

Equilibrium Calculation PD 1000

Empty craft condition, m_{EC}

Equilibrium Calculation - 1000.5

(High precision, 62 sections, Trimming on, Skin thickness not applied). Long. datum: Aft extremity; Vert. datum: Baseline.

Analysis tolerance - ideal(worst case): Disp. %: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

Loadcase - Loadcase 1

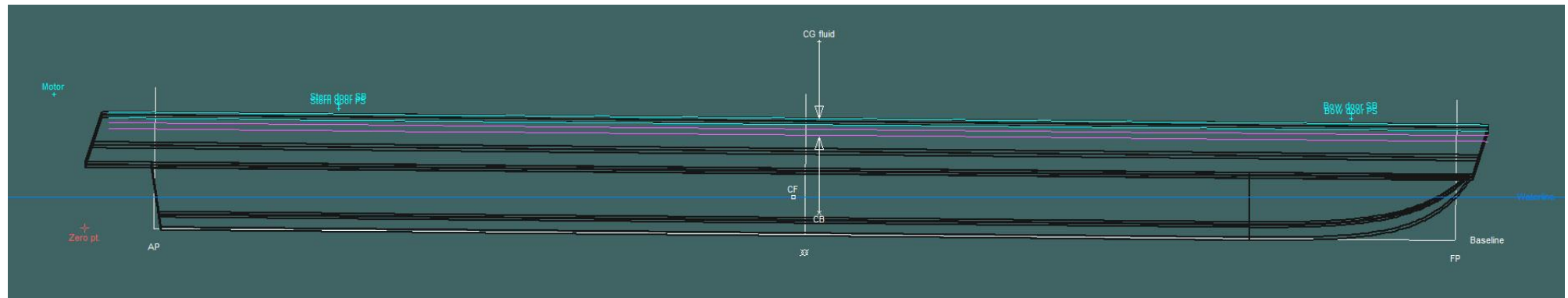
Damage Case - Intact

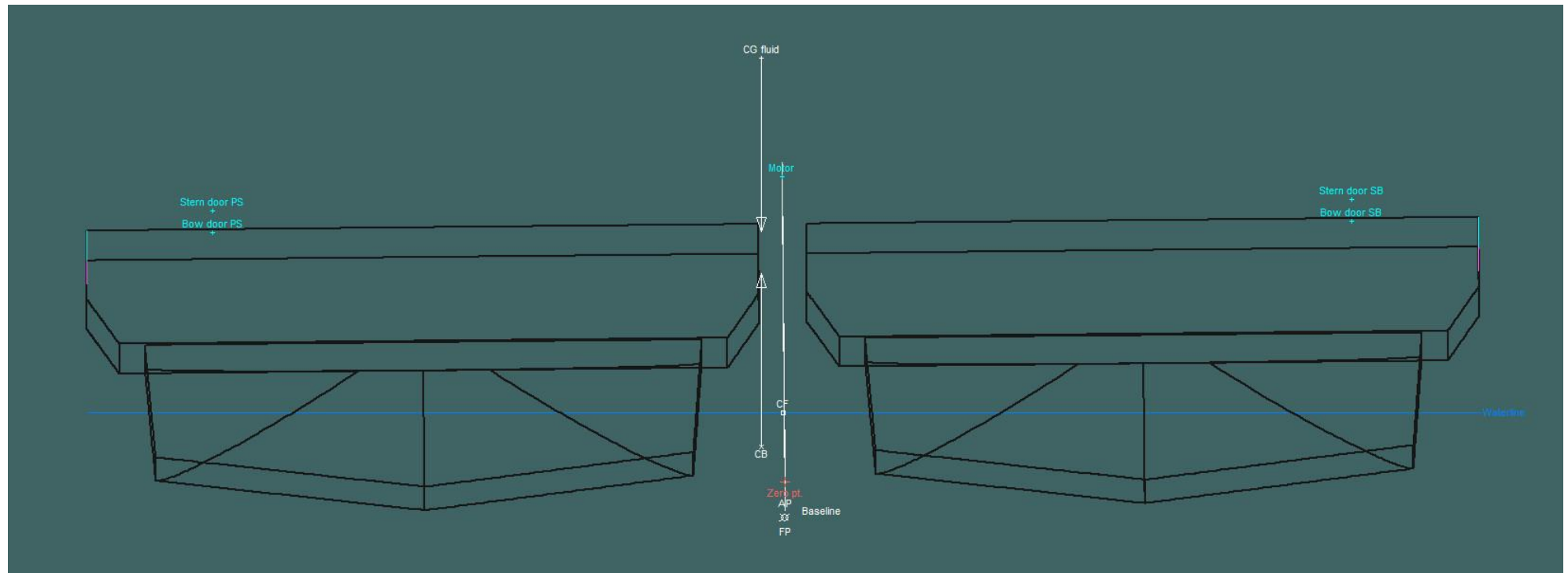
Free to Trim

Specific gravity = 1,025; (Density = 1025 kg/m³)

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass kg	Total Mass kg	Unit Volume m ³	Total Volume m ³	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM kg.m	FSM Type
