STABILITY INFORMATION BOOKLET

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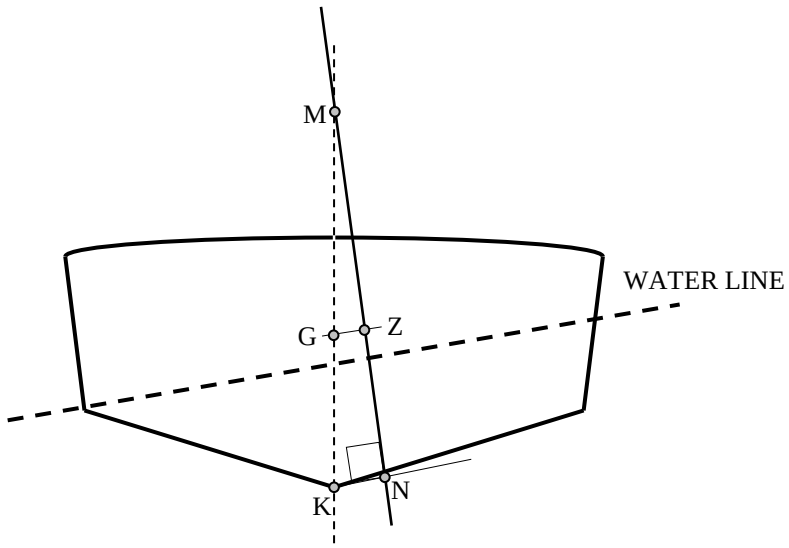

[This may be replaced by a suitable drawing/photograph of the yacht if preferred]

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DATE: .....

CONTENTS

General Particulars

Name

Official Number

Port of Registry

Owner's name and address

Classification Society

Builder

Yard Number

Date of keel laying

Principal Dimensions

Length overall (LOA)	m
Length between perpendiculars (LBP)	m
Max Beam	m
Depth	m
Assigned Freeboard	m
Max Summer loaded draught	m
Max Displacement at Summer Load Draught	T

Gross Tonnage

Area of operation *[insert actual imposed limitation otherwise, if appropriate, state Unlimited]*

Standard of survivability *[state either "intact stability only" or "intact & damage stability" as appropriate]*

Number of Crew

Number of passengers

Notes to the Master

1. General Instructions

The loading conditions shown in this booklet represent typical service conditions. Where a loading condition departs from those shown in this book a separate calculation should be made to ensure compliance with the stability criteria.

2. General Stability Requirements

It is important to ensure that in any sailing condition the stability of the yacht complies with the criteria of section 11 of the *[The Safety of Large Commercial Sailing & Motor Vessels – A Code of Practice (LY1)/ The Large Commercial Large Yacht Code (LY2)]*.

Limiting KG curves for this yacht are provided at page [*XX]*. These curves include the provisions of *[intact/intact and damage]* stability criteria contained in the Code.

If the vertical centre of gravity of any sailing condition, after correction for free surface effects, lies below the limiting KG curve on page *[XX]* compliance with the requirements of the Code for *[intact/intact and damage]* stability is ensured. It must be appreciated however, that compliance can never guarantee survivability in the event of damage and good seamanship must prevail under such circumstances.

[This yacht has been provided with X tonnes of fixed ballast for stability purposes. The position of this ballast is shown on the drawing at page Y. This ballast is not to be moved or removed without prior consultation regarding the consequences on stability. Should the ballast be required to be removed for survey/repair or any other reason it must be returned to its original position and made secure against movement.]

[This vessel has not been assessed for damage stability, and therefore might not remain afloat in the event of damage or flooding.]

3. Precautions against capsize

Compliance with the stability criteria does not ensure immunity against capsize or absolve the Master from his responsibilities. Masters should therefore exercise prudence and good seamanship having regard to the season of year, weather forecast and the navigational zone.

Before a voyage commences care should be taken to ensure large items of equipment and stores are properly stowed. All external hull doors and flush hatches *[to be listed]* are to be closed and secured. If poor weather is likely to encountered during the passage additionally storm boards and shutters should be fitted.

The number of slack tanks should be kept to a minimum. Where port and starboard tanks are cross coupled, such connection should be closed at sea to minimise the reduction in stability.

4. Operating Restrictions

[If there are any operating restrictions details are to be included in this section Such operating restrictions could include, but not necessarily limited to, items such as restricted range/weather, maximum speed and handling of the yacht, maximum wave height limitations on use of consumable fluids, trim restrictions etc. If there are no operating restrictions a note is to be included to that effect.]

