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## A. 일반사항

### 1. 안전운항지침서(Information to Master)

본 복원성 자료는 본선의 표준 재화상태에서의 복원성을 검토하기 위한 것일 뿐 아니라, 본선의 특성을 충분히 이해하여 안전운항을 할 수 있도록 하기 위하여 작성되었다. 따라서 본선의 상태가 표준재화 상태와 상이할 경우 본선의 선장은 첨부된 예제와 같은 방법으로 트림 및 복원성 계산을 수행한 후 기준에 적합한지 검토하여야 하며, 만약 복원성기준 및 본선의 안전운항에 적합하지 않으면 적재상태를 변경하여 만족한 복원성을 유지한 후 운항하여야 한다.

1. 본 선박은 어떠한 적재상태에서도 흘수가 1.00 m (Extreme Draft)를 넘지 않도록 할 것.
2. 운항 중 해수유입으로 복원성에 영향을 줄수 있는 거주구 출입문, 창문 및 각종 개구의 Hatch 등 모든 풍우밀 및 수밀 폐쇄 장치는 출입을 행하는 경우 이외에는 풍우밀을 유지할 수 있도록 폐쇄하여야 한다.
3. 기타 창고품의 무게 중심을 가능한 낮게 할 수 있는 장소에 적재할 것.
4. 운항 책임자는 모든 항해 상태에서 연료 탱크의 부분 적재를 최소로 유지하고, 화물창내 유동수에 의한 복원성 감소를 최소로 할 것.
5. 소모성 액체의 비움은 복원성, 트림, 횡경사를 고려하여 선택적으로 행할 것.
6. 항해중 선박의 운동으로 인하여 이동할 가능성이 있는 적재물에 대하여는 운항 전 적절한 고박을 실시하여야 한다.
7. 본선의 운항 책임자는 본 계산서에 언급한 표준상태 이외의 임의의 재화상태에 대하여 본 자료의 "중량중심, 트림 및 복원성 계산"에 의거 복원성 계산을 행하여 안전성을 확인 후 운항하여야 한다.

#### <주의사항>

- \* 본 책자에는 Loading Condition을 변경하였을 경우, 즉 Fuel Oil 및 Fresh Water 등 Loading상태를 변경할 경우의 복원력 계산에 필요한 Data를 포함시켰으므로 이를 참조하도록 한다.
- \* 건조당시 설치된 Door Sill, Hatch Coaming, Air Pipe, Ventilation과 Piping System은 관계 기관의 허락없이 개조 또는 이동하여서는 아니된다.
- \* 본 계산서에서 사용된 흘수의 "0 Point"는 Base Line 하방 0 mm, 초기트림은 0.00 m임.

## 2. 일반 요약

### 2-1. 일반사항

- 선종 : 총톤수 19톤급 청소선
- 국적 : 대한민국
- 선적항 :
- 항해구역 : 평수(한강)
- 선주 : 한강관리사업본부

### 2-2. 주요 요약

- 전장 (Length O. A.) : 16.100 m
- 수선간장 (Length B. P.) : 15.800 m
- 전폭 (Breadth Mld.) : 1.800 m
- 깊이 (Depth Mld.) : 1.500 m
- 만재흘수 (Design Draft Ext.) : 0.850 m
- 만재배수량 (Displacement) : 63.68 tonnes
- 총톤수 (Gross Tonnage) : 19 tons
- 승선인원 선원 : 2 명
- 기타승선인원 : - 명

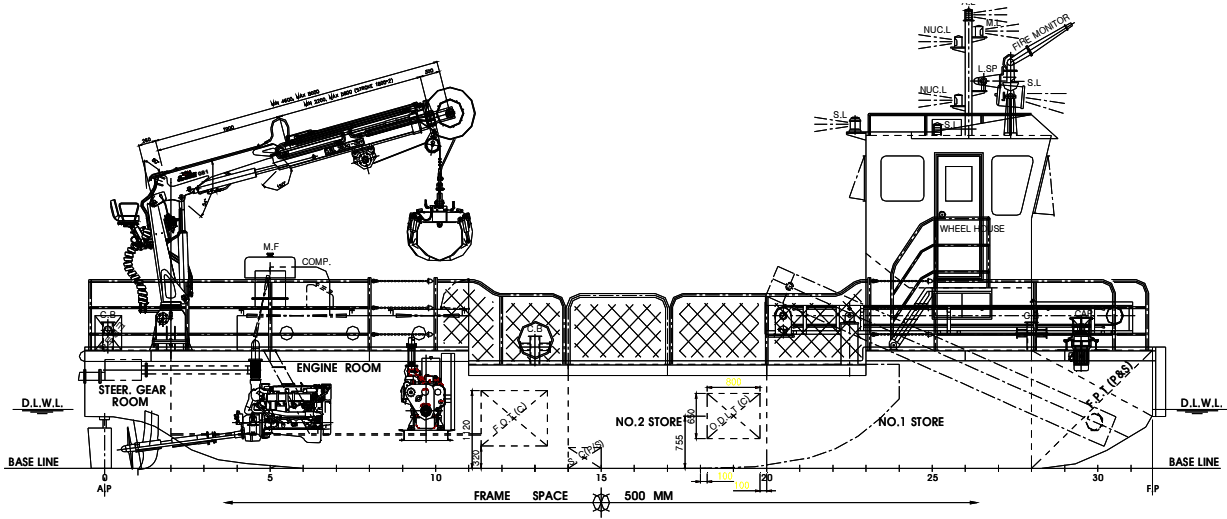
### 2-3. 적용 법규

- 한국선급(KR)의 선급 및 소형 강선 규칙
- 한국정부(KG)의 선박안전법 및 관계 법규
- 국제해상 충돌 예방 규칙 (1972년)

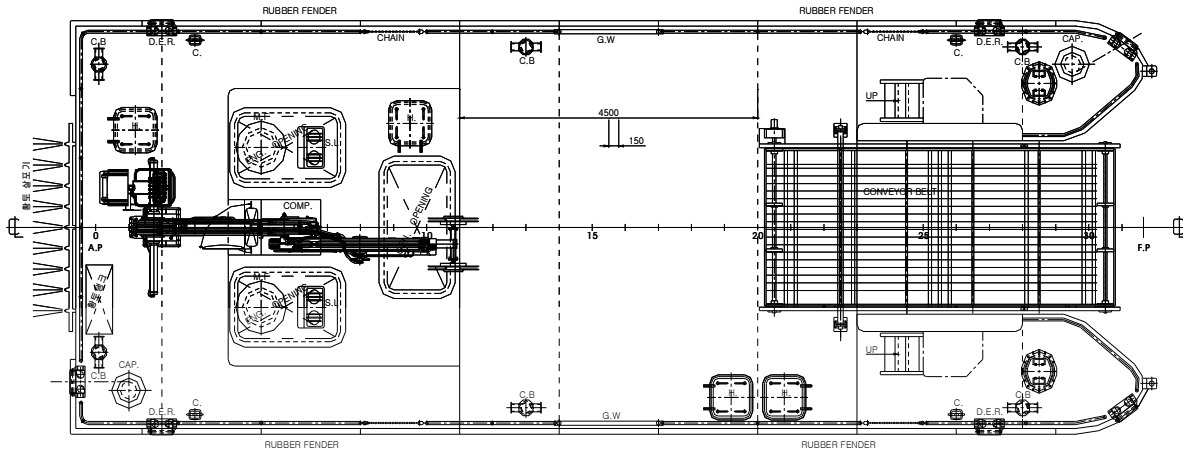
### 2-4. 계산의 기초

- 비중  
Fresh Water : 1.000                      Sea Water : 1.025  
Fuel Oil : 0.860                        Lub Oil : 0.900
- 식량은 본선의 항해일수를 0 일 기준으로 하여, 1인당 2.5 kg으로 계산함.  
 $2 \text{ 명} \times 0 \text{ 일} \times 2.5 \text{ kg} = - \text{ Ton}$
- 승무원은 1인당 100 kg, 기타승선인원은 1인당 80 kg으로 계산하였음.  
 $2 \text{ 명} \times 100 \text{ kg} = 0.200 \text{ Ton}$   
 $- \text{ 명} \times 80 \text{ kg} = - \text{ Ton} \quad \text{총 } 0.200 \text{ Ton}$
- 연료유, 윤활유는 열팽창 증가분 4%를 고려하여 탱크용적의 96%를 적재하는 것으로 하였음.
- 참고품은  $(LBP)^2/1000 =$   
 $(15.0)^2/1000 = 0.250 \text{ Ton}.$
- 본 계산에서 (+)부호는 선체 중앙으로부터 선수쪽을, (-)부호는 선미쪽을 나타냄.  
트림은 (+)부호가 선수트림을 (-)부호가 선미트림을 나타냄.

