# MARITIME & COASTGUARD AGENCY (UK)

**For examinations conducted by**

# SCOTTISH QUALIFICATIONS AUTHORITY

# EXAMINATION FOR CHIEF MATE/MASTER UNLIMITED - STABILITY AND STRUCTURE

# SHIP B

# 57000 DWT BULK CARRIER

# SHIP STABILITY DATA SHEETS

**The information provided are *limited extracts* and are intended for exercise and examination purposes only.**

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# REVISION LOG

| Revision No. | Remarks | Date |
|---|---|---|
| Version 1 | SHIP B 57000 DWT BULK CARRIER SHIP STABILITY DATA SHEETS | Sept-20 |
| Version 1.1 | GRAIN DATA FOR PARTLY FILLED HOLDS<br>NO. 1 CARGO HOLD (FR 183-217) – Pages 50-51<br>Data table updated | Jan-22 |
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# ABBREVIATIONS

| | |
|---|---|
| A: | (Refers to wind heeling) Projected lateral area of hull and cargoes on deck above waterline ($m^2$) |
| AP: | After perpendicular |
| CGY: | Parameters to port (+) or starboard (-) form centreline (m) |
| CGZ: | Parameters from baseline upwards (m) |
| DISPL: | Displacement (tonnes) |
| FILL: | Filling ratio (%) |
| FP: | Fore perpendicular |
| FR: | Frame number |
| GM: | Metacentric height with correction for free surface effects (m) |
| GRMV: | Volumetric grain shift moment ($m^4$) |
| IMAX: | Max. transverse moment of inertia of free surface ($m^4$) |
| IMOM: | Transverse moment of inertia of free surface ($m^4$) |
| KB: | Vertical centre of buoyancy above baseline (m) |
| KG: | Height of the whole ship's centre of gravity above base line (m) |
| KM, KMT: | Height of transverse metacentre (m) |
| KML: | Height of longitudinal metacentre (m) |
| KN: | Righting lever from cross curves for KG = 0.00 m (m) |
| LCB: | Longitudinal centre of buoyancy from AP (m) |
| LCF: | Longitudinal centre of flotation from AP (m) |
| LCG: | Longitudinal centre of gravity from AP ("+" fore, "-" aft) (m) |
| Lever: | (Refers to wind heeling) The vertical distance between the level of the half-draught and ZCG (m) |
| MCTC: | Moment to change trim by 1cm (tm/cm) |
| T, Draught: | Draught moulded, measured from base line (m) |
| TPC: | Change of displacement/change of draught 1 cm (t/cm) |
| TCG: | Transverse centre of gravity from ship's centerline ("+" port, "-"starboard) (m) |
| VCG: | Height of the centre of gravity above base line (m) |
| ZCG: | (Refers to wind heeling) Height of centre of projected lateral area above base line (m) |

# PART A

# GENERAL INFORMATION

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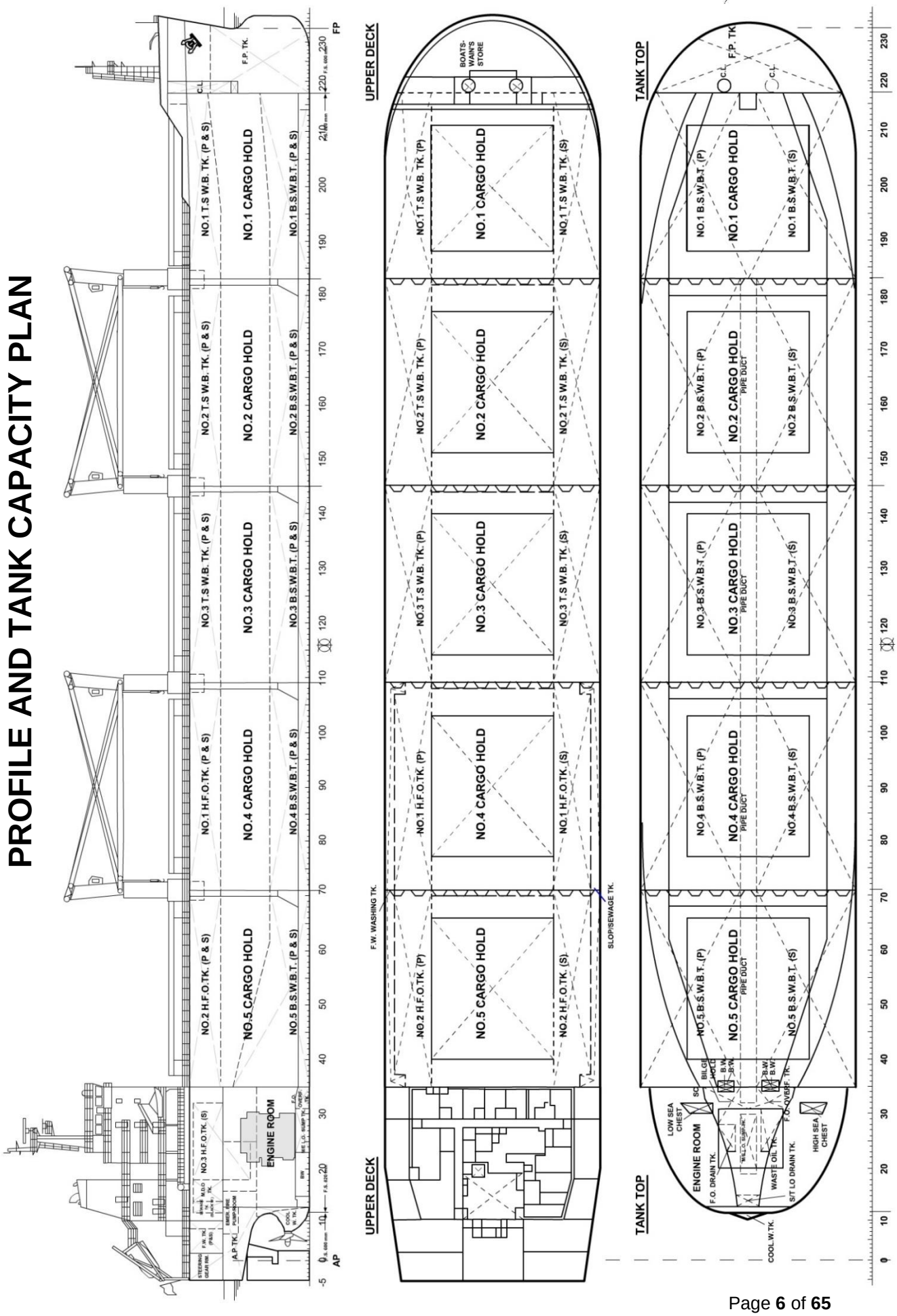
# PRINCIPAL DIMENSIONS

| | |
|---|---|
| Ship's name | Ship B (57000 DWT Bulk Carrier) |
| Length overall | 189.99 m |
| Length B.P. at Design Draft | 185.00 m |
| Breadth moulded | 32.26 m |
| Depth moulded | 18.00 m |
| Gross Tonnage | 33005 |
| Net Tonnage | 19231 |
| Light ship weight | 10968.00 t |
| LCG | 82.890 m from AP |
| TCG | 0.049 m from CL |
| VCG | 11.812 m above BL |

# PROFILE AND TANK CAPACITY PLAN



# CAPACITY DATA

## CARGO CAPACITIES
## (INCLUDING hatch coaming)

| Comp. | NET VOLUME $m^3$ | LCG foap m | TCG from CL m | KG above BL m | I MAX $m^4$ |
|---|---|---|---|---|---|
| NO.1 CARGO HOLD | 13009.86 | 160.513 | 0.000 | 10.584 | 67702.56 |
| NO.2 CARGO HOLD | 15333.25 | 131.364 | 0.000 | 10.270 | 86745.03 |
| NO.3 CARGO HOLD | 14553.08 | 101.025 | 0.000 | 10.295 | 82177.16 |
| NO.4 CARGO HOLD | 15333.27 | 70.684 | 0.000 | 10.270 | 86742.56 |
| NO.5 CARGO HOLD | 13404.64 | 41.070 | 0.000 | 10.693 | 81084.76 |
| SUBTOTAL | 71634.10 | | | | |

## CARGO CAPACITIES
## (EXCLUDING hatch coaming)

| Comp. | NET VOLUME $m^3$ | LCG foap m | TCG from CL m | KG above BL m | I MAX $m^4$ |
|---|---|---|---|---|---|
| NO.1 CARGO HOLD | 12339.10 | 160.497 | 0.000 | 10.099 | 67721.75 |
| NO.2 CARGO HOLD | 14634.38 | 131.341 | 0.000 | 9.834 | 86750.63 |
| NO.3 CARGO HOLD | 13854.17 | 101.001 | 0.000 | 9.836 | 82177.16 |
| NO.4CARGO HOLD | 14634.36 | 70.661 | 0.000 | 9.834 | 86742.56 |
| NO.5 CARGO HOLD | 12700.26 | 41.081 | 0.000 | 10.217 | 81087.63 |
| SUBTOTAL | 68162.27 | | | | |

## WATER BALLAST CAPACITIES

| Comp. | NET VOLUME $m^3$ | LCG foap m | TCG from CL m | KG above BL m | I MAX $m^4$ |
|---|---|---|---|---|---|
| F.P.TK. | 2018.63 | 179.505 | 0.000 | 7.949 | 4789.46 |
| NO.1 B.S.W.B.TK.P | 858.81 | 160.809 | 8.285 | 1.907 | 5774.25 |
| NO.1 B.S.W.B.TK.S | 858.81 | 160.809 | -8.285 | 1.907 | 5774.25 |
| NO.1 T.S.W.B.TK.P | 481.95 | 160.176 | 13.092 | 16.716 | 687.07 |
| NO.1 T.S.W.B.TK.S | 481.95 | 160.176 | -13.092 | 16.716 | 687.07 |
| NO.2 B.S.W.B.TK.P | 1047.30 | 131.737 | 10.038 | 1.496 | 8244.32 |
| NO.2 B.S.W.B.TK.S | 1047.30 | 131.737 | -10.038 | 1.496 | 8244.32 |
| NO.2 T.S.W.B.TK.P | 601.70 | 131.840 | 13.378 | 16.569 | 872.87 |
| NO.2 T.S.W.B.TK.S | 601.70 | 131.840 | -13.378 | 16.569 | 872.87 |
| NO.3 B.S.W.B.TK.P | 1001.00 | 101.500 | 10.085 | 1.491 | 7908.43 |
| NO.3 B.S.W.B.TK.S | 1001.00 | 101.500 | -10.085 | 1.491 | 7908.43 |
| NO.3 T.S.W.B.TK.P | 570.01 | 101.500 | 13.378 | 16.569 | 826.90 |
| NO.3 T.S.W.B.TK.S | 570.01 | 101.500 | -13.378 | 16.569 | 826.90 |
| NO.4 B.S.W.B.TK.P | 1039.46 | 71.347 | 9.999 | 1.498 | 8145.48 |
| NO.4 B.S.W.B.TK.S | 1039.46 | 71.347 | -9.999 | 1.498 | 8145.48 |
| NO.5 B.S.W.B.TK.P | 998.28 | 39.658 | 9.571 | 2.874 | 4146.95 |
| NO.5 B.S.W.B.TK.S | 998.28 | 39.658 | -9.571 | 2.874 | 4146.95 |
| A.P.TK. | 1117.69 | 2.075 | 0.018 | 12.699 | 11780.33 |
| NO.3 CARGO HOLD FOR BALLAST TANK | 14553.08 | 101.025 | 0.000 | 10.295 | 80938.31 |
| SUBTOTAL | 30886.42 | | | | |

## HEAVY FUEL OIL CAPACITIES

| Comp. | NET VOLUME $m^3$ | LCG foap m | TCG from CL m | KG above BL m | I MAX $m^4$ |
|---|---|---|---|---|---|
| NO.1 H.F.O.TK.P | 410.64 | 70.838 | 12.447 | 16.866 | 435.90 |
| NO.1 H.F.O.TK.S | 410.64 | 70.838 | -12.447 | 16.866 | 435.90 |
| NO.2 H.F.O.TK.P | 388.55 | 41.142 | 12.445 | 16.867 | 412.38 |
| NO.2 H.F.O.TK.S | 388.55 | 41.142 | -12.445 | 16.867 | 412.38 |
| NO.3 H.F.O.TK.P | 200.51 | 18.572 | 13.196 | 13.694 | 29.04 |
| NO.3 H.F.O.TK.S | 341.26 | 16.881 | -11.502 | 13.688 | 251.41 |
| NO.1 H.F.O. SERV. TK | 26.47 | 20.320 | -8.846 | 15.297 | 7.00 |
| NO.2 H.F.O. SERV. TK | 26.47 | 18.680 | -8.846 | 15.297 | 7.00 |
| NO.1 H.F.O. SETT. TK | 39.70 | 22.370 | -8.846 | 15.297 | 10.49 |
| NO.2 H.F.O. SETT. TK | 26.47 | 17.040 | -8.846 | 15.297 | 7.00 |
| SUBTOTAL | 2259.26 | | | | |

## DIESEL OIL CAPACITIES

| Comp. | NET VOLUME $m^3$ | LCG foap m | TCG from CL m | KG above BL m | I MAX $m^4$ |
|---|---|---|---|---|---|
| M.D.O. TK | 92.83 | 10.509 | -10.213 | 15.266 | 83.58 |
| M.D.O. SERV. TK | 26.47 | 14.580 | -8.846 | 15.297 | 7.00 |
| M.D.O. SETT. TK | 26.47 | 12.940 | -8.846 | 15.297 | 7.00 |
| SUBTOTAL | 145.77 | | | | |

## LUBRICATING OIL CAPACITIES

| Comp. | NET VOLUME $m^3$ | LCG foap m | TCG from CL m | KG above BL m | I MAX $m^4$ |
|---|---|---|---|---|---|
| M/E L.O. SUMP TK | 17.34 | 17.860 | 0.000 | 1.161 | 7.33 |
| NO.1 CYL. OIL STOR. TK | 21.23 | 9.351 | 10.620 | 10.458 | 13.40 |
| NO.2 CYL. OIL STOR. TK | 20.21 | 9.295 | 8.034 | 9.828 | 1.96 |
| M/E L.O STOR. TK | 26.81 | 9.289 | 4.112 | 9.533 | 2.99 |
| M/E L.O. SETT. TK | 20.76 | 9.250 | 1.759 | 9.900 | 2.34 |
| G/E L.O. STOR. TK | 8.63 | 9.289 | 5.760 | 9.611 | 0.11 |
| G/E L.O. SETT. TK | 8.41 | 9.290 | 6.580 | 9.666 | 0.11 |
| SUBTOTAL | 123.39 | | | | |

## FRESH WATER CAPACITIES

| Comp. | NET VOLUME $m^3$ | LCG foap m | TCG from CL m | KG above BL m | I MAX $m^4$ |
|---|---|---|---|---|---|
| F.W.TK. P | 232.72 | 3.647 | 9.103 | 15.815 | 430.43 |
| F.W.TK. S | 200.87 | 3.560 | -9.697 | 15.825 | 305.34 |
| DISTILLED W. TK | 31.82 | 4.200 | -5.352 | 15.750 | 1.30 |
| SUBTOTAL | 465.41 | | | | |

## MISCELLANEOUS TANK CAPACITIES

| Comp. | NET VOLUME $m^3$ | LCG foap m | TCG from CL m | KG above BL m | I MAX $m^4$ |
|---|---|---|---|---|---|
| COOL. W. TK | 29.59 | 6.855 | 0.000 | 3.468 | 120.01 |
| F.W. WASHING TK | 372.49 | 56.400 | 15.378 | 15.930 | 25.59 |
| SLOPE/SEWAGE TK | 372.49 | 56.400 | -15.378 | 15.930 | 25.59 |
| SLUDGE TK | 18.44 | 23.471 | -10.115 | 7.603 | 122.72 |
| BILGE HOLD TK | 33.65 | 23.628 | 2.985 | 1.248 | 48.40 |
| F.O. DRAIN TK | 7.40 | 18.626 | 2.565 | 1.468 | 2.63 |
| F.O. OVERF. TK | 24.63 | 24.352 | -2.966 | 1.198 | 43.17 |
| WASTE OIL TK | 16.43 | 20.289 | -2.827 | 1.421 | 12.56 |
| S/T L.O. DRAIN TK | 6.54 | 8.958 | -0.108 | 1.105 | 3.38 |
| SEWAGE TK | 27.72 | 8.032 | -12.682 | 15.423 | 13.05 |
| SUBTOTAL | 909.38 | | | | |

