

BAB V

KESIMPULAN DAN SARAN

5.1.Kesimpulan

Dari hasil perhitungan yang telah dilakukan,pada kapal rancangan yaitu kapal Penumpang 6022 GT Twin Screw dengan dimensi sebagai berikut :

Panjang keseluruhan	(LOA)	: 99.80 m
Panjang antara garis tegak	(LPP)	: 90.50 m
Panjang antara garis air	(LWL)	: 93.30 m
Lebar kapal	(B)	: 18.00 m
Sarat kapal	(T)	: 4.20 m
Kecepatan	(VS)	: 17 Knots
Koefisien Block	δ_{pp}	: 0.67
Gross Tonage	GT	: 6022 Ton
Rute pelayaran		: Indonesia Timur
Klasifikasi		: BKI & GL

- Untuk dapat menentukan besarnya daya motor induk sebagai penggerak utama kapal,maka faktor kecepatan,daerah pelayaran serta dimensi dari kapal rancangan mempunyai pengaruh yang sangat besar.Dari hasil perhitungan di ketahui bahwa untuk mencapai kecepatan 17 knots hambatan total yang dialami kapal adalah sebesar 43052.74 kg, dan daya penggerak yang dibutuhkan adalah sebesar 2 x 5520 HP.
- Pada pemilihan generator set didasarkan pada pembebanan penggunaan daya yang terbesar yaitu pada kapal melakukan manuver sebesar 1113.4 Kw dengan menggunakan 4 buah generator masing-masing 485 Kw.

- Dalam perancangan kamar mesin, tidak terlepas dari adanya asumsi-asumsi yang diberikan untuk mempermudah dalam perhitungan dengan tidak mengabaikan tanggung jawab secara teknis, ekonomi serta peraturan-peraturan yang ada sehingga hasil perhitungan dapat mendekati keadaan yang sebenarnya.
- Tata letak mesin induk, mesin bantu serta permesinan lainnya diatur seefisien mungkin, hal ini untuk mempermudah dalam hal perawatan dan perbaikan peralatan yang ada di kamar mesin.
- Tata letak mesin induk, mesin bantu serta permesinan lainnya sangat berpengaruh pada stabilitas kapal.

5.2. Saran-saran

Setelah melakukan perhitungan-perhitungan diatas dan dari pengalaman selama menyusun tugas perancangan mesin kapal ini, maka penulis menyarankan :

- Agar kiranya pihak fakultas dan universitas dapat melengkapi buku-buku referensi dalam hal perancangan mesin kapal untuk mempermudah mahasiswa menyelesaikan tugasnya dengan baik.
- Dalam menyelesaikan tugas perancangan mesin kapal ini, pengalaman study lapangan sangat membantu. Untuk itu di sarankan untuk lebih banyak mengadakan study lapangan agar tugas perancangan mesin kapal ini dapat diselesaikan dengan baik.

Demikian kesimpulan dan saran-saran yang dapat penulis berikan sehubungan dengan tugas perancangan mesin kapal ini.

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DAFTAR NOTASI

A	:	Luas bidang
B	:	Lebar kapal
b	:	Tinggi daun kemudi
BHP	:	Break Horse Power
Cr	:	Gaya daun kemudi
Cw	:	Faktor koreksi beban
d	:	Diameter
db	:	Diameter pipa ballast
Dcl	:	Diameter efektif panjang rantrai
dh	:	Diameter utama sistem bilga
Dt	:	Diameter poros kemudi
dw	:	Diameter tali tambat
dz	:	Diameter pipa cabang sistem bilga
df	:	Diameter winch boat
Dh	:	Diameter winch head
EHP	:	Effective Horse Power
Ga	:	Berat jangkar
g	:	Gravitasi
H	:	Tinggi kapal
ha	:	Head statis total
hlf	:	Head kerugian pipa
hli	:	Head kerugian instalasi pipa
hi	:	Head total sistem
HP	:	Daya (Horse Power)
la	:	Ratio antara putaran motor dengan putaran cable lifter
lcl	:	Panjang rantai untuk satu putaran cable lifter
lw	:	Ratio antara putaran motor dengan putaran poros penggulung tali tambat
J	:	Kapasitas botol angin
L	:	Panjang pipa
La	:	Panjang rantai yang menggantung
LCB	:	Letak titik tekan keatas terhadap midship section



Lpp	:	Panjang kapal antara garis tegak
Lwl	:	Panjang garis air
Mcl	:	Torsi pada cable lifter
Mm	:	Torsi poros motor
Mmb	:	Torsi yang bekerja pada poros penggerak
N	:	Putaran mesin, putaran propeller, Daya
Ncl	:	Putaran cable lifter
nh	:	Putaran winch head
Nw	:	Putaran penggulung tali tambat
Pa	:	Tekanan kerja maksimum botol udara start
Pb	:	Tekanan kerja minimum botol udara start
Pc	:	Koefisien propulsi
Pe	:	Tekanan udara luar
Q	:	Kapasitas aliran fluida
Qc	:	Kapasitas fan
Qs	:	Berat skoci
Qo	:	Berat penumpang
Qp	:	Berat perlengkapan
Qt	:	Berat total
Rbr	:	Beban putus tali tambat
Re	:	Reynold Number
Rpm	:	Putaran mesin/menit
RT	:	Hambatan total
S	:	Jarak pelayaran
SFOC	:	Pemakaian bahan bakar spesifik motor induk
SLOC	:	Pemakaian minyak pelumas
SHP	:	Daya yang diberikan poros
s	:	Waktu (detik)
T	:	Sarat kapal
Tcl	:	Gaya tarik untuk menarik dua jangkar
Tw	:	Gaya tarik pada penggulung capstan
Tmaks	:	Tegangan maksimum winch head
Tmin	:	Tegangan minimum winch head
V	:	Kecepatan
Va	:	Kecepatan angkat rantai jangkar rata-rata

