NATIONAL CARGO BUREAU, INC.
GRAIN STABILITY CALCULATION FORM

∗ (Required for vessels loading bulk grain in the United States of America)

M.V. / S.S.			YEAR BUILT AT CITY IN COUNTRY
COUNTRY OF REGISTRY	NET TONNAGE	IMO NO.	
AGENT			

GRAIN LOADING BOOKLET APPROVED BY _____

ON BEHALF OF (FLAG STATE) _____

DRAWING NO. _____ DATE OF APPROVAL _____

APPLICABLE REGULATIONS _____

ADDENDUM FOR UNTRIMMED ENDS APPROVED BY _____

DRAWING NO. _____ DATE OF APPROVAL _____

LOADING PORT(S) _____

BUNKERING PORT(S) _____

DISCHARGE PORT(S) _____

STEAMING DISTANCE _____ MILES MILES PER DAY _____ TIME _____

DAILY CONSUMPTION: FUEL _____ DIESEL _____ WATER _____

	DISPLACEMENT	DEADWEIGHT	DRAFT	FREEBOARD
**WINTER	_____	_____	_____	_____
SUMMER	_____	_____	_____	_____
**TROPICAL	_____	_____	_____	_____

FRESH WATER ALLOWANCE _____ TPC/TPI (AT SUMMER DRAFT) _____

∗ EXCEPT FOR EXEMPTED VOYAGES

** IF APPLICABLE

THIS IS TO CERTIFY THAT:

1. THIS CALCULATION IS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE VESSEL'S GRAIN LOADING BOOKLET AND THE APPLICABLE GRAIN REGULATIONS.
2. THE STABILITY OF THE VESSEL WILL BE MAINTAINED THROUGHOUT THE VOYAGE IN ACCORDANCE WITH THIS CALCULATION.

CALCULATION PREPARED BY:

(TO BE COMPLETED IF THE FORM IS PREPARED BY OTHER THAN SHIP'S PERSONNEL)

NAME (PRINT) _____

COMPANY _____

SIGNATURE _____

DATE _____

_____
MASTER'S SIGNATURE

_____
MASTER'S NAME (PRINTED)

EXAMINED BY: _____
N.C.B. SURVEYOR'S SIGNATURE

_____
N.C.B. SURVEYOR'S NAME (PRINTED)

DATE: _____

NOTE: ORIGINAL STABILITY CALCULATION AND GRAIN ARRANGEMENT PLAN TO BE SUBMITTED TO THE N.C.B. SURVEYOR. ALL TONNAGES USED IN THIS CALCULATION SHALL BE SHOWN IN THE SAME UNITS AS USED IN THE GRAIN LOADING BOOKLET.

SHIP AND CARGO CALCULATION

PART I

TYPE OF GRAIN _____ STOWAGE FACTOR _____ M^3/MT _____ FT^3/LT

COMPT. NO.	CARGO (1)	S.F. (1)	GRAIN CUBICS (2)		WEIGHT (3)	V.C.G.	MOMENT (3)
			TOTAL	USED			

S.F.	S.F.	DEN
$\frac{M^3}{MT}$	$\frac{FT^3}{LT}$	$\frac{MT}{M^3}$
1.171	42	0.854
1.184	42.5	0.844
1.198	43	0.834
1.212	43.5	0.825
1.226	44	0.816
1.240	44.5	0.806
1.254	45	0.797
1.268	45.5	0.789
1.282	46	0.780
1.296	46.5	0.772
1.310	47	0.763
1.324	47.5	0.755
1.338	48	0.747
1.352	48.5	0.740
1.366	49	0.732
1.380	49.5	0.725
1.393	50	0.718
1.407	50.5	0.711
1.421	51	0.704
1.435	51.5	0.697
1.449	52	0.690
1.477	53	0.677
1.505	54	0.664
1.533	55	0.652
1.561	56	0.641
1.589	57	0.629
1.616	58	0.619
1.644	59	0.608
1.672	60	0.598
1.700	61	0.588
1.728	62	0.579

THIS CALCULATION IS PREPARED IN:

