 69Z00501	TH0036-05
3508	DI	TA	JWAC	180F	ASWC	13.0:1		H PROP ENG	A-CONT	705	526.0	1200 69Z00498	TH0027-04
3508	DI	TA	JWAC	180F	ASWC	13.0:1		H PROP ENG	A-CONT ✓	775	578.0	1600 96Y01050	TH0010-03
3508	DI	TA	JWAC	180F	ASWC	13.0:1		H PROP ENG	A-CONT	775	578.0	1800 96Y01128	TH0020-05
3508	DI	TA	JWAC	130F	ASWC	13.0:1		H PROP ENG	A-CONT	855	637.5	1600 96Y01088	TH0017-05
3508	DI	TA	JWAC	180F	ASWC	13.0:1		H PROP ENG	A-CONT	855	637.5	1800 96Y01139	TH0021-05
3508	DI	TA	JWAC	180F	ASWC	13.0:1		H PROP ENG	B-MED DUTY	805	600.0	1300 69Z00615	TH0028-05
3508	DI	TA	JWAC	130F	ASWC	13.0:1		H PROP ENG	B-MED DUTY	905	675.0	1600 96Y01050	TH0018-04
3508	DI	TA	JWAC	180F	ASWC	13.0:1		H PROP ENG	B-MED DUTY	960	716.0	1800 96Y01050	TH0022-05
3508	DI	TA	JWAC	180F	ASWC	13.0:1		H PROP ENG	C-INTER	820	611.5	1300 69Z00518	TH0034-05
3508	DI	TA	JWAC	180F	ASWC	13.0:1		H PROP ENG	C-INTER	850	634.0	1800 96Y01141	TH0048-05
3508	DI	TA	JWAC	180F	ASWC	13.0:1		H PROP ENG	C-INTER	940	701.0	1600 96Y01050	TH0019-06
3508	DI	TA	JWAC	180F	ASWC	13.0:1		H PROP ENG	C-INTER	1000	746.0	1800 96Y01050	TH0023-05
3508	DI	TA	JWAC	180F	ASWC	13.0:1		H PROP ENG	D-PATROL CF	1150	857.5	1800 96Y01139	TH8297-05
3512	DI	TA	JWAC	180F	ASWC	13.0:1		H PROP ENG	A-CONT	900	671.0	1200 66Z00615	TH0037-05
3512	DI	TA	JWAC	180F	ASWC	13.0:1		H PROP ENG	A-CONT	1060	790.5	1200 66Z00383	TH0038-05

