

MARITIME & COASTGUARD AGENCY

in conjunction with

SCOTTISH QUALIFICATIONS AUTHORITY

EXAMINATION FOR CHIEF MATE CERTIFICATE OF COMPETENCY

SHIP STABILITY DATA SHEETS

The data sheets are intended for exercise and examination purposes only and are limited extracts from the original ship data.

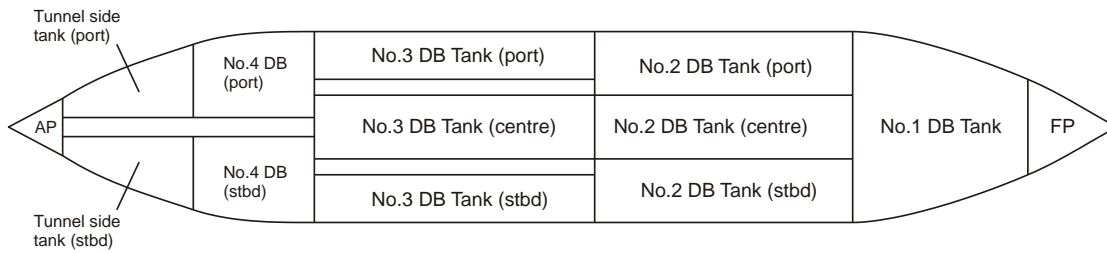
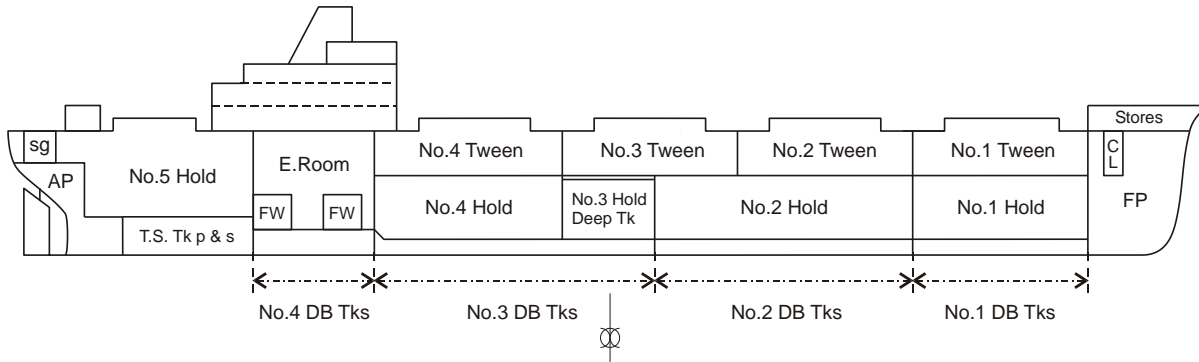
CONTENTS

Item No.	Content	Page No.
1	Contents	1
2	General particulars	2
3	Plan showing cargo spaces, storerooms and tanks	3
4	Cargo and tank capacities	4
5	Hydrostatic particulars	5/6
6	Tabulated KN values	7
7	Maximum KG values	8
8	Angle of Heel data	9
9	Grain: Full holds and tween decks, Volumetric heeling moments.	10
10	Grain: No. 1 tween deck, Volumetric heeling moments	11
11	Grain: No. 2 tween deck, Volumetric heeling moments	12
12	Grain: No. 3 tween deck, Volumetric heeling moments	13
13	Grain: No. 4 tween deck, Volumetric heeling moments	14
14	Grain: Maximum Permissible Grain Heeling moments	15/16
15	Worksheet, trim and stability	17

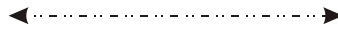
GENERAL PARTICULARS

Ship's Name:	Ship A		
Moulded Dimensions	LBP	137.50 metres	
	Breadth	20.42 metres	
	Depth	11.75 metres	
Summer Load Draught:	8.867 metres		
Block Coefficient:	0.7437		
Summer Load Displacement	19006 tonnes		
Light Displacement:	3831 tonnes	Light KG	8.21 metres
Deadweight:	15175 tonnes		
Gross Tonnage:	8996		
Net Tonnage:	6238		