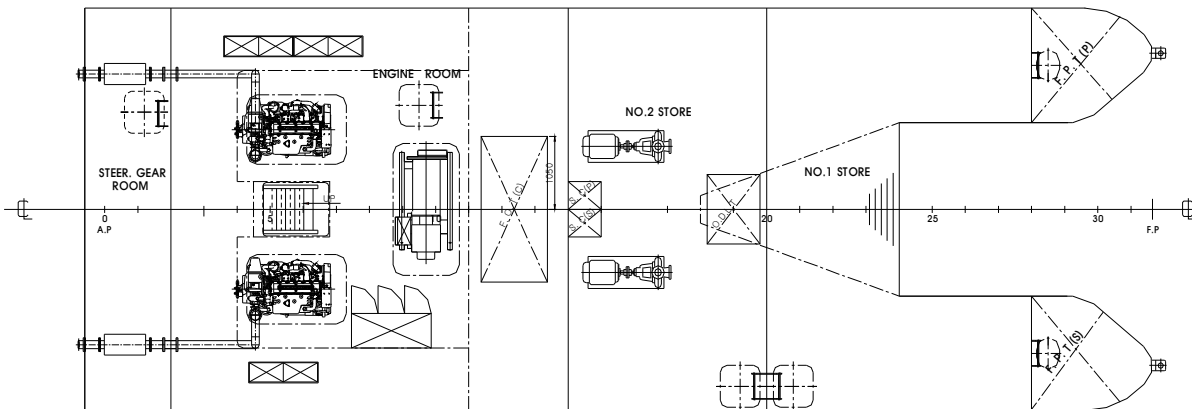
### 3. 일반 배치도



UPPER DECK



BOTTOM PLAN



#### 4. 약 어 설 명 (ABBREVIATION EXPLANATIONS)

DRAFT	(EXT. :	Draft from bottom of keel in meter 용골바닥으로부터의 흘수
DISPT.	(EXT.):	Displacement with all appendages in metric ton 배수량
VOLUME	(MLC :	Volume of naked body in cubic meter 형 배수 용적
TON	:	Metric Ton
M	:	Meter
LBP	:	Length between perpendiculars 수선간 길이
F.P	:	Fore perpendicular
A.P	:	AFT. perpendicular
Cb	:	Block coefficient 방형 계수
Cp	:	Prismatic coefficient 주형 계수
Cwl	:	Water plane area coefficient 수선면 계수
Cm	:	Midship sectional area coefficient 중앙 횡단면 계수
L.C.B	:	Longitudinal center of buoyancy from midship in meter 선체 중앙에서 부심까지의 수평거리
L.C.G	:	Longitudinal center of gravity from midship in meter 선체 중앙에서 무게 중심까지의 수평거리
B.G.L	:	LCG - LCB L.C.B. 와 L.C.G. 간의 거리
L.C.F	:	Longitudinal center of floatation from mishap in meter 선체 중앙에서 부면심까지의 수평거리
KB	:	Vertical center of buoyancy above base line in meter 기선으로부터 부심까지의 연직 높이
KG	:	Vertical center of gravity above base line in meter 기선으로부터 무게 중심까지의 연직 높이
KMT	:	Transverse metacentric height above base line in meter 기선으로부터 횡메타센터까지의 연직 높이
KML	:	Longitudinal metacentric height above base line in meter 기선으로부터 종메타센터까지의 연직 높이
T.P.C	:	Ton per one centimeter immersion in metric ton per 흘수 1Cm 증감에 상당하는 배수량 (T/CM)
M.T.C	:	Moment to change trim one centimeter in metric ton x meter 트림 1Cm 변화에 상당하는 모멘트 (T x M)
GM	:	Transverse metacentric height above vertical center of gravity 연직 메타센터 높이
GGo	:	Correction of free surface effect 액체의 자유표면 영향에 의한 GM 감소치
S.G	:	Specific gravity in metric ton per cubic meter (T/M <sup>3</sup> ) 비 중

## 5. TRIM STABILITY 계산을 위한 가이드

### 5-1. 흘수 계산으로부터 배수량, LCB, LCF, MTC 및 LCG 를 구하는 방법

- $d_f$  : 선수 흘수 MARK 에서의 흘수 (M)
- $d_a$  : 선미 흘수 MARK 에서의 흘수 (M)
- SG : 해수 비중 (TON / M<sup>3</sup>)
  - \* 우현과 좌현의 흘수가 다를 경우는 좌우현 평균값을 취함.

1) 예측 되어진 흘수로부터 흘수수정(DRAFT CORRECTION)을 하여 각 수선에서의 흘수를 구한다.

- $d_F$  ( 선수흘수 ) :  $d_f \pm @d_f$
- $d_A$  ( 선미흘수 ) :  $d_a \pm @d_a$
- $d_m$  ( 평균흘수 ) :  $(d_F + d_A) / 2$
- TRIM :  $(d_A - d_F)$
- \*  $@d_f$  : 선수 흘수 수정 (M)
- \*  $@d_a$  : 선미 흘수 수정 (M)

2) 상당흘수 (  $D_{eq}$  : LCF 에서의 흘수 )를 구하는 방법

$d_M$ 에서 LCF를 읽은후(Hydro Table 참조),

LCF 지점에서의 흘수(Deg)를 계산한다.

$$Deg = d_M \pm Trim / LBP \times (\text{Midship} \sim \text{LCF까지의 거리})$$

3) HYDRO, TABLE 로부터 배수량, LCB, MTC 등을 구한다.

$$\text{실제 배수량 (▲)} = \text{배수량 (HYDRO TABLE 참조)} \times S.G. / 1.025$$

4) L.C.G.를 구하는 방법

$$BG = 100 \times MTC \times TRIM / \blacktriangle$$

- \* BG : L.C.G. 와 L.C.B. 사이의 거리
- \*  $d_A \geq d_F$  : L.C.G. 는 L.C.B. 보다 뒤쪽에 위치
- \*  $d_A \leq d_F$  : L.C.G. 는 L.C.B. 보다 앞쪽에 위치

5-2. 배수량, L.C.G., V.C.G. 에 의한 흘수, TRIM, GoM 를 구하는 방법

1) HYDRO, TABLE 로부터 아래 ITEM 들을 구한다.

deq : 배수량에 대응되는 상당흘수 (M)  
L.C.B : 선박중앙에서 부심까지의 수평거리 (M)  
L.C.F : 선박중앙에서 부면심까지의 수평거리 (M)  
M T C : 트림 1 Cm 변화에 상당하는 모멘트 (T-M)  
K M T : 기선으로부터 횡메타센터까지의 높이 (M)

2) 흘수 및 트림은 아래와 같은 산식에 의해서 구한다.

TRIM :  $(\blacktriangle \times BG) / (MTC \times 100)$  (M)  
dF :  $deq + (((LBP / 2) - LCF) / LBP) \times TRIM$   
dA :  $deq + (((LBP / 2) + LCF) / LBP) \times TRIM$   
dm :  $(dA + dF) / 2$

3) 연직 메타센터 높이 ( GoM )를 구하는 방법

GM :  $KMT - KG ( V. C. G )$   
GoM :  $GM - GGo$   
KGo :  $KG + GGo$   
GoM :  $KMT - Kgo$

\* GGo ( 액체의 자유표면 영향에 의한 감소치 )  
=  $\sum ( \text{각 TANK 에서의 관성 MOMENT} \times \text{각 TANK의 S.G} ) / \text{배수량}(\blacktriangle)$

## 6. 복원성 판정기준(IMO RESOLUTION A.167)

\* 항해상태에서의 복원성 판정은 아래의 최소값을 만족하는 것을 기준으로 한다.

Area 'A' : 30°까지의 GZ곡선하 면적으로써 최소 0.055M-RADIAN이상이어야 한다.

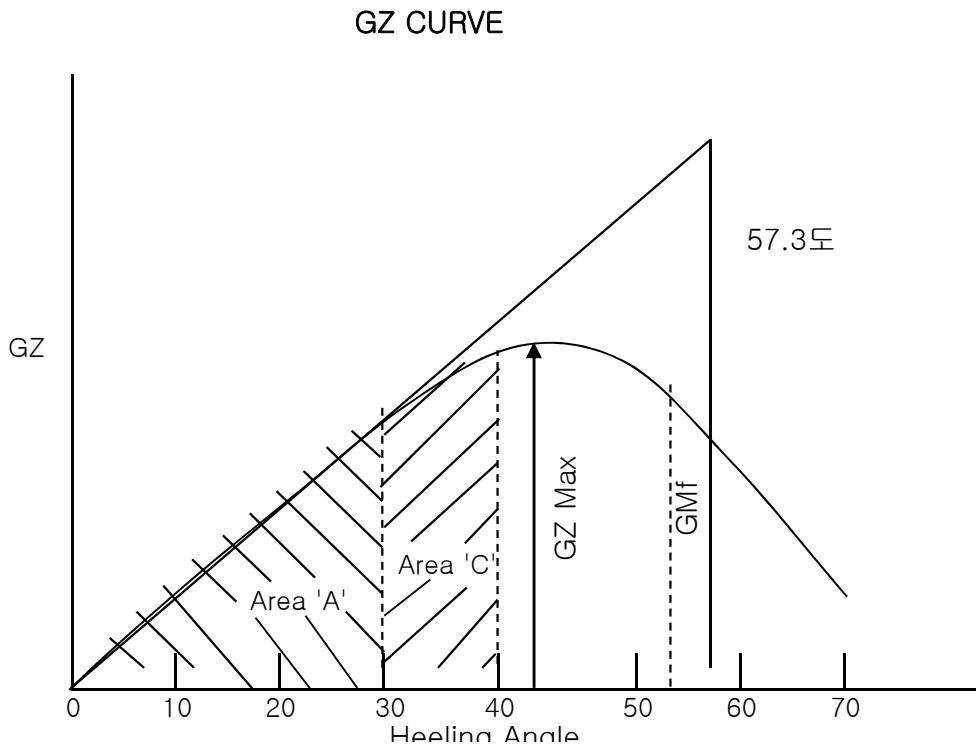
Area 'B' : 40° 또는  $\Theta F$ 까지의 GZ곡선하 면적으로써 최소 0.09M-RADIAN이상이어야 한다.

Area 'C' : 30° 또는  $\Theta F$ 까지의 GZ곡선하 면적으로써 최소 0.03M-RADIAN이상이어야 한다.

$\Theta F$  : 40° 또는 그이하의 각으로써 선체 상부구조 또는 거주구의 개구부하단이 해수에 의해 침수되는 각도

GMf : 초기 GoM값으로써 최소 0.15M이상이어야 한다.

Gzmax : 최대복원정(GoM)이 일어나는 각으로서 30°이상이어야 하며 25°보다 작아서는 안된다.  
또한, 30°이상의 경사각에서 최소 0.20M이상의 복원정(GZ)을 가져야 한다.