FEB 95 6202

MARINE ENGINE PERFORMANCE DATA

TH0010-06 3508 DI TA JWAC M PROP ENG

775 HP (578.0 KW) @ 1500 RPM A-CONT

ASAC MFLD

G9V

EFF SERIAL NO. 96Y01050

ENG PERF DATA CURVE I - ZONE I

ENGINE SPEED	RPM	1500	1500	1400	1300	1200	1100	1000	900	800
ENGINE POWER	HP KW	775 578.0	735 548.3	694 517.3	651 485.7	578 430.9	465 346.9	376 280.7	302 225.1	247 184.3
ENGINE TORQUE	FT-LB N.M	2545 3450	2575 3491	2603 3529	2632 3568	2529 3429	2221 3011	1977 2681	1762 2389	1623 2200
ENGINE BKEP	PSI KPA	182 1256	184 1271	186 1285	188 1299	181 1249	159 1097	142 976	126 870	116 801
SPECIFIC FUEL CONSUMPTIO	LB/HP-HR G/KW-HR	.358 218	.355 216	.363 221	.372 226	.370 225	.373 227	.386 235	.404 246	.424 258
FUEL RATE	GAL/HR LPH	39.7 150.1	37.4 141.4	36.0 136.1	34.6 130.8	30.6 115.7	24.8 93.9	20.8 78.6	17.5 66.1	15.0 56.8
INTAKE MANIFOLD TEMP	DEG F DEG C	184.5 84.7	182.5 83.6	181.6 83.1	180.5 82.5	178.2 81.2	176.7 80.4	175.6 79.8	174.9 79.4	174.7 79.3
INTAKE MANIFOLD PRESSURE	IN-HG KPA	40.2 135.6	36.2 122.3	33.0 111.5	29.8 100.8	24.7 83.4	18.0 60.9	13.2 44.7	9.4 31.6	6.7 22.5
INTAKE AIR FLOW	CFM M3/MIN	1755 50	1600 45	1451 41	1307 37	1116 32	929 26	791 22	675 19	579 16
EXHAUST MANIFOLD TEMP	DEG F DEG C	1023 550.7	1047 563.8	1075 579.4	1107 597.3	1131 610.4	1126 608.0	1119 604.0	1108 598.0	1099 592.7
EXHAUST MANIFOLD STACK TEMPERATURE	DEG F DEG C	725 385	757 403	788 420	818 437	841 450	846 452	859 459	897 480	941 505
EXHAUST GAS FLOW	CFM M3/MIN	3888 110	3644 103	3401 96	3143 89	2733 77	2264 64	1963 56	1720 49	1526 43

MARINE ENGINE PERFORMANCE DATA

FEB 95 6202

TH0010-06 3508 DI TA JHAC H PROP ENG : 775 HP (578.0 KW) @ 1600 RPM A-CONT ASWC MFLD GOV

EFF SERIAL NO. 96Y01050

PROPELLER DEMAND DATA FOR CURVE P										
ENGINE SPEED	RPM	1600	1500	1400	1300	1200	1100	1000	900	800
ENGINE POWER	HP KW	775 578.0	639 476.3	519 387.2	416 310.0	327 243.8	252 187.8	189 141.1	138 102.9	97 72.3
ENGINE TORQUE	FT-LB N.M	2545 3450	2236 3032	1948 2641	1679 2277	1431 1940	1203 1631	994 1348	805 1092	636 862
ENGINE BHEP	PSI KPA	182 1256	160 1104	140 962	120 829	103 707	86 594	71 491	58 398	46 314
SPECIFIC FUEL CONSUMPTIO	LB/HP-HR G/KW-HR	.358 218	.358 218	.365 222	.368 224	.373 227	.390 237	.416 253	.441 268	.464 282
FUEL RATE	GAL/HR LPH	39.7 150.1	32.7 123.6	27.1 102.4	21.8 82.7	17.4 65.8	14.1 53.2	11.2 42.5	8.7 32.9	6.4 24.3
INTAKE MANIFOLD TEMP	DEG F DEG C	184.5 84.7	180.1 82.3	178.0 81.1	176.2 80.1	175.8 79.9	174.9 79.4	174.2 79.0	173.8 78.8	173.3 78.5
INTAKE MANIFOLD PRESSURE	IN-HG KPA	40.2 135.6	29.5 99.7	21.5 72.7	15.0 50.8	10.0 33.7	6.1 20.6	3.2 10.8	1.3 4.5	.3 .9
INTAKE AIR FLOW	CFM M3/MIN	1755 50	1437 41	1169 33	950 27	766 22	682 19	618 18	547 16	463 13
EXHAUST MANIFOLD TEMP	DEG F DEG C	1023 550.7	1009 543.0	993.7 534.3	961.9 516.6	918.5 492.5	850.3 454.6	764.2 406.8	667.4 353.0	560.1 293.4
EXHAUST MANIFOLD STACK TEMPERATURE	DEG F DEG C	725 385	744 396	746 397	724 385	720 382	697 369	654 346	599 315	526 275
EXHAUST GAS FLOW	CFM M3/MIN	3888 110	3235 92	2642 75	2105 60	1692 48	1466 42	1282 36	1077 31	840 24