☐ METRIC UNITS

☐ ENGLISH UNITS

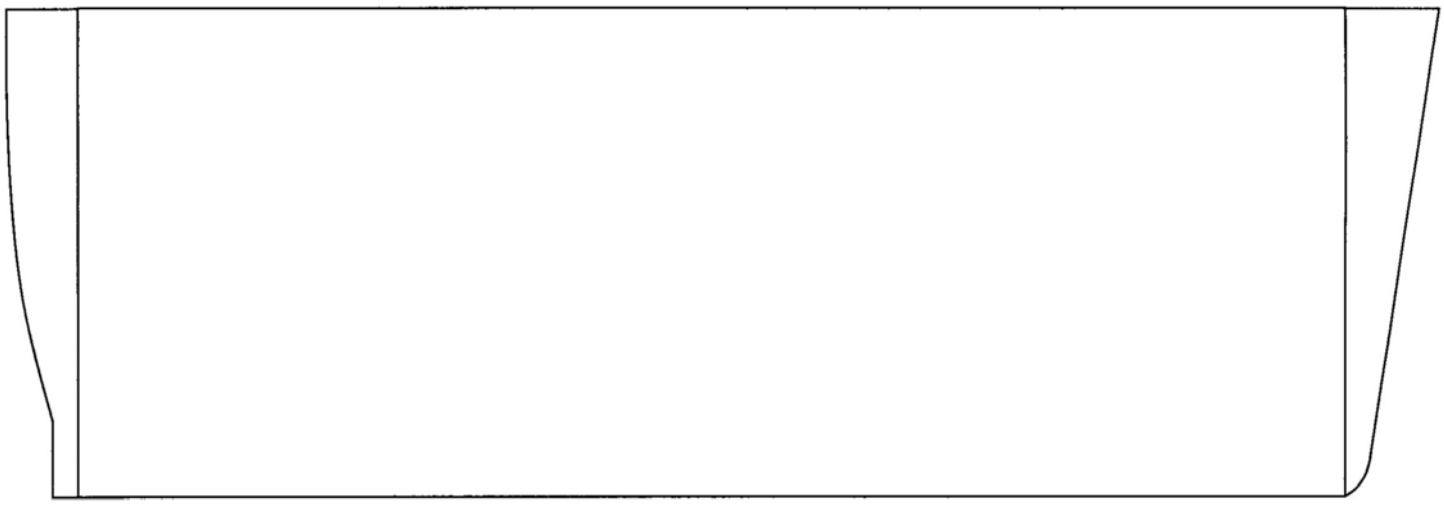
CARGO TOTALS			
LIGHT SHIP			
CONSTANT			
SHIP AND CARGO TOTALS			

(1) COMPLETE THESE COLUMNS IF MORE THAN ONE TYPE OF CARGO IS LOADED.

(2) FOR PARTLY FILLED COMPARTMENTS, SHOW THE CUBICS USED IN ADDITION TO THE TOTAL CUBICS.

(3) WEIGHTS AND MOMENTS SHOULD BE SHOWN TO THE NEAREST WHOLE UNIT.

CARGO PLAN: INDICATE HOLDS, TWEEN DECKS, ENGINE SPACES, FITTINGS, STOWAGE, TONNAGES, ETC.



FUEL AND WATER CALCULATION

PART II

THE **INTERMEDIATE** SECTION MUST BE COMPLETED IF THE **ARRIVAL** SECTION SHOWS BALLAST THAT IS NOT LISTED IN THE **DEPARTURE** SECTION. THE **INTERMEDIATE** CONDITION IS IMMEDIATELY BEFORE BALLASTING AND MUST INCLUDE THE EFFECT OF FREE SURFACE, BUT **NOT** THE EFFECT OF ADDED WEIGHT. ADDITIONAL FUEL TAKEN AFTER DEPARTURE MUST BE SHOWN IN THE **INTERMEDIATE** SECTION IN THE SAME MANNER AS BALLAST.

		DEPARTURE:				INTERMEDIATE:				ARRIVAL:			
TANK	TYPE LIQUID	WEIGHT	V.C.G.	MOMENT	F.S. MOM.	WEIGHT	V.C.G.	MOMENT	F.S. MOM.	WEIGHT	V.C.G.	MOMENT	F.S. MOM.

TOTALS

LIQUIDS _____ _____ _____ _____ _____ _____ _____ _____ _____

SHIP AND CARGO _____ _____ _____ _____ _____ _____

DISPLACEMENT _____ _____ _____ _____ _____ _____

SAILING DRAFT _____ AT DENSITY _____

DEPARTURE KG	_____	INTERMEDIATE KG	_____	ARRIVAL KG	_____
(1) FREE SURFACE CORR. (+)	_____	(1) FREE SURFACE CORR. (+)	_____	(1) FREE SURFACE CORR. (+)	_____
(2) VERT. S.M. CORR. (+)	_____	(2) VERT. S.M. CORR. (+)	_____	(2) VERT. S.M. CORR. (+)	_____
DEPARTURE KG_V	_____	INTERMEDIATE KG_V	_____	ARRIVAL KG_V	_____
DEPARTURE KM	_____	INTERMEDIATE KM	_____	ARRIVAL KM	_____
DEPARTURE KG_V	_____	INTERMEDIATE KG_V	_____	ARRIVAL KG_V	_____
DEPARTURE GM	_____	INTERMEDIATE GM	_____	ARRIVAL GM	_____
REQUIRED MINIMUM GM	_____	REQUIRED MINIMUM GM	_____	REQUIRED MINIMUM GM	_____

(1) FREE SURFACE CORR. = $\frac{\text{SUM OF FREE SURFACE MOMENTS}}{\text{DISPLACEMENT}}$

(THIS CORRECTION MUST BE APPLIED TO ALL SHIPS.)