PLAN SHOWING CARGO SPACES, STOREROOMS AND TANKS



Approximate Scale = 40 metres



CARGO CAPACITIES

COMPARTMENT	GRAIN CAPACITY Metres ³	BALE CAPACITY Metre ³	LCG (foap) Metres	KG above keel Metres
No. 1 Hold	2215	1966	114.48	5.09
No. 2 Hold	4672	4254	89.97	4.95
No. 3 Hold	1742	1536	68.91	4.94
No. 4 Hold	3474	3161	51.77	4.95
No. 5 Hold	2605	2371	17.26	8.76
TOTAL HOLDS	14708	13288		
No. 1 Tween Deck	1695	1581	115.52	11.26
No. 2 Tween Deck	1676	1583	95.59	10.78
No. 3 Tween Deck	1626	1523	74.05	10.59
No. 4 Tween Deck	1674	1561	51.67	10.57
TOTAL TWEEN DECKS	6671	6248		
TOTAL HOLDS AND TWEEN DECKS	21379	19536		

TANK CAPACITIES

FSMs for even keel with no list

	CAPACITY Metres ³	LCG foap Metres	KG above keel Metres	TCG from centreline Metres	FSM For FW Metres ⁴
WATER BALLAST					
Fore Peak	554	130.56	8.43		519
After Peak	108	3.07	7.73		325
No. 3 Hold	1786	68.91	4.94		8113
No. 1 D.B. tank across	255	113.95	0.61		3722
No. 2 D.B. tank centre	271	90.00	0.59		1021
No. 2 D.B. tank port	223	89.47	0.60	6.48	680
No. 2 D.B. tank starb'd	223	89.47	0.60	6.48	680
HEAVY FUEL OIL					
No. 3 D.B. tank centre	271	57.02	0.60		1142
No. 3 D.B. tank port	153	57.87	0.63	7.29	275
No 3 D.B. tank starb'd	153	57.87	0.63	7.29	275
Tunnel side tank port	198	21.08	2.29	2.04	246
Tunnel side tank starb'd	198	21.08	2.29	2.04	246
DIESEL OIL					
No. 4 D.B. tank port	55	35.66	0.83	4.45	168
No. 4 D.B. tank starb'd	52	35.50	0.83	4.45	150
FRESH WATER					
Forward tank	51	32.47	7.35		29
After tank	44	28.67	7.38		46