FEB 95 6202

MARINE ENGINE PERFORMANCE DATA

TM0010-06 3508 DI TA JHAC M PROP ENG

775 HP (578.0 KW) @ 1500 RPM A-CONT

ASHC MFLD

GOV

EFF SERIAL NO. 96Y01050

ENG PERF DATA CURVE I - ZONE I

		1400	1500	1400	1300	1200	1100	1000	900	800
ENGINE SPEED	RPM	1400	1500	1400	1300	1200	1100	1000	900	800
ENGINE POWER	HP KW	775 578.0	735 548.3	694 517.3	651 485.7	578 430.9	465 346.9	376 280.7	302 225.1	247 184.3
ENGINE TORQUE	FT-LB N.M	2545 3450	2575 3491	2603 3529	2632 3568	2529 3429	2221 3011	1977 2681	1762 2389	1623 2200
ENGINE BREP	PSI KPA	182 1256	184 1271	186 1285	188 1299	191 1249	159 1097	142 976	126 870	116 801
SPECIFIC FUEL CONSUMPTIO	LB/HP-HR G/KW-HR	.358 218	.355 216	.363 221	.372 226	.370 225	.373 227	.386 235	.404 246	.424 258
FUEL RATE	GAL/HR LPH	39.7 150.1	37.4 141.4	36.0 136.1	34.6 130.8	30.6 115.7	24.8 93.9	20.8 78.6	17.5 66.1	15.0 56.8
INTAKE MANIFOLD TEMP	DEG F DEG C	184.5 84.7	182.5 83.6	181.6 83.1	180.5 82.5	178.2 81.2	176.7 80.4	175.6 79.8	174.9 79.4	174.7 77.3
INTAKE MANIFOLD PRESSURE	IN-HG KPA	40.2 135.6	36.2 122.3	33.0 111.5	29.8 100.8	24.7 83.4	18.0 60.9	13.2 44.7	9.4 31.6	6.7 22.5
INTAKE AIR FLOW	CFM M3/MIN	1755 50	1600 45	1451 41	1307 37	1116 32	929 26	791 22	675 19	579 16
EXHAUST MANIFOLD TEMP	DEG F DEG C	1023 550.7	1047 563.8	1075 579.4	1107 597.3	1131 610.4	1126 608.0	1119 604.0	1108 598.0	1099 592.7
EXHAUST MANIFOLD STACK TEMPERATURE	DEG F DEG C	725 385	757 403	788 420	818 437	841 450	846 452	855 459	897 480	941 505
EXHAUST GAS FLOW	CFM M3/MIN	3888 110	3644 103	3401 96	3143 89	2733 77	2264 64	1963 56	1720 49	1526 43

FEB 95 6202

MARINE ENGINE PERFORMANCE DATA

TH0010-06 3508 DI TA JWAC H PROP ENG 775 HP (578.0 KW) @ 1600 RPM A-CONT ASHC HFLD GOV

EFF SERIAL NO. 96Y01050

HEAT REJECTION DATA FOR CURVE 4

ENGINE SPEED RPM	1600	1500	1400	1300	1200	1100	1000	900	800
ENGINE POWER HP KW	775 578.0	735 548.3	694 517.3	651 485.7	593 442.5	536 399.7	467 348.2	347 258.5	275 205.4
COOLANT TOT BTU/HN KW	28321 498	25933 456	25705 452	25478 448	22975 404	20701 364	18141 319	13706 241	11203 197
ATMOSPHERE BTU/HN KW	3298 58	3242 57	3128 55	3071 54	2957 52	2843 50	2730 48	2616 46	2559 45
EXHAUST TOT BTU/HN KW	26103 459	24966 439	23828 419	22577 397	20644 363	18995 334	17288 304	14331 252	12739 224
EXH RECOVERY BTU/HN KW	12227 215	12170 214	12000 211	11601 204	10748 189	10123 178	9270 163	8189 144	7450 131
FROM OIL CLR BTU/HN KW	4550 80	4265 75	4095 72	3924 69	3583 63	3242 57	2900 51	2275 40	1934 34
FROM AFTRCLR BTU/HN KW	3469 61	2730 48	2161 38	1649 29	1194 21	910 16	512 9	-114 -2	-284 -5
WORK ENERGY BTU/HN KW	32871 578	31165 548	29402 517	27639 486	25136 442	22748 400	19791 348	14729 259	11658 205
LHV ENERGY BTU/HN KW	85760 1598	80755 1420	77798 1368	74727 1314	67960 1195	61818 1087	54993 967	43164 759	36340 639
HHV ENERGY BTU/HN KW	91333 1606	86044 1513	82859 1457	79618 1400	72395 1273	65855 1156	58576 1030	45951 808	38728 681