5. Master's Shipboard Procedures

*[This section is to include **any** procedures relating to the safe operation of the yacht affecting stability or survivability following damage etc that the master is to be made aware of in order that the appropriate action can be taken either in the course of normal seagoing preparation or in the case of an emergency. The following are examples, and not to be considered exhaustive, of what is expected. These are to be modified as required to suite the specific yacht in question:-*

"As part of familiarisation with the yacht all persons, including passengers, should be briefed on the operation of sliding watertight doors and advised to keep well clear when they are closing."

"IN SHELTERED ANCHORAGES AND IN PORT:

> *The master is responsible for evaluating the risks and hazards present and taking appropriate precautions.*
> *It is recommended that the door from the garage to the engine room is kept closed whenever the garage hull door is open."*

"PREPARING FOR SEA.

> *External hull doors and flush hatches (to be itemised) to be closed, secured and recorded.*
> *Internal hinged WT doors (to be itemised) are to be closed and secured.*
> *Internal sliding WT doors (to be itemised) are to be tested immediately before departure.*
> *Sidelights capable of being opened are to be secured closed."*

"PREPARING FOR ROUGH WEATHER PASSAGE.

> *The master is responsible for taking appropriate precautions whenever rough weather is anticipated. The precautions should include (but are not limited to) the following:*

All loose gear (including tenders, jet skis etc,) on deck, and in the garage/lazarette are to be securely lashed in place.
Large or Heavy Items of furniture to be secured.
The shutters provided are to be put up over the windows.
Deadlights are to be closed and secured."
Secure closing devices as appropriate

"AT SEA

Internal sliding WT doors, situated at XYZ may be left open, but consideration should be given to closing them when the risk of hull damage and flooding increases e.g. in fog, in shallow rocky waters, in congested shipping lanes, when entering and leaving port and at any other time the master considers appropriate. Sliding WT doors should be checked daily to ensure that nothing has been placed in way of the door or where it might fall into the opening and prevent the door from closing.

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Internal hinged water tight doors, situated at XYZ, should remain closed but may be opened when passing through.

6. Tank Usage and Free Surface Moments

Provided a tank is completely filled with liquid no movement of the liquid is possible and the effect on the ship's stability is precisely the same as if the tank contained solid material.

Immediately a quantity of liquid is withdrawn from the tank the situation changes completely and the stability of the ship is adversely affected by what is known as the 'free surface effect'. This adverse effect on the stability is referred to as a 'loss in GM' or as a 'virtual rise in VCG' and is calculated as follows:

$$\text{Virtual rise in VCG/ } Loss\,of\ GM = \frac{Free\ Surface\ Mmt(Tonnes\,m)}{Vessel\ Displacement(Tonnes)}$$

When preparing loading conditions, it is to be noted that free surface effects must be allowed for the maximum number of tanks which are slack or shortly to become slack in that given loading condition. This will mean that, for departure conditions all main fuel tanks as well as fresh water tanks are considered to be slack.

The number of slack tanks should be kept to a minimum. Where port and starboard tanks are cross coupled, such connection should be closed at sea to minimise the reduction in stability.

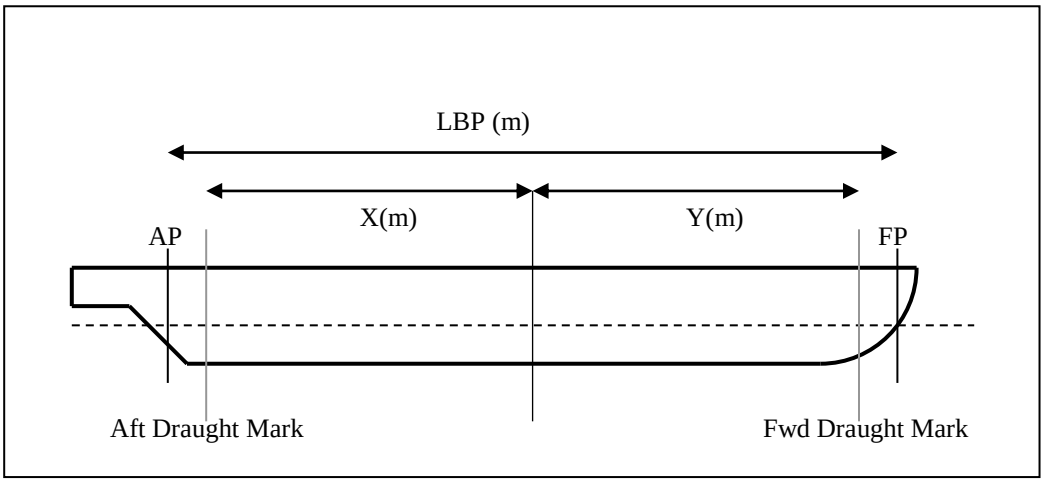
Where ballast tanks are used they should be ‘pressed full’ or ‘empty’ as far as possible. Dirty water in the bilges must be kept to a minimum.