HYDROSTATIC PARTICULARS

DRAUGHT m	DISPLACEMENT t		TPC t		MCTC tm		KM _T m	KB m	LCB foap m	LCF foap m
	SW RD 1.025	FW RD 1.000	SW RD 1.025	FW RD 1.000	SW RD 1.025	FW RD 1.000				
10.00	21789	21258	24.85	24.24	224.8	219.3	8.69	5.25	68.71	65.11
9.90	21541	21016	24.80	24.20	223.6	218.1	8.67	5.20	68.75	65.16
9.80	21293	20774	24.75	24.15	222.4	217.0	8.64	5.15	68.79	65.20
9.70	21046	20533	24.70	24.10	221.2	215.8	8.62	5.10	68.83	65.25
9.60	20799	20292	24.65	24.05	220.0	214.6	8.60	5.04	68.87	65.29
9.50	20553	20052	24.60	24.00	218.8	213.5	8.58	4.99	68.92	65.34
9.40	20307	19812	24.55	23.95	217.6	212.3	8.56	4.93	68.96	65.39
9.30	20062	19573	24.50	23.90	216.4	211.1	8.54	4.88	69.00	65.45
9.20	19817	19334	24.45	23.85	215.2	210.0	8.52	4.82	69.04	65.50
9.10	19573	19096	24.40	23.80	213.0	207.8	8.50	4.77	69.09	65.56
9.00	19329	18858	24.35	23.76	212.7	207.5	8.48	4.72	69.13	65.62
8.90	19086	18620	24.30	23.71	211.5	206.3	8.47	4.67	69.18	65.68
8.80	18843	18383	24.24	23.65	210.2	205.1	8.45	4.61	69.22	65.74
8.70	18601	18147	24.18	23.59	208.0	202.9	8.43	4.56	69.27	65.81
8.60	18359	17911	24.13	23.54	207.7	202.6	8.42	4.50	69.31	65.87
8.50	18119	17677	24.08	23.49	206.4	201.4	8.41	4.45	69.36	65.95
8.40	17878	17442	24.02	23.43	205.1	200.1	8.39	4.39	69.40	66.02
8.30	17639	17208	23.96	23.38	203.8	198.8	8.38	4.34	69.45	66.10
8.20	17399	16975	23.90	23.32	202.4	197.5	8.37	4.28	69.49	66.17
8.10	17161	16742	23.84	23.26	201.0	196.1	8.36	4.23	69.54	66.25
8.00	16922	16509	23.78	23.20	199.6	194.7	8.35	4.17	69.58	66.33
7.90	16685	16278	23.71	23.13	198.2	193.4	8.35	4.12	69.63	66.42
7.80	16448	16047	23.65	23.07	196.8	192.0	8.34	4.07	69.67	66.51
7.70	16212	15817	23.59	23.01	195.4	190.6	8.34	4.02	69.72	66.61
7.60	15976	15586	23.52	22.95	193.9	189.2	8.33	3.96	69.76	66.71
7.50	15742	15358	23.45	22.88	192.4	187.7	8.33	3.91	69.81	66.82
7.40	15507	15129	23.39	22.82	190.9	186.2	8.33	3.85	69.85	66.92
7.30	15274	14901	23.33	22.76	189.4	184.8	8.33	3.80	69.90	67.03
7.20	15040	14673	23.26	22.69	187.8	183.2	8.33	3.75	69.94	67.13
7.10	14808	14447	23.19	23.32	186.2	181.7	8.34	3.70	69.99	67.24
7.00	14576	14220	23.13	22.57	184.6	180.1	8.34	3.64	70.03	67.35
6.90	14345	13996	23.06	22.50	183.0	178.5	8.35	3.58	70.08	67.46
6.80	14115	13771	22.99	22.43	181.4	177.0	8.36	3.53	70.12	67.57
6.70	13886	13548	22.92	22.36	179.9	175.5	8.37	3.48	70.16	67.68
6.60	13657	13324	22.85	22.29	178.3	174.0	8.38	3.43	70.20	67.79
6.50	13429	13102	22.78	22.23	176.8	172.5	8.39	3.38	70.24	67.90
6.40	13201	12879	22.72	22.17	175.3	171.0	8.41	3.33	70.28	68.00
6.30	12975	12658	22.66	22.11	173.9	169.6	8.43	3.28	70.32	68.10
6.20	12748	12437	22.60	22.05	172.5	168.3	8.46	3.22	70.35	68.20
6.10	12523	12217	22.54	21.99	171.1	167.0	8.49	3.17	70.38	68.30
6.00	12297	11997	22.48	21.93	169.8	165.7	8.52	3.11	70.42	68.39
5.90	12073	11778	22.43	21.87	168.5	164.4	8.55	3.06	70.46	68.43
5.80	11848	11559	22.37	21.82	167.3	163.2	8.59	3.01	70.50	68.57
5.70	11625	11342	22.32	21.77	166.1	162.1	8.63	2.95	70.53	68.65