MARINE ENGINE PERFORMANCE DATA

FEB 95 3202

TM0010-06 3508 DI TA JWAC M PROP ENG

775 HP (578.0 KH) @ 1600 RPM A-CONT

ASWC HFLD

GOY

EFF SERIAL NO. 96Y01050

SOUND - EXHAUST - DATA FOR CURVE A

	ENG SPD RPM	ENGINE POWER HP KH	OVERALL SOUND DB(A)	OBCF 83HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
DATA @ 1.5M (4.9 FT)	1600	775 578.0	110	100	103	105	102	104	103	104	101
	1500	735 548.3	110	99	103	105	102	103	103	104	101
	1400	694 517.3	110	99	103	105	102	103	103	103	100
	1300	651 485.7	109	97	101	103	100	101	103	104	98
	1200	593 442.5	109	97	101	103	99	100	102	104	97
	1100	536 399.7	108	96	100	102	98	99	101	103	97
	1000	467 348.2	107	91	94	95	94	97	101	103	92
	900	347 258.5	106	90	93	93	93	96	100	102	90
	800	275 205.4	105	89	92	92	92	95	99	101	89
DATA @ 7.0M (22.9 FT)	1600	775 578.0	97	85	92	91	88	91	90	91	86
	1500	735 548.3	97	85	92	90	88	91	90	90	86
	1400	694 517.3	96	84	92	90	88	90	89	90	85
	1300	651 485.7	96	87	89	91	87	89	89	90	83
	1200	593 442.5	95	86	89	90	87	89	89	89	82
	1100	536 399.7	95	86	88	89	86	88	88	88	81
	1000	467 348.2	94	84	85	83	83	86	86	86	79
	900	347 258.5	92	83	83	81	81	85	85	88	77
	800	275 205.4	91	82	82	80	80	84	84	87	76
DATA @ 15 M (49.2 FT)	1600	775 578.0	90	78	86	84	82	84	83	84	79
	1500	735 548.3	90	78	85	84	81	84	83	84	79
	1400	694 517.3	90	78	85	83	81	84	83	83	79
	1300	651 485.7	89	80	83	84	81	83	83	83	76
	1200	593 442.5	89	80	82	83	80	82	82	82	75
	1100	536 399.7	88	79	81	83	79	82	81	82	75
	1000	467 348.2	87	77	78	76	76	80	80	83	72
	900	347 258.5	86	76	77	75	75	78	78	82	71
	800	275 205.4	85	75	75	74	74	77	77	81	70