# CARGO HOLD CAPACITY DATA

## NO. 1 CARGO HOLD

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 1.78 | 0.00 | 0.0 | 0.00 | 159.580 | 1.781 | 18826.63 |
| 1.98 | 0.20 | 0.8 | 107.61 | 159.598 | 1.880 | 19912.51 |
| 2.18 | 0.40 | 1.7 | 217.44 | 159.616 | 1.981 | 21052.63 |
| 2.38 | 0.60 | 2.5 | 329.49 | 159.633 | 2.083 | 22237.13 |
| 2.58 | 0.80 | 3.4 | 443.76 | 159.651 | 2.185 | 23466.89 |
| 2.78 | 1.00 | 4.3 | 560.24 | 159.668 | 2.288 | 24742.80 |
| 2.98 | 1.20 | 5.2 | 678.95 | 159.684 | 2.392 | 26065.76 |
| 3.18 | 1.40 | 6.1 | 799.88 | 159.700 | 2.496 | 27436.63 |
| 3.38 | 1.60 | 7.1 | 923.02 | 159.716 | 2.601 | 28856.33 |
| 3.58 | 1.80 | 8.1 | 1048.39 | 159.732 | 2.706 | 30325.72 |
| 3.78 | 2.00 | 9.0 | 1175.97 | 159.747 | 2.811 | 31845.71 |
| 3.98 | 2.20 | 10.0 | 1305.77 | 159.763 | 2.918 | 33417.17 |
| 4.18 | 2.40 | 11.1 | 1437.80 | 159.777 | 3.024 | 35040.99 |
| 4.38 | 2.60 | 12.1 | 1572.04 | 159.792 | 3.132 | 36718.07 |
| 4.58 | 2.80 | 13.1 | 1708.50 | 159.806 | 3.239 | 38449.30 |
| 4.78 | 3.00 | 14.2 | 1847.18 | 159.820 | 3.348 | 40235.54 |
| 4.98 | 3.20 | 15.3 | 1990.09 | 159.821 | 3.458 | 43167.27 |
| 5.18 | 3.40 | 16.4 | 2135.97 | 159.819 | 3.568 | 45066.24 |
| 5.38 | 3.60 | 17.6 | 2284.08 | 159.818 | 3.679 | 47022.90 |
| 5.58 | 3.80 | 18.7 | 2434.40 | 159.819 | 3.791 | 49038.14 |
| 5.78 | 4.00 | 19.9 | 2586.94 | 159.821 | 3.902 | 51112.84 |
| 5.98 | 4.20 | 21.1 | 2741.60 | 159.823 | 4.014 | 52904.99 |
| 6.18 | 4.40 | 22.3 | 2897.98 | 159.828 | 4.125 | 54181.75 |
| 6.38 | 4.60 | 23.5 | 3055.85 | 159.836 | 4.237 | 55444.01 |
| 6.58 | 4.80 | 24.7 | 3215.12 | 159.846 | 4.348 | 56575.39 |
| 6.78 | 5.00 | 25.9 | 3375.74 | 159.858 | 4.459 | 57740.57 |
| 6.98 | 5.20 | 27.2 | 3537.71 | 159.871 | 4.570 | 58939.10 |
| 7.18 | 5.40 | 28.4 | 3701.01 | 159.886 | 4.680 | 60078.80 |
| 7.38 | 5.60 | 29.7 | 3865.44 | 159.902 | 4.791 | 60975.47 |
| 7.58 | 5.80 | 31.0 | 4030.89 | 159.919 | 4.901 | 61871.84 |
| 7.78 | 6.00 | 32.3 | 4197.32 | 159.936 | 5.011 | 62751.46 |
| 7.98 | 6.20 | 33.5 | 4364.61 | 159.954 | 5.121 | 63423.91 |
| 8.18 | 6.40 | 34.8 | 4532.46 | 159.971 | 5.231 | 63771.34 |
| 8.38 | 6.60 | 36.1 | 4700.45 | 159.987 | 5.340 | 63858.71 |
| 8.58 | 6.80 | 37.4 | 4868.53 | 160.002 | 5.448 | 63943.22 |
| 8.78 | 7.00 | 38.7 | 5036.68 | 160.016 | 5.556 | 64027.89 |
| 8.98 | 7.20 | 40.0 | 5204.92 | 160.030 | 5.664 | 64111.65 |
| 9.18 | 7.40 | 41.3 | 5373.22 | 160.042 | 5.771 | 64181.00 |

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 9.38 | 7.60 | 42.6 | 5541.58 | 160.054 | 5.877 | 64249.26 |
| 9.58 | 7.80 | 43.9 | 5710.01 | 160.065 | 5.984 | 64317.60 |
| 9.78 | 8.00 | 45.2 | 5878.49 | 160.076 | 6.090 | 64383.51 |
| 9.98 | 8.20 | 46.5 | 6047.04 | 160.086 | 6.195 | 64444.02 |
| 10.18 | 8.40 | 47.8 | 6215.66 | 160.095 | 6.301 | 64552.61 |
| 10.38 | 8.60 | 49.1 | 6384.40 | 160.104 | 6.406 | 64667.16 |
| 10.58 | 8.80 | 50.4 | 6553.25 | 160.113 | 6.511 | 64781.97 |
| 10.78 | 9.00 | 51.7 | 6722.22 | 160.122 | 6.616 | 64900.48 |
| 10.98 | 9.20 | 53.0 | 6891.32 | 160.130 | 6.720 | 65039.89 |
| 11.18 | 9.40 | 54.3 | 7060.57 | 160.138 | 6.825 | 65195.30 |
| 11.38 | 9.60 | 55.6 | 7230.00 | 160.146 | 6.929 | 65376.96 |
| 11.58 | 9.80 | 56.9 | 7399.64 | 160.154 | 7.033 | 65591.62 |
| 11.78 | 10.00 | 58.2 | 7569.49 | 160.161 | 7.138 | 65806.02 |
| 11.98 | 10.20 | 59.5 | 7739.56 | 160.169 | 7.242 | 66021.49 |
| 12.18 | 10.40 | 60.8 | 7909.85 | 160.176 | 7.346 | 66238.03 |
| 12.38 | 10.60 | 62.1 | 8080.35 | 160.183 | 7.450 | 66455.63 |
| 12.58 | 10.80 | 63.4 | 8251.09 | 160.191 | 7.554 | 66687.52 |
| 12.78 | 11.00 | 64.7 | 8422.06 | 160.198 | 7.658 | 66939.20 |
| 12.98 | 11.20 | 66.1 | 8593.29 | 160.205 | 7.762 | 67192.38 |
| 13.18 | 11.40 | 67.4 | 8764.78 | 160.212 | 7.866 | 67447.04 |
| 13.38 | 11.60 | 68.7 | 8936.51 | 160.219 | 7.970 | 67703.19 |
| 13.58 | 11.80 | 70.0 | 9107.66 | 160.227 | 8.074 | 65613.27 |
| 13.78 | 12.00 | 71.3 | 9276.93 | 160.236 | 8.176 | 63048.73 |
| 13.98 | 12.20 | 72.6 | 9444.02 | 160.245 | 8.277 | 60395.95 |
| 14.18 | 12.40 | 73.9 | 9608.63 | 160.256 | 8.377 | 57252.04 |
| 14.38 | 12.60 | 75.1 | 9770.32 | 160.267 | 8.474 | 54082.14 |
| 14.58 | 12.80 | 76.3 | 9928.95 | 160.278 | 8.570 | 50838.29 |
| 14.78 | 13.00 | 77.5 | 10084.30 | 160.290 | 8.664 | 47646.04 |
| 14.98 | 13.20 | 78.7 | 10236.31 | 160.302 | 8.757 | 44449.55 |
| 15.18 | 13.40 | 79.8 | 10384.64 | 160.314 | 8.847 | 41179.55 |
| 15.38 | 13.60 | 80.9 | 10529.23 | 160.325 | 8.935 | 38122.12 |
| 15.58 | 13.80 | 82.0 | 10670.09 | 160.335 | 9.022 | 35165.67 |
| 15.78 | 14.00 | 83.1 | 10807.12 | 160.346 | 9.106 | 32316.79 |
| 15.98 | 14.20 | 84.1 | 10938.41 | 160.357 | 9.187 | 29181.00 |
| 16.18 | 14.40 | 85.1 | 11065.24 | 160.369 | 9.266 | 26561.42 |
| 16.38 | 14.60 | 86.0 | 11188.12 | 160.380 | 9.343 | 24168.93 |
| 16.58 | 14.80 | 86.9 | 11307.15 | 160.391 | 9.418 | 21943.30 |
| 16.78 | 15.00 | 87.8 | 11422.33 | 160.401 | 9.492 | 19858.69 |
| 16.98 | 15.20 | 88.7 | 11533.67 | 160.411 | 9.563 | 17910.44 |
| 17.18 | 15.40 | 89.5 | 11641.17 | 160.420 | 9.632 | 16093.98 |
| 17.38 | 15.60 | 90.3 | 11744.82 | 160.429 | 9.700 | 14404.67 |
| 17.58 | 15.80 | 91.1 | 11845.84 | 160.437 | 9.766 | 14073.57 |

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 17.78 | 16.00 | 91.8 | 11946.79 | 160.445 | 9.833 | 14073.57 |
| 17.98 | 16.20 | 92.6 | 12047.73 | 160.453 | 9.901 | 14073.57 |
| 18.18 | 16.40 | 93.4 | 12148.67 | 160.461 | 9.969 | 14073.57 |
| 18.38 | 16.60 | 94.2 | 12249.61 | 160.469 | 10.037 | 14073.57 |
| 18.58 | 16.80 | 94.9 | 12344.42 | 160.482 | 10.102 | 11988.26 |
| 18.78 | 17.00 | 95.5 | 12420.48 | 160.493 | 10.154 | 9521.07 |
| 18.98 | 17.20 | 96.0 | 12489.01 | 160.495 | 10.202 | 9521.07 |
| 19.18 | 17.40 | 96.5 | 12557.54 | 160.498 | 10.251 | 9521.07 |
| 19.38 | 17.60 | 97.1 | 12626.08 | 160.500 | 10.300 | 9521.07 |
| 19.58 | 17.80 | 97.6 | 12694.61 | 160.503 | 10.349 | 9521.07 |
| 19.78 | 18.00 | 98.1 | 12763.14 | 160.505 | 10.399 | 9521.07 |
| 19.98 | 18.20 | 98.6 | 12831.68 | 160.507 | 10.450 | 9521.07 |
| 20.18 | 18.40 | 99.2 | 12900.21 | 160.510 | 10.501 | 9521.08 |
| 20.38 | 18.60 | 99.7 | 12968.74 | 160.512 | 10.553 | 9521.08 |
| 20.50 | 18.72 | 100.0 | 13009.86 | 160.513 | 10.584 | 9521.08 |

## NO. 2 CARGO HOLD

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 1.78 | 0.00 | 0.0 | 0.00 | 130.610 | 1.781 | 32194.85 |
| 1.98 | 0.20 | 0.9 | 139.60 | 130.863 | 1.880 | 34488.33 |
| 2.18 | 0.40 | 1.8 | 281.83 | 130.878 | 1.981 | 36225.17 |
| 2.38 | 0.60 | 2.8 | 426.38 | 130.883 | 2.083 | 38019.36 |
| 2.58 | 0.80 | 3.7 | 573.25 | 130.885 | 2.185 | 39871.84 |
| 2.78 | 1.00 | 4.7 | 722.46 | 130.887 | 2.287 | 41783.53 |
| 2.98 | 1.20 | 5.7 | 874.00 | 130.888 | 2.390 | 43755.38 |
| 3.18 | 1.40 | 6.7 | 1027.87 | 130.888 | 2.493 | 45788.30 |
| 3.38 | 1.60 | 7.7 | 1184.06 | 130.889 | 2.597 | 47883.24 |
| 3.58 | 1.80 | 8.8 | 1342.59 | 130.889 | 2.701 | 50041.12 |
| 3.78 | 2.00 | 9.8 | 1503.44 | 130.890 | 2.806 | 52262.88 |
| 3.98 | 2.20 | 10.9 | 1666.70 | 130.891 | 2.911 | 56003.54 |
| 4.18 | 2.40 | 12.0 | 1836.62 | 130.927 | 3.019 | 58418.54 |
| 4.38 | 2.60 | 13.1 | 2008.94 | 130.957 | 3.128 | 60902.00 |
| 4.58 | 2.80 | 14.2 | 2183.65 | 130.983 | 3.236 | 63454.87 |
| 4.78 | 3.00 | 15.4 | 2360.74 | 131.005 | 3.344 | 66078.09 |
| 4.98 | 3.20 | 16.6 | 2545.12 | 131.031 | 3.455 | 71333.77 |
| 5.18 | 3.40 | 17.8 | 2733.78 | 131.055 | 3.568 | 74203.61 |
| 5.38 | 3.60 | 19.1 | 2924.91 | 131.077 | 3.679 | 77149.42 |
| 5.58 | 3.80 | 20.3 | 3118.53 | 131.097 | 3.791 | 80172.20 |
| 5.78 | 4.00 | 21.6 | 3314.62 | 131.115 | 3.903 | 83272.91 |
| 5.98 | 4.20 | 22.9 | 3513.20 | 131.131 | 4.015 | 86452.53 |
| 6.18 | 4.40 | 24.2 | 3713.22 | 131.146 | 4.126 | 86738.24 |
| 6.38 | 4.60 | 25.5 | 3913.26 | 131.159 | 4.236 | 86738.42 |
| 6.58 | 4.80 | 26.8 | 4113.29 | 131.172 | 4.345 | 86738.62 |
| 6.78 | 5.00 | 28.1 | 4313.33 | 131.183 | 4.454 | 86738.80 |
| 6.98 | 5.20 | 29.4 | 4513.37 | 131.193 | 4.561 | 86739.00 |
| 7.18 | 5.40 | 30.7 | 4713.40 | 131.202 | 4.668 | 86739.18 |
| 7.38 | 5.60 | 32.0 | 4913.44 | 131.210 | 4.774 | 86739.37 |
| 7.58 | 5.80 | 33.3 | 5113.47 | 131.218 | 4.880 | 86739.56 |
| 7.78 | 6.00 | 34.7 | 5313.51 | 131.225 | 4.986 | 86739.76 |
| 7.98 | 6.20 | 36.0 | 5513.55 | 131.232 | 5.091 | 86739.94 |
| 8.18 | 6.40 | 37.3 | 5713.58 | 131.238 | 5.195 | 86740.13 |
| 8.38 | 6.60 | 38.6 | 5913.62 | 131.244 | 5.300 | 86740.31 |
| 8.58 | 6.80 | 39.9 | 6113.66 | 131.249 | 5.404 | 86740.50 |
| 8.78 | 7.00 | 41.2 | 6313.69 | 131.254 | 5.507 | 86740.75 |
| 8.98 | 7.20 | 42.5 | 6513.73 | 131.259 | 5.611 | 86740.94 |
| 9.18 | 7.40 | 43.8 | 6713.77 | 131.264 | 5.714 | 86741.12 |
| 9.38 | 7.60 | 45.1 | 6913.81 | 131.268 | 5.818 | 86741.31 |
| 9.58 | 7.80 | 46.4 | 7113.85 | 131.272 | 5.921 | 86741.56 |