DRAUGHT m	DISPLACEMENT t		TPC t		MCTC tm		KM _T m	KB m	LCB foap m	LCF Foap m
	SW RD 1.025	FW RD 1.000	SW RD 1.025	FW RD 1.000	SW RD 1.025	FW RD 1.000				
5.60	11402	11124	22.26	21.72	165.0	161.0	8.67	2.90	70.57	68.73
5.50	11180	10908	22.21	21.66	163.9	160.0	8.71	2.85	70.60	68.80
5.40	10958	10691	22.15	21.61	162.9	158.9	8.76	2.80	70.64	68.88
5.30	10737	10476	22.10	21.56	161.8	157.9	8.81	2.74	70.68	68.95
5.20	10516	10260	22.05	21.51	160.8	156.9	8.86	2.69	70.72	69.02
5.10	10296	10045	22.00	21.46	159.8	155.9	8.92	2.63	70.75	69.09
5.00	10076	9830	21.95	21.41	158.8	154.9	8.98	2.58	70.79	69.16
4.90	9857	9616	21.90	21.36	157.9	154.0	9.06	2.53	70.82	69.23
4.80	9638	9403	21.85	21.32	156.9	153.1	9.13	2.48	70.86	69.29
4.70	9420	9190	21.80	21.27	156.0	152.2	9.22	2.43	70.90	69.35
4.60	9202	8978	21.75	21.22	155.1	151.3	9.30	2.38	70.93	69.42
4.50	8985	8766	21.70	21.17	154.2	150.5	9.40	2.32	70.96	69.48
4.40	8768	8554	21.65	21.12	153.3	149.6	9.49	2.27	71.00	69.55
4.30	8552	8344	21.60	21.07	152.4	148.7	9.60	2.22	71.04	69.62
4.20	8336	8133	21.55	21.02	151.5	147.8	9.71	2.17	71.08	69.68
4.10	8121	7923	21.50	20.97	150.6	146.9	9.83	2.12	71.12	69.74
4.00	7906	7713	21.45	20.93	149.7	146.0	9.96	2.07	71.15	69.81
3.90	7692	7505	21.40	20.88	148.7	145.1	10.11	2.01	71.18	69.88
3.80	7478	7296	21.35	20.83	147.8	144.2	10.25	1.96	71.22	69.94
3.70	7265	7088	21.30	20.78	146.8	143.3	10.41	1.91	71.25	70.00
3.60	7052	6880	21.24	20.72	145.9	142.3	10.57	1.86	71.29	70.07
3.50	6840	6673	21.19	20.67	144.9	141.3	10.76	1.81	71.33	70.14
3.40	6628	6466	21.13	20.61	143.9	140.4	10.95	1.75	71.37	70.20
3.30	6418	6261	21.08	20.56	142.9	139.4	11.18	1.70	71.41	70.27
3.20	6207	6056	21.02	20.51	141.9	138.4	11.40	1.65	71.44	70.33
3.10	5998	5852	20.96	20.45	140.9	137.5	11.66	1.60	71.48	70.40
3.00	5788	5647	20.90	20.39	139.9	136.5	11.92	1.55	71.52	70.46
2.90	5580	5444	20.84	20.33	138.9	135.5	12.22	1.50	71.56	70.53
2.80	5371	5240	20.78	20.27	137.9	134.5	12.52	1.44	71.60	70.59
2.70	5164	5038	20.72	20.21	136.9	133.6	12.87	1.39	71.64	70.66
2.60	4957	4836	20.65	20.15	135.9	132.6	13.21	1.34	71.67	70.73
2.50	4752	4636	20.58	20.08	134.9	131.6	13.63	1.29	71.71	70.80
2.40	4546	4435	20.51	20.01	133.9	130.6	14.04	1.23	71.75	70.87
2.30	4342	4236	20.44	19.94	132.9	129.6	14.56	1.18	71.79	70.94
2.20	4138	4037	20.36	19.86	131.8	128.6	15.07	1.13	71.83	71.01
2.10	3936	3840	20.28	19.79	130.7	127.5	15.72	1.08	71.87	71.08
2.00	3733	3642	20.20	19.71	129.5	126.3	16.36	1.02	71.91	71.15
1.90	3532	3446	20.12	19.63	128.3	125.2	17.19	0.97	71.96	71.22
1.80	3331	3250	20.03	19.54	127.0	123.9	18.01	0.92	72.00	71.29
1.70	3132	3055	19.93	19.45	125.6	122.5	19.08	0.87	72.05	71.37
1.60	2932	2860	19.83	19.35	124.1	121.1	20.15	0.82	72.09	71.44