FEB 95 8202

MARINE ENGINE PERFORMANCE DATA

TM0010-06 3508 DI TA JWAC M PROP ENG

775 HP (578.0 KW) @ 1600 RPM A-CONT

ASHC HFLD

GOV

EFF SERIAL NO. 96Y01050

SOUND - MECHANICAL - DATA FOR CURVE 4

	ENG SPD RPM	ENGINE POWER		OVERALL SOUND DB(A)	OBCF	OBCF	OBCF	OBCF	OBCF	OBCF	OBCF	
		HP	KW		63HZ DB	125HZ DB	250HZ DB	500HZ DB	1000HZ DB	2000HZ DB	4000HZ DB	8000HZ DB
DATA @ 1.0M (3.2 FT)	1600	775	578.0	102	98	99	95	94	97	97	93	87
	1500	735	548.3	101	97	99	95	93	96	96	92	86
	1400	694	517.3	101	96	98	94	93	96	95	91	86
	1300	651	485.7	100	99	96	90	91	94	95	92	84
	1200	593	442.5	100	99	95	90	91	93	95	92	83
	1100	536	399.7	99	98	95	89	90	93	94	91	83
	1000	467	348.2	98	98	94	88	89	92	94	90	82
	800	275	205.4	97	96	93	87	88	91	92	89	81
DATA @ 7.0M (22.9 FT)	1600	775	578.0	90	86	87	83	82	85	85	81	75
	1500	735	548.3	89	85	87	83	81	84	84	80	74
	1400	694	517.3	89	84	86	82	81	84	83	79	74
	1300	651	485.7	88	87	84	78	79	82	83	80	72
	1200	593	442.5	88	87	83	78	79	81	83	80	71
	1100	536	399.7	87	86	83	77	78	81	82	79	71
	1000	467	348.2	86	86	82	76	77	80	82	78	70
	800	275	205.4	85	84	81	75	76	79	80	77	69
DATA @ 15 M (49.2 FT)	1600	775	578.0	84	80	81	77	76	79	79	75	69
	1500	735	548.3	83	79	81	77	75	78	78	74	68
	1400	694	517.3	83	78	80	76	75	78	77	73	68
	1300	651	485.7	82	81	78	72	73	76	77	74	66
	1200	593	442.5	82	81	77	72	73	75	77	74	65
	1100	536	399.7	81	80	77	71	72	75	76	73	65
	1000	467	348.2	80	80	76	70	71	74	76	72	64
	800	275	205.4	79	78	75	69	70	73	74	71	63

MARINE ENGINE PERFORMANCE DATA

FEB 95 6202

TH0010-06 3508 DI TA JWAC M PROP ENG

775 HP (578.0 KW) @ 1600 RPM A-CONT

ASHC MFLD

GOV

EFF SERIAL NO. 96YG1050

IDENTIFICATION REFERENCE AND NOTES

ENGINE ARRANGEMENT	NUMBER	7N-8702	LUBE OIL PRESS @ LOW IDLE SPD	PSI	20
EFFECTIVE SERIAL	NUMBER	96Y01050	LUBE OIL PRESS @ RATED SPEED	KPA	138
PRIMARY ENGINE TEST SPEC (OT)	NUMBER	OT-6901		PSI	65
PERFORMANCE PARM REF., ENGLISH	NUMBER	TE0015		KPA	445
PERFORMANCE DATA REF. METRIC	NUMBER	TH0015	PISTON SPD @ RATED END SPD	FT/MIN	1970.50
AUX COOLANT PUMP PERF REF.	NUMBER	TH0010		M/SEC	10.01
COOLING SYSTEM PERF REF.	NUMBER	153094	MAX OPERATING ALTITUDE	FEET	10171
CERTIFICATION REF.	NUMBER			METRE	3100
COMPRESSION RATIO	NUMBER	13.0	PEEC ELECT CONTROL MODULE REF	NUMBER	
AFTERCOOLER TEMPERATURE	DEG F	180	PEEC PERSONALITY CONT MOD REF	NUMBER	
	DEG C	82	TURBOCHARGER MODEL REF.	NUMBER	TH8106-1.03
CRANKCASE BLOWBY VOLUME	CU FT/H	388.46	FUEL INJECTOR REF.	NUMBER	7E-3382
	M ³ /H	11.0	TIMING STATIC	DEG	
FUEL RATE (RATED RPM) NO LOAD	GAL/HR		TIMING STATIC ADVANCE	DEG	
	L/HR		TIMING STATIC	MM	
			UNIT INJECTOR TIMING	MM	86.40