Area 'B' :  $\Theta F \geq 40^\circ$     Area 'A' + Area 'C'  
           $\Theta F < 40^\circ$     Area upto  $\Theta F$



## B. 복원성 계산 자료

### 1. Tank Volume Table (Total)

<b>FUEL OIL</b>										SG :	0.86
No.	Compartment Name	Frame Location	Volume (M3)		Weight (Tonnes)	Center of Gravity from			FSM (M <sup>4</sup> )		
			100%	96%		Midship	Baseline	Centerline			
101	F.O.T. (C)	11 - 12	1.655	1.589	1.366	-1.900	0.720	0.000	0.77		
Total			1.655	1.589	1.366	-1.900	0.720	0.000	0.77		

<b>OTHER TANKS</b>										SG :	0.86
No.	Compartment Name	Frame Location	Volume (M3)		Weight (Tonnes)	Center of Gravity from			FSM (M <sup>4</sup> )		
			100%	96%		Midship	Baseline	Centerline			
102	O.D.L.TK (P)	18 - 20	0.512	0.492	0.423	1.600	0.755	0.000	0.07		
Total			0.512		0.423	1.600	0.755	0.000	0.07		

## 2. Deadweight Items

<b>CREW &amp; EFFECTS</b>		0.1 Ton / Person						
No.	Deadweight Item	Weight (T)	LCG (M)	L-Mom (T-M)	VCG (M)	V-Mom (T-M)	FSM (M <sup>4</sup> )	
	Wheel House ( 2P )	0.200	5.500	1.100	3.500	0.700	0.00	
	<b>Total ( 2P )</b>	<b>0.200</b>	<b>5.500</b>	<b>1.100</b>	<b>3.500</b>	<b>0.700</b>	<b>0.00</b>	

<b>STORE &amp; EQUIPMENTS</b>		Weight (T)	LCG (M)	L-Mom (T-M)	VCG (M)	V-Mom (T-M)	FSM (M <sup>4</sup> )
	No.1 Store	0.100	4.000	0.400	0.500	0.050	0.00
	No.2 Store	0.250	1.500	0.374	0.500	0.125	0.00
	<b>Total</b>	<b>0.350</b>	<b>2.215</b>	<b>0.774</b>	<b>0.500</b>	<b>0.175</b>	<b>0.00</b>

### 3. Summary Table

Item	Condition		Lightship Condition	Going Condition	
				Departure	Arrival
Lightweight	ton		60.074	60.074	60.074
Deadweight	ton		0.000	1.989	0.379
Garbage	ton		0.000	0.000	8.000
Displacement	ton		60.074	62.063	68.453
Draft (Deq.)	m		0.876	0.905	0.983
Draft (dF)	m		0.806	0.847	0.966
Draft (dM)	m		0.876	0.905	0.983
Draft (dA)	m		0.945	0.962	1.001
Trim (Aft : - )	m		-0.125	-0.102	-0.032
LCB (Aft : - )	m		-0.646	-0.660	-0.693
LCF (Aft : - )	m		-0.930	-0.920	-0.867
BGL	m		-0.208	-0.164	-0.046
MTC	t-m		1.000	1.000	1.000
KMT	m		4.650	4.502	4.109
KG	m		0.991	0.989	1.077
GM	m		3.659	3.512	3.031
GGo	m		0.000	0.000	0.012
GoM	m		3.659	3.512	3.043
KGo	m		0.991	0.989	1.089
Stability Result					
GZ Area 0 - 30°	m-r		0.411	0.396	0.344
GZ Area 0 - 40°	m-r		0.603	0.582	0.502
GZ Area 30 - 40°	m-r		0.192	0.186	0.158
Righting Lever at 30°	m		1.171	1.133	0.968
Max. GZ Angle	Deg		25.000	21.000	21.000
Metacentric Height	m		3.659	3.512	3.043
Flooding Angle	Deg		55.211	52.405	45.697
Judgement			Satisfied	Satisfied	Satisfied

4.1 Condition No. 1 : Lightship Condition

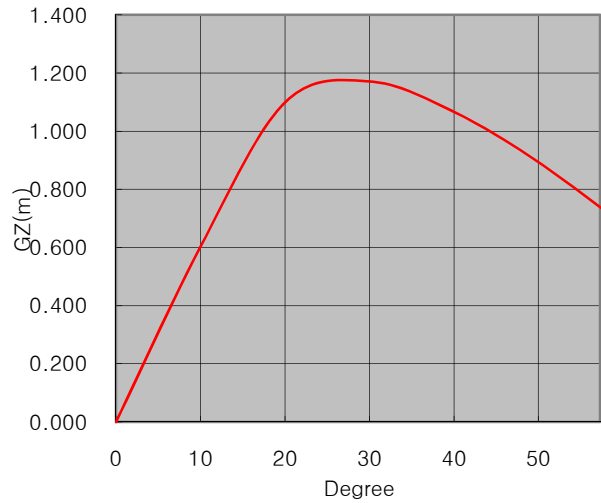
<Loading Data>

Deadweight Items	Load	Weight (ton)	LCG (m)	L-Mom (ton-m)	VCG (m)	V-Mom (ton-m)	F.S.M (ton-m)
LIGHTSHIP		60.07	-0.853	-51.270	0.991	59.517	
Displacement		60.074	-0.853	-51.270	0.991	59.517	

<Hydrostatic Particulars>

Draft Equivalent	0.876	m
Draft at F.P.	0.806	m
Draft at Amidship	0.876	m
Draft at A.P.	0.945	m
Trim by Head	-0.125	m
LCB from Amidship	-0.646	m
LCF from Amidship	-0.930	m
BGL	-0.208	m
MTC	1.000	ton-m
KMT	4.650	m
KG	0.991	m
GM	3.659	m
GGo	0.000	m
GoM	3.659	m
KGo	0.991	m

<Stability Criteria>



<Stability Data>

$$GZ = KN - KGo \cdot \sin\theta$$

$\theta$	KN	KGo*Sin $\theta$	GZ
0	0.000	0.000	0.000
10	0.774	0.172	0.602
20	1.438	0.339	1.099
30	1.667	0.495	1.171
40	1.704	0.637	1.067
50	1.653	0.759	0.894
60	1.537	0.858	0.679

<Judgement>

Item	Actual	Required
- GZ Area 0° - 30°	0.411	> 0.055 M-R
- GZ Area 0° - 40°	0.603	> 0.090 M-R
- GZ Area 30° - 40°	0.192	> 0.030 M-R
- GZ at 30°	1.171	> 0.200 M
- Max. GZ Angle	25 Deg.	
- Metacentric Height	3.659	> 0.150 M
- Flooding Angle	55.211 Deg.	

※ 복원성 기준 만족함.

4.1 Condition No. 2 : Departure Condition

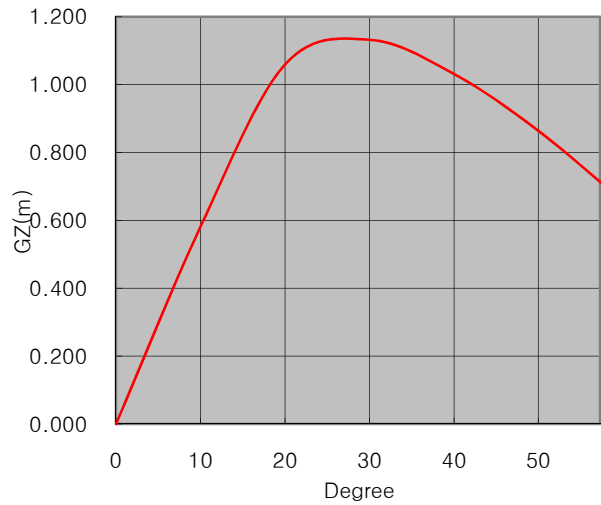
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Deadweight Items	Load	Weight (ton)	LCG (m)	L-Mom (ton-m)	VCG (m)	V-Mom (ton-m)	F.S.M (ton-m)
LIGHTSHIP		60.07	-0.853	-51.270	0.991	59.517	
F.O.T. (C)		1.37	-1.900	-2.596	0.720	0.984	
O.D.L.TK (P)		0.42	1.600	0.676	0.755	0.319	
CREW'S		0.20	5.000	1.000	3.800	0.760	
STORE&EQUIPMENTS		0.35	2.215	0.774	0.500	0.175	
<b>Displacement</b>		<b>62.413</b>	<b>-0.824</b>	<b>-51.415</b>	<b>0.989</b>	<b>61.755</b>	

<Hydrostatic Particulars>

Draft Equivalent	0.905	m
Draft at F.P.	0.847	m
Draft at Amidship	0.905	m
Draft at A.P.	0.962	m
Trim by Head	-0.102	m
LCB from Amidship	-0.660	m
LCF from Amidship	-0.920	m
BGL	-0.164	m
MTC	1.000	ton-m
KMT	4.502	m
KG	0.989	m
GM	3.512	m
GGo	0.000	m
GoM	3.512	m
KGo	0.989	m

<Stability Criteria>



<Stability Data>

$$GZ = KN - KGo * \sin\theta$$

$\theta$	KN	KGo*Sin $\theta$	GZ
0	0.000	0.000	0.000
10	0.753	0.172	0.581
20	1.398	0.338	1.060
30	1.628	0.495	1.133
40	1.668	0.636	1.032
50	1.622	0.758	0.864
60	1.513	0.857	0.657

<Judgement>

Item	Actual	Required
- GZ Area 0° - 30°	0.396	> 0.055 M-R
- GZ Area 0° - 40°	0.582	> 0.090 M-R
- GZ Area 30° - 40°	0.186	> 0.030 M-R
- GZ at 30°	1.133	> 0.200 M
- Max. GZ Angle	21 Deg.	
- Metacentric Height	3.512	> 0.150 M
- Flooding Angle	52.405 Deg.	

※ 복원성 기준 만족함.

4.1 Condition No. 3 : Arrival Condition (Garbage=8.0Ton)

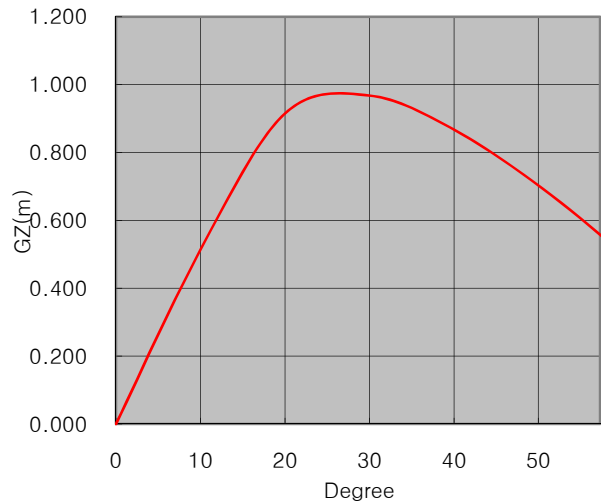
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Deadweight Items	Load	Weight (ton)	LCG (m)	L-Mom (ton-m)	VCG (m)	V-Mom (ton-m)	F.S.M (ton-m)
Lightship		60.07	-0.853	-51.270	0.991	59.517	
F.O.T. (C)		0.14	-1.900	-0.260	0.360	0.049	0.772
O.D.L.TK (P)		0.04	1.600	0.068	0.463	0.020	0.067
CREW'S		0.20	5.000	1.000	3.800	0.760	
STORE&EQUIPMENTS		0.35	2.215	0.774	0.500	0.175	
GARBAGE		8.00	-0.150	-1.200	1.700	13.600	
<b>Displacement</b>		<b>68.803</b>	<b>-0.740</b>	<b>-50.888</b>	<b>1.077</b>	<b>74.121</b>	<b>0.839</b>

<Hydrostatic Particulars>

Draft Equivalent	0.983	m
Draft at F.P.	0.966	m
Draft at Amidship	0.983	m
Draft at A.P.	1.001	m
Trim by Head	-0.032	m
LCB from Amidship	-0.693	m
LCF from Amidship	-0.867	m
BGL	-0.046	m
MTC	1.000	ton-m
KMT	4.109	m
KG	1.077	m
GM	3.031	m
GGo	0.012	m
GoM	3.043	m
KGo	1.089	m

<Stability Criteria>



<Stability Data>

$$GZ = KN - KGo * \sin\theta$$

$\theta$	KN	KGo*Sin $\theta$	GZ
0	0.000	0.000	0.000
10	0.702	0.189	0.513
20	1.288	0.373	0.915
30	1.513	0.545	0.968
40	1.568	0.700	0.868
50	1.538	0.835	0.703
60	1.447	0.943	0.503

<Judgement>

Item	Actual	Required
- GZ Area 0° - 30°	0.344	> 0.055 M-R
- GZ Area 0° - 40°	0.502	> 0.090 M-R
- GZ Area 30° - 40°	0.158	> 0.030 M-R
- GZ at 30°	0.968	> 0.200 M
- Max. GZ Angle	21 Deg.	
- Metacentric Height	3.043	> 0.150 M
- Flooding Angle	45.697 Deg.	