V_b	:	Volume tangki ballast
V_{lo}	:	Volume tangki minyak pelumas
V_s	:	Kecepatan kapal
V_t	:	Volume tangki air tawar
V_w	:	Kecepatan tarik tali tambat
W_{ab}	:	Berat air ballast
W_{co}	:	Berat minyak pelumas mesin induk
W_{do}	:	Berat bahan bakar mesin induk
W_{fo}	:	Berat bahan bakar mesin induk
W_{lo}	:	Berat minyak pelumas mesin induk
W_t	:	Berat total keperluan air tawar
Z	:	Jumlah silinder
Δp	:	Kerugian head karena perbedaan tekanan
λ	:	Koefisien gesek pada saluran pipa
ν	:	Viskositas kinematik fluida
α	:	Sudut putar kemudi
γ	:	Berat jenis fluida
η_p	:	Efisiensi propeller
η_{cl}	:	Efisiensi peralatann mesin jangkar
η_h	:	Efisiensi cable lifter
η_m	:	Efisiensi mekanis
η_s	:	Efisiensi snatch bolck
η_f	:	Efisiensi guide roller
δ	:	Koefisien block
β	:	Koefisien midship
Δ	:	Displacement
∇	:	Volume displacement

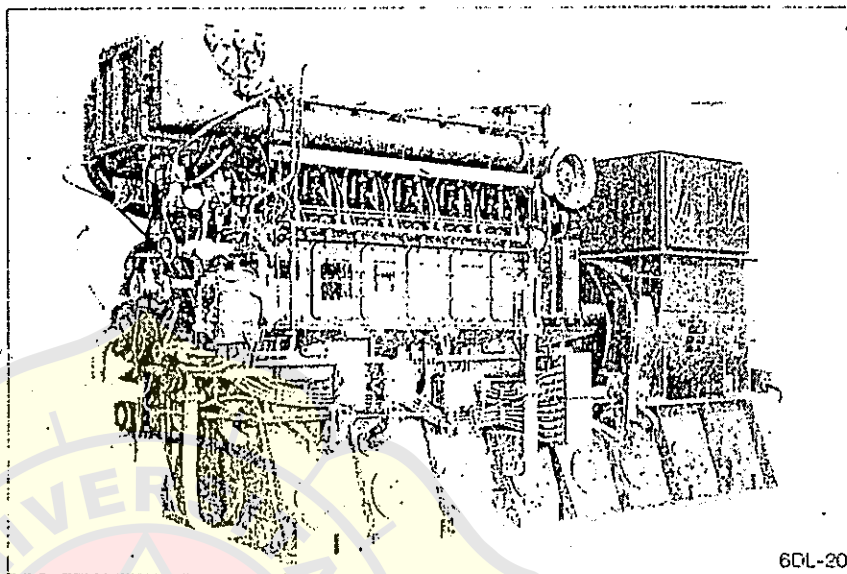
AUX. ENGINE

MARINE AUXILIARY DIESEL ENGINE

DL-20

BORE:200mm
STROKE:260mm
No. of cylinder:6
Pme:15.80~19.13kg/cm²
Piston speed:6.24m/sec
(at 720rpm)

4 stroke. Direct injection type
 with 2 inlet & 2 exhaust valves.
 turbo-charger and inter cooler



6DL-20

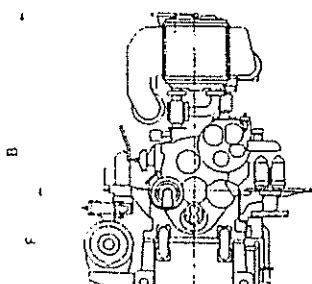
PRINCIPAL PARTICULARS

Model	Fuel oil Rev.(rpm)	Diesel oil				Diesel oil			
		720	750	900	1000	720	750	900	1000
6DLB-20	PS	620*	620*	660	660	620	620	660	660
	kW	455*	455*	485	485	455	455	485	485
6DL-20	PS	720	720	830	830	750	750	900	900
	kW	530	530	610	610	550	550	660	660

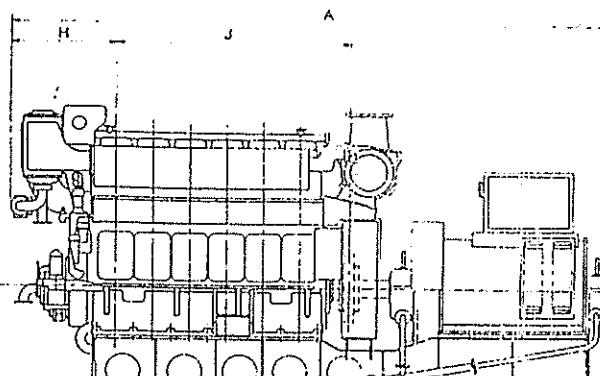
ISO 1^{AW} 1.359¹¹
 * : up to 380cSt/50 C

DIMENSIONS & WEIGHTS (at 720rpm)

Model	Mark	(mm)								(ton)			
		A	B	C	D	E	F	G	H	J			
6DLB-20		4770	2415	1600	320	3850	950	1570	780	1907.5	6.75	2.5	1.5
6DL-20												3.1	1.8



G (Height for with-drawal
Piston & Rod)