Lightship	1	6440,0	6440,0			5,220	-0,060	1,370	0,000	User Specified
Total Loadcase			6440,0	0,000	0,000	5,220	-0,060	1,370	0,000	
FS correction								0,000		
VCG fluid								1,370		





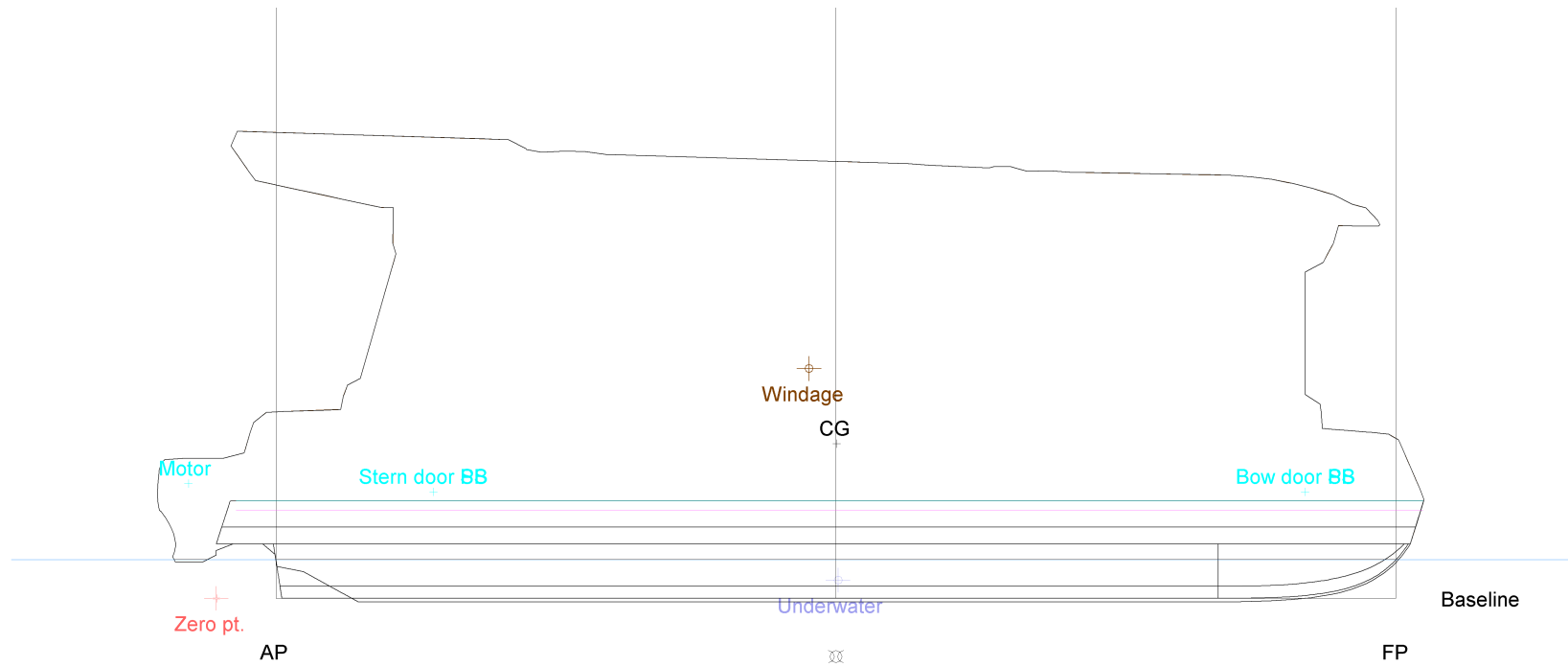
Draft Amidships m	0,265
Displacement kg	6440
Heel deg	-0,6
Draft at FP m	0,308
Draft at AP m	0,221
Draft at LCF m	0,264
Trim (+ve by stern) m	-0,087
WL Length m	9,276
Beam max extents on WL m	3,963
Wetted Area m^2	36,002
Waterpl. Area m^2	30,552
Prismatic coeff. (Cp)	0,817
Block coeff. (Cb)	0,559
Max Sect. area coeff. (Cm)	0,684
Waterpl. area coeff. (Cwp)	0,831
LCB from zero pt. (+ve fwd) m	5,231
LCF from zero pt. (+ve fwd) m	5,045
KB m	0,158