※ 복원성 기준 만족함.

## 5. Hydrostatic Tables

.500	.510	.520	.530	.540	.550	.560	.570	0	DRAFT (MLD. M)
.500	.510	.520	.530	.540	.550	.560	.570	0	DRAFT (EXT. M)
31.489	32.178	32.897	33.629	34.361	35.093	35.825	36.557	1	DISPLACEMENT (F. W, T)
37.254	38.066	38.915	39.777	40.640	41.503	42.366	43.229	2	MOULD VOLUME (M3)
-.48	-.48	-.48	-.49	-.50	-.50	-.51	-.51	3	L. C. B. FROM MIDSHIP (M)
-.61	-.62	-.63	-.64	-.65	-.66	-.67	-.68	4	L. C. F. FROM MIDSHIP (M)
.26	.26	.27	.28	.28	.29	.29	.30	5	V. C. B. FROM BASE LINE (M)
.7	.7	.7	.8	.8	.8	.8	.8	6	T. P. C (T/CM)
.7	.7	.7	.7	.7	.7	.7	.7	7	M. T. C (T-M)
7.028	6.914	6.831	6.761	6.695	6.632	6.571	6.512	8	K. M. T (M)
33.5	33.4	33.2	33.0	32.8	32.6	32.4	32.3	9	K. M. L (M)
213.14	213.97	215.82	218.08	220.34	222.60	224.86	227.12	10	I. T (M4)
108.27	109.03	109.74	110.43	111.12	111.80	112.49	113.18	11	WETTED SURFACE AREA (M2)
83.16	83.67	84.11	84.53	84.95	85.37	85.78	86.20	12	WATER PLANE AREA (M2)
.8131	.8145	.8166	.8190	.8213	.8234	.8256	.8276	13	Cb
.8104	.8119	.8141	.8165	.8188	.8210	.8231	.8252	14	Cp
.9075	.9130	.9178	.9224	.9270	.9315	.9361	.9407	15	Cw
.570	.580	.590	.600	.610	.620	.630	.640	0	DRAFT (MLD. M)
.570	.580	.590	.600	.610	.620	.630	.640	0	DRAFT (EXT. M)
36.557	37.289	38.020	38.752	39.484	40.225	40.976	41.727	1	DISPLACEMENT (F. W, T)
43.229	44.092	44.955	45.818	46.681	47.552	48.433	49.315	2	MOULD VOLUME (M3)
-.51	-.52	-.52	-.53	-.53	-.54	-.54	-.55	3	L. C. B. FROM MIDSHIP (M)
-.68	-.69	-.70	-.70	-.71	-.72	-.71	-.70	4	L. C. F. FROM MIDSHIP (M)
.30	.30	.31	.31	.32	.32	.33	.34	5	V. C. B. FROM BASE LINE (M)
.8	.8	.8	.8	.8	.8	.8	.8	6	T. P. C (T/CM)
.7	.8	.8	.8	.8	.8	.8	.8	7	M. T. C (T-M)
6.512	6.456	6.402	6.350	6.300	6.227	6.128	6.032	8	K. M. T (M)
32.3	32.1	32.0	31.8	31.7	31.3	30.8	30.3	9	K. M. L (M)
227.12	229.38	231.64	233.90	236.16	237.43	237.54	237.66	10	I. T (M4)
113.18	113.87	114.55	115.24	115.93	116.44	116.74	117.05	11	WETTED SURFACE AREA (M2)
86.20	86.62	87.04	87.46	87.88	88.11	88.11	88.12	12	WATER PLANE AREA (M2)
.8276	.8296	.8315	.8333	.8351	.8369	.8389	.8408	13	Cb
.8252	.8272	.8291	.8310	.8328	.8347	.8367	.8387	14	Cp
.9407	.9452	.9498	.9544	.9590	.9615	.9615	.9616	15	Cw

.640	.650	.660	.670	.680	.690	.700	.710	0	DRAFT (MLD. M)
.640	.650	.660	.670	.680	.690	.700	.710	0	DRAFT (EXT. M)
41.727	42.479	43.230	43.981	44.732	45.483	46.234	46.986	1	DISPLACEMENT (F. W, T)
49.31	50.20	51.08	51.96	52.84	53.72	54.60	55.48	2	MOULD VOLUME (M3)
-.55	-.55	-.55	-.56	-.56	-.57	-.57	-.57	3	L. C. B. FROM MIDSHIP (M)
-.70	-.70	-.69	-.69	-.68	-.68	-.67	-.67	4	L. C. F. FROM MIDSHIP (M)
.34	.34	.35	.35	.36	.36	.37	.37	5	V. C. B. FROM BASE LINE (M)
.8	.8	.8	.8	.8	.8	.8	.8	6	T. P. C (T/CM)
.8	.8	.8	.8	.8	.8	.8	.8	7	M. T. C (T-M)
6.032	5.940	5.851	5.765	5.682	5.602	5.524	5.449	8	K. M. T (M)
30.3	29.8	29.4	28.9	28.5	28.1	27.6	27.3	9	K. M. L (M)
237.66	237.77	237.88	238.00	238.11	238.22	238.34	238.45	10	I. T (M4)
117.05	117.36	117.66	117.97	118.27	118.58	118.89	119.19	11	WETTED SURFACE AREA (M2)
88.12	88.13	88.14	88.14	88.15	88.16	88.16	88.17	12	WATER PLANE AREA (M2)
.8408	.8427	.8445	.8463	.8480	.8496	.8512	.8528	13	Cb
.8387	.8406	.8424	.8442	.8459	.8476	.8492	.8508	14	Cp
.9616	.9617	.9618	.9618	.9619	.9620	.9621	.9621	15	Cw
.710	.720	.730	.740	.750	.760	.770	.780	0	DRAFT (MLD. M)
.710	.720	.730	.740	.750	.760	.770	.780	0	DRAFT (EXT. M)
46.99	47.74	48.52	49.30	50.08	50.86	51.64	52.42	1	DISPLACEMENT (F. W, T)
55.48	56.37	57.27	58.18	59.08	59.98	60.89	61.79	2	MOULD VOLUME (M3)
-.57	-.58	-.58	-.59	-.59	-.60	-.60	-.60	3	L. C. B. FROM MIDSHIP (M)
-.67	-.67	-.70	-.72	-.75	-.78	-.81	-.83	4	L. C. F. FROM MIDSHIP (M)
.37	.38	.39	.39	.40	.40	.41	.41	5	V. C. B. FROM BASE LINE (M)
.8	.8	.8	.8	.8	.8	.8	.8	6	T. P. C (T/CM)
.8	.8	.8	.8	.9	.9	.9	.9	7	M. T. C (T-M)
5.449	5.381	5.334	5.288	5.244	5.201	5.159	5.119	8	K. M. T (M)
27.3	27.0	27.1	27.2	27.3	27.4	27.6	27.7	9	K. M. L (M)
238.45	238.81	240.12	241.43	242.74	244.05	245.36	246.66	10	I. T (M4)
119.19	119.59	120.37	121.15	121.92	122.70	123.47	124.25	11	WETTED SURFACE AREA (M2)
88.17	88.27	88.75	89.22	89.69	90.16	90.64	91.11	12	WATER PLANE AREA (M2)
.8528	.8543	.8561	.8579	.8596	.8613	.8629	.8645	13	Cb
.8508	.8524	.8542	.8560	.8577	.8594	.8611	.8627	14	Cp
.9621	.9632	.9684	.9736	.9787	.9839	.9891	.9942	15	Cw



.780	.790	.800	.810	.820	.830	.840	.850	0	DRAFT (MLD. M)
.780	.790	.800	.810	.820	.830	.840	.850	0	DRAFT (EXT. M)
52.42	53.20	53.98	54.76	55.54	56.36	57.17	57.98	1	DISPLACEMENT (F. W, T)
61.79	62.69	63.60	64.50	65.41	66.33	67.26	68.19	2	MOULD VOLUME (M3)
-.60	-.61	-.61	-.62	-.62	-.62	-.63	-.63	3	L. C. B. FROM MIDSHIP (M)
-.83	-.86	-.88	-.91	-.93	-.93	-.93	-.93	4	L. C. F. FROM MIDSHIP (M)
.41	.42	.42	.43	.43	.44	.45	.45	5	V. C. B. FROM BASE LINE (M)
.8	.8	.8	.8	.8	.8	.8	.8	6	T. P. C (T/CM)
.9	.9	.9	1.0	1.0	1.0	1.0	1.0	7	M. T. C (T-M)
5.119	5.080	5.042	5.005	4.969	4.909	4.849	4.791	8	K. M. T (M)
27.7	27.8	27.9	28.0	28.1	27.7	27.3	27.0	9	K. M. L (M)
246.66	247.97	249.28	250.59	251.90	251.84	251.71	251.58	10	I. T (M4)
124.25	125.02	125.80	126.58	127.35	127.72	128.07	128.42	11	WETTED SURFACE AREA (M2)
91.11	91.58	92.06	92.53	93.00	93.01	92.98	92.96	12	WATER PLANE AREA (M2)
.8645	.8660	.8675	.8690	.8704	.8721	.8738	.8755	13	Cb
.8627	.8642	.8657	.8672	.8687	.8704	.8721	.8738	14	Cp
.9942	.9994	1.0046	1.0097	1.0149	1.0149	1.0147	1.0144	15	Cw
.850	.860	.870	.880	.890	.900	.910	.920	0	DRAFT (MLD. M)
.850	.860	.870	.880	.890	.900	.910	.920	0	DRAFT (EXT. M)
57.98	58.79	59.61	60.42	61.23	62.04	62.86	63.67	1	DISPLACEMENT (F. W, T)
68.19	69.13	70.06	70.99	71.92	72.85	73.78	74.71	2	MOULD VOLUME (M3)
-.63	-.64	-.64	-.65	-.65	-.66	-.66	-.67	3	L. C. B. FROM MIDSHIP (M)
-.93	-.93	-.93	-.93	-.93	-.92	-.92	-.92	4	L. C. F. FROM MIDSHIP (M)
.45	.46	.46	.47	.47	.48	.48	.49	5	V. C. B. FROM BASE LINE (M)
.8	.8	.8	.9	.9	.9	.9	.9	6	T. P. C (T/CM)
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	7	M. T. C (T-M)
4.791	4.735	4.680	4.627	4.575	4.524	4.475	4.427	8	K. M. T (M)
27.0	26.6	26.3	26.0	25.6	25.3	25.0	24.7	9	K. M. L (M)
251.58	251.45	251.32	251.19	251.06	250.93	250.80	250.66	10	I. T (M4)
128.42	128.78	129.13	129.48	129.83	130.18	130.53	130.88	11	WETTED SURFACE AREA (M2)
92.96	92.94	92.92	92.90	92.87	92.85	92.83	92.81	12	WATER PLANE AREA (M2)
.8755	.8771	.8787	.8802	.8818	.8832	.8847	.8861	13	Cb
.8738	.8754	.8770	.8786	.8801	.8816	.8831	.8845	14	Cp
1.0144	1.0142	1.0139	1.0137	1.0135	1.0132	1.0130	1.0127	15	Cw