Anchor, Chain cable & Ropes

Table 18.2 Anchor, Chain Cables and Ropes

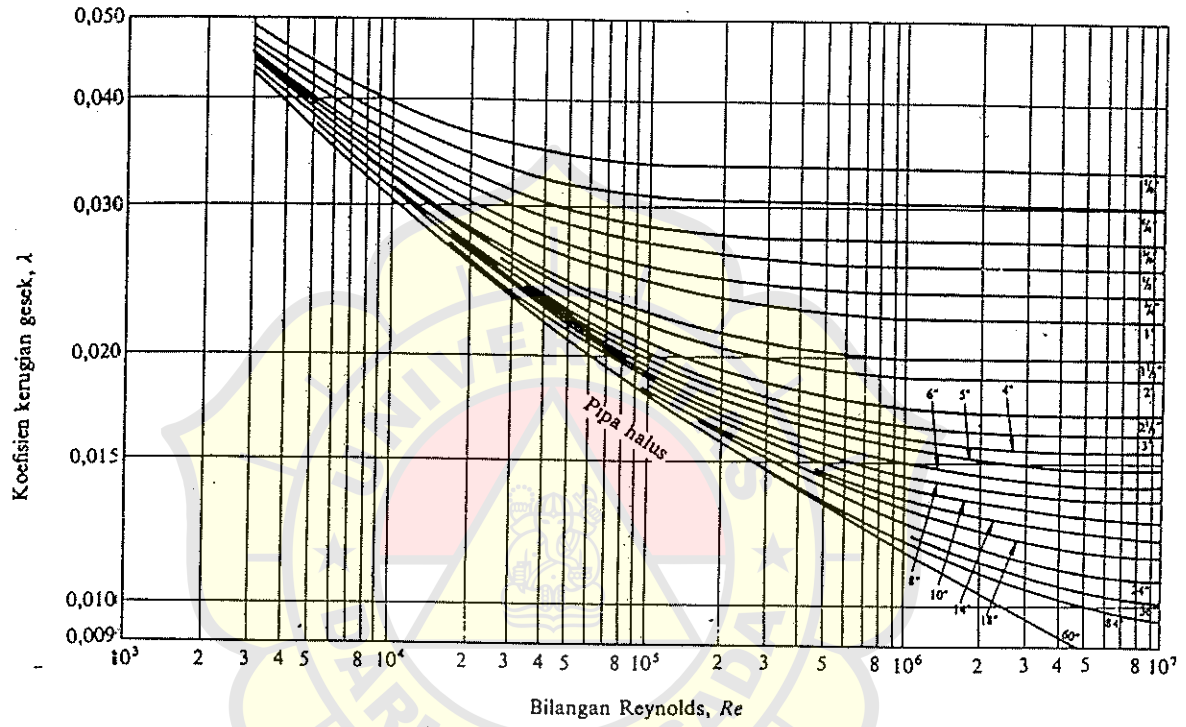
No. for Page	Equipment numeral Z	Stockless anchor			Stud link chain cables							Recommended ropes				
		Dower anchor		Stream anchor	Dower anchors				Stream wire or chain for stream anchor		Towline		Mooring ropes			
		Number ¹	Mass per anchor		Total length [m]	Diameter			Length [m]	Br. load ² [t]	Length [m]	Br. load ² [kN]	Number	Length [m]	Br. load ² [kN]	
			[kg]	[kg]		d ₁ [mm]	d ₂ [mm]	d ₃ [mm]								
3	4	5	6	7	8	9	10	11	12	13	14	15	16			
101	50	2	120	40	165	12.5	12.5	12.5	80	65	180	100	3	80	35	
102	50	2	180	60	220	14	12.5	12.5	80	65	180	100	3	80	35	
103	70	2	240	80	270	16	14	14	85	75	180	100	3	100	40	
104	90	2	300	100	330	17.5	16	16	85	80	180	100	3	110	45	
105	110	2	350	120	380	19	17.5	17.5	90	90	180	100	3	120	50	
106	130	2	420	140	450	20.5	17.5	17.5	90	100	180	100	3	120	50	
107	150	2	480	160	510	22	19	19	90	110	180	100	3	120	55	
108	175	2	570	190	600	24	20.5	20.5	90	120	180	110	3	120	60	
109	205	3	660	220	690	26	22	22	90	120	180	130	4	120	65	
110	240	3	780	260	840	28	24	24	90	120	180	150	4	120	70	
111	280	3	900	300	990	30	26	26	90	120	180	175	4	110	80	
112	320	3	1020	340	1140	32	28	28	90	120	180	200	4	110	85	
113	360	3	1140	380	1290	34	30	30	90	120	180	225	4	110	95	
114	400	3	1260	420	1440	36	32	32	90	120	180	250	4	110	100	
115	450	3	1440	480	1620	38	34	34	90	120	180	275	4	140	110	
116	500	3	1570	540	1770	40	36	36	90	120	180	305	4	160	120	
117	550	3	1710	600	1920	42	38	38	90	120	180	340	4	160	130	
118	600	3	1860	660	2070	44	40	40	90	120	180	370	4	160	145	
119	650	3	2010	720	2220	46	42	42	90	120	180	405	4	160	160	
120	700	3	2160	780	2370	48	44	44	90	120	180	440	4	170	170	
121	750	3	2310	840	2520	50	46	46	90	120	180	480	4	170	185	
122	800	3	2460	900	2670	52	48	48	90	120	180	520	4	170	200	
123	850	3	2610	960	2820	54	50	50	90	120	180	560	4	170	215	
124	900	3	2760	1020	2970	56	52	52	90	120	180	600	4	180	230	
125	950	3	2910	1080	3120	58	54	54	90	120	180	645	4	180	250	
126	1000	3	3060	1140	3270	60	56	56	90	120	180	690	4	180	270	
127	1050	3	3210	1200	3420	62	58	58	90	120	180	740	4	180	285	
128	1100	3	3360	1260	3570	64	60	60	90	120	180	785	4	180	305	
129	1150	3	3510	1320	3720	66	62	62	90	120	180	835	4	180	325	
130	1200	3	3660	1380	3870	68	64	64	90	120	180	890	5	190	335	
131	1250	3	3810	1440	4020	70	66	66	90	120	180	940	5	190	350	