THESE HYDROSTATIC PARTICULARS HAVE BEEN DEVELOPED WITH THE
VESSEL FLOATING ON EVEN KEEL

TABULATED KN VALUES

KN values in metres

KN values calculated for vessel on even keel and fixed trim

W tonnes	ANGLE OF HEEL - DEGREES						
	12	20	30	40	50	60	75
20000	1.80	2.90	4.14	5.14	5.92	6.51	6.84
19500	1.79	2.90	4.17	5.19	5.97	6.55	6.86
19000	1.78	2.91	4.20	5.24	6.02	6.59	6.88
18500	1.77	2.92	4.23	5.29	6.07	6.63	6.90
18000	1.75	2.93	4.27	5.36	6.12	6.67	6.92
17500	1.75	2.94	4.30	5.43	6.18	6.71	6.94
17000	1.74	2.95	4.34	5.48	6.23	6.75	6.96
16500	1.74	2.97	4.37	5.54	6.29	6.79	6.98
16000	1.73	2.98	4.40	5.60	6.35	6.83	7.00
15500	1.73	2.98	4.44	5.66	6.44	6.87	7.02
15000	1.73	2.98	4.48	5.72	6.48	6.91	7.04
14500	1.74	2.98	4.51	5.79	6.58	6.95	7.07
14000	1.75	2.98	4.53	5.81	6.68	7.00	7.10
13500	1.76	2.99	4.56	5.86	6.73	7.05	7.13
13000	1.77	3.00	4.59	5.90	6.78	7.10	7.16
12500	1.78	3.03	4.64	5.96	6.83	7.15	7.19
12000	1.79	3.06	4.68	6.02	6.88	7.20	7.21
11500	1.81	3.10	4.73	6.07	6.93	7.25	7.24
11000	1.83	3.14	4.78	6.12	6.98	7.30	7.26
10500	1.84	3.19	4.81	6.17	7.02	7.35	7.29
10000	1.87	3.24	4.85	6.21	7.08	7.40	7.31
9500	1.93	3.28	4.91	6.25	7.11	7.45	7.34
9000	2.00	3.36	4.96	6.28	7.18	7.50	7.36
8500	2.05	3.43	5.03	6.32	7.20	7.55	7.39
8000	2.10	3.52	5.09	6.35	7.22	7.60	7.41
7500	2.17	3.62	5.17	6.38	7.24	7.65	7.43
7000	2.22	3.70	5.25	6.41	7.26	7.70	7.45
6500	2.32	3.85	5.35	6.44	7.27	7.70	7.47
6000	2.42	4.00	5.45	6.48	7.28	7.70	7.49
5500	2.57	4.15	5.55	6.53	7.29	7.68	7.47
5000	2.72	4.32	5.67	6.58	7.30	7.66	7.45
4500	2.92	4.55	5.79	6.64	7.25	7.60	7.42
4000	3.15	4.75	5.91	6.71	7.22	7.52	7.40
3500	3.45	5.00	6.08	6.78	7.20	7.42	7.38

KN values are for hull and forecastle only

**MAXIMUM KG TO COMPLY WITH MINIMUM INTACT STABILITY CRITERIA SPECIFIED
IN THE CURRENT LOADLINE RULES**

Displacement t	KG m
19500	7.85
19000	7.93
18500	8.02
18000	8.10
17500	8.17
17000	8.20
16500	8.19
16000	8.18
15500	8.18
15000	8.19
14500	8.20
14000	8.22
13500	8.24
13000	8.28
12500	8.34
12000	8.42
11500	8.50
11000	8.60
10500	8.71
10000	8.85
9500	9.03
9000	9.24
8500	9.48
8000	9.73
7500	9.82
7000	9.62
6500	9.42
6000	9.18
5500	8.84
5000	8.40

ANGLE OF HEEL DATA

Displacement In Tonnes	Angle to Immerse Deck Edge °	Angle of Flooding °	Wind Moment In Tonne.metres
4000	54.9	76.8	897
5000	50.3	73.3	869
6000	46.7	69.8	841
7000	43.6	66.7	814
8000	40.7	63.6	786
9000	38.0	60.6	760
10000	35.3	57.8	733
11000	32.9	55.2	707
12000	30.8	52.8	681
13000	28.4	50.6	655
14000	26.3	48.5	630
15000	24.3	46.5	604
16000	22.3	44.5	580
17000	20.3	42.6	555
18000	18.2	40.6	531
19000	16.0	38.7	507
20000	13.8	36.7	483

GRAIN HEELING MOMENTS

FULL HOLDS

HOLD	GRAIN CAPACITY Metres ³	VOLUMETRIC HEELING MOMENT Metres ⁴	KG of HOLD Metres
No. 1	2215	410	5.09
No. 2	4672	1285	4.95
No. 3	1742	475	4.94
No. 4	3474	910	4.95
No. 5	2605	455	8.76

FULL TWEEN DECKS

TWEEN DECK	GRAIN CAPACITY Metres ³	VOLUMETRIC HEELING MOMENT Metres ⁴	KG of TWEEN DECK Metres
No. 1	1695	352	11.26
No. 2	1676	539	10.78
No. 3	1626	578	10.59
No. 4	1674	604	10.57