. 920	. 930	. 940	. 950	. 960	. 970	. 980	. 990	0	DRAFT (MLD. M)
. 920	. 930	. 940	. 950	. 960	. 970	. 980	. 990	0	DRAFT (EXT. M)
63. 67	64. 48	65. 29	66. 10	66. 91	67. 72	68. 53	69. 34	1	DISPLACEMENT (F. W, T)
74. 71	75. 63	76. 55	77. 47	78. 40	79. 32	80. 24	81. 16	2	MOULD VOLUME (M3)
-. 67	-. 67	-. 68	-. 68	-. 68	-. 69	-. 69	-. 70	3	L. C. B. FROM MIDSHIP (M)
-. 92	-. 92	-. 91	-. 90	-. 89	-. 88	-. 87	-. 86	4	L. C. F. FROM MIDSHIP (M)
. 49	. 50	. 50	. 51	. 51	. 52	. 52	. 53	5	V. C. B. FROM BASE LINE (M)
. 9	. 9	. 9	. 9	. 9	. 9	. 9	. 9	6	T. P. C (T/CM)
1. 0	1. 0	1. 0	1. 0	1. 0	1. 0	1. 0	1. 0	7	M. T. C (T-M)
4. 427	4. 375	4. 322	4. 271	4. 221	4. 172	4. 124	4. 078	8	K. M. T (M)
24. 7	24. 5	24. 3	24. 0	23. 8	23. 6	23. 4	23. 2	9	K. M. L (M)
250. 66	250. 15	249. 47	248. 79	248. 11	247. 43	246. 75	246. 07	10	I. T (M4)
130. 88	131. 29	131. 74	132. 18	132. 62	133. 06	133. 51	133. 95	11	WETTED SURFACE AREA (M2)
92. 81	92. 71	92. 59	92. 47	92. 34	92. 22	92. 09	91. 97	12	WATER PLANE AREA (M2)
. 8861	. 8874	. 8887	. 8899	. 8911	. 8923	. 8935	. 8946	13	Cb
. 8845	. 8859	. 8871	. 8884	. 8896	. 8908	. 8920	. 8931	14	Cp
1. 0127	1. 0117	1. 0104	1. 0090	1. 0076	1. 0063	1. 0049	1. 0036	15	Cw
. 990	1. 000	1. 010	1. 020	1. 030	1. 040	1. 050	1. 060	0	DRAFT (MLD. M)
. 990	1. 000	1. 010	1. 020	1. 030	1. 040	1. 050	1. 060	0	DRAFT (EXT. M)
69. 34	70. 15	70. 96	71. 76	72. 58	73. 40	74. 21	75. 03	1	DISPLACEMENT (F. W, T)
81. 16	82. 08	83. 00	83. 93	84. 84	85. 75	86. 66	87. 57	2	MOULD VOLUME (M3)
-. 70	-. 70	-. 70	-. 71	-. 71	-. 72	-. 72	-. 72	3	L. C. B. FROM MIDSHIP (M)
-. 86	-. 85	-. 85	-. 84	-. 83	-. 84	-. 85	-. 85	4	L. C. F. FROM MIDSHIP (M)
. 53	. 53	. 54	. 54	. 55	. 56	. 56	. 57	5	V. C. B. FROM BASE LINE (M)
. 9	. 9	. 9	. 9	. 9	. 9	. 9	. 9	6	T. P. C (T/CM)
1. 0	1. 0	1. 0	1. 0	1. 0	1. 0	1. 0	1. 0	7	M. T. C (T-M)
4. 078	4. 032	3. 988	3. 944	3. 902	3. 862	3. 823	3. 784	8	K. M. T (M)
23. 2	23. 0	22. 9	22. 7	22. 5	22. 2	21. 9	21. 6	9	K. M. L (M)
246. 07	245. 39	244. 71	244. 03	243. 37	242. 73	242. 09	241. 45	10	I. T (M4)
133. 95	134. 39	134. 84	135. 28	135. 72	136. 16	136. 61	137. 05	11	WETTED SURFACE AREA (M2)
91. 97	91. 84	91. 72	91. 60	91. 47	91. 34	91. 21	91. 08	12	WATER PLANE AREA (M2)
. 8946	. 8957	. 8968	. 8979	. 8989	. 8997	. 9006	. 9015	13	Cb
. 8931	. 8942	. 8953	. 8964	. 8974	. 8983	. 8992	. 9001	14	Cp
1. 0036	1. 0022	1. 0009	. 9995	. 9981	. 9967	. 9953	. 9939	15	Cw

1.060	1.070	1.080	1.090	1.100	1.110	1.120	1.130	0	DRAFT (MLD. M)
1.060	1.070	1.080	1.090	1.100	1.110	1.120	1.130	0	DRAFT (EXT. M)
75.03	75.85	76.67	77.49	78.30	79.12	79.94	80.76	1	DISPLACEMENT (F. W, T)
87.57	88.48	89.39	90.29	91.20	92.11	93.02	93.93	2	MOULD VOLUME (M3)
-.72	-.72	-.73	-.73	-.73	-.74	-.74	-.74	3	L. C. B. FROM MIDSHIP (M)
-.85	-.86	-.86	-.87	-.87	-.88	-.88	-.89	4	L. C. F. FROM MIDSHIP (M)
.57	.57	.58	.58	.59	.59	.60	.60	5	V. C. B. FROM BASE LINE (M)
.9	.9	.9	.9	.9	.9	.9	.9	6	T. P. C (T/CM)
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	7	M. T. C (T-M)
3.784	3.747	3.710	3.674	3.639	3.604	3.570	3.538	8	K. M. T (M)
21.6	21.4	21.1	20.9	20.6	20.4	20.1	19.9	9	K. M. L (M)
241.45	240.81	240.18	239.54	238.90	238.26	237.62	237.03	10	I. T (M4)
137.05	137.49	137.93	138.37	138.81	139.26	139.70	140.14	11	WETTED SURFACE AREA (M2)
91.08	90.95	90.82	90.69	90.56	90.44	90.31	90.18	12	WATER PLANE AREA (M2)
.9015	.9023	.9031	.9040	.9048	.9055	.9063	.9070	13	Cb
.9001	.9009	.9018	.9026	.9034	.9042	.9050	.9057	14	Cp
.9939	.9925	.9911	.9897	.9883	.9869	.9854	.9840	15	Cw
1.130	1.140	1.150	1.160	1.170	1.180	1.190	1.200	0	DRAFT (MLD. M)
1.130	1.140	1.150	1.160	1.170	1.180	1.190	1.200	0	DRAFT (EXT. M)
80.76	81.58	82.39	83.21	84.02	84.84	85.66	86.47	1	DISPLACEMENT (F. W, T)
93.93	94.82	95.72	96.61	97.51	98.40	99.30	100.19	2	MOULD VOLUME (M3)
-.74	-.74	-.75	-.75	-.75	-.75	-.76	-.76	3	L. C. B. FROM MIDSHIP (M)
-.89	-.89	-.89	-.88	-.88	-.88	-.88	-.88	4	L. C. F. FROM MIDSHIP (M)
.60	.61	.61	.62	.63	.63	.64	.64	5	V. C. B. FROM BASE LINE (M)
.9	.9	.9	.9	.9	.9	.9	.9	6	T. P. C (T/CM)
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	7	M. T. C (T-M)
3.538	3.510	3.482	3.455	3.428	3.402	3.377	3.352	8	K. M. T (M)
19.9	19.7	19.5	19.4	19.2	19.0	18.8	18.7	9	K. M. L (M)
237.03	236.66	236.28	235.90	235.53	235.15	234.77	234.40	10	I. T (M4)
140.14	140.58	141.02	141.46	141.91	142.35	142.79	143.23	11	WETTED SURFACE AREA (M2)
90.18	90.05	89.92	89.79	89.66	89.53	89.40	89.27	12	WATER PLANE AREA (M2)
.9070	.9076	.9083	.9088	.9094	.9100	.9106	.9111	13	Cb
.9057	.9063	.9070	.9076	.9082	.9087	.9093	.9099	14	Cp
.9840	.9826	.9812	.9798	.9784	.9770	.9756	.9742	15	Cw