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 9.78 | 8.00 | 47.7 | 7313.88 | 131.276 | 6.023 | 86741.75 |
| 9.98 | 8.20 | 49.0 | 7513.92 | 131.279 | 6.126 | 86741.93 |
| 10.18 | 8.40 | 50.3 | 7713.96 | 131.283 | 6.229 | 86742.11 |
| 10.38 | 8.60 | 51.6 | 7914.00 | 131.286 | 6.331 | 86742.29 |
| 10.58 | 8.80 | 52.9 | 8114.04 | 131.289 | 6.433 | 86742.48 |
| 10.78 | 9.00 | 54.2 | 8314.08 | 131.292 | 6.535 | 86742.67 |
| 10.98 | 9.20 | 55.5 | 8514.11 | 131.294 | 6.638 | 86742.85 |
| 11.18 | 9.40 | 56.8 | 8714.15 | 131.297 | 6.740 | 86743.02 |
| 11.38 | 9.60 | 58.1 | 8914.19 | 131.300 | 6.841 | 86743.20 |
| 11.58 | 9.80 | 59.4 | 9114.23 | 131.302 | 6.943 | 86743.39 |
| 11.78 | 10.00 | 60.7 | 9314.27 | 131.304 | 7.045 | 86743.57 |
| 11.98 | 10.20 | 62.1 | 9514.31 | 131.307 | 7.147 | 86743.75 |
| 12.18 | 10.40 | 63.4 | 9714.35 | 131.309 | 7.248 | 86743.94 |
| 12.38 | 10.60 | 64.7 | 9914.39 | 131.311 | 7.350 | 86744.09 |
| 12.58 | 10.80 | 66.0 | 10114.43 | 131.313 | 7.451 | 86744.28 |
| 12.78 | 11.00 | 67.3 | 10314.47 | 131.314 | 7.553 | 86744.47 |
| 12.98 | 11.20 | 68.6 | 10514.51 | 131.316 | 7.654 | 86744.65 |
| 13.18 | 11.40 | 69.9 | 10714.55 | 131.318 | 7.755 | 86744.84 |
| 13.38 | 11.60 | 71.2 | 10914.59 | 131.320 | 7.856 | 86743.05 |
| 13.58 | 11.80 | 72.5 | 11112.48 | 131.321 | 7.957 | 81273.52 |
| 13.78 | 12.00 | 73.7 | 11306.08 | 131.323 | 8.055 | 76038.27 |
| 13.98 | 12.20 | 75.0 | 11495.38 | 131.324 | 8.151 | 71032.78 |
| 14.18 | 12.40 | 76.2 | 11680.38 | 131.324 | 8.244 | 66251.94 |
| 14.38 | 12.60 | 77.4 | 11861.08 | 131.325 | 8.336 | 61690.57 |
| 14.58 | 12.80 | 78.5 | 12037.49 | 131.326 | 8.426 | 57343.53 |
| 14.78 | 13.00 | 79.6 | 12209.60 | 131.327 | 8.515 | 53205.66 |
| 14.98 | 13.20 | 80.7 | 12377.42 | 131.328 | 8.601 | 49271.78 |
| 15.18 | 13.40 | 81.8 | 12540.94 | 131.329 | 8.685 | 45536.75 |
| 15.38 | 13.60 | 82.8 | 12700.16 | 131.330 | 8.768 | 41995.42 |
| 15.58 | 13.80 | 83.8 | 12855.09 | 131.330 | 8.849 | 38642.61 |
| 15.78 | 14.00 | 84.8 | 13005.71 | 131.331 | 8.928 | 35473.19 |
| 15.98 | 14.20 | 85.8 | 13148.57 | 131.332 | 9.004 | 31670.98 |
| 16.18 | 14.40 | 86.6 | 13286.16 | 131.332 | 9.077 | 28827.12 |
| 16.38 | 14.60 | 87.5 | 13419.47 | 131.333 | 9.148 | 26232.16 |
| 16.58 | 14.80 | 88.4 | 13548.60 | 131.334 | 9.218 | 23816.53 |
| 16.78 | 15.00 | 89.2 | 13673.56 | 131.335 | 9.286 | 21553.91 |
| 16.98 | 15.20 | 90.0 | 13794.35 | 131.336 | 9.353 | 19439.36 |
| 17.18 | 15.40 | 90.7 | 13910.97 | 131.336 | 9.418 | 17467.80 |
| 17.38 | 15.60 | 91.5 | 14023.41 | 131.337 | 9.481 | 15634.28 |
| 17.58 | 15.80 | 92.2 | 14133.00 | 131.338 | 9.543 | 15274.91 |
| 17.78 | 16.00 | 92.9 | 14242.50 | 131.339 | 9.605 | 15274.91 |
| 17.98 | 16.20 | 93.6 | 14352.00 | 131.339 | 9.668 | 15274.91 |

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 18.18 | 16.40 | 94.3 | 14461.50 | 131.340 | 9.732 | 15274.91 |
| 18.38 | 16.60 | 95.0 | 14571.00 | 131.341 | 9.796 | 15274.91 |
| 18.58 | 16.80 | 95.7 | 14666.99 | 131.342 | 9.853 | 10762.95 |
| 18.78 | 17.00 | 96.2 | 14744.46 | 131.345 | 9.900 | 10762.95 |
| 18.98 | 17.20 | 96.7 | 14821.93 | 131.347 | 9.946 | 10762.95 |
| 19.18 | 17.40 | 97.2 | 14899.41 | 131.350 | 9.994 | 10762.95 |
| 19.38 | 17.60 | 97.7 | 14976.88 | 131.352 | 10.042 | 10762.95 |
| 19.58 | 17.80 | 98.2 | 15054.35 | 131.355 | 10.091 | 10762.95 |
| 19.78 | 18.00 | 98.7 | 15131.82 | 131.357 | 10.140 | 10762.95 |
| 19.98 | 18.20 | 99.2 | 15209.29 | 131.360 | 10.189 | 10762.96 |
| 20.18 | 18.40 | 99.7 | 15286.76 | 131.362 | 10.239 | 10762.96 |
| 20.30 | 18.52 | 100.0 | 15333.25 | 131.364 | 10.270 | 10762.96 |

## NO. 3 CARGO HOLD

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 1.78 | 0.00 | 0.0 | 0.00 | 100.270 | 1.781 | 30355.17 |
| 1.98 | 0.20 | 0.9 | 131.76 | 100.523 | 1.880 | 32555.39 |
| 2.18 | 0.40 | 1.8 | 266.01 | 100.538 | 1.981 | 34194.89 |
| 2.38 | 0.60 | 2.8 | 402.46 | 100.543 | 2.083 | 35888.52 |
| 2.58 | 0.80 | 3.7 | 541.11 | 100.545 | 2.185 | 37637.16 |
| 2.78 | 1.00 | 4.7 | 681.95 | 100.547 | 2.287 | 39441.72 |
| 2.98 | 1.20 | 5.7 | 825.00 | 100.548 | 2.390 | 41303.05 |
| 3.18 | 1.40 | 6.7 | 970.24 | 100.549 | 2.493 | 43222.04 |
| 3.38 | 1.60 | 7.7 | 1117.68 | 100.549 | 2.597 | 45199.56 |
| 3.58 | 1.80 | 8.7 | 1267.32 | 100.549 | 2.701 | 47236.50 |
| 3.78 | 2.00 | 9.8 | 1419.16 | 100.550 | 2.806 | 49333.73 |
| 3.98 | 2.20 | 10.8 | 1573.27 | 100.551 | 2.911 | 52946.23 |
| 4.18 | 2.40 | 11.9 | 1733.92 | 100.587 | 3.020 | 55229.40 |
| 4.38 | 2.60 | 13.0 | 1896.83 | 100.617 | 3.128 | 57577.28 |
| 4.58 | 2.80 | 14.2 | 2062.00 | 100.643 | 3.236 | 59990.79 |
| 4.78 | 3.00 | 15.3 | 2229.43 | 100.666 | 3.345 | 62470.80 |
| 4.98 | 3.20 | 16.5 | 2404.01 | 100.691 | 3.456 | 67579.36 |
| 5.18 | 3.40 | 17.7 | 2582.74 | 100.715 | 3.569 | 70298.14 |
| 5.38 | 3.60 | 19.0 | 2763.81 | 100.737 | 3.681 | 73088.91 |
| 5.58 | 3.80 | 20.3 | 2947.24 | 100.757 | 3.793 | 75952.60 |
| 5.78 | 4.00 | 21.5 | 3133.01 | 100.775 | 3.905 | 78890.09 |
| 5.98 | 4.20 | 22.8 | 3321.13 | 100.791 | 4.017 | 81902.36 |
| 6.18 | 4.40 | 24.1 | 3510.64 | 100.806 | 4.128 | 82177.16 |
| 6.38 | 4.60 | 25.4 | 3700.15 | 100.820 | 4.238 | 82177.16 |
| 6.58 | 4.80 | 26.7 | 3889.66 | 100.832 | 4.347 | 82177.16 |
| 6.78 | 5.00 | 28.0 | 4079.17 | 100.843 | 4.456 | 82177.16 |
| 6.98 | 5.20 | 29.3 | 4268.68 | 100.853 | 4.563 | 82177.16 |
| 7.18 | 5.40 | 30.6 | 4458.19 | 100.862 | 4.670 | 82177.16 |
| 7.38 | 5.60 | 31.9 | 4647.70 | 100.871 | 4.777 | 82177.16 |
| 7.58 | 5.80 | 33.2 | 4837.21 | 100.878 | 4.883 | 82177.16 |
| 7.78 | 6.00 | 34.5 | 5026.72 | 100.886 | 4.988 | 82177.16 |
| 7.98 | 6.20 | 35.8 | 5216.23 | 100.892 | 5.093 | 82177.16 |
| 8.18 | 6.40 | 37.1 | 5405.74 | 100.899 | 5.198 | 82177.16 |
| 8.38 | 6.60 | 38.4 | 5595.25 | 100.904 | 5.302 | 82177.16 |
| 8.58 | 6.80 | 39.7 | 5784.76 | 100.910 | 5.406 | 82177.16 |
| 8.78 | 7.00 | 41.1 | 5974.27 | 100.915 | 5.510 | 82177.16 |
| 8.98 | 7.20 | 42.4 | 6163.78 | 100.920 | 5.614 | 82177.16 |
| 9.18 | 7.40 | 43.7 | 6353.29 | 100.924 | 5.717 | 82177.16 |
| 9.38 | 7.60 | 45.0 | 6542.80 | 100.928 | 5.820 | 82177.16 |
| 9.58 | 7.80 | 46.3 | 6732.31 | 100.932 | 5.923 | 82177.16 |

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 9.78 | 8.00 | 47.6 | 6921.82 | 100.936 | 6.026 | 82177.16 |
| 9.98 | 8.20 | 48.9 | 7111.33 | 100.939 | 6.129 | 82177.16 |
| 10.18 | 8.40 | 50.2 | 7300.85 | 100.943 | 6.232 | 82177.16 |
| 10.38 | 8.60 | 51.5 | 7490.36 | 100.946 | 6.334 | 82177.16 |
| 10.58 | 8.80 | 52.8 | 7679.87 | 100.949 | 6.436 | 82177.16 |
| 10.78 | 9.00 | 54.1 | 7869.38 | 100.952 | 6.538 | 82177.16 |
| 10.98 | 9.20 | 55.4 | 8058.89 | 100.955 | 6.641 | 82177.16 |
| 11.18 | 9.40 | 56.7 | 8248.40 | 100.957 | 6.743 | 82177.16 |
| 11.38 | 9.60 | 58.0 | 8437.91 | 100.960 | 6.844 | 82177.16 |
| 11.58 | 9.80 | 59.3 | 8627.42 | 100.962 | 6.946 | 82177.16 |
| 11.78 | 10.00 | 60.6 | 8816.93 | 100.965 | 7.048 | 82177.16 |
| 11.98 | 10.20 | 61.9 | 9006.44 | 100.967 | 7.150 | 82177.16 |
| 12.18 | 10.40 | 63.2 | 9195.95 | 100.969 | 7.251 | 82177.16 |
| 12.38 | 10.60 | 64.5 | 9385.46 | 100.971 | 7.353 | 82177.16 |
| 12.58 | 10.80 | 65.8 | 9574.97 | 100.973 | 7.454 | 82177.16 |
| 12.78 | 11.00 | 67.1 | 9764.48 | 100.975 | 7.556 | 82177.16 |
| 12.98 | 11.20 | 68.4 | 9953.99 | 100.977 | 7.657 | 82177.16 |
| 13.18 | 11.40 | 69.7 | 10143.50 | 100.978 | 7.758 | 82177.16 |
| 13.38 | 11.60 | 71.0 | 10333.01 | 100.980 | 7.860 | 82177.16 |
| 13.58 | 11.80 | 72.3 | 10520.49 | 100.981 | 7.960 | 76995.13 |
| 13.78 | 12.00 | 73.6 | 10703.89 | 100.983 | 8.058 | 72035.48 |
| 13.98 | 12.20 | 74.8 | 10883.23 | 100.984 | 8.154 | 67293.53 |
| 14.18 | 12.40 | 76.0 | 11058.49 | 100.985 | 8.248 | 62764.38 |
| 14.38 | 12.60 | 77.2 | 11229.69 | 100.985 | 8.340 | 58443.16 |
| 14.58 | 12.80 | 78.3 | 11396.81 | 100.986 | 8.430 | 54324.96 |
| 14.78 | 13.00 | 79.4 | 11559.86 | 100.987 | 8.518 | 50404.93 |
| 14.98 | 13.20 | 80.5 | 11718.84 | 100.988 | 8.604 | 46678.15 |
| 15.18 | 13.40 | 81.6 | 11873.76 | 100.989 | 8.689 | 43139.75 |
| 15.38 | 13.60 | 82.6 | 12024.60 | 100.990 | 8.771 | 39784.85 |
| 15.58 | 13.80 | 83.6 | 12171.37 | 100.991 | 8.852 | 36608.55 |
| 15.78 | 14.00 | 84.6 | 12314.07 | 100.991 | 8.931 | 33605.98 |
| 15.98 | 14.20 | 85.5 | 12449.22 | 100.992 | 9.007 | 29961.26 |
| 16.18 | 14.40 | 86.4 | 12579.34 | 100.993 | 9.080 | 27265.75 |
| 16.38 | 14.60 | 87.3 | 12705.40 | 100.993 | 9.151 | 24810.30 |
| 16.58 | 14.80 | 88.1 | 12827.51 | 100.994 | 9.221 | 22525.62 |
| 16.78 | 15.00 | 89.0 | 12945.67 | 100.995 | 9.289 | 20385.65 |
| 16.98 | 15.20 | 89.7 | 13059.89 | 100.996 | 9.356 | 18385.71 |
| 17.18 | 15.40 | 90.5 | 13170.16 | 100.997 | 9.420 | 16521.03 |
| 17.38 | 15.60 | 91.2 | 13276.48 | 100.997 | 9.483 | 14786.89 |
| 17.58 | 15.80 | 91.9 | 13380.11 | 100.998 | 9.545 | 14447.00 |
| 17.78 | 16.00 | 92.7 | 13483.65 | 100.999 | 9.608 | 14447.00 |
| 17.98 | 16.20 | 93.4 | 13587.19 | 100.999 | 9.671 | 14447.00 |

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 18.18 | 16.40 | 94.1 | 13690.73 | 101.000 | 9.734 | 14447.00 |
| 18.38 | 16.60 | 94.8 | 13794.27 | 101.001 | 9.798 | 14447.00 |
| 18.58 | 16.80 | 95.4 | 13886.82 | 101.002 | 9.856 | 10762.95 |
| 18.78 | 17.00 | 96.0 | 13964.29 | 101.005 | 9.905 | 10762.95 |
| 18.98 | 17.20 | 96.5 | 14041.76 | 101.008 | 9.955 | 10762.95 |
| 19.18 | 17.40 | 97.0 | 14119.23 | 101.010 | 10.005 | 10762.95 |
| 19.38 | 17.60 | 97.6 | 14196.71 | 101.013 | 10.055 | 10762.95 |
| 19.58 | 17.80 | 98.1 | 14274.18 | 101.016 | 10.106 | 10762.95 |
| 19.78 | 18.00 | 98.6 | 14351.65 | 101.018 | 10.158 | 10762.95 |
| 19.98 | 18.20 | 99.1 | 14429.12 | 101.021 | 10.210 | 10762.96 |
| 20.18 | 18.40 | 99.7 | 14506.59 | 101.024 | 10.263 | 10762.96 |
| 20.30 | 18.52 | 100.0 | 14553.08 | 101.025 | 10.295 | 10762.96 |