NO. 1 TWEEN DECK: VOLUMETRIC HEELING MOMENTS WHEN PARTLY FILLED			
ULLAGE DATUM: Top of hatch side coaming at its mid length No centreline division			
ULLAGE m	VOLUME OF GRAIN m ³	VOLUMETRIC HEELING MOMENT m ⁴	Kg of GRAIN m
0.25	1686	598	11.24
0.50	1668	659	11.19
0.75	1649	746	11.13
1.00	1628	864	11.07
1.25	1607	1016	11.01
1.50	1510	1176	10.94
1.75	1416	1372	10.88
2.00	1324	1577	10.82
2.25	1232	1700	10.75
2.50	1144	2017	10.69
2.75	1059	2218	10.63
3.00	970	2388	10.59
3.25	883	2512	10.55
3.50	800	2579	10.50
3.75	714	2575	10.45
4.00	633	2500	10.39
4.25	550	2362	10.31
4.50	467	2155	10.21
4.75	384	1908	10.20
5.00	302	1592	9.98
5.25	222	1239	9.81
5.50	143	848	9.56
5.75	64	380	9.27
5.95	0	0	8.70
Ullage for maximum volumetric heeling moment			
3.60	764	2578	10.48

The volumetric heeling moment for the slack tween deck has been obtained by calculating the maximum volumetric heeling moment and increasing it by 12%. The Kg of the level grain is to be used when calculating the KG of the ship.

NO. 2 TWEEN DECK: VOLUMETRIC HEELING MOMENTS WHEN PARTLY FILLED			
ULLAGE DATUM: Top of hatch side coaming at its mid length No centreline division			
ULLAGE m	VOLUME OF GRAIN m ³	VOLUMETRIC HEELING MOMENT m ⁴	Kg of GRAIN m
0.25	1659	975	10.76
0.50	1634	1019	10.74
0.75	1609	1122	10.70
1.00	1584	1344	10.69
1.25	1560	1642	10.65
1.50	1472	1948	10.62
1.75	1369	2257	10.59
2.00	1264	2566	10.56
2.25	1165	2874	10.50
2.50	1062	3160	10.44
2.75	959	3350	10.38
3.00	858	3460	10.32
3.25	757	3514	10.28
3.50	658	3432	10.24
3.75	550	3218	10.18
4.00	452	2925	10.11
4.25	349	2473	10.00
4.50	248	1868	9.85
4.75	143	1160	9.62
5.00	47	368	9.23
5.12	0	0	8.70
Ullage for maximum volumetric heeling moment			
3.25	757	3514	10.28

The volumetric heeling moment for the slack tween deck has been obtained by calculating the maximum volumetric heeling moment and increasing it by 12%. The Kg of the level grain is to be used when calculating the KG of the ship.

NO. 3 TWEEN DECK: VOLUMETRIC HEELING MOMENTS WHEN PARTLY FILLED			
ULLAGE DATUM: Top of hatch side coaming at its mid length No centreline division			
ULLAGE m	VOLUME OF GRAIN m ³	VOLUMETRIC HEELING MOMENT m ⁴	Kg of GRAIN m
0.25	1598	1028	10.55
0.50	1569	1051	10.53
0.75	1540	1122	10.50
1.00	1512	1268	10.48
1.25	1476	1547	10.47
1.50	1399	1900	10.45
1.75	1308	2236	10.42
2.00	1203	2558	10.36
2.25	1086	2863	10.32
2.50	979	3142	10.25
2.75	866	3304	10.19
3.00	758	3339	10.13
3.25	649	3291	10.08
3.50	538	3109	10.04
3.75	427	2750	9.98
4.00	317	2262	9.86
4.25	206	1610	9.62
4.50	97	796	9.37
4.72	0	0	8.70
Ullage for maximum volumetric heeling moment			
3.00	7.58	3339	10.13

The volumetric heeling moment for the slack tween deck has been obtained by calculating the maximum volumetric heeling moment and increasing it by 12%. The Kg of the level grain is to be used when calculating the KG of the ship.