KG fluid m	1,370
BMt m	7,314
BML m	32,610
GMt corrected m	6,102
GML m	31,398
KMt m	7,471
KML m	32,766
Immersion (TPc) tonne/cm	0,313
MTc tonne.m	0,218
RM at 1deg = GMt.Disp.sin(1) kg.m	685,807
Max deck inclination deg	0,7794
Trim angle (+ve by stern) deg	-0,5391

Key point	Type	Freeboard m
Margin Line (freeboard pos = 10 m)		0,397
Deck Edge (freeboard pos = 10 m)		0,473
Motor	Downflooding point	0,736
Stern door SB	Downflooding point	0,664
Stern door PS	Downflooding point	0,629
Bow door SB	Downflooding point	0,596
Bow door PS	Downflooding point	0,561

Code	Criteria	Value	Units	Actual	Status	Margin %
ISO 12217-1:2002(E)	6.1.2 Downflooding height at equilibrium	0,400	m	0,561	Pass	+40,25
ISO 12217-1:2002(E)	6.2 Offset load test - heel at equilibrium	10,0	deg	-0,6	Pass	+105,63
ISO 12217-1:2002(E)	6.2 Offset load test - required freeboard at equilibrium	0,045	m	0,561	Pass	+1146,67

PD1000



Profile View

Minimum operating condition, m_{MO}

Stability Calculation - 1000.5

(High precision, 62 sections, Trimming on, Skin thickness not applied). Long. datum: Aft extremity; Vert. datum: Baseline.

Analysis tolerance - ideal(worst case): Disp. %: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