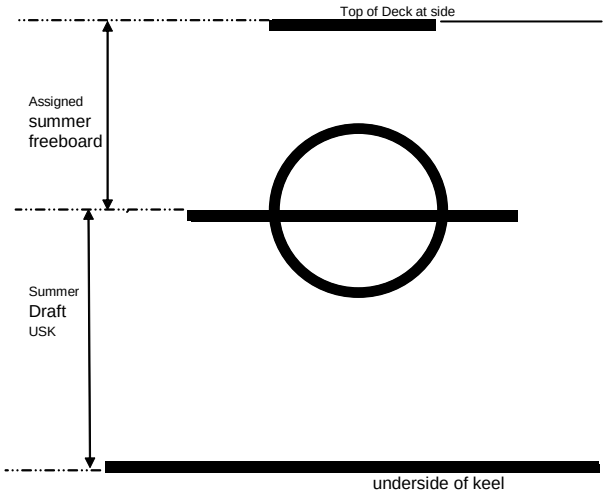
7. Angles of down flooding

The angle of down flooding is the angle of heel at which progressive down flooding of the yacht will occur due to the immersion of an opening. For this yacht the following openings have been identified:

Description	Area of Opening (m^2)	ANGLES OF IMMERSION (degrees)	
		100% Consumable	10% Consumable
Saloon *[X]*	*[A]*	$[\theta_1]$	$[\theta_4]$
Crew *[Y]*	*[B]*	$[\theta_2]$	$[\theta_5]$
Gallery *[Z]*	*[C]*	$[\theta_3]$	$[\theta_6]$

Draught Marks, Freeboard Mark and Datum reference Information

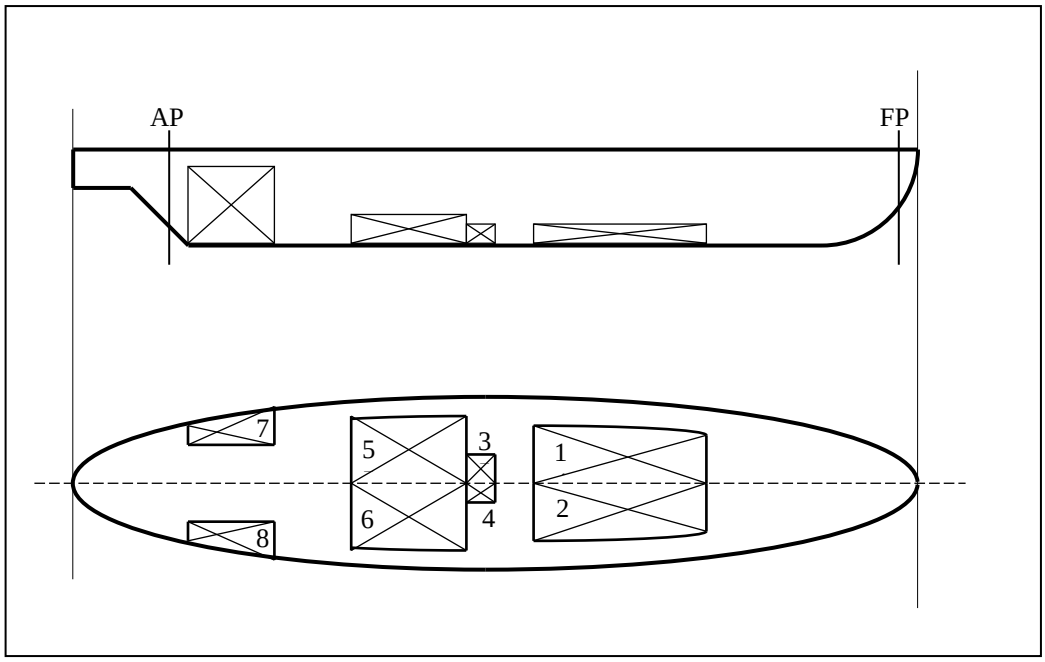




Longitudinal datum	=	*[AP/amidships/FP]*
Transverse datum	=	centreline
Vertical datum	=	*[base line/underside of keel (amidships/AP])*
Aft Perpendicular	=	*[? metres aft amidships]*
Fwd Perpendicular	=	*[? metres fwd amidships]*
Aft Draught Marks *[N]* metres AB	=	*[X metres aft amidships]*
Fwd Draught Marks *[N]* metres AB	=	*[Y metres fwd amidships]*