1.200	1.210	1.220	1.230	1.240	1.250	1.260	1.270	0	DRAFT (MLD. M)
1.200	1.210	1.220	1.230	1.240	1.250	1.260	1.270	0	DRAFT (EXT. M)
86.47	87.29	88.11	88.92	89.74	90.55	91.36	92.18	1	DISPLACEMENT (F. W, T)
100.19	101.09	101.98	102.88	103.76	104.65	105.53	106.41	2	MOULD VOLUME (M3)
-.76	-.76	-.76	-.77	-.77	-.77	-.77	-.78	3	L. C. B. FROM MIDSHIP (M)
-.88	-.88	-.88	-.88	-.88	-.89	-.90	-.90	4	L. C. F. FROM MIDSHIP (M)
.64	.65	.65	.66	.66	.67	.67	.68	5	V. C. B. FROM BASE LINE (M)
.9	.9	.9	.9	.9	.9	.9	.9	6	T. P. C (T/CM)
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	7	M. T. C (T-M)
3.352	3.327	3.303	3.279	3.258	3.238	3.218	3.198	8	K. M. T (M)
18.7	18.5	18.3	18.2	18.0	17.8	17.6	17.4	9	K. M. L (M)
234.40	234.02	233.65	233.27	233.02	232.79	232.56	232.32	10	I. T (M4)
143.23	143.67	144.12	144.56	145.00	145.44	145.88	146.32	11	WETTED SURFACE AREA (M2)
89.27	89.14	89.01	88.88	88.75	88.63	88.50	88.37	12	WATER PLANE AREA (M2)
.9111	.9117	.9122	.9127	.9131	.9135	.9139	.9143	13	Cb
.9099	.9104	.9110	.9115	.9119	.9123	.9127	.9131	14	Cp
.9742	.9727	.9713	.9699	.9685	.9671	.9657	.9643	15	Cw
1.270	1.280	1.290	1.300	1.310	1.320	1.330	1.340	0	DRAFT (MLD. M)
1.270	1.280	1.290	1.300	1.310	1.320	1.330	1.340	0	DRAFT (EXT. M)
92.18	92.99	93.81	94.62	95.43	96.25	97.06	97.88	1	DISPLACEMENT (F. W, T)
106.41	107.29	108.17	109.06	109.94	110.82	111.70	112.58	2	MOULD VOLUME (M3)
-.78	-.78	-.78	-.78	-.79	-.79	-.79	-.79	3	L. C. B. FROM MIDSHIP (M)
-.90	-.91	-.91	-.92	-.92	-.93	-.93	-.93	4	L. C. F. FROM MIDSHIP (M)
.68	.68	.69	.69	.70	.70	.71	.71	5	V. C. B. FROM BASE LINE (M)
.9	.9	.9	.9	.9	.9	.9	.9	6	T. P. C (T/CM)
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	7	M. T. C (T-M)
3.198	3.179	3.160	3.141	3.123	3.105	3.087	3.072	8	K. M. T (M)
17.4	17.3	17.1	16.9	16.8	16.6	16.4	16.3	9	K. M. L (M)
232.32	232.09	231.85	231.62	231.39	231.15	230.92	230.84	10	I. T (M4)
146.32	146.77	147.21	147.65	148.09	148.53	148.98	149.42	11	WETTED SURFACE AREA (M2)
88.37	88.24	88.11	87.98	87.85	87.72	87.59	87.46	12	WATER PLANE AREA (M2)
.9143	.9147	.9151	.9154	.9158	.9161	.9165	.9168	13	Cb
.9131	.9135	.9139	.9143	.9146	.9150	.9154	.9156	14	Cp
.9643	.9629	.9615	.9600	.9586	.9572	.9558	.9544	15	Cw

1.340	1.350	1.360	1.370	1.380	1.390	1.400	1.410	0	DRAFT (MLD. M)
1.340	1.350	1.360	1.370	1.380	1.390	1.400	1.410	0	DRAFT (EXT. M)
97.88	98.71	99.53	100.35	101.18	102.00	102.83	103.65	1	DISPLACEMENT (F. W, T)
112.58	113.44	114.31	115.18	116.05	116.92	117.79	118.66	2	MOULD VOLUME (M3)
-.79	-.79	-.79	-.80	-.80	-.80	-.80	-.80	3	L. C. B. FROM MIDSHIP (M)
-.93	-.92	-.91	-.90	-.90	-.89	-.88	-.87	4	L. C. F. FROM MIDSHIP (M)
.71	.72	.72	.73	.74	.74	.75	.75	5	V. C. B. FROM BASE LINE (M)
.9	.9	.9	.9	.9	.9	.9	.9	6	T. P. C (T/CM)
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	7	M. T. C (T-M)
3.072	3.058	3.044	3.031	3.017	3.004	2.991	2.979	8	K. M. T (M)
16.3	16.2	16.2	16.1	16.0	15.9	15.9	15.8	9	K. M. L (M)
230.84	230.85	230.86	230.86	230.87	230.88	230.88	230.89	10	I. T (M4)
149.42	149.86	150.30	150.74	151.18	151.63	152.07	152.51	11	WETTED SURFACE AREA (M2)
87.46	87.33	87.20	87.07	86.94	86.81	86.69	86.56	12	WATER PLANE AREA (M2)
.9168	.9170	.9172	.9174	.9177	.9179	.9181	.9183	13	Cb
.9156	.9159	.9161	.9163	.9166	.9168	.9170	.9172	14	Cp
.9544	.9530	.9516	.9502	.9488	.9473	.9459	.9445	15	Cw
1.410	1.420	1.430	1.440	1.450	1.460	1.470	1.480	0	DRAFT (MLD. M)
1.410	1.420	1.430	1.440	1.450	1.460	1.470	1.480	0	DRAFT (EXT. M)
103.65	104.48	105.30	106.12	106.95	107.77	108.59	109.41	1	DISPLACEMENT (F. W, T)
118.66	119.53	120.39	121.26	122.11	122.97	123.82	124.68	2	MOULD VOLUME (M3)
-.80	-.80	-.80	-.81	-.81	-.81	-.81	-.81	3	L. C. B. FROM MIDSHIP (M)
-.87	-.86	-.85	-.85	-.85	-.84	-.84	-.84	4	L. C. F. FROM MIDSHIP (M)
.75	.76	.76	.77	.77	.78	.78	.79	5	V. C. B. FROM BASE LINE (M)
.9	.9	.9	.9	.9	.9	.9	.9	6	T. P. C (T/CM)
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	7	M. T. C (T-M)
2.979	2.966	2.954	2.942	2.930	2.919	2.908	2.897	8	K. M. T (M)
15.8	15.7	15.7	15.6	15.5	15.4	15.3	15.2	9	K. M. L (M)
230.89	230.89	230.90	230.89	230.85	230.81	230.77	230.73	10	I. T (M4)
152.51	152.95	153.39	153.84	154.30	154.75	155.21	155.67	11	WETTED SURFACE AREA (M2)
86.56	86.43	86.30	86.16	86.02	85.88	85.74	85.60	12	WATER PLANE AREA (M2)
.9183	.9185	.9187	.9189	.9190	.9191	.9192	.9193	13	Cb
.9172	.9175	.9177	.9178	.9180	.9181	.9182	.9183	14	Cp
.9445	.9431	.9417	.9402	.9387	.9372	.9357	.9341	15	Cw

1.480	1.490	1.500	1.510	1.520	1.530	1.540	1.550	0	DRAFT (MLD. M)
1.480	1.490	1.500	1.510	1.520	1.530	1.540	1.550	0	DRAFT (EXT. M)
109.41	110.23	111.05	111.87	112.69	113.51	114.33	115.14	1	DISPLACEMENT (F. W, T)
124.68	125.54	126.39	127.25	128.10	128.96	129.81	130.65	2	MOULD VOLUME (M3)
-.81	-.81	-.81	-.82	-.82	-.82	-.82	-.82	3	L. C. B. FROM MIDSHIP (M)
-.84	-.84	-.84	-.84	-.84	-.84	-.84	-.86	4	L. C. F. FROM MIDSHIP (M)
.79	.79	.80	.80	.81	.81	.82	.82	5	V. C. B. FROM BASE LINE (M)
.9	.9	.9	.9	.9	.9	.9	.9	6	T. P. C (T/CM)
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	7	M. T. C (T-M)
2.897	2.886	2.875	2.865	2.854	2.844	2.834	2.825	8	K. M. T (M)
15.2	15.1	15.0	14.9	14.8	14.7	14.6	14.4	9	K. M. L (M)
230.73	230.69	230.65	230.61	230.57	230.53	230.49	230.44	10	I. T (M4)
155.67	156.12	156.58	157.04	157.49	157.95	158.41	158.89	11	WETTED SURFACE AREA (M2)
85.60	85.46	85.32	85.19	85.05	84.91	84.76	84.61	12	WATER PLANE AREA (M2)
.9193	.9194	.9195	.9196	.9197	.9197	.9198	.9198	13	Cb
.9183	.9184	.9185	.9186	.9187	.9188	.9188	.9188	14	Cp
.9341	.9326	.9311	.9296	.9280	.9265	.9250	.9232	15	Cw
1.550	1.560	1.570	1.580	1.590	1.600	1.610	1.620	0	DRAFT (MLD. M)
1.550	1.560	1.570	1.580	1.590	1.600	1.610	1.620	0	DRAFT (EXT. M)
115.14	115.95	116.76	117.57	118.38	119.19	120.00	120.81	1	DISPLACEMENT (F. W, T)
130.65	131.49	132.33	133.17	134.01	134.85	135.69	136.53	2	MOULD VOLUME (M3)
-.82	-.82	-.83	-.83	-.83	-.83	-.83	-.83	3	L. C. B. FROM MIDSHIP (M)
-.86	-.87	-.89	-.90	-.92	-.93	-.95	-.96	4	L. C. F. FROM MIDSHIP (M)
.82	.83	.83	.84	.84	.85	.85	.86	5	V. C. B. FROM BASE LINE (M)
.9	.9	.9	.9	.9	.9	.9	.9	6	T. P. C (T/CM)
1.0	1.0	1.0	1.0	1.0	1.0	1.0	.9	7	M. T. C (T-M)
2.825	2.816	2.807	2.798	2.789	2.781	2.772	2.764	8	K. M. T (M)
14.4	14.2	14.0	13.9	13.7	13.5	13.4	13.2	9	K. M. L (M)
230.44	230.39	230.35	230.30	230.26	230.21	230.16	230.12	10	I. T (M4)
158.89	159.37	159.85	160.34	160.82	161.30	161.78	162.26	11	WETTED SURFACE AREA (M2)
84.61	84.45	84.29	84.13	83.98	83.82	83.66	83.50	12	WATER PLANE AREA (M2)
.9198	.9198	.9198	.9197	.9197	.9197	.9197	.9196	13	Cb
.9188	.9188	.9188	.9188	.9188	.9187	.9187	.9187	14	Cp
.9232	.9215	.9198	.9181	.9164	.9146	.9129	.9112	15	Cw