132	1300	3	3960	1500	4170	72	68	68	90	120	180	1005	5	190	375	
133	1350	3	4110	1560	4320	74	70	70	90	120	180	1110	5	190	400	
134	1400	3	4260	1620	4470	76	72	72	90	120	180	1170	5	200	425	
135	1450	3	4410	1680	4620	78	74	74	90	120	180	1260	5	200	450	
136	1500	3	4560	1740	4770	80	76	76	90	120	180	1355	5	200	480	
137	1550	3	4710	1800	4920	82	78	78	90	120	180	1455	5	200	490	
138	1600	3	4860	1860	5070	84	80	80	90	120	180	1570	6	200	500	
139	1650	3	5010	1920	5220	86	82	82	90	120	180	1670	6	200	520	
140	1700	3	5160	1980	5370	88	84	84	90	120	180	1770	6	200	555	
141	1750	3	5310	2040	5520	90	86	86	90	120	180	1870	6	200	590	
142	1800	3	5460	2100	5670	92	88	88	90	120	180	1970	6	200	620	
143	1850	3	5610	2160	5820	94	90	90	90	120	180	2070	6	200	650	
144	1900	3	5760	2220	5970	96	92	92	90	120	180	2170	7	200	650	
145	1950	3	5910	2280	6120	98	94	94	90	120	180	2270	7	200	660	
146	2000	3	6060	2340	6270	100	96	96	90	120	180	2370	7	200	670	
147	2050	3	6210	2400	6420	102	98	98	90	120	180	2470	7	200	680	
148	2100	3	6360	2460	6570	104	100	100	90	120	180	2570	7	200	685	
149	2150	3	6510	2520	6720	106	102	102	90	120	180	2670	8	200	685	
150	2200	3	6660	2580	6870	108	104	104	90	120	180	2770	8	200	695	
151	2250	3	6810	2640	7020	110	106	106	90	120	180	2870	8	200	705	
152	2300	3	6960	2700	7170	112	108	108	90	120	180	2970	9	200	705	
153	2350	3	7110	2760	7320	114	110	110	90	120	180	3070	9	200	715	
154	2400	3	7260	2820	7470	116	112	112	90	120	180	3170	10	200	725	
155	2450	3	7410	2880	7620	118	114	114	90	120	180	3270	10	200	725	
156	2500	3	7560	2940	7770	120	116	116	90	120	180	3370	11	200	735	
157	2550	3	7710	3000	7920	122	118	118	90	120	180	3470	11	200	735	
158	2600	3	7860	3060	8070	124	120	120	90	120	180	3570	11	200	735	
159	2650	3	8010	3120	8220	126	122	122	90	120	180	3670	12	200	735	
160	2700	3	8160	3180	8370	128	124	124	90	120	180	3770	12	200	735	
161	2750	3	8310	3240	8520	130	126	126	90	120	180	3870	13	200	735	
162	2800	3	8460	3300	8670	132	128	128	90	120	180	3970	13	200	735	
163	2850	3	8610	3360	8820	134	130	130	90	120	180	4070	14	200	735	
164	2900	3	8760	3420	8970	136	132	132	90	120	180	4170	14	200	735	
165	2950	3	8910	3480	9120	138	134	134	90	120	180	4270	15	200	735	
166	3000	3	9060	3540	9270	140	136	136	90	120	180	4370	15	200	735	
167	3050	3	9210	3600	9420	142	138	138	90	120	180	4470	16	200	735	
168	3100	3	9360	3660	9570	144	140	140	90	120	180	4570	16	200	735	