NO. 4 TWEEN DECK: VOLUMETRIC HEELING MOMENTS WHEN PARTLY FILLED			
ULLAGE DATUM: Top of hatch side coaming at its mid length No centreline division			
ULLAGE m	VOLUME OF GRAIN m ³	VOLUMETRIC HEELING MOMENT m ⁴	Kg of GRAIN m
0.25	1646	1072	10.58
0.50	1618	1147	10.56
0.75	1589	1248	10.54
1.00	1561	1398	10.52
1.25	1530	1592	10.50
1.50	1452	1847	10.47
1.75	1360	2150	10.43
2.00	1243	2512	10.37
2.25	1132	2857	10.32
2.50	1014	3116	10.27
2.75	900	3278	10.20
3.00	786	3323	10.14
3.25	672	3283	10.09
3.50	555	3094	10.04
3.75	444	2794	9.98
4.00	329	2250	9.85
4.25	213	1526	9.67
4.50	98	813	9.37
4.72	0	0	8.70
Ullage for maximum volumetric heeling moment			
3.00	786	3323	10.14

The volumetric heeling moment for the slack tween deck has been obtained by calculating the maximum volumetric heeling moment and increasing it by 12%. The Kg of the level grain is to be used when calculating the KG of the ship.

TABLE OF MAXIMUM PERMISSIBLE GRAIN HEELING MOMENTS (tonne.metres)

W (tonnes)	FLUID KG (metres)															
	5.50	5.60	5.70	5.80	5.90	6.00	6.10	6.20	6.30	6.40	6.50	6.60	6.70	6.80	6.90	7.00
5000	8425	8315	8204	8094	7983	7873	7762	7651	7541	7430	7320	7209	7099	6988	6877	6767
5500	8336	8214	8093	7971	7850	7728	7606	7485	7363	7241	7120	6998	6877	6755	6633	6512
6000	8158	8026	7893	7760	7628	7495	7362	7230	7097	6964	6832	6699	6566	6434	6301	6168
6500	7987	7843	7699	7556	7412	7268	7124	6981	6837	6693	6550	6406	6262	6118	5975	5831
7000	7891	7737	7582	7427	7272	7117	6963	6808	6653	6498	6343	6189	6034	5879	5724	5569
7500	7911	7745	7579	7413	7248	7082	6916	6750	6584	6418	6252	6087	5921	5755	5589	5423
8000	7979	7802	7625	7448	7271	7094	6917	6741	6564	6387	6210	6033	5856	5679	5502	5325
8500	8006	7818	7630	7442	7254	7066	6879	6691	6503	6315	6127	5939	5751	5563	5375	5187
9000	8017	7818	7619	7420	7221	7022	6823	6624	6425	6226	6027	5828	5629	5430	5231	5032
9500	8062	7852	7642	7432	7222	7012	6802	6592	6382	6171	5961	5751	5541	5331	5121	4911
10000	8151	7930	7709	7488	7267	7046	6824	6603	6382	6161	5940	5719	5498	5276	5055	4834
10500	8270	8038	7800	7573	7341	7109	6877	6645	6412	6180	5948	5716	5484	5251	5019	4787
11000	8376	8133	7890	7647	7403	7160	6917	6674	6430	6187	5944	5701	5457	5214	4971	4728
11500	8437	8182	7928	7674	7419	7165	6911	6656	6402	6148	5893	5639	5385	5130	4876	4622
12000	8511	8245	7980	7714	7449	7184	6918	6653	6388	6122	5857	5591	5326	5061	4795	4630
12500	8655	8379	8102	7826	7549	7273	6997	6702	6444	6167	5891	5614	5338	5062	4785	4509
13000	8809	8522	8234	7947	7659	7372	7084	6797	6509	6222	5934	5647	5359	5072	4784	4497
13500	8909	8611	8312	8013	7715	7416	7118	6819	6521	6222	5924	5625	5327	5028	4730	4431
14000	9053	8743	8434	8124	7815	7505	7195	6886	6576	6267	5957	5647	5338	5028	4719	4409
14500	9347	9026	8706	8385	8065	7744	7423	7103	6782	6461	6141	5820	5499	5179	4858	4537
15000	9702	9371	9039	8707	8376	8044	7712	7380	7049	6717	6385	6053	5722	5390	5058	4727
15500	10010	9667	9325	8982	8639	8296	7954	7611	7268	6925	6583	6240	5897	5554	5211	4869
16000	10352	9998	9644	9290	8937	8583	8229	7875	7521	7167	6814	6460	6106	5752	5398	5045
16500	10823	10458	10093	9728	9363	8998	8634	8269	7904	7539	7174	6809	6444	6079	5715	5350
17000	11329	10953	10577	10201	9826	9450	9074	8698	8322	7946	7570	7194	6818	6442	6066	5690
17500	11762	11375	10988	10601	10214	9827	9440	9053	8666	8279	7892	7505	7118	6731	6344	5957
18000	12173	11775	11377	10979	10581	10183	9785	9387	8989	8590	8192	7794	7396	6998	6600	6202
18500	12626	12217	11808	11398	10989	10580	10171	9762	9353	8944	8535	8125	7716	7307	6898	6489
19000	13040	12619	12199	11779	11359	10939	10519	10098	9678	9258	8838	8418	7998	7577	7157	6737
19500	13376	12945	12514	12082	11651	11220	10789	10357	9926	9495	9064	8633	8201	7770	7339	6908