## NO. 4 CARGO HOLD

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 1.78 | 0.00 | 0.0 | 0.00 | 69.930 | 1.781 | 32194.86 |
| 1.98 | 0.20 | 0.9 | 139.60 | 70.183 | 1.880 | 34488.34 |
| 2.18 | 0.40 | 1.8 | 281.83 | 70.198 | 1.981 | 36225.18 |
| 2.38 | 0.60 | 2.8 | 426.38 | 70.203 | 2.083 | 38019.37 |
| 2.58 | 0.80 | 3.7 | 573.25 | 70.205 | 2.185 | 39871.85 |
| 2.78 | 1.00 | 4.7 | 722.46 | 70.207 | 2.287 | 41783.54 |
| 2.98 | 1.20 | 5.7 | 874.00 | 70.208 | 2.390 | 43755.39 |
| 3.18 | 1.40 | 6.7 | 1027.87 | 70.208 | 2.493 | 45788.30 |
| 3.38 | 1.60 | 7.7 | 1184.06 | 70.209 | 2.597 | 47883.25 |
| 3.58 | 1.80 | 8.8 | 1342.59 | 70.209 | 2.701 | 50041.13 |
| 3.78 | 2.00 | 9.8 | 1503.44 | 70.210 | 2.806 | 52262.89 |
| 3.98 | 2.20 | 10.9 | 1666.70 | 70.211 | 2.911 | 56003.54 |
| 4.18 | 2.40 | 12.0 | 1836.62 | 70.247 | 3.019 | 58418.55 |
| 4.38 | 2.60 | 13.1 | 2008.94 | 70.277 | 3.128 | 60902.01 |
| 4.58 | 2.80 | 14.2 | 2183.65 | 70.303 | 3.236 | 63454.88 |
| 4.78 | 3.00 | 15.4 | 2360.74 | 70.325 | 3.344 | 66078.10 |
| 4.98 | 3.20 | 16.6 | 2545.12 | 70.351 | 3.455 | 71333.76 |
| 5.18 | 3.40 | 17.8 | 2733.78 | 70.375 | 3.568 | 74203.61 |
| 5.38 | 3.60 | 19.1 | 2924.91 | 70.397 | 3.679 | 77149.41 |
| 5.58 | 3.80 | 20.3 | 3118.53 | 70.417 | 3.791 | 80172.17 |
| 5.78 | 4.00 | 21.6 | 3314.62 | 70.434 | 3.903 | 83272.88 |
| 5.98 | 4.20 | 22.9 | 3513.20 | 70.451 | 4.015 | 86452.49 |
| 6.18 | 4.40 | 24.2 | 3713.23 | 70.466 | 4.126 | 86742.56 |
| 6.38 | 4.60 | 25.5 | 3913.26 | 70.479 | 4.236 | 86742.56 |
| 6.58 | 4.80 | 26.8 | 4113.30 | 70.492 | 4.345 | 86742.56 |
| 6.78 | 5.00 | 28.1 | 4313.34 | 70.503 | 4.454 | 86742.56 |
| 6.98 | 5.20 | 29.4 | 4513.38 | 70.513 | 4.561 | 86742.56 |
| 7.18 | 5.40 | 30.7 | 4713.42 | 70.522 | 4.668 | 86742.56 |
| 7.38 | 5.60 | 32.0 | 4913.46 | 70.530 | 4.774 | 86742.56 |
| 7.58 | 5.80 | 33.3 | 5113.50 | 70.538 | 4.880 | 86742.56 |
| 7.78 | 6.00 | 34.7 | 5313.54 | 70.545 | 4.986 | 86742.56 |
| 7.98 | 6.20 | 36.0 | 5513.57 | 70.552 | 5.091 | 86742.56 |
| 8.18 | 6.40 | 37.3 | 5713.61 | 70.558 | 5.195 | 86742.56 |
| 8.38 | 6.60 | 38.6 | 5913.65 | 70.564 | 5.300 | 86742.56 |
| 8.58 | 6.80 | 39.9 | 6113.69 | 70.569 | 5.404 | 86742.56 |
| 8.78 | 7.00 | 41.2 | 6313.73 | 70.574 | 5.507 | 86742.56 |
| 8.98 | 7.20 | 42.5 | 6513.77 | 70.579 | 5.611 | 86742.56 |
| 9.18 | 7.40 | 43.8 | 6713.81 | 70.584 | 5.714 | 86742.56 |
| 9.38 | 7.60 | 45.1 | 6913.85 | 70.588 | 5.818 | 86742.56 |
| 9.58 | 7.80 | 46.4 | 7113.89 | 70.592 | 5.921 | 86742.56 |

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 9.78 | 8.00 | 47.7 | 7313.92 | 70.596 | 6.023 | 86742.56 |
| 9.98 | 8.20 | 49.0 | 7513.96 | 70.599 | 6.126 | 86742.56 |
| 10.18 | 8.40 | 50.3 | 7714.00 | 70.603 | 6.229 | 86742.56 |
| 10.38 | 8.60 | 51.6 | 7914.04 | 70.606 | 6.331 | 86742.56 |
| 10.58 | 8.80 | 52.9 | 8114.08 | 70.609 | 6.433 | 86742.56 |
| 10.78 | 9.00 | 54.2 | 8314.12 | 70.612 | 6.535 | 86742.56 |
| 10.98 | 9.20 | 55.5 | 8514.16 | 70.614 | 6.638 | 86742.56 |
| 11.18 | 9.40 | 56.8 | 8714.19 | 70.617 | 6.740 | 86742.56 |
| 11.38 | 9.60 | 58.1 | 8914.23 | 70.620 | 6.841 | 86742.56 |
| 11.58 | 9.80 | 59.4 | 9114.27 | 70.622 | 6.943 | 86742.56 |
| 11.78 | 10.00 | 60.7 | 9314.31 | 70.624 | 7.045 | 86742.56 |
| 11.98 | 10.20 | 62.1 | 9514.35 | 70.627 | 7.147 | 86742.56 |
| 12.18 | 10.40 | 63.4 | 9714.39 | 70.629 | 7.248 | 86742.56 |
| 12.38 | 10.60 | 64.7 | 9914.43 | 70.631 | 7.350 | 86742.56 |
| 12.58 | 10.80 | 66.0 | 10114.47 | 70.633 | 7.451 | 86742.56 |
| 12.78 | 11.00 | 67.3 | 10314.50 | 70.634 | 7.553 | 86742.56 |
| 12.98 | 11.20 | 68.6 | 10514.54 | 70.636 | 7.654 | 86742.56 |
| 13.18 | 11.40 | 69.9 | 10714.58 | 70.638 | 7.755 | 86742.56 |
| 13.38 | 11.60 | 71.2 | 10914.62 | 70.640 | 7.856 | 86742.56 |
| 13.58 | 11.80 | 72.5 | 11112.51 | 70.641 | 7.957 | 81272.61 |
| 13.78 | 12.00 | 73.7 | 11306.11 | 70.642 | 8.055 | 76037.44 |
| 13.98 | 12.20 | 75.0 | 11495.40 | 70.644 | 8.151 | 71032.04 |
| 14.18 | 12.40 | 76.2 | 11680.40 | 70.644 | 8.244 | 66251.27 |
| 14.38 | 12.60 | 77.4 | 11861.11 | 70.645 | 8.336 | 61689.99 |
| 14.58 | 12.80 | 78.5 | 12037.52 | 70.646 | 8.426 | 57343.01 |
| 14.78 | 13.00 | 79.6 | 12209.63 | 70.647 | 8.515 | 53205.20 |
| 14.98 | 13.20 | 80.7 | 12377.44 | 70.648 | 8.601 | 49271.37 |
| 15.18 | 13.40 | 81.8 | 12540.96 | 70.649 | 8.685 | 45536.40 |
| 15.38 | 13.60 | 82.8 | 12700.18 | 70.650 | 8.768 | 41995.11 |
| 15.58 | 13.80 | 83.8 | 12855.11 | 70.650 | 8.849 | 38642.36 |
| 15.78 | 14.00 | 84.8 | 13005.74 | 70.651 | 8.928 | 35472.98 |
| 15.98 | 14.20 | 85.8 | 13148.59 | 70.652 | 9.004 | 31670.82 |
| 16.18 | 14.40 | 86.6 | 13286.19 | 70.652 | 9.077 | 28826.98 |
| 16.38 | 14.60 | 87.5 | 13419.50 | 70.653 | 9.148 | 26232.05 |
| 16.58 | 14.80 | 88.4 | 13548.63 | 70.654 | 9.218 | 23816.45 |
| 16.78 | 15.00 | 89.2 | 13673.59 | 70.655 | 9.286 | 21553.86 |
| 16.98 | 15.20 | 90.0 | 13794.37 | 70.656 | 9.353 | 19439.32 |
| 17.18 | 15.40 | 90.7 | 13910.99 | 70.656 | 9.418 | 17467.79 |
| 17.38 | 15.60 | 91.5 | 14023.43 | 70.657 | 9.481 | 15634.28 |
| 17.58 | 15.80 | 92.2 | 14133.02 | 70.658 | 9.543 | 15274.92 |
| 17.78 | 16.00 | 92.9 | 14242.52 | 70.659 | 9.605 | 15274.92 |
| 17.98 | 16.20 | 93.6 | 14352.02 | 70.659 | 9.668 | 15274.92 |

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 18.18 | 16.40 | 94.3 | 14461.52 | 70.660 | 9.732 | 15274.92 |
| 18.38 | 16.60 | 95.0 | 14571.02 | 70.661 | 9.796 | 15274.92 |
| 18.58 | 16.80 | 95.7 | 14667.02 | 70.662 | 9.853 | 10762.95 |
| 18.78 | 17.00 | 96.2 | 14744.49 | 70.665 | 9.900 | 10762.95 |
| 18.98 | 17.20 | 96.7 | 14821.96 | 70.667 | 9.946 | 10762.95 |
| 19.18 | 17.40 | 97.2 | 14899.43 | 70.670 | 9.994 | 10762.95 |
| 19.38 | 17.60 | 97.7 | 14976.90 | 70.672 | 10.042 | 10762.95 |
| 19.58 | 17.80 | 98.2 | 15054.37 | 70.675 | 10.091 | 10762.95 |
| 19.78 | 18.00 | 98.7 | 15131.84 | 70.677 | 10.140 | 10762.95 |
| 19.98 | 18.20 | 99.2 | 15209.32 | 70.680 | 10.189 | 10762.96 |
| 20.18 | 18.40 | 99.7 | 15286.79 | 70.682 | 10.239 | 10762.96 |
| 20.30 | 18.52 | 100.0 | 15333.27 | 70.684 | 10.270 | 10762.96 |

## NO. 5 CARGO HOLD

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 1.78 | 0.00 | 0.0 | 0.00 | 42.008 | 1.781 | 16099.90 |
| 1.98 | 0.20 | 0.7 | 99.73 | 41.985 | 1.880 | 17060.19 |
| 2.18 | 0.40 | 1.5 | 201.67 | 41.962 | 1.981 | 18070.30 |
| 2.38 | 0.60 | 2.3 | 305.80 | 41.939 | 2.083 | 19121.63 |
| 2.58 | 0.80 | 3.1 | 412.13 | 41.917 | 2.186 | 20215.05 |
| 2.78 | 1.00 | 3.9 | 520.66 | 41.896 | 2.289 | 21351.45 |
| 2.98 | 1.20 | 4.7 | 631.39 | 41.875 | 2.393 | 22531.70 |
| 3.18 | 1.40 | 5.6 | 744.31 | 41.854 | 2.497 | 23756.67 |
| 3.38 | 1.60 | 6.4 | 859.44 | 41.834 | 2.602 | 25027.26 |
| 3.58 | 1.80 | 7.3 | 976.76 | 41.814 | 2.707 | 26344.33 |
| 3.78 | 2.00 | 8.2 | 1096.28 | 41.794 | 2.813 | 27708.78 |
| 3.98 | 2.20 | 9.1 | 1218.08 | 41.776 | 2.920 | 30575.55 |
| 4.18 | 2.40 | 10.0 | 1346.41 | 41.797 | 3.031 | 32100.08 |
| 4.38 | 2.60 | 11.0 | 1477.00 | 41.813 | 3.141 | 33676.39 |
| 4.58 | 2.80 | 12.0 | 1609.85 | 41.823 | 3.252 | 35305.39 |
| 4.78 | 3.00 | 13.0 | 1744.97 | 41.830 | 3.362 | 36987.98 |
| 4.98 | 3.20 | 14.1 | 1885.21 | 41.854 | 3.475 | 40196.30 |
| 5.18 | 3.40 | 15.1 | 2028.86 | 41.880 | 3.589 | 42091.89 |
| 5.38 | 3.60 | 16.2 | 2174.85 | 41.902 | 3.702 | 44046.51 |
| 5.58 | 3.80 | 17.3 | 2323.19 | 41.919 | 3.816 | 46061.12 |
| 5.78 | 4.00 | 18.5 | 2473.88 | 41.934 | 3.930 | 48136.64 |
| 5.98 | 4.20 | 19.6 | 2626.93 | 41.946 | 4.043 | 50274.02 |
| 6.18 | 4.40 | 20.8 | 2782.10 | 41.955 | 4.157 | 51726.88 |
| 6.38 | 4.60 | 21.9 | 2938.90 | 41.959 | 4.270 | 53002.78 |
| 6.58 | 4.80 | 23.1 | 3097.37 | 41.961 | 4.383 | 54430.34 |
| 6.78 | 5.00 | 24.3 | 3257.61 | 41.959 | 4.496 | 56007.24 |
| 6.98 | 5.20 | 25.5 | 3419.71 | 41.954 | 4.609 | 57661.16 |
| 7.18 | 5.40 | 26.7 | 3583.64 | 41.947 | 4.722 | 59195.95 |
| 7.38 | 5.60 | 28.0 | 3749.37 | 41.937 | 4.835 | 60840.02 |
| 7.58 | 5.80 | 29.2 | 3917.01 | 41.924 | 4.948 | 62596.14 |
| 7.78 | 6.00 | 30.5 | 4086.60 | 41.909 | 5.062 | 64430.69 |
| 7.98 | 6.20 | 31.8 | 4258.03 | 41.892 | 5.175 | 65892.45 |
| 8.18 | 6.40 | 33.1 | 4430.91 | 41.873 | 5.289 | 67168.55 |
| 8.38 | 6.60 | 34.4 | 4605.20 | 41.853 | 5.402 | 68498.80 |
| 8.58 | 6.80 | 35.7 | 4780.92 | 41.831 | 5.515 | 69873.84 |
| 8.78 | 7.00 | 37.0 | 4958.04 | 41.808 | 5.628 | 71245.95 |
| 8.98 | 7.20 | 38.3 | 5136.40 | 41.784 | 5.741 | 72383.59 |
| 9.18 | 7.40 | 39.7 | 5315.90 | 41.759 | 5.854 | 73562.87 |
| 9.38 | 7.60 | 41.0 | 5496.56 | 41.734 | 5.966 | 74789.22 |
| 9.58 | 7.80 | 42.4 | 5678.35 | 41.708 | 6.079 | 76059.93 |

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 9.78 | 8.00 | 43.7 | 5861.15 | 41.682 | 6.191 | 76893.59 |
| 9.98 | 8.20 | 45.1 | 6044.59 | 41.656 | 6.303 | 77551.64 |
| 10.18 | 8.40 | 46.5 | 6228.64 | 41.631 | 6.415 | 78234.98 |
| 10.38 | 8.60 | 47.8 | 6413.32 | 41.605 | 6.526 | 78944.08 |
| 10.58 | 8.80 | 49.2 | 6598.59 | 41.580 | 6.637 | 79588.60 |
| 10.78 | 9.00 | 50.6 | 6784.32 | 41.556 | 6.748 | 80072.85 |
| 10.98 | 9.20 | 52.0 | 6970.45 | 41.531 | 6.858 | 80562.69 |
| 11.18 | 9.40 | 53.4 | 7156.88 | 41.508 | 6.968 | 80768.30 |
| 11.38 | 9.60 | 54.8 | 7343.43 | 41.485 | 7.078 | 80903.62 |
| 11.58 | 9.80 | 56.2 | 7530.08 | 41.464 | 7.187 | 81009.30 |
| 11.78 | 10.00 | 57.6 | 7716.77 | 41.443 | 7.295 | 81033.80 |
| 11.98 | 10.20 | 59.0 | 7903.49 | 41.424 | 7.404 | 81057.51 |
| 12.18 | 10.40 | 60.4 | 8090.22 | 41.405 | 7.512 | 81068.93 |
| 12.38 | 10.60 | 61.7 | 8276.95 | 41.387 | 7.619 | 81075.40 |
| 12.58 | 10.80 | 63.1 | 8463.69 | 41.370 | 7.726 | 81078.42 |
| 12.78 | 11.00 | 64.5 | 8650.42 | 41.353 | 7.833 | 81081.34 |
| 12.98 | 11.20 | 65.9 | 8837.17 | 41.337 | 7.940 | 81084.18 |
| 13.18 | 11.40 | 67.3 | 9023.91 | 41.322 | 8.046 | 81084.59 |
| 13.38 | 11.60 | 68.7 | 9210.65 | 41.308 | 8.153 | 81084.76 |
| 13.58 | 11.80 | 70.1 | 9395.36 | 41.294 | 8.257 | 75905.56 |
| 13.78 | 12.00 | 71.4 | 9576.00 | 41.281 | 8.360 | 70945.93 |
| 13.98 | 12.20 | 72.8 | 9752.57 | 41.268 | 8.459 | 66203.99 |
| 14.18 | 12.40 | 74.0 | 9925.08 | 41.257 | 8.557 | 61708.28 |
| 14.38 | 12.60 | 75.3 | 10093.57 | 41.246 | 8.653 | 57471.28 |
| 14.58 | 12.80 | 76.5 | 10258.10 | 41.235 | 8.746 | 53478.64 |
| 14.78 | 13.00 | 77.7 | 10418.68 | 41.225 | 8.838 | 49678.12 |
| 14.98 | 13.20 | 78.9 | 10575.32 | 41.216 | 8.927 | 46043.07 |
| 15.18 | 13.40 | 80.0 | 10727.95 | 41.207 | 9.015 | 42548.87 |
| 15.38 | 13.60 | 81.1 | 10876.54 | 41.199 | 9.100 | 39193.97 |
| 15.58 | 13.80 | 82.2 | 11021.05 | 41.191 | 9.184 | 36017.67 |
| 15.78 | 14.00 | 83.3 | 11161.50 | 41.184 | 9.266 | 33028.20 |
| 15.98 | 14.20 | 84.3 | 11296.29 | 41.174 | 9.345 | 29842.94 |
| 16.18 | 14.40 | 85.2 | 11426.66 | 41.165 | 9.421 | 27245.53 |
| 16.38 | 14.60 | 86.2 | 11553.08 | 41.156 | 9.496 | 24811.37 |
| 16.58 | 14.80 | 87.1 | 11675.56 | 41.148 | 9.570 | 22526.67 |
| 16.78 | 15.00 | 88.0 | 11794.09 | 41.140 | 9.641 | 20386.70 |
| 16.98 | 15.20 | 88.8 | 11908.67 | 41.133 | 9.711 | 18386.77 |
| 17.18 | 15.40 | 89.7 | 12019.31 | 41.125 | 9.779 | 16522.10 |
| 17.38 | 15.60 | 90.5 | 12126.00 | 41.119 | 9.845 | 14787.95 |
| 17.58 | 15.80 | 91.2 | 12229.99 | 41.112 | 9.909 | 14448.06 |
| 17.78 | 16.00 | 92.0 | 12333.90 | 41.106 | 9.975 | 14448.06 |
| 17.98 | 16.20 | 92.8 | 12437.81 | 41.100 | 10.041 | 14448.06 |