Loadcase - Loadcase 6

Damage Case - Intact

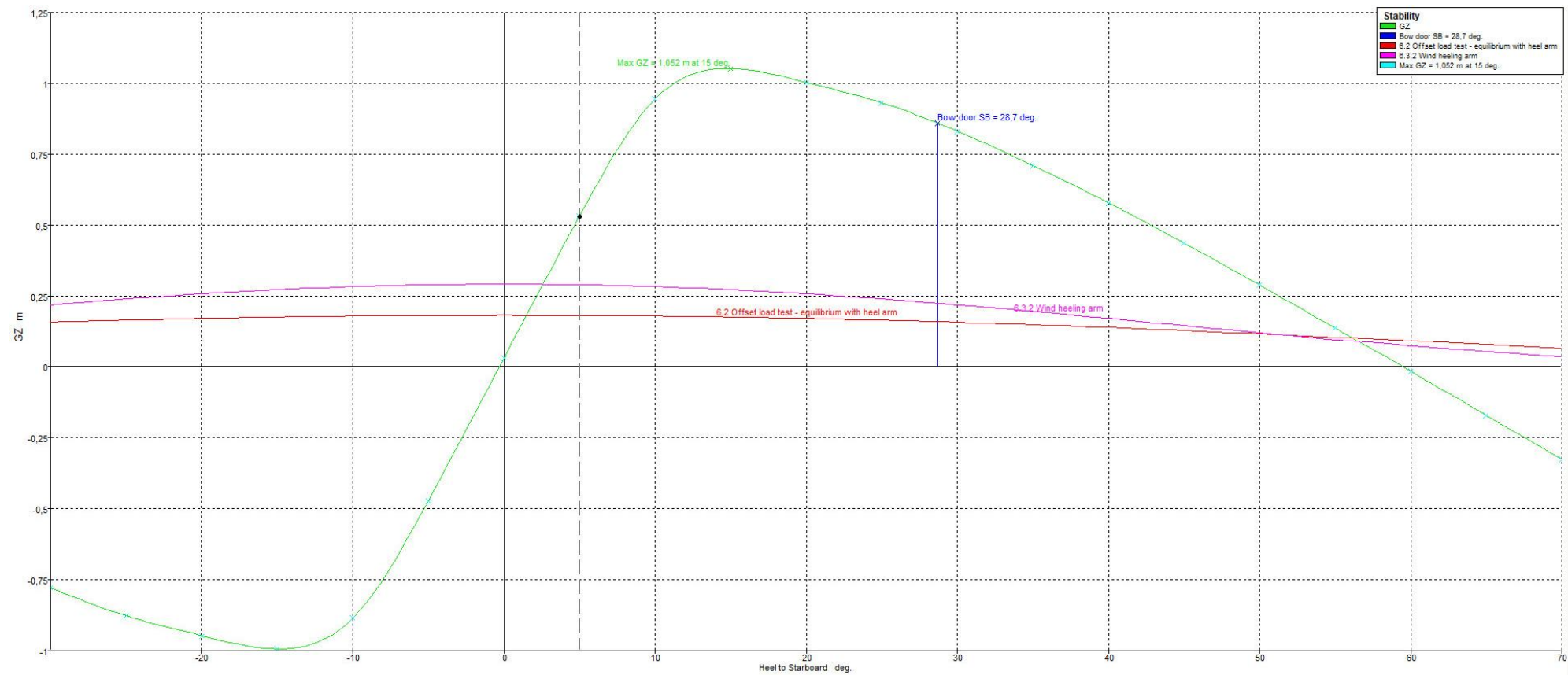
Free to Trim

Specific gravity = 1,025; (Density = 1025 kg/m³)

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass kg	Total Mass kg	Unit Volume m ³	Total Volume m ³	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM kg.m	FSM Type
Minimum operating condition mMO	1	6850,0	6850,0			5,240	-0,030	1,370	0,000	User Specified
Total Loadcase			6850,0	0,000	0,000	5,240	-0,030	1,370	0,000	
FS correction								0,000		
VCG fluid								1,370		