TABLE OF MAXIMUM PERMISSIBLE GRAIN HEELING MOMENTS (tonne.metres)

W (tonnes)	FLUID KG (metres)															
	7.10	7.20	7.30	7.40	7.50	7.60	7.70	7.80	7.90	8.00	8.10	8.20	8.30	8.40		
5000	6656	6546	6435	6325	6214	6103	5993	5882	5772	5661	5551	5440	5329			
5500	6390	6268	6147	6025	5903	5782	5660	5539	5417	5295	5174	5052	4930	4809		
6000	6035	5903	5770	5637	5505	5372	5239	5107	4974	4841	4709	4576	4443	4311		
6500	5687	5543	5400	5256	5112	4968	4825	4681	4537	4393	4250	4106	3962	3818		
7000	5415	5260	5105	4950	4795	4641	4486	4331	4176	4021	3867	3712	3557	3402		
7500	5257	5091	4926	4760	4594	4428	4262	4096	3930	3765	3599	3433	3267	3101		
8000	5148	4971	4795	4618	4441	4264	4087	3910	3733	3556	3379	3202	3025	2848		
8500	4999	4811	4623	4435	4247	4059	3871	3683	3495	3307	3119	2931	2743	2555		
9000	4833	4634	4435	4236	4037	3838	3639	3440	3241	3041	2842	2643	2444	2245		
9500	4701	4491	4281	4071	3860	3650	3440	3230	3020	2810	2600	2390	2180	1970		
10000	4613	4392	4171	3950	3728	3507	3286	3065	2844	2623	2402	2180	1959	1738		
10500	4555	4323	4090	3858	3626	3394	3162	2929	2697	2465	2233	2001	1768	1536		
11000	4484	4241	3998	3755	3511	3268	3025	2782	2538	2295	2052	1808	1565	1322		
11500	4368	4113	3859	3605	3350	3096	2842	2587	2333	2079	1824	1570	1316			
12000	4265	3999	3734	3468	3203	2938	2672	2407	2142	1876	1611	1346				
12500	4232	3956	3679	3403	3127	2850	2574	2297	2021	1744	1468					
13000	4209	3922	3634	3347	3059	2772	2484	2197	1909	1622	1335					
13500	4132	3834	3535	3237	2938	2640	2341	2043	1744	1446						
14000	4099	3790	3480	3171	2861	2551	2242	1932	1623	1313						
14500	4217	3896	3575	3255	2934	2613	2293	1972	1651	1331						
15000	4395	4063	3731	3400	3068	2736	2405	2073	1741	1409						
15500	4526	4183	3840	3498	3155	2812	2469	2127	1784	1441						
16000	4691	4337	3983	3629	3275	2922	2568	2214	1860	1506						
16500	4985	4620	4255	3890	3525	3160	2795	2431	2066	1701						
17000	5314	4938	4562	4186	3810	3434	3059	2683	2079	1064						
17500	5570	5183	4796	4409	4022	3635	3248	2411	1324	383						
18000	5804	5406	5008	4610	4212	3814	2563	1493	542							
18500	6080	5671	5262	4853	3721	2662	1681	793	14							
19000	6317	5897	5076	3995	2974	2029	1156	349								
19500	6476	5616	4490	3427	2436	1514	644									