| Height above BL m | Height from tank bottom m | FILL % | NET VOLUME $m^3$ | LCG foap m | KG above BL m | I MOM $m^4$ |
|---|---|---|---|---|---|---|
| 18.18 | 16.40 | 93.6 | 12541.71 | 41.093 | 10.108 | 14448.06 |
| 18.38 | 16.60 | 94.3 | 12645.62 | 41.087 | 10.175 | 14448.06 |
| 18.58 | 16.80 | 95.0 | 12738.39 | 41.083 | 10.235 | 10762.95 |
| 18.78 | 17.00 | 95.6 | 12815.86 | 41.082 | 10.286 | 10762.95 |
| 18.98 | 17.20 | 96.2 | 12893.33 | 41.080 | 10.338 | 10762.95 |
| 19.18 | 17.40 | 96.8 | 12970.80 | 41.079 | 10.390 | 10762.95 |
| 19.38 | 17.60 | 97.3 | 13048.27 | 41.077 | 10.443 | 10762.95 |
| 19.58 | 17.80 | 97.9 | 13125.75 | 41.076 | 10.496 | 10762.95 |
| 19.78 | 18.00 | 98.5 | 13203.22 | 41.074 | 10.550 | 10762.95 |
| 19.98 | 18.20 | 99.1 | 13280.69 | 41.073 | 10.605 | 10762.96 |
| 20.18 | 18.40 | 99.7 | 13358.16 | 41.071 | 10.659 | 10762.96 |
| 20.30 | 18.52 | 100.0 | 13404.64 | 41.070 | 10.693 | 10762.96 |

# FREEBOARD DATA

| Mark | Season | Freeboard (mm) | Draught moulded (m) | Displacement (t) | Deadweight (t) |
|---|---|---|---|---|---|
| S | Summer | 5224 | 12.800 | 67681.1 | 56713.1 |
| F | Summer fresh water | 4936 | 13.088 | 67681.1 | 56713.1 |
| T | Tropical | 4957 | 13.067 | 69254.4 | 58286.4 |
| TF | Tropical fresh water | 4669 | 13.355 | 69254.4 | 58286.4 |
| W | Winter | 5491 | 12.533 | 66110.4 | 55142.4 |

# PART B

# HYDROSTATIC DATA

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# HYDROSTATIC DATA

**HYDROSTATIC DATA HAS BEEN DEVELOPED WITH THE VESSEL FLOATING ON AN EVEN KEEL WATERLINE HAVING A LENGTH OF 185.000 METRES BETWEEN THE PERPENDICULARS.**

**DATA VALUES ARE FOR THE SHIP IN SALT WATER (RD 1.025)**

| T (m) | DISPL. (t) | TPC (t) | MCTC (tm) | KM (m) | KB (m) | LCB (m) | LCF (m) |
|---|---|---|---|---|---|---|---|
| 2.000 | 8919.0 | 48.20 | 494.6 | 41.069 | 1.036 | 101.017 | 100.457 |
| 2.050 | 9160.3 | 48.30 | 497.1 | 40.176 | 1.062 | 101.003 | 100.429 |
| 2.100 | 9402.1 | 48.40 | 499.5 | 39.326 | 1.088 | 100.989 | 100.403 |
| 2.150 | 9644.4 | 48.50 | 501.9 | 38.514 | 1.114 | 100.976 | 100.375 |
| 2.200 | 9887.1 | 48.60 | 504.2 | 37.741 | 1.140 | 100.962 | 100.349 |
| 2.250 | 10130.4 | 48.70 | 506.6 | 37.001 | 1.166 | 100.949 | 100.322 |
| 2.300 | 10374.1 | 48.80 | 508.9 | 36.295 | 1.192 | 100.935 | 100.297 |
| 2.350 | 10618.3 | 48.80 | 511.1 | 35.620 | 1.218 | 100.922 | 100.273 |
| 2.400 | 10862.9 | 48.90 | 513.4 | 34.976 | 1.244 | 100.909 | 100.248 |
| 2.450 | 11108.0 | 49.00 | 515.6 | 34.360 | 1.270 | 100.896 | 100.221 |
| 2.500 | 11353.5 | 49.10 | 517.7 | 33.768 | 1.296 | 100.883 | 100.193 |
| 2.550 | 11599.5 | 49.20 | 519.8 | 33.200 | 1.322 | 100.870 | 100.164 |
| 2.600 | 11845.9 | 49.30 | 521.9 | 32.651 | 1.348 | 100.857 | 100.139 |
| 2.650 | 12092.7 | 49.40 | 524.0 | 32.120 | 1.374 | 100.844 | 100.116 |
| 2.700 | 12339.9 | 49.40 | 526.0 | 31.609 | 1.400 | 100.831 | 100.095 |
| 2.750 | 12587.5 | 49.50 | 528.0 | 31.118 | 1.426 | 100.819 | 100.072 |
| 2.800 | 12835.5 | 49.60 | 530.0 | 30.646 | 1.452 | 100.806 | 100.049 |
| 2.850 | 13083.9 | 49.70 | 532.0 | 30.192 | 1.478 | 100.794 | 100.028 |
| 2.900 | 13332.7 | 49.70 | 534.0 | 29.756 | 1.504 | 100.781 | 100.006 |
| 2.950 | 13581.9 | 49.80 | 535.9 | 29.336 | 1.530 | 100.769 | 99.982 |
| 3.000 | 13831.4 | 49.90 | 537.8 | 28.931 | 1.557 | 100.757 | 99.958 |
| 3.050 | 14081.3 | 50.00 | 539.6 | 28.536 | 1.583 | 100.744 | 99.931 |
| 3.100 | 14331.6 | 50.00 | 541.4 | 28.152 | 1.609 | 100.732 | 99.907 |
| 3.150 | 14582.3 | 50.10 | 543.2 | 27.781 | 1.635 | 100.720 | 99.883 |
| 3.200 | 14833.2 | 50.20 | 545.0 | 27.421 | 1.661 | 100.708 | 99.860 |
| 3.250 | 15084.6 | 50.20 | 546.7 | 27.074 | 1.687 | 100.696 | 99.838 |
| 3.300 | 15336.2 | 50.30 | 548.5 | 26.739 | 1.713 | 100.684 | 99.816 |
| 3.350 | 15588.2 | 50.40 | 550.2 | 26.416 | 1.739 | 100.672 | 99.794 |
| 3.400 | 15840.6 | 50.40 | 552.0 | 26.103 | 1.765 | 100.660 | 99.770 |
| 3.450 | 16093.2 | 50.50 | 553.8 | 25.800 | 1.791 | 100.648 | 99.743 |
| 3.500 | 16346.2 | 50.50 | 555.5 | 25.506 | 1.817 | 100.636 | 99.716 |
| 3.550 | 16599.6 | 50.60 | 557.2 | 25.220 | 1.843 | 100.624 | 99.689 |
| 3.600 | 16853.2 | 50.70 | 558.8 | 24.943 | 1.869 | 100.612 | 99.664 |

| T (m) | DISPL. (t) | TPC (t) | MCTC (tm) | KM (m) | KB (m) | LCB (m) | LCF (m) |
|---|---|---|---|---|---|---|---|
| 3.650 | 17107.2 | 50.70 | 560.4 | 24.674 | 1.895 | 100.600 | 99.642 |
| 3.700 | 17361.5 | 50.80 | 562.0 | 24.413 | 1.921 | 100.589 | 99.620 |
| 3.750 | 17616.0 | 50.80 | 563.5 | 24.160 | 1.947 | 100.577 | 99.599 |
| 3.800 | 17870.8 | 50.90 | 565.1 | 23.913 | 1.973 | 100.565 | 99.579 |
| 3.850 | 18125.5 | 51.00 | 566.6 | 23.674 | 1.999 | 100.551 | 99.560 |
| 3.900 | 18380.4 | 51.00 | 568.1 | 23.443 | 2.025 | 100.537 | 99.536 |
| 3.950 | 18635.6 | 51.10 | 569.4 | 23.217 | 2.051 | 100.523 | 99.517 |
| 4.000 | 18891.3 | 51.10 | 570.7 | 22.997 | 2.077 | 100.508 | 99.495 |
| 4.050 | 19147.0 | 51.20 | 572.2 | 22.782 | 2.103 | 100.494 | 99.467 |
| 4.100 | 19403.0 | 51.20 | 573.6 | 22.572 | 2.129 | 100.481 | 99.439 |
| 4.150 | 19659.3 | 51.30 | 574.9 | 22.369 | 2.155 | 100.467 | 99.411 |
| 4.200 | 19915.8 | 51.30 | 576.3 | 22.170 | 2.181 | 100.453 | 99.384 |
| 4.250 | 20172.5 | 51.40 | 577.7 | 21.978 | 2.207 | 100.440 | 99.357 |
| 4.300 | 20429.5 | 51.40 | 579.1 | 21.790 | 2.233 | 100.426 | 99.329 |
| 4.350 | 20686.8 | 51.50 | 580.5 | 21.608 | 2.259 | 100.412 | 99.299 |
| 4.400 | 20944.3 | 51.50 | 581.8 | 21.430 | 2.285 | 100.399 | 99.269 |
| 4.450 | 21202.0 | 51.60 | 583.1 | 21.255 | 2.311 | 100.385 | 99.237 |
| 4.500 | 21460.0 | 51.60 | 584.4 | 21.086 | 2.337 | 100.371 | 99.203 |
| 4.550 | 21715.2 | 51.70 | 585.6 | 20.923 | 2.363 | 100.370 | 99.176 |
| 4.600 | 21973.6 | 51.70 | 586.9 | 20.761 | 2.389 | 100.356 | 99.140 |
| 4.650 | 22232.3 | 51.80 | 588.3 | 20.604 | 2.415 | 100.341 | 99.105 |
| 4.700 | 22491.2 | 51.80 | 589.6 | 20.450 | 2.441 | 100.327 | 99.072 |
| 4.750 | 22750.3 | 51.90 | 590.9 | 20.299 | 2.467 | 100.313 | 99.039 |
| 4.800 | 23009.8 | 51.90 | 592.1 | 20.150 | 2.492 | 100.298 | 99.007 |
| 4.850 | 23269.8 | 51.90 | 593.4 | 20.006 | 2.518 | 100.282 | 98.975 |
| 4.900 | 23529.9 | 52.00 | 594.9 | 19.864 | 2.544 | 100.266 | 98.935 |
| 4.950 | 23790.4 | 52.00 | 596.3 | 19.726 | 2.570 | 100.249 | 98.894 |
| 5.000 | 24051.1 | 52.10 | 597.8 | 19.591 | 2.597 | 100.233 | 98.852 |
| 5.050 | 24312.0 | 52.10 | 599.3 | 19.459 | 2.623 | 100.217 | 98.808 |
| 5.100 | 24573.2 | 52.20 | 601.0 | 19.330 | 2.649 | 100.200 | 98.752 |
| 5.150 | 24834.7 | 52.30 | 603.0 | 19.204 | 2.675 | 100.183 | 98.686 |
| 5.200 | 25096.5 | 52.30 | 605.0 | 19.082 | 2.701 | 100.166 | 98.619 |
| 5.250 | 25358.4 | 52.40 | 607.0 | 18.962 | 2.728 | 100.149 | 98.553 |
| 5.300 | 25620.4 | 52.40 | 609.0 | 18.846 | 2.754 | 100.132 | 98.487 |
| 5.350 | 25882.8 | 52.50 | 611.0 | 18.731 | 2.780 | 100.115 | 98.419 |
| 5.400 | 26145.4 | 52.60 | 613.0 | 18.621 | 2.806 | 100.098 | 98.349 |
| 5.450 | 26408.4 | 52.60 | 615.0 | 18.515 | 2.832 | 100.080 | 98.277 |
| 5.500 | 26671.7 | 52.70 | 617.0 | 18.411 | 2.858 | 100.062 | 98.205 |
| 5.550 | 26935.3 | 52.70 | 618.9 | 18.309 | 2.884 | 100.043 | 98.135 |
| 5.600 | 27199.1 | 52.80 | 620.6 | 18.208 | 2.910 | 100.024 | 98.077 |