¹ Chain diameter Grade K 1 (Ordinary quality)
² Chain diameter Grade K 2 (Special quality)
³ Chain diameter Grade K 3 (Extra special quality)

See also D

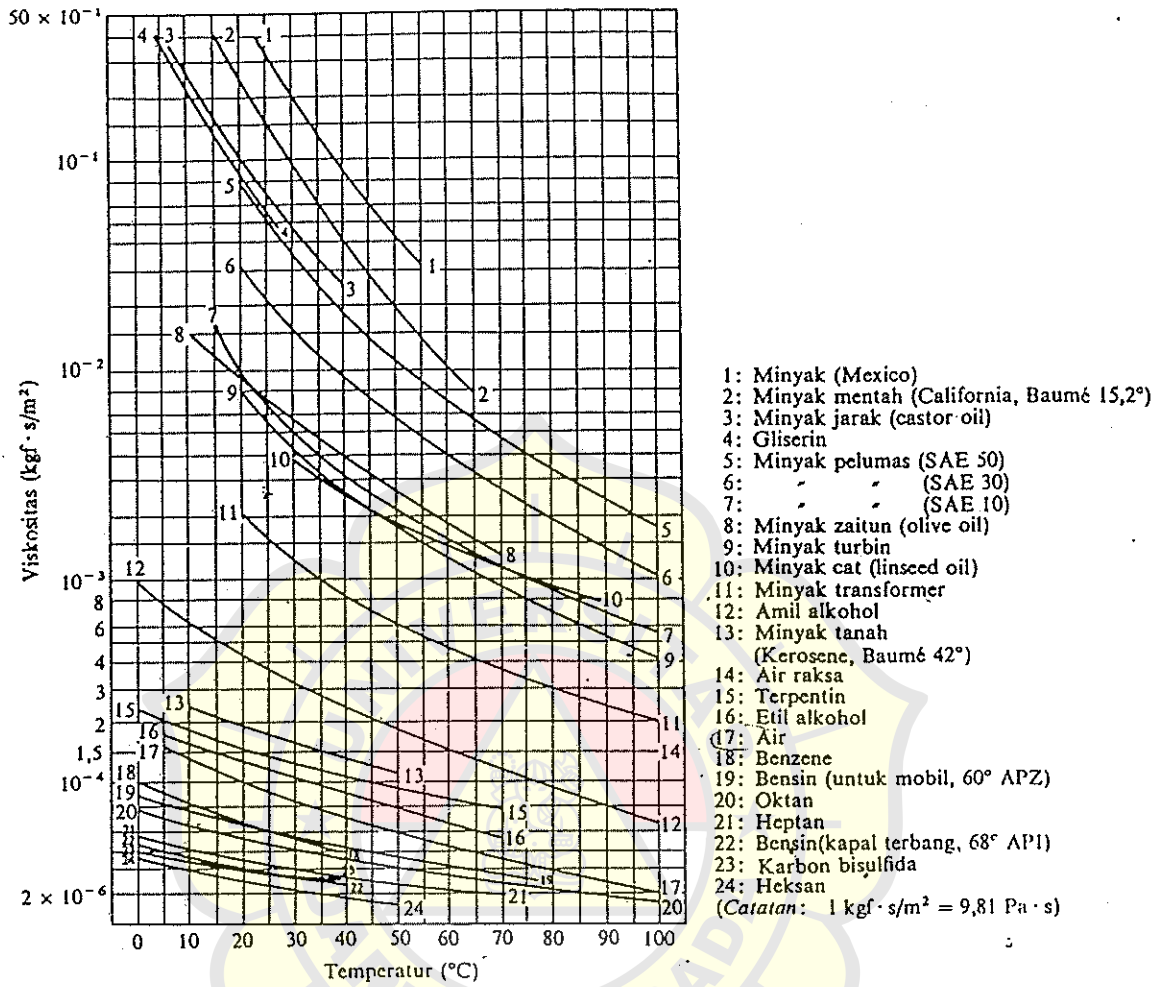
¹ see C.1
² see F.1.2

Moody diagram

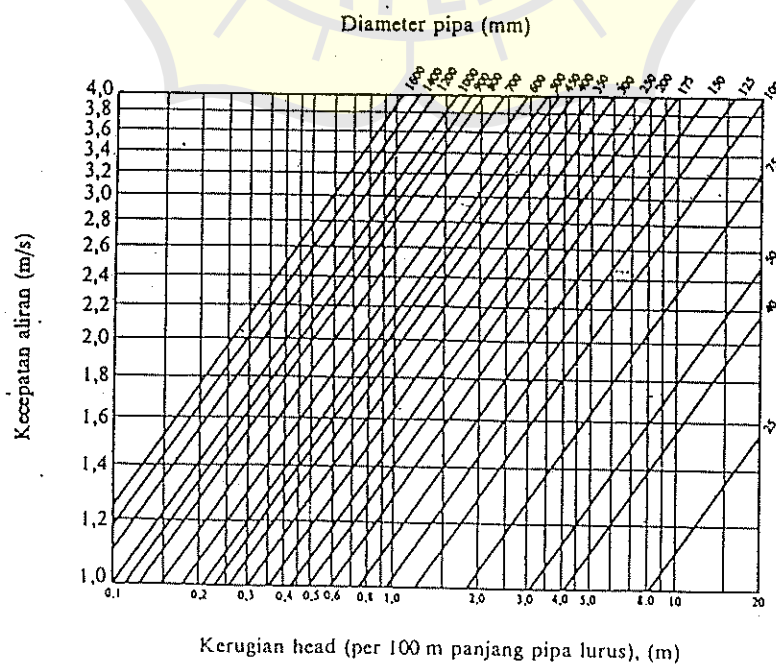


Gb. 2.17 Bilangan Reynolds dan koefisien gesek.
(angka-angka menunjukkan diameter dalam pipa).

Viskositas



(a) Viskositas μ



Gb. 2.4 Kerugian gesek pada pipa lurus (rumus Darcy).

SEKOCI

STANDART UKURAN SEKOCI OLEH BOT (BOARD OF TRADE) ENGLAND

Tabel II

L. B. H (m)	L. B. H (ft3)	Kapasitas (ft3)	Jumlah orang	berat sekoci (kg)	Berat Orang (kg)	berat perlengkapan (kg)	Total berat (kg)
9,4 x 2,74 x 1 x 1,14	30 x 9 x 3,75	607	60	2205	4500	356	7061
8,84 x 2,74 x 1,10	29 x 8,75 x 3,60	545	54	1976	4050	356	6382
8,53 x 2,59 x 1,07	28 x 8,50 x 3,50	500	50	1824	3750	330	5894
8,23 x 2,51 x 1,04	27 x 8,25 x 3,40	454	45	1646	3376	330	5351
7,92 x 2,44 x 0,99	26 x 8,00 x 3,25	405	40	473	3000	305	4778
7,62 x 2,36 x 0,96	25 x 7,75 x 3,15	366	36	1326	2700	305	4331
7,31 x 2,29 x 0,91	24 x 7,50 x 3,00	324	32	1180	2400	254	3843
7,01 x 2,29 x 0,88	23 x 7,50 x 2,90	300	30	1087	2250	254	3591
6,71 x 2,21 x 0,84	22 x 7,25 x 2,75	236	28	955	1950	229	3134
6,40 x 2,13 x 0,82	21 x 7,00 x 2,70	238	23	864	1725	229	2818
6,10 x 2,06 x 0,79	20 x 6,75 x 2,60	210	21	762	1575	203	2540
5,79 x 1,98 x 0,76	19 x 6,50 x 2,50	182	18	650	1350	178	2178
5,49 x 1,90 x 0,73	18 x 6,25 x 2,40	162	16	590	1200	152	1942
5,18 x 1,83 x 0,715	17 x 6,00 x 2,30	143	14	508	1050	152	1710
4,88 x 1,75 x 0,70	16 x 5,75 x 2,30	127	12	475	900	127	1484