[the above drawing is to include details of the keel thickness and, if the yacht has a rake of keel, the profile is to be modified to show the rake of keel and include dimensions]

Tank Capacities, arrangement of Tanks and Free Surface Moments



No	Name	SG	Frames	Volume	Mass	VCG	LCG	TCG	FSM

Sample Stability Loading Condition

Condition No. *[YY Departure 100%] Consumables*

ITEM	Load %	WT	LCG m *forward AP*	Long Mom	VCG above base (KG)	Vertical Mom	FSM
Passengers and effects	-						-
Crew and Effects	-						-
Provisions and stores Deck A	-						-
Provisions and stores Deck B	-						-
Provisions and stores Deck C	-						-
Permanent Ballast	-						-
Jet Skis etc	-						-
Tender	-						-
No V Fresh water tank (P)							
No W Fresh water tank (S)							
No X Diesel Oil Tank (p)							
No X Diesel Oil Tank (p)							
No Y Ballast Tank (P)							
No Z Ballast Tank (S)							
No A Lub Oil tank							
No B Grey Water Tank							
Total Dead Weight							-
Lightship Weight							-
Displacement							

Mean Draught at LCF ($D_{m)}$	
LCF (m forward AP)	
LCB (m forward AP)	
MCT (TM/cm)	
KM_T (m AB)	

Trim = $\frac{\text{(separation of LCB \& LCG) x Displacement}}{\text{MCT x 100}}$ = m

Draught Aft (D_A) = $D_M \pm \frac{\text{LCF}}{\text{LBP}}$ x Trim = m

Draught Forward = $D_A \pm$ Trim = m

VCG above base (KG)	
Free Surface Correction (FSC)	
KG liquid (KG_L)	
KG $_{max}$	

Explanation and notes on completing Sample Stability Condition.

Calculating the Displacement and Centres of gravity

- Add the appropriate weights in column 3 (WT) and, for fluids, also complete column 2 (Load %) to indicate the % fill for each tank.
- Add the longitudinal and vertical centres of gravity in columns 4 (LCG) and 6(VCG) respectively.
- Multiply the weight of each item by its centre of gravity to obtain the longitudinal and vertical moments and enter in columns 5 (Long Mom) and 7 (Vertical Mom) respectively.
- From the tank capacity table *[page NN]* enter Free Surface Moment (FSM) into column 8.
- Sum columns 3, 5 and 7 and enter totals in the Total Dead Weight row.
- Sum Total Dead Weight and Light Ship Weight and enter total in Displacement row column 3.
- Similarly sum Total Dead Weight and Light Ship longitudinal and vertical moments and enter totals in the Displacement row, columns 5 and 7 respectively.
- Divide Displacement row column 5 by Total Displacement row column 3 to calculate LCG for the loading condition, and enter the result in column 4 of that row.
- Divide Displacement row column 7 by Displacement row column 3 to calculate VCG for the loading condition, and enter the result in column 6 of that row.
- Sum column 8 (FSM) and enter total into Displacement row column 8.

Obtaining Draught and trim

- Using the hydrostatic particulars provided on page *MM*, **for zero trim,** interpolate for the Displacement of the loading condition above and obtain values for Draught, LCB, LCF, MCT and KMT.
- Trim is calculated from the stated formula: If the LCB is forward of the LCG the trim is by the stern and if the LCB is aft of the LCG the trim is by the head (bow). It is to be noted that the trim so calculated is for the length used in the formulation of the hydrostatics – usually Length between perpendiculars (LBP) and will need to be corrected for the positions of the draught marks if significantly different.
- As the yacht trims about the LCF, trim is proportioned over the length (LBP) and either added to or subtracted from the mean Draught (Dm) depending on whether the trim is by the stern or by the head.