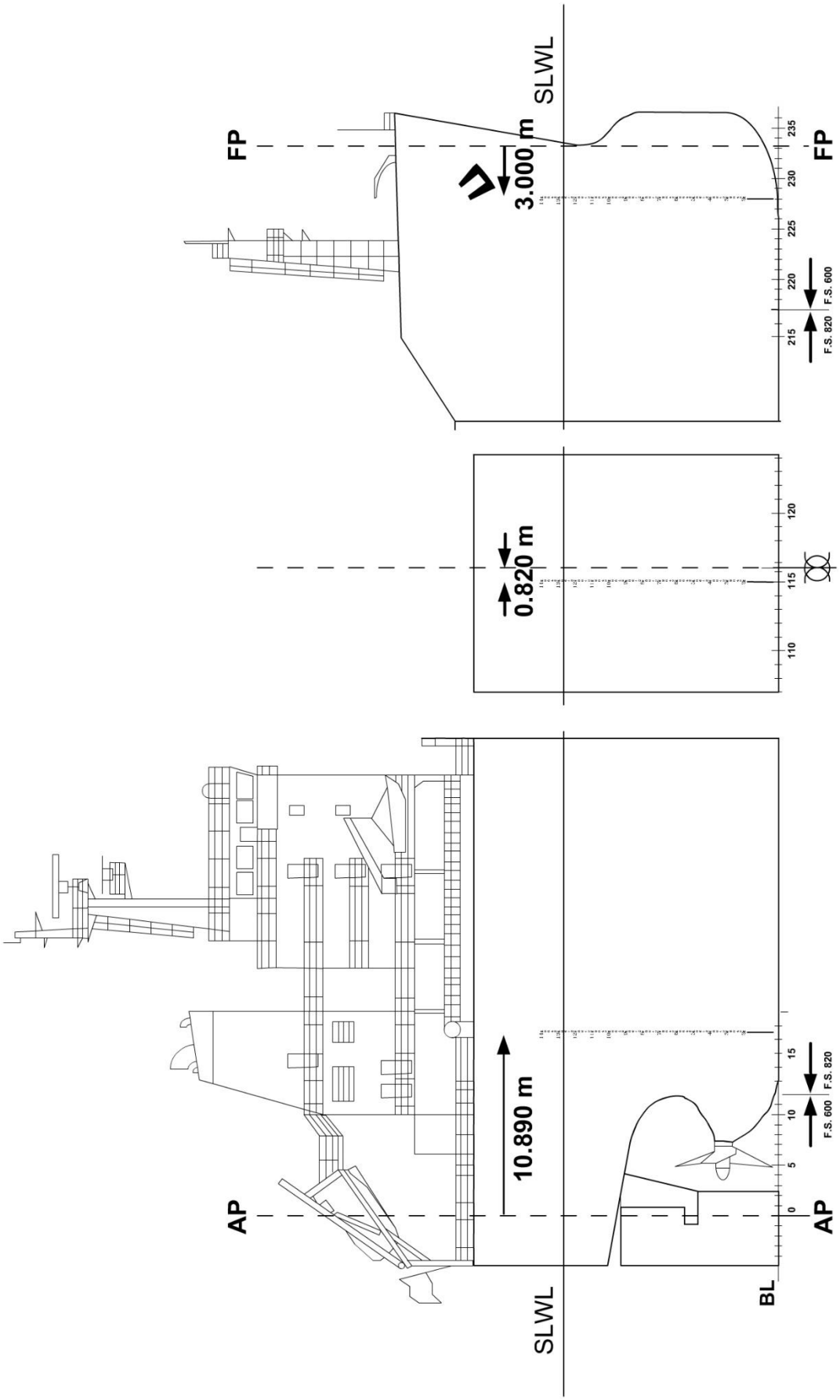
| T (m) | DISPL. (t) | TPC (t) | MCTC (tm) | KM (m) | KB (m) | LCB (m) | LCF (m) |
|---|---|---|---|---|---|---|---|
| 5.650 | 27463.3 | 52.80 | 622.2 | 18.109 | 2.936 | 100.005 | 98.021 |
| 5.700 | 27727.6 | 52.90 | 623.8 | 18.013 | 2.962 | 99.986 | 97.965 |
| 5.750 | 27992.2 | 52.90 | 625.4 | 17.918 | 2.988 | 99.967 | 97.909 |
| 5.800 | 28257.1 | 53.00 | 626.8 | 17.825 | 3.015 | 99.947 | 97.861 |
| 5.850 | 28522.2 | 53.00 | 628.1 | 17.733 | 3.041 | 99.928 | 97.814 |
| 5.900 | 28787.4 | 53.10 | 629.5 | 17.643 | 3.067 | 99.908 | 97.767 |
| 5.950 | 29052.9 | 53.10 | 630.9 | 17.556 | 3.093 | 99.888 | 97.720 |
| 6.000 | 29318.7 | 53.20 | 632.3 | 17.470 | 3.119 | 99.868 | 97.670 |
| 6.050 | 29584.6 | 53.20 | 633.7 | 17.385 | 3.145 | 99.848 | 97.621 |
| 6.100 | 29850.8 | 53.30 | 635.0 | 17.302 | 3.171 | 99.828 | 97.571 |
| 6.150 | 30117.1 | 53.30 | 636.4 | 17.221 | 3.197 | 99.808 | 97.522 |
| 6.200 | 30383.8 | 53.30 | 638.0 | 17.142 | 3.224 | 99.788 | 97.466 |
| 6.250 | 30650.6 | 53.40 | 639.5 | 17.064 | 3.250 | 99.767 | 97.409 |
| 6.300 | 30917.6 | 53.40 | 641.1 | 16.987 | 3.276 | 99.747 | 97.352 |
| 6.350 | 31184.9 | 53.50 | 642.6 | 16.912 | 3.302 | 99.726 | 97.297 |
| 6.400 | 31452.5 | 53.50 | 644.3 | 16.839 | 3.328 | 99.705 | 97.235 |
| 6.450 | 31720.3 | 53.60 | 646.1 | 16.768 | 3.354 | 99.684 | 97.168 |
| 6.500 | 31988.3 | 53.60 | 647.9 | 16.698 | 3.380 | 99.663 | 97.102 |
| 6.550 | 32256.7 | 53.70 | 649.5 | 16.630 | 3.407 | 99.641 | 97.044 |
| 6.600 | 32525.2 | 53.70 | 651.1 | 16.562 | 3.433 | 99.619 | 96.983 |
| 6.650 | 32794.0 | 53.80 | 653.0 | 16.496 | 3.459 | 99.597 | 96.914 |
| 6.700 | 33063.1 | 53.80 | 654.8 | 16.433 | 3.485 | 99.575 | 96.845 |
| 6.750 | 33332.4 | 53.90 | 656.5 | 16.370 | 3.511 | 99.553 | 96.781 |
| 6.800 | 33602.0 | 53.90 | 658.1 | 16.308 | 3.537 | 99.530 | 96.719 |
| 6.850 | 33871.8 | 54.00 | 659.8 | 16.248 | 3.564 | 99.508 | 96.658 |
| 6.900 | 34141.8 | 54.00 | 661.5 | 16.189 | 3.590 | 99.485 | 96.591 |
| 6.950 | 34412.1 | 54.10 | 663.2 | 16.131 | 3.616 | 99.462 | 96.528 |
| 7.000 | 34682.6 | 54.10 | 664.9 | 16.073 | 3.642 | 99.439 | 96.463 |
| 7.050 | 34953.4 | 54.20 | 666.5 | 16.017 | 3.668 | 99.415 | 96.398 |
| 7.100 | 35224.4 | 54.20 | 668.1 | 15.962 | 3.695 | 99.392 | 96.332 |
| 7.150 | 35495.7 | 54.30 | 669.8 | 15.908 | 3.721 | 99.368 | 96.264 |
| 7.200 | 35767.2 | 54.30 | 671.6 | 15.855 | 3.747 | 99.344 | 96.193 |
| 7.250 | 36039.0 | 54.40 | 673.3 | 15.804 | 3.773 | 99.320 | 96.127 |
| 7.300 | 36311.0 | 54.40 | 674.9 | 15.754 | 3.800 | 99.296 | 96.061 |
| 7.350 | 36583.2 | 54.50 | 676.4 | 15.704 | 3.826 | 99.272 | 96.000 |
| 7.400 | 36855.6 | 54.50 | 678.0 | 15.655 | 3.852 | 99.247 | 95.936 |
| 7.450 | 37128.3 | 54.60 | 679.7 | 15.608 | 3.878 | 99.223 | 95.869 |
| 7.500 | 37401.2 | 54.60 | 681.4 | 15.561 | 3.904 | 99.198 | 95.803 |
| 7.550 | 37674.3 | 54.60 | 683.2 | 15.515 | 3.931 | 99.173 | 95.732 |
| 7.600 | 37947.7 | 54.70 | 684.9 | 15.469 | 3.957 | 99.148 | 95.662 |
| 7.650 | 38221.3 | 54.70 | 686.5 | 15.425 | 3.983 | 99.123 | 95.596 |
| 7.700 | 38495.1 | 54.80 | 688.2 | 15.382 | 4.009 | 99.097 | 95.530 |
| 7.750 | 38769.2 | 54.80 | 689.9 | 15.339 | 4.036 | 99.072 | 95.462 |
| 7.800 | 39043.5 | 54.90 | 691.5 | 15.298 | 4.062 | 99.046 | 95.396 |

| T (m) | DISPL. (t) | TPC (t) | MCTC (tm) | KM (m) | KB (m) | LCB (m) | LCF (m) |
|---|---|---|---|---|---|---|---|
| 7.850 | 39318.0 | 54.90 | 693.2 | 15.257 | 4.088 | 99.020 | 95.329 |
| 7.900 | 39592.8 | 55.00 | 694.7 | 15.218 | 4.115 | 98.995 | 95.267 |
| 7.950 | 39867.7 | 55.00 | 696.3 | 15.179 | 4.141 | 98.969 | 95.202 |
| 8.000 | 40142.9 | 55.10 | 697.8 | 15.140 | 4.167 | 98.943 | 95.142 |
| 8.050 | 40417.9 | 55.10 | 699.8 | 15.102 | 4.193 | 98.917 | 95.055 |
| 8.100 | 40693.5 | 55.20 | 701.7 | 15.065 | 4.220 | 98.891 | 94.969 |
| 8.150 | 40970.1 | 55.20 | 703.4 | 15.029 | 4.246 | 98.866 | 94.894 |
| 8.200 | 41247.3 | 55.20 | 704.9 | 14.994 | 4.273 | 98.841 | 94.833 |
| 8.250 | 41524.6 | 55.30 | 706.5 | 14.959 | 4.299 | 98.816 | 94.766 |
| 8.300 | 41802.2 | 55.30 | 708.3 | 14.926 | 4.326 | 98.791 | 94.692 |
| 8.350 | 42080.0 | 55.40 | 710.1 | 14.892 | 4.352 | 98.766 | 94.622 |
| 8.400 | 42358.1 | 55.40 | 711.7 | 14.860 | 4.379 | 98.740 | 94.557 |
| 8.450 | 42636.4 | 55.50 | 713.2 | 14.828 | 4.406 | 98.715 | 94.496 |
| 8.500 | 42914.9 | 55.50 | 714.7 | 14.796 | 4.432 | 98.689 | 94.435 |
| 8.550 | 43193.7 | 55.50 | 716.2 | 14.766 | 4.459 | 98.663 | 94.375 |
| 8.600 | 43472.7 | 55.60 | 717.6 | 14.735 | 4.485 | 98.637 | 94.317 |
| 8.650 | 43750.6 | 55.60 | 719.6 | 14.706 | 4.512 | 98.613 | 94.237 |
| 8.700 | 44030.0 | 55.70 | 722.0 | 14.677 | 4.539 | 98.587 | 94.141 |
| 8.750 | 44309.7 | 55.80 | 724.0 | 14.649 | 4.565 | 98.560 | 94.063 |
| 8.800 | 44589.4 | 55.80 | 726.0 | 14.621 | 4.592 | 98.534 | 93.984 |
| 8.850 | 44869.5 | 55.80 | 727.7 | 14.594 | 4.618 | 98.507 | 93.914 |
| 8.900 | 45149.9 | 55.90 | 729.4 | 14.568 | 4.645 | 98.480 | 93.845 |
| 8.950 | 45430.6 | 55.90 | 731.6 | 14.542 | 4.671 | 98.452 | 93.757 |
| 9.000 | 45711.3 | 56.00 | 733.9 | 14.517 | 4.698 | 98.425 | 93.668 |
| 9.050 | 45992.4 | 56.10 | 735.7 | 14.492 | 4.725 | 98.397 | 93.592 |
| 9.100 | 46273.8 | 56.10 | 737.7 | 14.468 | 4.751 | 98.369 | 93.511 |
| 9.150 | 46555.4 | 56.20 | 740.0 | 14.445 | 4.778 | 98.341 | 93.422 |
| 9.200 | 46837.1 | 56.20 | 742.3 | 14.422 | 4.804 | 98.313 | 93.330 |
| 9.250 | 47119.0 | 56.30 | 744.9 | 14.399 | 4.831 | 98.285 | 93.228 |
| 9.300 | 47401.4 | 56.30 | 746.9 | 14.377 | 4.858 | 98.256 | 93.151 |
| 9.350 | 47684.0 | 56.40 | 749.0 | 14.355 | 4.884 | 98.227 | 93.068 |
| 9.400 | 47966.9 | 56.40 | 751.3 | 14.334 | 4.911 | 98.198 | 92.979 |
| 9.450 | 48250.1 | 56.50 | 753.5 | 14.314 | 4.937 | 98.169 | 92.892 |
| 9.500 | 48533.5 | 56.60 | 755.8 | 14.294 | 4.964 | 98.139 | 92.802 |
| 9.550 | 48817.3 | 56.60 | 757.9 | 14.275 | 4.991 | 98.109 | 92.718 |
| 9.600 | 49101.2 | 56.70 | 760.3 | 14.255 | 5.017 | 98.079 | 92.626 |
| 9.650 | 49385.4 | 56.70 | 762.8 | 14.237 | 5.044 | 98.049 | 92.529 |
| 9.700 | 49669.9 | 56.80 | 765.3 | 14.219 | 5.071 | 98.019 | 92.435 |
| 9.750 | 49954.7 | 56.80 | 767.4 | 14.201 | 5.097 | 97.988 | 92.352 |
| 9.800 | 50239.7 | 56.90 | 769.7 | 14.184 | 5.124 | 97.957 | 92.263 |
| 9.850 | 50525.1 | 56.90 | 772.1 | 14.167 | 5.151 | 97.926 | 92.170 |
| 9.900 | 50810.8 | 57.00 | 774.6 | 14.151 | 5.177 | 97.895 | 92.075 |
| 9.950 | 51096.7 | 57.10 | 776.8 | 14.135 | 5.204 | 97.863 | 91.992 |
| 10.000 | 51382.9 | 57.10 | 779.3 | 14.119 | 5.231 | 97.831 | 91.901 |
| 10.050 | 51669.3 | 57.20 | 781.7 | 14.104 | 5.257 | 97.800 | 91.811 |

| T (m) | DISPL. (t) | TPC (t) | MCTC (tm) | KM (m) | KB (m) | LCB (m) | LCF (m) |
|---|---|---|---|---|---|---|---|
| 10.100 | 51956.0 | 57.20 | 784.4 | 14.090 | 5.284 | 97.768 | 91.715 |
| 10.150 | 52243.1 | 57.30 | 786.6 | 14.076 | 5.311 | 97.736 | 91.634 |
| 10.200 | 52530.4 | 57.30 | 788.9 | 14.062 | 5.337 | 97.703 | 91.552 |
| 10.250 | 52817.9 | 57.40 | 791.1 | 14.048 | 5.364 | 97.671 | 91.474 |
| 10.300 | 53105.7 | 57.50 | 793.1 | 14.035 | 5.391 | 97.638 | 91.399 |
| 10.350 | 53393.8 | 57.50 | 794.9 | 14.023 | 5.418 | 97.606 | 91.336 |
| 10.400 | 53682.0 | 57.50 | 796.6 | 14.011 | 5.444 | 97.573 | 91.274 |
| 10.450 | 53970.4 | 57.60 | 798.2 | 13.999 | 5.471 | 97.540 | 91.216 |
| 10.500 | 54259.0 | 57.60 | 799.7 | 13.987 | 5.498 | 97.508 | 91.161 |
| 10.550 | 54547.8 | 57.60 | 801.1 | 13.976 | 5.525 | 97.475 | 91.108 |
| 10.600 | 54836.8 | 57.70 | 802.5 | 13.965 | 5.551 | 97.442 | 91.058 |
| 10.650 | 55125.9 | 57.70 | 803.8 | 13.955 | 5.578 | 97.410 | 91.010 |
| 10.700 | 55415.2 | 57.80 | 805.1 | 13.944 | 5.605 | 97.377 | 90.962 |
| 10.750 | 55704.6 | 57.80 | 806.3 | 13.935 | 5.631 | 97.345 | 90.916 |
| 10.800 | 55994.2 | 57.80 | 807.6 | 13.925 | 5.658 | 97.313 | 90.873 |
| 10.850 | 56284.0 | 57.80 | 808.8 | 13.916 | 5.685 | 97.280 | 90.830 |
| 10.900 | 56573.9 | 57.90 | 810.0 | 13.907 | 5.711 | 97.248 | 90.790 |
| 10.950 | 56863.9 | 57.90 | 811.1 | 13.899 | 5.738 | 97.216 | 90.753 |
| 11.000 | 57154.1 | 57.90 | 812.2 | 13.890 | 5.765 | 97.184 | 90.715 |
| 11.050 | 57444.4 | 58.00 | 813.3 | 13.882 | 5.791 | 97.152 | 90.678 |
| 11.100 | 57734.8 | 58.00 | 814.3 | 13.875 | 5.818 | 97.121 | 90.641 |
| 11.150 | 58025.4 | 58.00 | 815.4 | 13.867 | 5.845 | 97.089 | 90.605 |
| 11.200 | 58316.1 | 58.00 | 816.5 | 13.860 | 5.871 | 97.058 | 90.569 |
| 11.250 | 58607.0 | 58.10 | 817.5 | 13.854 | 5.898 | 97.026 | 90.535 |
| 11.300 | 58897.9 | 58.10 | 818.5 | 13.847 | 5.925 | 96.995 | 90.502 |
| 11.350 | 59189.0 | 58.10 | 819.5 | 13.841 | 5.951 | 96.964 | 90.472 |
| 11.400 | 59480.2 | 58.20 | 820.5 | 13.835 | 5.978 | 96.933 | 90.442 |
| 11.450 | 59771.6 | 58.20 | 821.6 | 13.830 | 6.005 | 96.902 | 90.412 |
| 11.500 | 60063.1 | 58.20 | 822.6 | 13.825 | 6.031 | 96.871 | 90.384 |
| 11.550 | 60354.7 | 58.20 | 823.5 | 13.820 | 6.058 | 96.840 | 90.355 |
| 11.600 | 60646.4 | 58.30 | 824.5 | 13.815 | 6.084 | 96.810 | 90.327 |
| 11.650 | 60938.2 | 58.30 | 825.5 | 13.810 | 6.111 | 96.780 | 90.300 |
| 11.700 | 61230.2 | 58.30 | 826.4 | 13.806 | 6.138 | 96.749 | 90.273 |
| 11.750 | 61522.3 | 58.30 | 827.3 | 13.802 | 6.164 | 96.719 | 90.247 |
| 11.800 | 61814.5 | 58.40 | 828.2 | 13.798 | 6.191 | 96.689 | 90.221 |
| 11.850 | 62106.7 | 58.40 | 829.1 | 13.795 | 6.217 | 96.660 | 90.195 |
| 11.900 | 62399.2 | 58.40 | 830.0 | 13.792 | 6.244 | 96.630 | 90.170 |
| 11.950 | 62691.7 | 58.40 | 830.9 | 13.789 | 6.271 | 96.601 | 90.145 |
| 12.000 | 62984.3 | 58.50 | 831.8 | 13.786 | 6.297 | 96.571 | 90.120 |
| 12.050 | 63277.1 | 58.50 | 832.7 | 13.783 | 6.324 | 96.542 | 90.096 |
| 12.100 | 63570.0 | 58.50 | 833.5 | 13.781 | 6.350 | 96.513 | 90.072 |
| 12.150 | 63862.9 | 58.50 | 834.4 | 13.779 | 6.377 | 96.484 | 90.049 |
| 12.200 | 64156.0 | 58.50 | 835.2 | 13.777 | 6.403 | 96.455 | 90.025 |
| 12.250 | 64449.2 | 58.60 | 836.0 | 13.776 | 6.430 | 96.426 | 90.002 |
| 12.300 | 64742.4 | 58.60 | 836.9 | 13.774 | 6.456 | 96.398 | 89.979 |