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0	30,0	35,0	40,0	45,0	50,0	55,0	60,0	65,0	70,0
GZ m	-0,779	-0,877	-0,947	-0,994	-0,886	-0,473	0,030	0,533	0,945	1,052	1,003	0,931	0,831	0,711	0,578	0,437	0,289	0,137	-0,017	-0,172	-0,327
Area under GZ curve from zero heel m.rad	0,4015	0,3291	0,2494	0,1643	0,0803	0,0194	0,0000	0,0247	0,0907	0,1798	0,2699	0,3545	0,4316	0,4989	0,5553	0,5996	0,6314	0,6500	0,6552	0,6469	0,6251
Displacement kg	6850	6850	6850	6850	6850	6850	6850	6849	6850	6850	6850	6850	6850	6850	6850	6850	6850	6850	6850	6850	6850
Draft at FP m	-0,109	0,000	0,107	0,222	0,293	0,323	0,329	0,323	0,293	0,222	0,108	0,000	-0,108	-0,227	-0,358	-0,510	-0,689	-0,909	-1,193	-1,578	-2,142
Draft at AP m	-0,313	-0,166	-0,031	0,091	0,193	0,228	0,224	0,228	0,193	0,091	-0,031	-0,166	-0,313	-0,475	-0,658	-0,869	-1,120	-1,430	-1,827	-2,364	-3,146
WL Length m	10,002	10,001	10,001	10,001	9,961	9,428	9,292	9,428	9,961	10,001	10,001	10,001	10,002	10,002	10,003	10,004	10,004	10,005	10,006	10,006	10,007
Beam max extents on WL m	1,930	2,103	2,209	2,725	3,623	4,089	3,966	4,089	3,623	2,725	2,209	2,104	1,930	1,786	1,657	1,536	1,418	1,302	1,186	1,070	0,952
Wetted Area m ²	26,027	25,686	24,955	24,601	33,054	36,941	37,266	36,940	33,053	24,603	24,955	25,686	26,027	26,239	26,388	26,498	26,581	26,647	26,700	26,743	26,779
Waterpl. Area m ²	13,768	15,917	18,124	18,920	27,057	31,106	30,791	31,105	27,057	18,921	18,123	15,917	13,768	12,185	11,005	10,105	9,408	8,864	8,441	8,115	7,870
Prismatic coeff. (Cp)	0,817	0,815	0,813	0,807	0,786	0,805	0,807	0,805	0,786	0,807	0,813	0,815	0,817	0,817	0,818	0,817	0,817	0,817	0,816	0,816	0,817
Block coeff. (Cb)	0,447	0,443	0,459	0,404	0,359	0,428	0,579	0,428	0,359	0,404	0,459	0,443	0,447	0,452	0,460	0,473	0,493	0,521	0,560	0,590	0,630
LCB from zero pt. (+ve fwd) m	5,270	5,265	5,261	5,259	5,254	5,253	5,253	5,253	5,254	5,259	5,261	5,265	5,271	5,277	5,283	5,289	5,295	5,299	5,303	5,306	5,308
LCF from zero pt. (+ve fwd) m	4,977	4,962	4,922	5,086	5,085	5,144	5,028	5,144	5,085	5,086	4,922	4,962	4,977	4,980	4,982	4,985	4,988	4,991	4,996	5,001	5,006
Max deck inclination deg	30,0180	25,0162	20,0155	15,0197	10,0181	5,0339	0,6462	5,0338	10,0181	15,0198	20,0155	25,0162	30,0181	35,0196	40,0208	45,0215	50,0215	55,0207	60,0193	65,0171	70,0143
Trim angle (+ve by stern) deg	-1,2596	-1,0259	-0,8544	-0,8058	-0,6142	-0,5863	-0,6462	-0,5855	-0,6150	-0,8068	-0,8561	-1,0273	-1,2630	-1,5321	-1,8472	-2,2177	-2,6624	-3,2100	-3,9080	-4,8416	-6,1814



Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 10 m)		12	n/a
Deck Edge (immersion pos = 10 m)		14,9	n/a
Motor	Downflooding point	Not immersed in positive range	0
Stern door SB	Downflooding point	40,1	0
Stern door PS	Downflooding point	Not immersed in positive range	0
Bow door SB	Downflooding point	28,7	0
Bow door PS	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
ISO 12217-1:2002(E)	6.2 Offset load test - equilibrium with heel arm	10,0	deg	1,5	Pass	+84,98
ISO 12217-1:2002(E)	6.3.2 Rolling in beam waves and wind	100,00	%	26,51	Fail	-73,49
ISO 12217-1:2002(E)	6.3.3 Resistance to waves (Value of GZ)	0,400	m	1,052	Pass	+163,00
ISO 12217-1:2002(E)	6.3.3 Resistance to waves (Value of RM)	50,000	kN.m	70,647	Pass	+41,29
ISO 12217-1:2002(E)	6.4 Heel due to wind action (Categories C and D only)	5,0	deg	2,6	Pass	+48,34