Stability compliance

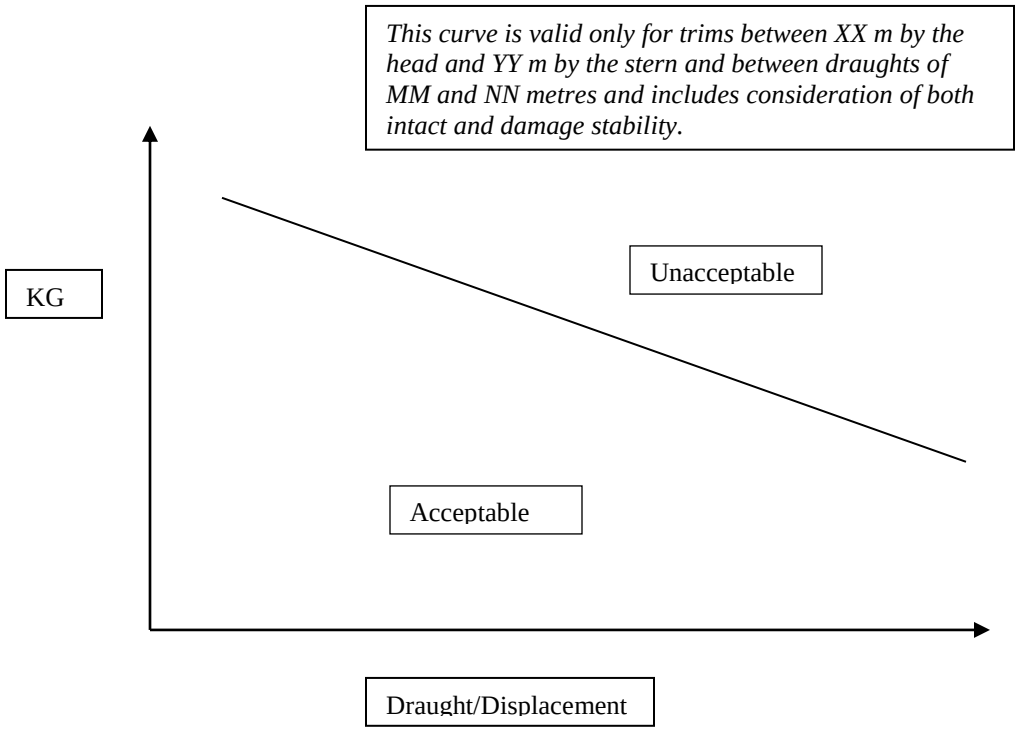
- The Free Surface Correction (FSC) is obtained by dividing column 8 of the Displacement row by the Displacement (column 3 of the same row).
- The KG liquid (KG_L) is obtained by **adding** the FSC to the VCG in column 6 in the Displacement row. (The effect of free surface is a virtual rise in the vertical centre of gravity)
- The KG liquid (KG_L) is compared with the KG_{max} obtained from page [*NN]*. If the KG_L is less than KG_{max} the loading condition complies with the stability criteria.

Max KG limiting criteria (KG_{max})

[A Table or Curve is to be included, as considered appropriate, covering the operational draught and trim range. One set of data is to be provided representing the combined effects of satisfying both intact and damage (where appropriate) stability requirements.

If possible a single table or curve (or even a single value) satisfying the whole draught and trim range based on the worst case should be provided and should be labelled to show the extent of application.

Any draught or trim limitation arising from stability consideration should be clearly documented in the Notes to the Master.]



Notes on use of the Curve

If, for any loading condition within the stated operational trim and draught range, the vertical centre of gravity (corrected for free surface effects) falls below the limiting curve compliance with the stability criteria contained in the Code is met.

Hydrostatic Particulars

Tabular output showing Displacement, Draught, LCB, LCF, TPC, KMT and MCT across the range of **operational draughts and trims**.

NOTE:
Water Density =1.025 T/m^3
K is to underside of keel at amidships
Draught is to underside of keel at amidships

Loading Conditions

The following conditions of loading are to be provided as a minimum:

- Departure (100% consumables)
- Half Load (50% consumables) (*OPTIONAL CONDITION*)
- Arrival (10% consumables)
- Practical Departure and arrival conditions if different from above

Lightship History

An inclining experiment was undertaken at *[QQ on xx/yy/xxxx]*. The resulting lightship figures are as follows:

Lightship	LCG	VCG	TCG

The above lightship does not include the following items which are to be included in the loading condition as deadweight items. Should any of these items be changed during the life of the yacht, the loading conditions are to be modified to take account of the difference in weight and centres of gravity and their effect n the stability of the yacht:

Item	Weight	LCG	VCG	TCG
[Main tender]				
[Jet ski]				

Whenever a significant change is made to the lightship, verified either by inclining experiment, lightweight check or calculation, the results are to be indicated in the following table and endorsed by an approved surveyor.

Lightship	LCG	VCG	TCG	Date	Reason

Inclining Experiment Report

[A copy of the agreed inclining experiment report is to be included.]