| T (m) | DISPL. (t) | TPC (t) | MCTC (tm) | KM (m) | KB (m) | LCB (m) | LCF (m) |
|---|---|---|---|---|---|---|---|
| 12.350 | 65035.8 | 58.60 | 837.7 | 13.773 | 6.483 | 96.369 | 89.960 |
| 12.400 | 65329.3 | 58.60 | 838.6 | 13.772 | 6.510 | 96.341 | 89.940 |
| 12.450 | 65622.9 | 58.70 | 839.5 | 13.772 | 6.536 | 96.313 | 89.921 |
| 12.500 | 65916.6 | 58.70 | 840.3 | 13.771 | 6.563 | 96.285 | 89.902 |
| 12.550 | 66210.4 | 58.70 | 841.2 | 13.771 | 6.589 | 96.257 | 89.884 |
| 12.600 | 66504.4 | 58.70 | 842.0 | 13.771 | 6.616 | 96.230 | 89.867 |
| 12.650 | 66798.4 | 58.70 | 842.9 | 13.771 | 6.642 | 96.202 | 89.850 |
| 12.700 | 67092.5 | 58.80 | 843.7 | 13.772 | 6.669 | 96.175 | 89.833 |
| 12.750 | 67386.8 | 58.80 | 844.5 | 13.772 | 6.695 | 96.147 | 89.816 |
| 12.800 | 67681.1 | 58.80 | 845.3 | 13.773 | 6.722 | 96.120 | 89.799 |
| 12.850 | 67975.5 | 58.80 | 846.2 | 13.774 | 6.748 | 96.093 | 89.783 |
| 12.900 | 68270.1 | 58.90 | 847.0 | 13.775 | 6.775 | 96.067 | 89.766 |
| 12.950 | 68564.7 | 58.90 | 847.8 | 13.777 | 6.801 | 96.040 | 89.750 |
| 13.000 | 68859.5 | 58.90 | 848.5 | 13.779 | 6.827 | 96.013 | 89.734 |
| 13.050 | 69154.3 | 58.90 | 849.3 | 13.780 | 6.854 | 95.987 | 89.718 |
| 13.100 | 69449.2 | 58.90 | 850.1 | 13.782 | 6.880 | 95.961 | 89.703 |
| 13.150 | 69744.3 | 59.00 | 850.9 | 13.784 | 6.907 | 95.935 | 89.688 |
| 13.200 | 70039.4 | 59.00 | 851.6 | 13.786 | 6.933 | 95.909 | 89.673 |
| 13.250 | 70334.6 | 59.00 | 852.4 | 13.789 | 6.960 | 95.883 | 89.658 |
| 13.300 | 70629.9 | 59.00 | 853.1 | 13.791 | 6.986 | 95.857 | 89.646 |
| 13.350 | 70925.3 | 59.00 | 853.9 | 13.794 | 7.013 | 95.832 | 89.634 |
| 13.400 | 71220.8 | 59.10 | 854.7 | 13.797 | 7.039 | 95.807 | 89.622 |
| 13.450 | 71516.4 | 59.10 | 855.5 | 13.800 | 7.066 | 95.781 | 89.610 |
| 13.500 | 71812.1 | 59.10 | 856.3 | 13.803 | 7.092 | 95.756 | 89.599 |
| 13.550 | 72107.9 | 59.10 | 857.1 | 13.807 | 7.118 | 95.731 | 89.587 |
| 13.600 | 72403.8 | 59.10 | 857.8 | 13.811 | 7.145 | 95.706 | 89.576 |
| 13.650 | 72699.8 | 59.20 | 858.6 | 13.814 | 7.171 | 95.682 | 89.565 |
| 13.700 | 72995.9 | 59.20 | 859.3 | 13.818 | 7.198 | 95.657 | 89.554 |
| 13.750 | 73292.0 | 59.20 | 860.1 | 13.822 | 7.224 | 95.633 | 89.544 |
| 13.800 | 73588.3 | 59.20 | 860.8 | 13.826 | 7.250 | 95.609 | 89.534 |
| 13.850 | 73884.6 | 59.20 | 861.6 | 13.831 | 7.277 | 95.585 | 89.524 |
| 13.900 | 74181.1 | 59.30 | 862.3 | 13.835 | 7.303 | 95.561 | 89.515 |
| 13.950 | 74477.6 | 59.30 | 863.0 | 13.839 | 7.330 | 95.537 | 89.505 |
| 14.000 | 74774.2 | 59.30 | 863.7 | 13.844 | 7.356 | 95.513 | 89.496 |

# DISPLACEMENT OF DRAUGHT MARKS



# PART C

# STABILITY DATA

# STABILITY CROSS CURVES (KN) DATA

**DATA VALUES ARE FOR THE SHIP ON AN EVEN KEEL FIXED TRIM BASIS.**

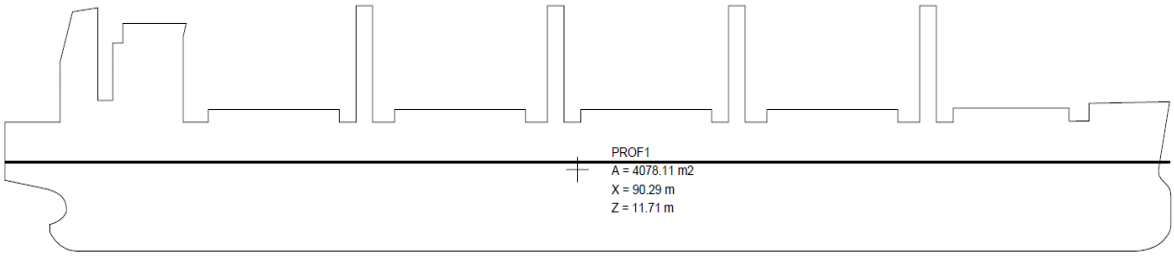
**DATA VALUES ARE FOR THE SHIP IN SALT WATER (RD 1.025)**

| T (m) | ANGLE OF HEEL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 5 | 10 | 12 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| 2.000 | 3.540 | 6.558 | 7.378 | 9.465 | 10.761 | 11.278 | 11.340 | 11.160 | 11.031 | 10.654 |
| 2.100 | 3.397 | 6.373 | 7.207 | 9.343 | 10.687 | 11.263 | 11.372 | 11.239 | 11.130 | 10.698 |
| 2.200 | 3.266 | 6.195 | 7.041 | 9.219 | 10.622 | 11.237 | 11.390 | 11.306 | 11.213 | 10.739 |
| 2.300 | 3.146 | 6.021 | 6.882 | 9.094 | 10.550 | 11.213 | 11.399 | 11.371 | 11.288 | 10.773 |
| 2.400 | 3.036 | 5.852 | 6.726 | 8.983 | 10.478 | 11.189 | 11.418 | 11.435 | 11.354 | 10.803 |
| 2.500 | 2.933 | 5.689 | 6.574 | 8.870 | 10.409 | 11.163 | 11.445 | 11.497 | 11.413 | 10.831 |
| 2.600 | 2.838 | 5.531 | 6.426 | 8.761 | 10.336 | 11.138 | 11.463 | 11.557 | 11.465 | 10.855 |
| 2.700 | 2.750 | 5.380 | 6.282 | 8.651 | 10.269 | 11.114 | 11.481 | 11.617 | 11.511 | 10.878 |
| 2.800 | 2.668 | 5.236 | 6.142 | 8.548 | 10.203 | 11.092 | 11.498 | 11.674 | 11.552 | 10.898 |
| 2.900 | 2.592 | 5.100 | 6.006 | 8.447 | 10.139 | 11.070 | 11.515 | 11.728 | 11.589 | 10.915 |
| 3.000 | 2.520 | 4.972 | 5.873 | 8.348 | 10.077 | 11.047 | 11.532 | 11.778 | 11.622 | 10.931 |
| 3.100 | 2.454 | 4.850 | 5.744 | 8.253 | 10.015 | 11.025 | 11.547 | 11.824 | 11.651 | 10.942 |
| 3.200 | 2.391 | 4.736 | 5.619 | 8.159 | 9.956 | 11.003 | 11.564 | 11.867 | 11.675 | 10.956 |
| 3.300 | 2.332 | 4.627 | 5.499 | 8.066 | 9.901 | 10.981 | 11.580 | 11.905 | 11.700 | 10.967 |
| 3.400 | 2.277 | 4.524 | 5.384 | 7.976 | 9.844 | 10.959 | 11.596 | 11.939 | 11.718 | 10.974 |
| 3.500 | 2.225 | 4.427 | 5.274 | 7.887 | 9.789 | 10.938 | 11.612 | 11.967 | 11.737 | 10.982 |
| 3.600 | 2.177 | 4.334 | 5.169 | 7.800 | 9.734 | 10.917 | 11.627 | 11.995 | 11.756 | 10.988 |
| 3.700 | 2.130 | 4.247 | 5.069 | 7.717 | 9.681 | 10.896 | 11.643 | 12.018 | 11.769 | 10.993 |
| 3.800 | 2.087 | 4.163 | 4.974 | 7.634 | 9.629 | 10.875 | 11.658 | 12.038 | 11.781 | 10.998 |
| 3.900 | 2.046 | 4.084 | 4.883 | 7.553 | 9.578 | 10.855 | 11.673 | 12.055 | 11.791 | 11.001 |
| 4.000 | 2.007 | 4.009 | 4.796 | 7.473 | 9.528 | 10.836 | 11.687 | 12.069 | 11.800 | 11.004 |
| 4.100 | 1.970 | 3.937 | 4.713 | 7.395 | 9.479 | 10.817 | 11.702 | 12.081 | 11.808 | 11.007 |
| 4.200 | 1.935 | 3.869 | 4.634 | 7.318 | 9.431 | 10.798 | 11.714 | 12.091 | 11.812 | 11.009 |
| 4.300 | 1.902 | 3.804 | 4.559 | 7.242 | 9.384 | 10.779 | 11.726 | 12.099 | 11.815 | 11.011 |
| 4.400 | 1.870 | 3.742 | 4.487 | 7.168 | 9.337 | 10.761 | 11.736 | 12.104 | 11.816 | 11.013 |
| 4.500 | 1.840 | 3.684 | 4.419 | 7.095 | 9.292 | 10.743 | 11.745 | 12.108 | 11.816 | 11.016 |
| 4.600 | 1.812 | 3.628 | 4.353 | 7.023 | 9.248 | 10.726 | 11.752 | 12.110 | 11.815 | 11.018 |
| 4.700 | 1.785 | 3.575 | 4.290 | 6.953 | 9.204 | 10.709 | 11.758 | 12.110 | 11.812 | 11.021 |
| 4.800 | 1.759 | 3.524 | 4.230 | 6.883 | 9.162 | 10.692 | 11.761 | 12.109 | 11.808 | 11.025 |
| 4.900 | 1.734 | 3.475 | 4.172 | 6.814 | 9.120 | 10.676 | 11.763 | 12.106 | 11.803 | 11.029 |
| 5.000 | 1.711 | 3.428 | 4.117 | 6.747 | 9.079 | 10.660 | 11.762 | 12.103 | 11.797 | 11.033 |
| 5.100 | 1.688 | 3.384 | 4.064 | 6.681 | 9.039 | 10.645 | 11.760 | 12.098 | 11.790 | 11.037 |
| 5.200 | 1.667 | 3.341 | 4.013 | 6.616 | 8.999 | 10.630 | 11.755 | 12.091 | 11.782 | 11.042 |
| 5.300 | 1.646 | 3.301 | 3.965 | 6.552 | 8.960 | 10.615 | 11.749 | 12.083 | 11.775 | 11.046 |
| 5.400 | 1.627 | 3.262 | 3.918 | 6.489 | 8.922 | 10.601 | 11.741 | 12.074 | 11.767 | 11.051 |
| 5.500 | 1.608 | 3.224 | 3.873 | 6.427 | 8.884 | 10.588 | 11.732 | 12.064 | 11.760 | 11.055 |
| 5.600 | 1.590 | 3.188 | 3.831 | 6.367 | 8.847 | 10.574 | 11.721 | 12.052 | 11.754 | 11.060 |