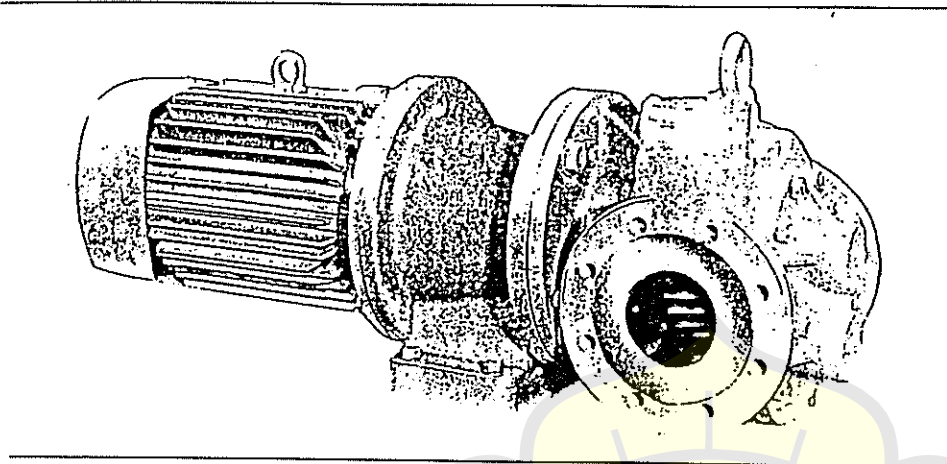
SKOCI

STANDART UKURAN SEKOCI BERMOTOR :

Tabel III

L	B	H	Kapasitas	Jumlah orang	Berat sekoci dari kayu	Berat sekoci dari plat	Berat motor	Berat perangkapan	Berat total
8,00	2,60	1,16	14,5	34	1700	1900	820	460	2550
8,50	2,60	1,16	15,4	39	1800	2100	820	480	2925
9,00	2,70	1,22	17,8	46	1900	2300	870	510	3450
9,50	2,80	1,22	19,4	50	2100	2500	1120	530	3750
STANDART UKURAN SEKOCI KERJA									
L1	L	B	H	Kapasitas	Jumlah orang	Berat penumpang	Berat perangkapan	Berat sekoci	Berat total
3,60	3,76	1,55	0,6	2,0	4	300	60	300	660
3,80	3,96	1,65	0,66	2,5	5	375	60	360	795
4,00	4,16	1,75	0,70	3,0	6	450	60	420	930
4,50	4,66	1,80	0,78	3,5	7	525	70	450	1045
5,00	5,18	1,85	0,72	4,0	8	600	70	500	1170
5,50	5,68	1,90	0,75	4,7	9	675	80	600	1355
6,00	6,18	2,00	0,80	5,8	11	825	80	700	1605

POMPA-POMPA



Design Features

Gear pumps of the TF series are suitable to pump all media having at least some minimal lubricity but not containing solids.

The sense of rotation in TF pump models is normally clockwise, as seen from the pump shaft. The pumps can be supplied upon request with counter-clockwise rotation or for clockwise and counter-clockwise rotation with alternating direction of delivery flow.

For unchanging delivery flow direction with alternating sense of rotation pumps with reserve valves can be made available.

The nominal bores of suction and pressure ports are dimensioned so that with the standard number of revolutions per minute oil speeds of approx. 1.5 m/sec will be attained.

All pumps can be supplied to special order with pressure relief valve within the pump body. Owing to large enough flow cross-sections, such valves are suitable as safety valves with only slight pressure rise for short-time circulation of the entire throughput within the pump.

The pumps operate in any angular position between motor drive from the top and from below. Base mounting or flange mounting allow, in addition to direct attachment of the pumps, various assembly variants in system or group configurations.

To take up radial and axial forces the pumps can be supplied with an antifriction bearing at the driving end.

The standard pump models are designed for rotational speeds of max. 2,000 rpm at a pressure of 25 bar. The maximum permissible rotational speed depends on the viscosity or lubricity of the pumped medium. In case of poor lubricity of your pumping medium please contact our engineering department.

In addition to our line of standard pump models a great variety of special-design pumps can be made available.