1.620	1.630	1.640	1.650	1.660	1.670	1.680	1.690	0	DRAFT (MLD. M)
1.620	1.630	1.640	1.650	1.660	1.670	1.680	1.690	0	DRAFT (EXT. M)
120.81	121.62	122.43	122.91	123.36	123.80	124.25	124.70	1	DISPLACEMENT (F. W, T)
136.53	137.37	138.21	138.72	139.20	139.67	140.15	140.62	2	MOULD VOLUME (M3)
-.83	-.84	-.84	-.84	-.84	-.84	-.85	-.85	3	L. C. B. FROM MIDSHIP (M)
-.96	-.98	-.99	-.99	-.99	-.99	-.99	-.99	4	L. C. F. FROM MIDSHIP (M)
.86	.86	.87	.87	.87	.88	.88	.88	5	V. C. B. FROM BASE LINE (M)
.9	.9	.9	.8	.7	.6	.5	.4	6	T. P. C (T/CM)
.9	.9	.9	.9	.8	.7	.6	.5	7	M. T. C (T-M)
2.764	2.756	2.748	2.580	2.395	2.211	2.028	1.847	8	K. M. T (M)
13.2	13.1	12.9	11.8	10.6	9.4	8.2	7.1	9	K. M. L (M)
230.12	230.07	230.02	209.89	187.47	165.04	142.61	120.19	10	I. T (M4)
162.26	162.74	163.22	170.72	179.01	187.31	195.60	203.90	11	WETTED SURFACE AREA (M2)
83.50	83.35	83.19	75.89	67.78	59.68	51.57	43.46	12	WATER PLANE AREA (M2)
.9196	.9196	.9196	.9174	.9150	.9127	.9103	.9080	13	Cb
.9187	.9187	.9187	.9186	.9186	.9185	.9185	.9184	14	Cp
.9112	.9095	.9078	.8282	.7397	.6512	.5627	.4742	15	Cw
1.690	1.700	1.700	1.700	1.700	1.700	1.700	1.700	0	DRAFT (MLD. M)
1.690	1.700	1.700	1.700	1.700	1.700	1.700	1.700	0	DRAFT (EXT. M)
124.70	125.14	125.14	125.14	125.14	125.14	125.14	125.14	1	DISPLACEMENT (F. W, T)
140.62	141.10	141.10	141.10	141.10	141.10	141.10	141.10	2	MOULD VOLUME (M3)
-.85	-.85	-.85	-.85	-.85	-.85	-.85	-.85	3	L. C. B. FROM MIDSHIP (M)
-.99	-.99	-.99	-.99	-.99	-.99	-.99	-.99	4	L. C. F. FROM MIDSHIP (M)
.88	.89	.89	.89	.89	.89	.89	.89	5	V. C. B. FROM BASE LINE (M)
.4	.4	.4	.4	.4	.4	.4	.4	6	T. P. C (T/CM)
.5	.4	.4	.4	.4	.4	.4	.4	7	M. T. C (T-M)
1.847	1.667	1.667	1.667	1.667	1.667	1.667	1.667	8	K. M. T (M)
7.1	5.9	5.9	5.9	5.9	5.9	5.9	5.9	9	K. M. L (M)
120.19	97.76	97.76	97.76	97.76	97.76	97.76	97.76	10	I. T (M4)
203.90	212.19	212.19	212.19	212.19	212.19	212.19	212.19	11	WETTED SURFACE AREA (M2)
43.457	35.348	35.348	35.348	35.348	35.348	35.348	35.348	12	WATER PLANE AREA (M2)
.9080	.9057	.9057	.9057	.9057	.9057	.9057	.9057	13	Cb
.9184	.9184	.9184	.9184	.9184	.9184	.9184	.9184	14	Cp
.4742	.3857	.3857	.3857	.3857	.3857	.3857	.3857	15	Cw

## 6. Stability Cross (KN) Tables

DISPL	ANGLES OF HEEL							
	.1	5.0	10.0	20.0	30.0	40.0	50.0	60.0
20	.018	.914	1.567	1.997	2.130			
21	.018	.881	1.540	1.981	2.122			
22	.017	.850	1.513	1.966	2.114			
23	.017	.817	1.484	1.950	2.106			
24	.016	.788	1.457	1.936	2.097			
25	.015	.756	1.428	1.922	2.089	2.115		
26	.015	.726	1.399	1.908	2.081	2.108		
27	.014	.709	1.372	1.893	2.074	2.102		
28	.014	.691	1.344	1.880	2.066	2.095	1.997	
29	.013	.674	1.317	1.867	2.059	2.089	1.990	1.799
30	.013	.657	1.290	1.853	2.051	2.083	1.982	1.793
31	.013	.639	1.262	1.840	2.043	2.075	1.974	1.786
32	.012	.622	1.235	1.826	2.036	2.066	1.967	1.780
33	.012	.604	1.208	1.814	2.028	2.058	1.958	1.773
34	.012	.592	1.185	1.801	2.020	2.049	1.950	1.766
35	.012	.581	1.162	1.788	2.011	2.040	1.942	1.760
36	.012	.570	1.140	1.775	2.002	2.030	1.933	1.753
37	.011	.560	1.116	1.762	1.993	2.020	1.924	1.745
38	.011	.549	1.094	1.749	1.982	2.009	1.914	1.738
39	.011	.538	1.071	1.737	1.971	1.998	1.905	1.731
40	.011	.528	1.048	1.725	1.960	1.987	1.895	1.723
41	.011	.517	1.029	1.712	1.949	1.975	1.885	1.715
42	.011	.510	1.012	1.700	1.938	1.963	1.875	1.708
43	.010	.502	.996	1.688	1.925	1.951	1.864	1.699
44	.010	.495	.979	1.675	1.912	1.938	1.853	1.691
45	.010	.488	.961	1.663	1.899	1.925	1.842	1.682
46	.010	.480	.945	1.650	1.886	1.912	1.831	1.674
47	.010	.473	.928	1.637	1.871	1.898	1.819	1.665
48	.009	.465	.911	1.624	1.857	1.884	1.807	1.656
49	.009	.459	.898	1.610	1.843	1.870	1.795	1.647
50	.009	.453	.886	1.595	1.828	1.855	1.783	1.637
51	.009	.447	.874	1.582	1.813	1.841	1.770	1.628
52	.009	.441	.861	1.567	1.797	1.826	1.758	1.618
53	.009	.435	.849	1.553	1.782	1.811	1.745	1.609
54	.009	.429	.837	1.538	1.766	1.796	1.732	1.599
55	.009	.424	.825	1.521	1.750	1.781	1.719	1.589
56	.009	.418	.813	1.505	1.734	1.766	1.706	1.579
57	.008	.412	.803	1.488	1.718	1.751	1.693	1.569
58	.008	.407	.794	1.472	1.702	1.736	1.680	1.559
59	.008	.402	.785	1.456	1.685	1.721	1.667	1.548
60	.008	.397	.775	1.439	1.668	1.705	1.654	1.538



DISPL	ANGLES OF HEEL							
	. 1	5. 0	10. 0	20. 0	30. 0	40. 0	50. 0	60. 0
69	. 007	. 356	. 701	1. 284	1. 509	1. 565	1. 535	1. 445
70	. 007	. 352	. 693	1. 267	1. 490	1. 549	1. 522	1. 435
71	. 007	. 348	. 686	1. 249	1. 472	1. 533	1. 508	1. 424
72	. 007	. 343	. 678	1. 231	1. 454	1. 516	1. 495	1. 414
73	. 007	. 339	. 672	1. 214	1. 435	1. 500	1. 481	1. 403
74	. 007	. 336	. 666	1. 196	1. 416	1. 483	1. 468	1. 393
75	. 007	. 332	. 660	1. 179	1. 398	1. 466	1. 454	1. 382
76	. 007	. 329	. 654	1. 162	1. 379	1. 449	1. 440	1. 372
77	. 007	. 325	. 648	1. 144	1. 361	1. 432	1. 426	1. 361
78	. 007	. 322	. 642	1. 127	1. 342	1. 415	1. 411	1. 350
79	. 006	. 318	. 635	1. 110	1. 323	1. 398	1. 397	1. 339
80	. 006	. 315	. 629	1. 093	1. 305	1. 381	1. 382	1. 328
81	. 006	. 311	. 623	1. 076	1. 286	1. 364	1. 367	1. 316
82	. 006	. 308	. 618	1. 060	1. 267	1. 347	1. 353	1. 305
83	. 006	. 305	. 612	1. 043	1. 249	1. 330	1. 338	1. 293
84	. 006	. 302	. 607	1. 027	1. 230	1. 312	1. 323	1. 282
85	. 006	. 299	. 602	1. 010	1. 212	1. 295	1. 309	1. 270
86	. 006	. 297	. 596	. 994	1. 193	1. 278	1. 294	1. 258
87	. 006	. 294	. 591	. 977	1. 175	1. 261	1. 279	1. 247
88	. 006	. 291	. 586	. 961	1. 156	1. 244	1. 265	1. 235
89	. 006	. 288	. 580	. 946	1. 138	1. 227	1. 250	1. 224
90	. 006	. 286	. 574	. 930	1. 119	1. 210	1. 235	1. 212

## 7. Sea Water Inlet Tables

ANGLE OF HEEL AT WHICH STIPULATED POINTS BECOME IMMERSSED

COORDINATES FOR SPECIAL POINTS ON THE SHIP

POINT	FRAME	Y	Z	TYPE
1	25.800	1.250	2.700	1.000 OPENING
2	-.600	.000	1.700	2.000 DECK EDGE
3	-.600	2.900	1.700	2.000 DECK EDGE
4	1.580	2.900	1.700	2.000 DECK EDGE
5	3.160	2.900	1.700	2.000 DECK EDGE
6	4.740	2.900	1.700	2.000 DECK EDGE
7	6.320	2.900	1.700	2.000 DECK EDGE
8	9.480	2.900	1.700	2.000 DECK EDGE
9	29.230	2.900	1.700	2.000 DECK EDGE
10	30.020	2.866	1.700	2.000 DECK EDGE
11	30.810	2.712	1.700	2.000 DECK EDGE
12	31.400	2.485	1.700	2.000 DECK EDGE
13	31.600	2.240	1.700	2.000 DECK EDGE
14	31.600	.000	1.700	2.000 DECK DDGE