	Code	Criteria	Value	Units	Actual	Status	Margin %
1	ISO 12217-1:2002(E)	6.2 Offset load test - equilibrium with heel arm					
2		<i>Heeling arm = $A / \text{disp.} \cdot \cos^n(\phi)$</i>					
3		A =	1250,000	kg.m			
4		n =	1				
5		<i>Intermediate values</i>					
6		Heel arm amplitude		m	0,182		
7							
8	ISO 12217-1:2002(E)	6.3.2 Wind heeling arm					
9		<i>Wind arm: $a \cdot v^2 \cdot A \cdot (h - H) / (g \cdot \text{disp.}) \cdot \cos^n(\phi)$</i>					
10		constant: a (0.5 rho _{air} Cd) =	0,3	kg/m ³			
11		wind velocity: v =	50,000	kn			
12		approx. area centroid height: h = A/Lwl + TmidWL	3,437	m			
13		additional area: A =	0,000	m ²			
14		H = vert. centre of projected lat. u'water area	0,068	m			
15		cosine power: n =	2				
16		gust ratio	1				
17		<i>Intermediate values</i>					
18		Model windage area		m ²	29,362		
19		Model windage area centroid height (from zero point)		m	1,826		
20		Total windage area		m ²	29,362		
21		Total windage area centroid height (from zero point)		m	3,437		
22		Heel arm amplitude		m	0,292		
23							
24	ISO 12217-1:2002(E)	6.1.2 Downflooding height at equilibrium				Not Analyse	
25		the min. freeboard of the	Downflooding				
26		shall not be less than (>=)	0,400	m		Not Analyse	
27							
28	ISO 12217-1:2002(E)	6.2 Offset load test - heel at equilibrium				Not Analyse	
29		the angle of	Heel				
30		shall not be greater than (<=)	10,0	deg		Not Analyse	
31							
32	ISO 12217-1:2002(E)	6.2 Offset load test - required freeboard at equilibriu				Not Analyse	
33		the min. freeboard of the	Downflooding				
34		shall be greater than (>)	0,045	m		Not Analyse	
35							
36	ISO 12217-1:2002(E)	6.2 Offset load test - equilibrium with heel arm				Pass	
37		6.2 Offset load test - equilibrium with heel arm					
38		shall not be greater than (<=)	10,0	deg	1,5	Pass	+84,98
39							
40	ISO 12217-1:2002(E)	6.3.2 Rolling in beam waves and wind				Fail	
41		6.3.2 Wind heeling arm (steady)					

	Code	Criteria	Value	Units	Actual	Status	Margin %
42		<i>Area1 integrated from the greater of</i>					
43		spec. heel angle	25,0	deg	25,0		
44		<i>to the lesser of</i>					
45		spec. heel angle	50,0	deg			
46		first downflooding angle	28,7	deg	28,7		
47		angle of vanishing stability (with heel arm)	56,6	deg			
48		<i>Area2 integrated to the lesser of</i>					
49		roll back angle from equilibrium (with heel arm)	25,0 (-22,4)	deg	-22,4		
50		Area1 / Area2 shall be greater than (>)	100,00	%	26,51	Fail	-73,49
51		<i>Intermediate values</i>					
52		Equilibrium angle with heel arm		deg	2,6		
53		Area1 (under GZ), from 25,0 to 28,7 deg.		m.rad	0,0582		
54		Area1 (under HA), from 25,0 to 28,7 deg.		m.rad	0,0151		
55		Area1, from 25,0 to 28,7 deg.		m.rad	0,0431		
56		Area2 (under GZ), from -22,4 to 25,0 deg.		m.rad	0,0658		
57		Area2 (under HA), from -22,4 to 25,0 deg.		m.rad	0,2284		
58		Area2, from -22,4 to 25,0 deg.		m.rad	0,1626		
59							
60	ISO 12217-1:2002(E)	6.3.3 Resistance to waves (Value of GZ)				Pass	
61		heel angle at which required GZ is constant	30,0	deg			
62		required value of GZ at this angle is	0,200	m			
63		limited by first downflooding angle	28,7	deg			
64		GZ at 15,0 deg shall be greater than (>)	0,400	m	1,052	Pass	+163,00
65		<i>Intermediate values</i>					
66		angle at which max. GZ occurs		deg	15,0		
67							
68	ISO 12217-1:2002(E)	6.3.3 Resistance to waves (Value of RM)				Pass	
69		heel angle at which required RM is constant	30,0	deg			
70		required value of RM at this angle is	25,000	kN.m			
71		limited by first downflooding angle	28,7	deg			
72		RM at 15,0 deg shall be greater than (>)	50,000	kN.m	70,647	Pass	+41,29
73		<i>Intermediate values</i>					
74		angle at which max. GZ occurs		deg	15,0		
75							
76	ISO 12217-1:2002(E)	6.4 Heel due to wind action (Categories C and D only)				Pass	
77		6.3.2 Wind heeling arm (steady)					
78		shall be less than (<)	5,0	deg	2,6	Pass	+48,34
79							