Pump size	Pump capacity Power rating	Pressure p in bar (rotational speed n = 1,450 rpm)										Displacement cm ³ /U
		2	4	6	8	10	12	14	16	20	25	
F 4/70 Motor *	lit/min	111	109	107	106	105	104	102	100	97	93	80
	NkW	1.15	1.5	1.9	2.3	2.6	3.0	3.3	3.6	4.4	5.3	
	kW	1.5	2.2	3	3	4	4	4	5.5	5.5	7.5	
F 4/95 Motor *	lit/min	154	152	150	148	146	144	142	140	135	128	108
	NkW	1.4	1.9	2.4	2.9	3.5	4.0	4.5	5.0	6.0	7.3	
	kW	2.2	3	4	5.5	5.5	7.5	7.5	11	11	15	
F 6/80 Motor *	lit/min	193	191	188	186	184	181	178	174	169	160	135
	NkW	1.8	2.5	3.2	4.0	4.6	5.4	6.0	6.8	8.2	10.2	
	kW	2.2	3	4	5.5	5.5	7.5	7.5	11	11	15	
F 6/110 Motor *	lit/min	261	259	256	253	250	248	245	242	236	230	182
	NkW	2.2	3.2	4.2	5.2	6.2	7.2	8.2	9.2	11.2	13.7	
	kW	3	4	5.5	7.5	7.5	11	11	15	15	18.5	
F 8/100 Motor *	lit/min	357	353	350	348	346	343	340	338	332	324	250
	NkW	3.3	4.7	6.0	7.4	8.8	10.2	11.3	12.7	15.4	18.7	
	kW	5.5	7.5	7.5	11	11	15	15	15	18.5	22	
F 8/120 Motor *	lit/min	435	432	428	423	418	411	406	401	387		304
	NkW	4.0	5.7	7.4	9.0	10.7	12.4	13.7	15.4	18.7		
	kW	5.5	7.5	11	11	15	15	18.5	18.5	22		
F 8/140 Motor *	lit/min	522	516	510	503	495	488	481	474	459		364
	NkW	4.8	6.8	8.8	10.8	12.8	14.8	16.4	18.4	22.5		
	kW	7.5	11	11	15	15	18.5	18.5	22	30		
F 8/170 Motor *	lit/min	619	611	602	594	586	580	570	561			430
	NkW	5.8	8.1	10.4	12.8	15.2	17.5	19.4	21.8			
	kW	7.5	11	15	15	18.5	22	30	30			
10/120 Motor *	lit/min	715	704	694	677	667	657	647	640			500
	NkW	6.6	9.35	12.1	14.9	17.6	20.4	22.6	25.3			
	kW	11	11	15	18.5	22	30	30	30			
10/140 Motor *	lit/min	835	825	815	800	785	770					583
	NkW	7.7	10.9	14.1	17.3	20.5	23.8					
	kW	11	15	18.5	22	30	30					
10/160 Motor *	lit/min	965	955	945	930	915	900					665
	NkW	8.9	12.5	16.2	19.8	23.5	27.1					
	kW	11	15	22	30	30	37					
10/180 Motor *	lit/min	1075	1055	1035	1015	995	970					750
	NkW	9.9	14.0	18.2	22.3	26.4	30.6					
	kW	15	18.5	22	30	37	37					
10/210 Motor *	lit/min	1258	1238	1218	1198	1178						875
	NkW	11.6	16.4	21.2	26.0	30.8						
	kW	15	22	30	37	37						
10/240 Motor *	lit/min	1440	1420	1400	1380	1360						1000
	NkW	13.2	18.7	24.2	29.7	35.2						
	kW	18.5	22	30	37	45						

NkW = nominal power requirement at the pump shaft related to a viscosity of 50 to 150 mm²/sec (cSt)

* Driving power required (20% additional extra are included).

The pump capacity (lit/min) is related to 1,450 rpm. It will be reduced as a function of the rated speed of the motor.

Variation of delivery output: ± 5 %
The pump capacity will also be reduced at a viscosity below 50 mm²/sec.

POMPA-POMPA

p	Pump capacity	Pressure p in bar (rotational speed n = 1,450 rpm)										Displacement cm ³ /rev	
		2	4	6	8	10	12	14	16	20	25		
1/2	Power rating												2
	litr/min	3.48	3.19	2.99	2.70	2.50							
	NkW	0.10	0.10	0.10	0.12	0.13							
1/3	Power rating												3
	litr/min	4.32	4.06	3.87	3.67	3.48							
	NkW	0.10	0.10	0.12	0.15	0.17							
1/4	Power rating												4
	litr/min	5.32	5.12	4.93	4.64	4.45	4.16	3.96	3.77				
	NkW	0.10	0.13	0.16	0.18	0.21	0.24	0.26	0.29				
1/5	Power rating												5
	litr/min	7.44	6.96	6.67	6.28	6.09	5.70	5.41	5.12	4.74			
	NkW	0.12	0.15	0.18	0.21	0.24	0.28	0.31	0.34	0.40	0.40		
1/6	Power rating												6
	litr/min	9.38	8.89	8.51	8.12	7.83	7.44	7.06	6.67	5.99			
	NkW	0.13	0.17	0.21	0.25	0.29	0.32	0.36	0.40	0.47			
1/8	Power rating												8
	litr/min	11.70	11.21	10.63	10.15	9.67	9.18	8.80	8.31	7.35	6.28		
	NkW	0.15	0.19	0.24	0.29	0.33	0.37	0.42	0.45	0.54	0.65		
1/10	Power rating												10
	litr/min	15.47	14.99	14.50	14.11	13.73	13.34	12.95	12.47	11.60	10.63		
	NkW	0.18	0.23	0.28	0.33	0.38	0.42	0.46	0.51	0.61	0.72		
1/13	Power rating												13
	litr/min	19.53	18.85	18.27	17.59	17.11	16.53	16.05	15.56	14.60	13.44		
	NkW	0.21	0.26	0.32	0.37	0.42	0.47	0.53	0.58	0.69	0.82		
1/16	Power rating												16
	litr/min	24.75	23.97	23.39	22.72	22.14	21.46	20.88	20.20	19.14	17.40		
	NkW	0.24	0.31	0.38	0.45	0.52	0.60	0.67	0.74	0.89	1.07		
1/20	Power rating												20
	litr/min	29.77	28.90	28.03	27.16	26.39	25.62	24.84	23.97	22.43	20.69		
	NkW	0.26	0.36	0.44	0.53	0.63	0.72	0.82	0.92	1.11	1.35		
1/25	Power rating												25
	litr/min	38.3	37.9	37.5	37.1	36.7	36.4	36.0	35.6	34.8	33.8		
	NkW	0.46	0.60	0.73	0.88	1.00	1.14	1.28	1.42	1.69	2.03		
1/32	Power rating												32
	litr/min	51.5	50.8	50.3	49.9	49.5	48.9	48.5	48.0	47.2	45.9		
	NkW	0.60	0.77	0.95	1.12	1.29	1.45	1.67	1.80	2.17	2.57		
1/40	Power rating												40
	litr/min	61.9	61.4	60.9	60.2	59.6	59.0	58.5	57.8	56.7	55.4		
	NkW	0.81	1.00	1.20	1.40	1.60	1.80	2.01	2.42	2.90	3.4		
1/50	Power rating												50
	litr/min	73.7	72.7	72.0	71.1	70.2	69.4	68.6	67.6	65.7	63.8		
	NkW	0.77	0.98	1.23	1.47	1.74	1.95	2.22	2.46	2.95	3.58		
1/63	Power rating												63
	litr/min	92.3	91.8	90.9	90.4	89.4	88.9	88.0	87.5	86.0	84.1		
	NkW	1.06	1.34	1.64	1.93	2.24	2.51	2.80	3.14	3.77	4.54		
1/80	Power rating												80
	litr/min	110	109	108	107	106	105	104	103	101	99		
	NkW	1.14	1.50	1.87	2.21	2.58	2.97	3.24	3.57	4.32	5.18		
1/90	Power rating												90
	litr/min	129	127	126	124	123	121	120	118	116	114		
	NkW	1.16	1.61	2.04	2.45	2.83	3.40	3.72	4.09	5.02	6.06		
1/112	Power rating												112
	litr/min	149	146	144	142	140	139	137	135	132	128		
	NkW	1.24	1.72	2.24	2.70	3.35	3.67	4.30	4.87	5.80	7.05		
1/120	Power rating												120
	litr/min	176	175	174	173	171	170	169	167	165	163		
	NkW	1.59	2.17	2.75	3.33	3.95	4.54	5.12	5.73	6.88	8.33		
1/132	Power rating												132
	litr/min	193	192	191	190	188	187	186	185	183	181		
	NkW	1.79	2.46	3.19	3.91	4.59	5.32	5.99	6.72	8.12	9.82		
1/160	Power rating												160
	litr/min	229	228	227	225	224	223	222	221	219	217		
	NkW	1.98	2.80	3.67	4.49	5.32	6.19	7.01	7.83	9.52	11.5		
1/180	Power rating												180
	litr/min	253	262	261	259	258	256	255	254	252	250		
	NkW	2.17	3.19	4.17	5.17	6.14	7.15	8.12	9.09	11.12	13.5		