\*\*\* INDICATES THAT THE POINT IS NOT FLOODED FOR CALC. RANGE OF ANGLES

POINT NUMBER AS DEFINED IN ABOVE TABLE

DISPL	1	2	3	4	5	6	7	8	9	10	11	12	13	14
20	****	****	****	****	****	****	****	****	****	****	****	****	****	****
21	****	****	****	****	****	****	****	****	****	****	****	****	****	****
22	****	****	****	****	****	****	****	****	****	****	****	****	****	****
23	****	****	****	****	****	****	****	****	****	****	****	****	****	****
24	****	****	****	****	****	****	****	****	****	****	****	****	****	****
25	****	****	34.1	34.6	35.0	35.3	35.7	36.4	****	****	****	****	****	****
26	****	****	33.3	33.8	34.1	34.4	34.7	35.4	39.8	****	****	****	****	****
27	****	****	32.6	32.9	33.2	33.5	33.8	34.4	38.4	39.5	****	****	****	****
28	****	****	31.8	32.1	32.4	32.6	32.9	33.4	37.1	38.2	43.0	****	****	****
29	****	****	31.0	31.3	31.5	31.8	32.0	32.5	35.8	36.8	41.4	49.9	****	****
30	****	****	30.3	30.5	30.7	30.9	31.1	31.6	34.7	35.6	40.2	48.3	59.5	****
31	****	****	29.7	29.9	30.1	30.2	30.4	30.7	33.3	34.2	38.6	46.4	57.2	****
32	****	****	29.2	29.4	29.5	29.6	29.7	30.0	32.0	32.8	36.9	44.4	55.0	****
33	****	****	28.8	28.9	29.0	29.0	29.1	29.3	30.6	31.5	35.3	42.6	52.6	****
34	****	****	28.3	28.4	28.4	28.5	28.5	28.6	29.4	30.1	33.8	40.8	50.4	****
35	****	****	27.9	27.9	27.9	27.9	28.0	28.0	28.3	29.0	32.3	38.8	48.1	****
36	****	****	27.4	27.4	27.4	27.4	27.4	27.4	27.2	27.8	30.8	36.9	45.8	****
37	****	****	27.0	26.9	26.9	26.9	26.8	26.8	26.2	26.7	29.5	35.1	43.5	****
38	****	****	26.5	26.4	26.4	26.3	26.2	26.1	25.3	25.8	28.4	33.6	41.5	****
39	****	****	26.1	26.0	25.9	25.8	25.7	25.6	24.4	24.8	27.2	31.8	39.2	****
40	****	****	25.7	25.6	25.4	25.3	25.2	25.0	23.4	23.8	26.0	30.2	36.9	****
41	****	****	25.3	25.1	25.0	24.9	24.7	24.5	22.5	22.9	24.9	28.7	34.7	****
42	****	****	24.9	24.7	24.6	24.4	24.2	23.9	21.7	22.0	23.9	27.4	32.8	****

\*\*\* INDICATES THAT THE POINT IS NOT FLOODED FOR CALC. RANGE OF ANGLES

POINT NUMBER AS DEFINED IN ABOVE TABLE														
DISPL	1	2	3	4	5	6	7	8	9	10	11	12	13	14
43	****	****	24.6	24.3	24.1	24.0	23.8	23.4	21.0	21.2	23.0	26.2	31.0	****
44	****	****	24.2	23.9	23.7	23.5	23.3	22.9	20.3	20.5	22.1	25.1	29.4	****
45	****	****	23.8	23.5	23.3	23.1	22.9	22.5	19.8	19.9	21.4	24.1	28.0	****
46	****	****	23.5	23.1	22.9	22.7	22.5	22.0	19.3	19.5	20.6	23.2	26.7	****
47	****	****	23.1	22.8	22.5	22.3	22.0	21.5	18.9	19.1	20.0	22.3	25.6	****
48	****	****	22.8	22.4	22.1	21.9	21.6	21.1	18.5	18.7	19.5	21.5	24.5	****
49	****	****	22.4	22.0	21.8	21.5	21.2	20.7	18.2	18.3	19.1	20.8	23.6	****
50	****	****	22.1	21.7	21.4	21.1	20.8	20.3	17.8	17.9	18.8	20.3	22.8	****
51	****	****	21.7	21.3	21.0	20.8	20.5	19.9	17.5	17.6	18.4	19.8	22.1	****
52	****	****	21.4	21.0	20.7	20.4	20.1	19.6	17.2	17.3	18.0	19.4	21.4	****
53	****	****	20.9	20.5	20.2	20.0	19.7	19.3	16.9	17.0	17.8	19.1	21.0	****
54	****	****	20.6	20.2	19.9	19.6	19.4	18.9	16.6	16.7	17.4	18.7	20.4	****
55	****	****	20.2	19.8	19.6	19.3	19.1	18.6	16.3	16.4	17.1	18.4	20.0	****
56	****	****	19.9	19.5	19.2	19.0	18.8	18.3	16.1	16.1	16.8	18.0	19.6	****
57	59.5	****	19.6	19.2	18.9	18.7	18.4	18.0	15.8	15.9	16.5	17.7	19.2	****
58	58.1	****	19.2	18.8	18.6	18.4	18.1	17.7	15.5	15.6	16.3	17.4	18.9	****
59	56.7	****	18.9	18.5	18.3	18.0	17.8	17.4	15.3	15.4	16.0	17.1	18.5	****
60	55.3	****	18.5	18.2	17.9	17.7	17.5	17.1	15.0	15.1	15.7	16.8	18.2	****
61	54.1	****	18.2	17.8	17.6	17.4	17.2	16.8	14.8	14.9	15.5	16.6	17.9	****
62	52.9	****	17.8	17.5	17.3	17.0	16.8	16.5	14.6	14.7	15.3	16.3	17.7	****
63	51.7	****	17.4	17.1	16.9	16.7	16.5	16.2	14.4	14.4	15.0	16.1	17.4	****
64	50.5	****	17.1	16.8	16.6	16.4	16.2	15.9	14.1	14.2	14.8	15.8	17.1	****
65	49.4	****	16.8	16.5	16.3	16.1	15.9	15.6	13.9	14.0	14.6	15.6	16.8	****
66	48.4	****	16.4	16.2	16.0	15.8	15.6	15.3	13.7	13.8	14.3	15.3	16.6	****
67	47.4	****	16.1	15.8	15.7	15.5	15.3	15.0	13.5	13.6	14.1	15.1	16.3	58.8
68	46.5	****	15.8	15.5	15.4	15.2	15.0	14.7	13.3	13.4	13.9	14.8	16.0	55.1
69	45.5	****	15.4	15.2	15.0	14.9	14.7	14.5	13.1	13.2	13.7	14.6	15.8	51.8
70	44.7	****	15.1	14.9	14.7	14.6	14.5	14.2	12.9	13.0	13.5	14.4	15.6	48.8
71	43.9	****	14.8	14.6	14.4	14.3	14.2	13.9	12.7	12.8	13.3	14.2	15.3	46.4
72	43.1	****	14.5	14.3	14.1	14.0	13.9	13.7	12.5	12.6	13.1	14.0	15.1	44.1
73	42.4	****	14.2	14.0	13.9	13.7	13.6	13.4	12.3	12.4	12.9	13.7	14.8	42.3
74	41.7	****	13.9	13.7	13.6	13.5	13.4	13.2	12.1	12.2	12.7	13.5	14.6	40.8
75	41.1	****	13.6	13.4	13.3	13.2	13.1	12.9	11.9	12.0	12.5	13.3	14.4	39.6
76	40.5	****	13.3	13.1	13.0	12.9	12.8	12.7	11.7	11.8	12.3	13.1	14.1	38.5
77	40.0	****	13.0	12.9	12.8	12.7	12.6	12.4	11.5	11.6	12.1	12.9	13.9	37.6
78	39.5	****	12.7	12.6	12.5	12.4	12.3	12.2	11.3	11.4	11.9	12.7	13.7	36.7
79	39.0	****	12.4	12.3	12.2	12.2	12.1	11.9	11.1	11.2	11.7	12.4	13.4	35.9
80	38.5	****	12.2	12.1	12.0	11.9	11.8	11.7	10.9	11.0	11.5	12.2	13.2	35.1
81	38.1	****	11.9	11.8	11.7	11.7	11.6	11.5	10.8	10.8	11.3	12.0	13.0	34.4
82	37.7	****	11.6	11.6	11.5	11.4	11.4	11.2	10.6	10.6	11.1	11.8	12.7	33.7
83	37.2	****	11.4	11.3	11.2	11.2	11.1	11.0	10.4	10.5	10.9	11.6	12.5	33.0
84	36.8	58.3	11.1	11.1	11.0	10.9	10.9	10.8	10.2	10.3	10.7	11.4	12.3	32.4
85	36.4	55.5	10.9	10.8	10.8	10.7	10.7	10.6	10.0	10.1	10.5	11.2	12.1	31.8

## 8. Tank Volume Tables

F. O. TANK (C)

COMP. NO 101

LEVEL FROM		VOLUME CUBM	CENTRE OF GRAVITY FROM			INERTIA MOMENT
BL	BOTTOM		LPP/2	BL	CL	
.320	.000	.0				
.370	.050	.103	-1.900	.345	.000	.772
.420	.100	.207	-1.900	.370	.000	.772
.470	.150	.310	-1.900	.395	.000	.772
.520	.200	.414	-1.900	.420	.000	.772
.570	.250	.517	-1.900	.445	.000	.772
.620	.300	.621	-1.900	.470	.000	.772
.670	.350	.724	-1.900	.495	.000	.772
.720	.400	.827	-1.900	.520	.000	.772
.770	.450	.931	-1.900	.545	.000	.772
.820	.500	1.034	-1.900	.570	.000	.772
.870	.550	1.138	-1.900	.595	.000	.772
.920	.600	1.241	-1.900	.620	.000	.772
.970	.650	1.345	-1.900	.645	.000	.772
1.020	.700	1.448	-1.900	.670	.000	.772
1.070	.750	1.551	-1.900	.695	.000	.772
1.120	.800	1.655	-1.900	.720	.000	

O. D. L. TANK (C)

COMP. NO 102

LEVEL FROM		VOLUME CUBM	CENTRE OF GRAVITY FROM			INERTIA MOMENT
BL	BOTTOM		LPP/2	BL	CL	
.430	.000	.0				
.480	.050	.039	1.600	.455	.000	.067
.530	.100	.079	1.600	.480	.000	.067
.580	.150	.118	1.600	.505	.000	.067
.630	.200	.158	1.600	.530	.000	.067
.680	.250	.197	1.600	.555	.000	.067
.730	.300	.236	1.600	.580	.000	.067
.780	.350	.276	1.600	.605	.000	.067
.830	.400	.315	1.600	.630	.000	.067
.880	.450	.355	1.600	.655	.000	.067
.930	.500	.394	1.600	.680	.000	.067
.980	.550	.433	1.600	.705	.000	.067
1.030	.600	.473	1.600	.730	.000	.067
1.080	.650	.512	1.600	.755	.000	.000
1.080	.650	.512	1.600	.755	.000	