(2) VERT. S.M. CORR. = $\frac{\text{SUM OF VERTICAL SHIFTING MOMENTS}}{\text{DISPLACEMENT}}$

(THIS CORRECTION APPLIES WHEN THE VOLUMETRIC HEELING MOMENT CURVES OR TABLES DO NOT SPECIFICALLY STATE THAT THE CORRECTION FOR THE RISE IN VERTICAL CENTER OF GRAVITY HAS BEEN INCLUDED, AND THE MANUAL PROVIDES VERTICAL SHIFTING MOMENTS.)

HEELING MOMENT CALCULATION

PART III

COMPT. NO	STOWAGE (1)	GRAIN ULLAGE OR DEPTH	VOLUMETRIC HEELING MOMENT	S.F. OR DENSITY (2)	GRAIN HEELING MOMENT	VERTICAL SHIFTING MOMENT (IF PROVIDED) SEE NOTE 2 IN PART II	
		M/FT	M^4/FT^4		MT– M / FT– LT	M^4/FT^4	MT– M / FT– LT
		TOTALS					

(1) UNDER STOWAGE INDICATE "F-T" FOR FILLED COMPARTMENTS TRIMMED, "F-UT" FOR FILLED COMPARTMENTS UNTRIMMED, "PF" FOR PARTLY FILLED COMPARTMENTS, AND "SEC" FOR SECURED OR OVER-STOWED COMPARTMENTS.

(2) THE STOWAGE FACTOR USED IN PART III SHALL NOT EXCEED THE ONE BASED ON THE WEIGHT PER UNIT OF VOLUME (TEST WEIGHT) OF THE GRAIN. IF THE STOWAGE FACTOR IS THE SAME IN ALL COMPARTMENTS, DIVIDE THE TOTAL VOLUMETRIC HEELING MOMENT BY THE STOWAGE FACTOR OR MULTIPLY BY THE DENSITY TO OBTAIN THE GRAIN HEELING MOMENT. IF THE STOWAGE FACTOR VARIES, OBTAIN THE GRAIN HEELING MOMENT FOR EACH COMPARTMENT.

A . FOR VESSELS APPROVED UNDER

INTERNATIONAL GRAIN CODE, Part A, 7.1
REGULATION 4, CHAPTER VI, SOLAS 1974 or
REGULATION 4, IMCO RESOLUTION A.264(VIII), NEW CHAPTER VI, SOLAS 1960
REGULATION 4, IMCO RESOLUTION A.184 AN EQUIVALENT TO CHAPTER VI, SOLAS 1960

STABILITY SUMMARY

	DEPARTURE	INTERMEDIATE	ARRIVAL
DISPLACEMENT			
KG_V or GM			
TOTAL GRAIN HEELING MOMENT			
MAXIMUM ALLOWABLE HEELING MOMENT			
✶ ANGLE OF HEEL (12° MAX.)			
✶ RESIDUAL AREA 0.075 METER-RADIANS (14.1 FT° OR 4.3 M°) MINIMUM			
✶ GM (0.3M OR 1 FT MINIMUM)			

✶ TO BE COMPLETED IF VESSEL'S GRAIN LOADING BOOKLET DOES NOT INCLUDE A TABLE OF ALLOWABLE HEELING MOMENTS. IN SUCH CASE, STATICAL STABILITY DIAGRAMS DEMONSTRATING THIS INFORMATION SHALL BE ATTACHED HERETO.

B. FOR SPECIALLY SUITABLE SHIPS APPROVED UNDER

INTERNATIONAL GRAIN CODE, PART A, 8. 2
SECTION V (B) , PART B, CHAPTER VI, SOLAS 1974
SECTION V (B) , PART B, IMCO RESOLUTION A.264 (VIII), NEW CHAPTER VI, SOLAS 1960
REGULATION 12, CHAPTER VI, SOLAS 1960

$$\text{ANGLE OF HEEL} = \frac{\text{GRAIN HEELING MOMENT} \times 57.3}{\text{DISPLACEMENT} \times \text{GM}}$$

	DEPARTURE	INTERMEDIATE	ARRIVAL
TOTAL GRAIN HEELING MOMENT			
DISPLACEMENT			
GM			
ANGLE OF HEEL (5° MAX.)			