Design Features

Gear pumps of the SF series are particularly suitable for media which do not contain solids have the least some minimal lubricity and are chemically compatible.

In standard-design SF pump models the sense of rotation is clockwise. It can be changed, however, simply turning the end cover plate by 180°, even subsequently. At the same time, the direction of delivery flow will be changed.

The cover end plate may be replaced by a pressure relief valve.

Provided the flow cross-section is large enough, such valves may be used as safety valves for short-time circulation of the entire throughput within the pump.

Mounting flange and shaft end are designed to allow, in addition to direct attachment of pumps, many assembly variants in system or group configuration.

Optimum gear tooth forming and engagement with minimum shape tolerances of pinions and gearwheels ensure extremely quiet running. Thanks to the use of gearwheels with twelve teeth, delivery flow pulsation is greatly reduced, a significant contribution to noise abatement.

The shaft journals run in composite bearing bushes (Teflon-coated and steel-backed lead-bronze bearings) will endure heavy continuous duty and guarantee long service life.

To take up radial and axial forces pumps of all sizes can be supplied with an antifriction bearing at the driving end.

The standard pump models are designed for rotational speeds of max. 3,000 rpm at a pressure of 25 bar. The maximum permissible rotational speed depends on the viscosity or lubricity of the pumped medium.

In addition to the standard-design pump models a great variety of special-design pumps can be made available.

1) The pump capacity (litr/min) is related to a viscosity of 50 to 150 mm²/sec (cSt).

• Driving power required (29) if additional data are included.
The pump capacity (litr/min) is related to 1,450 rpm. It will be reduced as a function of the rated speed of the motor. Variation of delivery output is 5%.
The pump capacity will also be reduced at a viscosity below 50 mm²/sec.



UNIVERSITAS DARMA PERSADA

Jl. Radin Inten II (Terusan Casablanca)
Pondok Kelapa - Jakarta 13450
Telp. 8649051 - 8649052, Fax. 8649052

Formulir Perbaikan

TUGAS PERANCANGAN MESIN KAPAL

Memperhatikan ketentuan **Sidang Tugas Perancangan Mesin Kapal** pada tanggal
Maret 1999, maka telah diadakan perbaikan :

Nama : Gafaruddin
Nim/Nirm : 93320002 / 933123743250002
Jurusan : Teknik Mesin Kapal
Judul : Perencanaan Lay-Out Kamar Mesin Kapal Penumpang
6.022 GT 17 Knots

No.	Pembimbing / Penguji	Tanggal	Paraf
01.	DR.Ir.Abdul Hamid, M. Eng	Maret 2002	
02.	Ir. Teguh Sastrodiwongso, M.SE	Maret 2002	
03.	Ir. Suwardi Masrun, M.Sc. AMK-C	Maret 2002	
04.	Ir. Satochid Sosrodirejo	Maret 2002	
05.	Ir. Muswar Muslim	Maret 2002	

Jakarta, Maret 2002

Mengetahui,

Dekan Fakultas Teknologi Kelautan

Ketua Jurusan Teknik Mesin Kapal

(Ir. Martin J. Tamaela Msc)

(Ir.Suwardi Masrun, Msc. AMK-C)



UNIVERSITAS DARMA PERSADA

Jl. Radin Inten II (Terusan Casablanca)
Pondok Kelapa - Jakarta 13450
Telp. 8649051 - 8649052, Fax. 8649052

LEMBAR PENGESAHAN

Tugas Perancangan Mesin Kapal ini, telah diperiksa dan disetujui pada tanggal :

.....Maret 2002

Oleh Para Pembimbing dan Penguji :

1. DR.Ir. Abdul Hamid M, Eng
2. Ir. Teguh Sastrodiwongso, MSE
3. Ir. Suwardi Masrun, M.Sc. AMK-C
4. Ir. Satochid Sosrodirejo
5. Ir. Muswar Muslim

Jakarta, Maret 2002

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Dekan Fakultas Teknologi Kelautan

Ketua Jurusan Teknik Mesin Kapal

(Ir. Martin J. Tamaela Msc)

(Ir.Suwardi Masrun, Msc. AMK-C)