| T (m) | ANGLE OF HEEL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 5 | 10 | 12 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| 5.700 | 1.573 | 3.154 | 3.789 | 6.308 | 8.810 | 10.562 | 11.710 | 12.040 | 11.748 | 11.063 |
| 5.800 | 1.557 | 3.121 | 3.750 | 6.251 | 8.775 | 10.549 | 11.696 | 12.027 | 11.740 | 11.068 |
| 5.900 | 1.541 | 3.089 | 3.712 | 6.196 | 8.739 | 10.537 | 11.682 | 12.012 | 11.735 | 11.072 |
| 6.000 | 1.526 | 3.059 | 3.676 | 6.142 | 8.705 | 10.525 | 11.666 | 11.997 | 11.730 | 11.076 |
| 6.100 | 1.511 | 3.030 | 3.641 | 6.090 | 8.670 | 10.513 | 11.650 | 11.981 | 11.725 | 11.079 |
| 6.200 | 1.497 | 3.002 | 3.608 | 6.040 | 8.636 | 10.500 | 11.633 | 11.965 | 11.720 | 11.083 |
| 6.300 | 1.484 | 2.975 | 3.576 | 5.991 | 8.603 | 10.488 | 11.615 | 11.947 | 11.716 | 11.086 |
| 6.400 | 1.471 | 2.950 | 3.545 | 5.943 | 8.570 | 10.474 | 11.597 | 11.929 | 11.711 | 11.089 |
| 6.500 | 1.459 | 2.925 | 3.516 | 5.897 | 8.538 | 10.460 | 11.577 | 11.911 | 11.706 | 11.091 |
| 6.600 | 1.447 | 2.901 | 3.487 | 5.853 | 8.506 | 10.446 | 11.557 | 11.892 | 11.700 | 11.092 |
| 6.700 | 1.435 | 2.879 | 3.460 | 5.810 | 8.475 | 10.430 | 11.536 | 11.871 | 11.695 | 11.094 |
| 6.800 | 1.424 | 2.857 | 3.433 | 5.768 | 8.444 | 10.414 | 11.515 | 11.852 | 11.690 | 11.094 |
| 6.900 | 1.414 | 2.836 | 3.408 | 5.728 | 8.413 | 10.397 | 11.492 | 11.835 | 11.684 | 11.094 |
| 7.000 | 1.404 | 2.815 | 3.384 | 5.689 | 8.383 | 10.379 | 11.469 | 11.817 | 11.678 | 11.094 |
| 7.100 | 1.394 | 2.796 | 3.361 | 5.651 | 8.353 | 10.360 | 11.446 | 11.800 | 11.672 | 11.094 |
| 7.200 | 1.385 | 2.777 | 3.338 | 5.615 | 8.324 | 10.341 | 11.421 | 11.782 | 11.666 | 11.093 |
| 7.300 | 1.376 | 2.759 | 3.317 | 5.580 | 8.295 | 10.320 | 11.396 | 11.764 | 11.659 | 11.091 |
| 7.400 | 1.367 | 2.742 | 3.296 | 5.546 | 8.266 | 10.299 | 11.371 | 11.747 | 11.653 | 11.089 |
| 7.500 | 1.359 | 2.725 | 3.276 | 5.513 | 8.238 | 10.277 | 11.344 | 11.730 | 11.646 | 11.087 |
| 7.600 | 1.351 | 2.710 | 3.257 | 5.482 | 8.210 | 10.255 | 11.318 | 11.712 | 11.638 | 11.085 |
| 7.700 | 1.344 | 2.694 | 3.238 | 5.451 | 8.183 | 10.231 | 11.291 | 11.695 | 11.630 | 11.082 |
| 7.800 | 1.336 | 2.679 | 3.221 | 5.422 | 8.156 | 10.207 | 11.264 | 11.678 | 11.621 | 11.079 |
| 7.900 | 1.329 | 2.665 | 3.204 | 5.394 | 8.129 | 10.183 | 11.236 | 11.661 | 11.611 | 11.076 |
| 8.000 | 1.322 | 2.652 | 3.187 | 5.367 | 8.103 | 10.158 | 11.209 | 11.644 | 11.601 | 11.072 |
| 8.100 | 1.316 | 2.639 | 3.172 | 5.341 | 8.077 | 10.132 | 11.181 | 11.627 | 11.591 | 11.068 |
| 8.200 | 1.310 | 2.626 | 3.157 | 5.316 | 8.052 | 10.106 | 11.153 | 11.609 | 11.579 | 11.064 |
| 8.300 | 1.304 | 2.614 | 3.142 | 5.292 | 8.026 | 10.078 | 11.126 | 11.592 | 11.568 | 11.060 |
| 8.400 | 1.298 | 2.602 | 3.128 | 5.269 | 8.001 | 10.051 | 11.097 | 11.574 | 11.556 | 11.055 |
| 8.500 | 1.292 | 2.591 | 3.115 | 5.246 | 7.977 | 10.022 | 11.070 | 11.556 | 11.543 | 11.050 |
| 8.600 | 1.287 | 2.581 | 3.102 | 5.225 | 7.953 | 9.994 | 11.043 | 11.539 | 11.530 | 11.045 |
| 8.700 | 1.282 | 2.571 | 3.090 | 5.204 | 7.929 | 9.964 | 11.016 | 11.521 | 11.517 | 11.039 |
| 8.800 | 1.277 | 2.561 | 3.078 | 5.185 | 7.906 | 9.934 | 10.989 | 11.503 | 11.504 | 11.033 |
| 8.900 | 1.272 | 2.551 | 3.067 | 5.166 | 7.883 | 9.904 | 10.963 | 11.484 | 11.489 | 11.026 |
| 9.000 | 1.268 | 2.543 | 3.056 | 5.148 | 7.859 | 9.873 | 10.936 | 11.466 | 11.475 | 11.020 |
| 9.100 | 1.264 | 2.534 | 3.046 | 5.130 | 7.836 | 9.842 | 10.910 | 11.446 | 11.460 | 11.014 |
| 9.200 | 1.259 | 2.526 | 3.036 | 5.114 | 7.813 | 9.810 | 10.884 | 11.427 | 11.446 | 11.007 |
| 9.300 | 1.256 | 2.518 | 3.027 | 5.098 | 7.790 | 9.778 | 10.858 | 11.407 | 11.431 | 11.000 |
| 9.400 | 1.252 | 2.511 | 3.018 | 5.083 | 7.767 | 9.745 | 10.833 | 11.387 | 11.416 | 10.993 |
| 9.500 | 1.248 | 2.504 | 3.009 | 5.068 | 7.743 | 9.712 | 10.808 | 11.367 | 11.400 | 10.985 |
| 9.600 | 1.245 | 2.497 | 3.001 | 5.054 | 7.719 | 9.678 | 10.782 | 11.346 | 11.384 | 10.978 |
| 9.700 | 1.242 | 2.490 | 2.994 | 5.041 | 7.695 | 9.644 | 10.757 | 11.325 | 11.368 | 10.970 |
| 9.800 | 1.239 | 2.484 | 2.986 | 5.029 | 7.671 | 9.610 | 10.732 | 11.304 | 11.352 | 10.961 |

| T (m) | ANGLE OF HEEL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 5 | 10 | 12 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| 9.900 | 1.236 | 2.479 | 2.979 | 5.016 | 7.646 | 9.575 | 10.707 | 11.282 | 11.336 | 10.953 |
| 10.000 | 1.233 | 2.473 | 2.973 | 5.005 | 7.621 | 9.540 | 10.682 | 11.261 | 11.319 | 10.944 |
| 10.100 | 1.231 | 2.468 | 2.966 | 4.994 | 7.596 | 9.505 | 10.657 | 11.239 | 11.302 | 10.935 |
| 10.200 | 1.228 | 2.463 | 2.960 | 4.984 | 7.570 | 9.469 | 10.632 | 11.217 | 11.285 | 10.927 |
| 10.300 | 1.226 | 2.458 | 2.955 | 4.974 | 7.544 | 9.434 | 10.606 | 11.194 | 11.268 | 10.917 |
| 10.400 | 1.224 | 2.454 | 2.949 | 4.964 | 7.518 | 9.398 | 10.580 | 11.172 | 11.251 | 10.908 |
| 10.500 | 1.222 | 2.450 | 2.944 | 4.956 | 7.492 | 9.362 | 10.554 | 11.149 | 11.234 | 10.899 |
| 10.600 | 1.220 | 2.446 | 2.940 | 4.947 | 7.466 | 9.326 | 10.527 | 11.126 | 11.217 | 10.890 |
| 10.700 | 1.218 | 2.442 | 2.935 | 4.939 | 7.439 | 9.290 | 10.500 | 11.102 | 11.200 | 10.880 |
| 10.800 | 1.216 | 2.439 | 2.931 | 4.932 | 7.412 | 9.254 | 10.472 | 11.079 | 11.182 | 10.871 |
| 10.900 | 1.215 | 2.435 | 2.927 | 4.925 | 7.386 | 9.219 | 10.444 | 11.055 | 11.165 | 10.861 |
| 11.000 | 1.213 | 2.432 | 2.923 | 4.918 | 7.359 | 9.183 | 10.416 | 11.031 | 11.148 | 10.851 |
| 11.100 | 1.212 | 2.430 | 2.920 | 4.912 | 7.331 | 9.148 | 10.387 | 11.006 | 11.130 | 10.842 |
| 11.200 | 1.210 | 2.427 | 2.917 | 4.906 | 7.304 | 9.114 | 10.358 | 10.982 | 11.113 | 10.832 |
| 11.300 | 1.209 | 2.425 | 2.914 | 4.901 | 7.277 | 9.079 | 10.329 | 10.957 | 11.095 | 10.823 |
| 11.400 | 1.208 | 2.422 | 2.911 | 4.896 | 7.249 | 9.045 | 10.299 | 10.932 | 11.078 | 10.813 |
| 11.500 | 1.207 | 2.420 | 2.909 | 4.891 | 7.222 | 9.012 | 10.269 | 10.907 | 11.060 | 10.804 |
| 11.600 | 1.206 | 2.418 | 2.906 | 4.887 | 7.194 | 8.979 | 10.239 | 10.881 | 11.042 | 10.795 |
| 11.700 | 1.206 | 2.417 | 2.904 | 4.883 | 7.166 | 8.946 | 10.208 | 10.856 | 11.024 | 10.786 |
| 11.800 | 1.205 | 2.415 | 2.902 | 4.879 | 7.139 | 8.913 | 10.177 | 10.830 | 11.006 | 10.777 |
| 11.900 | 1.204 | 2.414 | 2.901 | 4.876 | 7.111 | 8.881 | 10.145 | 10.804 | 10.988 | 10.768 |
| 12.000 | 1.204 | 2.413 | 2.899 | 4.873 | 7.084 | 8.849 | 10.113 | 10.778 | 10.970 | 10.759 |
| 12.100 | 1.203 | 2.412 | 2.898 | 4.870 | 7.056 | 8.816 | 10.081 | 10.751 | 10.951 | 10.750 |
| 12.200 | 1.203 | 2.411 | 2.897 | 4.868 | 7.029 | 8.784 | 10.049 | 10.724 | 10.933 | 10.741 |
| 12.300 | 1.203 | 2.410 | 2.896 | 4.865 | 7.001 | 8.752 | 10.016 | 10.698 | 10.914 | 10.731 |
| 12.400 | 1.202 | 2.410 | 2.895 | 4.862 | 6.974 | 8.720 | 9.983 | 10.671 | 10.896 | 10.722 |
| 12.500 | 1.202 | 2.409 | 2.895 | 4.858 | 6.947 | 8.687 | 9.950 | 10.643 | 10.877 | 10.713 |
| 12.600 | 1.202 | 2.409 | 2.895 | 4.854 | 6.920 | 8.654 | 9.916 | 10.616 | 10.858 | 10.704 |
| 12.700 | 1.202 | 2.409 | 2.894 | 4.849 | 6.893 | 8.622 | 9.883 | 10.588 | 10.839 | 10.695 |
| 12.800 | 1.202 | 2.409 | 2.894 | 4.843 | 6.866 | 8.589 | 9.849 | 10.561 | 10.820 | 10.686 |
| 12.900 | 1.202 | 2.409 | 2.894 | 4.837 | 6.839 | 6.556 | 9.815 | 10.534 | 10.801 | 10.596 |
| 13.000 | 1.202 | 2.409 | 2.894 | 4.831 | 6.812 | 6.523 | 9.781 | 10.507 | 10.782 | 10.506 |
| 13.100 | 1.202 | 2.408 | 2.893 | 4.824 | 6.785 | 6.490 | 9.747 | 10.480 | 10.763 | 10.416 |
| 13.200 | 1.202 | 2.408 | 2.893 | 4.817 | 6.785 | 6.457 | 9.713 | 10.453 | 10.744 | 10.326 |

# WIND PROFILE DATA




| Draught moulded (m) | Profile area above WL ($m^2$) | ZCG (m) | Lever (m) | Moment from centre of underwater part ($m^3$) |
|---|---|---|---|---|
| 3.000 | 3538.9 | 13.266 | 11.75 | 41598.2 |
| 3.200 | 3502.4 | 13.372 | 11.76 | 41187.3 |
| 3.400 | 3465.9 | 13.478 | 11.77 | 40776.7 |
| 3.600 | 3429.3 | 13.584 | 11.77 | 40366.4 |
| 3.800 | 3392.8 | 13.691 | 11.78 | 39956.3 |
| 4.000 | 3356.3 | 13.797 | 11.78 | 39546.8 |
| 4.200 | 3320.0 | 13.903 | 11.79 | 39138.8 |
| 4.400 | 3283.7 | 14.009 | 11.80 | 38731.8 |
| 4.600 | 3247.5 | 14.115 | 11.80 | 38325.4 |
| 4.800 | 3211.3 | 14.221 | 11.81 | 37919.6 |
| 5.000 | 3175.2 | 14.327 | 11.81 | 37514.1 |
| 5.200 | 3139.2 | 14.433 | 11.82 | 37108.8 |
| 5.400 | 3103.1 | 14.539 | 11.83 | 36703.7 |
| 5.600 | 3067.1 | 14.645 | 11.83 | 36298.6 |
| 5.800 | 3031.1 | 14.752 | 11.84 | 35893.5 |
| 6.000 | 2995.1 | 14.858 | 11.85 | 35488.3 |
| 6.200 | 2959.1 | 14.965 | 11.86 | 35082.9 |
| 6.400 | 2923.2 | 15.071 | 11.86 | 34677.4 |
| 6.600 | 2887.2 | 15.178 | 11.87 | 34271.6 |
| 6.800 | 2851.2 | 15.285 | 11.88 | 33865.6 |
| 7.000 | 2815.1 | 15.392 | 11.89 | 33459.4 |
| 7.200 | 2779.1 | 15.500 | 11.89 | 33052.9 |
| 7.400 | 2743.0 | 15.608 | 11.90 | 32646.1 |
| 7.600 | 2706.9 | 15.716 | 11.91 | 32238.9 |
| 7.800 | 2670.8 | 15.824 | 11.92 | 31831.3 |
| 8.000 | 2634.7 | 15.933 | 11.93 | 31423.2 |
| 8.200 | 2598.4 | 16.042 | 11.94 | 31014.5 |
| 8.400 | 2562.2 | 16.152 | 11.95 | 30605.2 |
| 8.600 | 2525.8 | 16.262 | 11.95 | 30195.2 |
| 8.800 | 2489.4 | 16.373 | 11.96 | 29784.2 |
| 9.000 | 2452.8 | 16.484 | 11.98 | 29371.8 |

| Draught moulded (m) | Profile area above WL ($m^2$) | ZCG (m) | Lever (m) | Moment from centre of underwater part ($m^3$) |
|---|---|---|---|---|
| 9.200 | 2416.0 | 16.597 | 11.99 | 28957.7 |
| 9.400 | 2379.1 | 16.710 | 12.00 | 28541.9 |
| 9.600 | 2341.9 | 16.824 | 12.01 | 28124.4 |
| 9.800 | 2304.6 | 16.939 | 12.02 | 27705.4 |
| 10.000 | 2267.2 | 17.056 | 12.03 | 27285.0 |
| 10.200 | 2229.5 | 17.173 | 12.05 | 26863.2 |
| 10.400 | 2191.8 | 17.291 | 12.06 | 26441.5 |
| 10.600 | 2154.2 | 17.410 | 12.08 | 26020.7 |
| 10.800 | 2116.6 | 17.529 | 12.10 | 25600.7 |
| 11.000 | 2078.9 | 17.649 | 12.11 | 25181.3 |
| 11.200 | 2041.3 | 17.770 | 12.13 | 24762.4 |
| 11.400 | 2003.7 | 17.891 | 12.15 | 24344.0 |
| 11.600 | 1966.1 | 18.014 | 12.17 | 23925.9 |
| 11.800 | 1928.5 | 18.137 | 12.19 | 23508.2 |
| 12.000 | 1890.9 | 18.261 | 12.21 | 23090.8 |
| 12.200 | 1853.3 | 18.386 | 12.23 | 22673.7 |
| 12.400 | 1815.7 | 18.512 | 12.26 | 22256.8 |
| 12.600 | 1778.1 | 18.639 | 12.28 | 21840.1 |
| 12.800 | 1740.4 | 18.767 | 12.31 | 21423.6 |
| 13.000 | 1702.8 | 18.897 | 12.34 | 21007.4 |

# FLOODING ANGLE DATA

**DATA VALUES ARE FOR THE SHIP ON AN EVEN KEEL.**

**DATA VALUES ARE FOR THE SHIP IN SALT WATER (RD 1.025)**

| DRAUGHT (m) | Angle of Flooding (°) |
|---|---|
| 7.6 | - |
| 7.8 | 79.1 |
| 8.0 | 77.9 |
| 8.2 | 76.8 |
| 8.4 | 75.7 |
| 8.6 | 74.6 |
| 8.8 | 73.5 |
| 9.0 | 72.5 |
| 9.2 | 71.4 |
| 9.4 | 70.4 |
| 9.6 | 69.3 |
| 9.8 | 68.3 |
| 10.0 | 67.3 |
| 10.2 | 66.2 |
| 10.4 | 65.2 |
| 10.6 | 64.1 |
| 10.8 | 63.0 |
| 11.0 | 61.9 |
| 11.2 | 60.9 |
| 11.4 | 59.8 |
| 11.6 | 58.8 |
| 11.8 | 57.7 |
| 12.0 | 56.7 |
| 12.2 | 55.7 |
| 12.4 | 54.7 |
| 12.6 | 53.7 |
| 12.8 | 52.8 |

The angle of heel at which the deck edge immerses ($\theta_{DEI}$) shall be calculated by the formula:

$$\text{Tan } \theta_{DEI} = \frac{\text{Hull depth – Draught}}{0.5 \times \text{Breadth}} \quad \text{(deg.)}$$

# IMO *INTACT* STABILITY LIMITS DATA

| Displacement (t) | MIN. GM (m) | MAX. KG (m) | | Displacement (t) | MIN. GM (m) | MAX. KG (m) |
|---|---|---|---|---|---|---|
| 11846 | 22.69 | 9.96 | | 39044 | 0.15 | 15.15 |
| 12340 | 21.40 | 10.21 | | 39593 | 0.15 | 15.07 |
| 12835 | 20.17 | 10.48 | | 40143 | 0.15 | 14.99 |
| 13333 | 19.17 | 10.59 | | 40694 | 0.15 | 14.92 |
| 13831 | 18.15 | 10.78 | | 41247 | 0.15 | 14.84 |
| 14332 | 17.19 | 10.96 | | 41802 | 0.15 | 14.78 |
| 14833 | 16.29 | 11.13 | | 42358 | 0.15 | 14.71 |
| 15336 | 15.39 | 11.35 | | 42915 | 0.15 | 14.65 |
| 15841 | 14.55 | 11.55 | | 43473 | 0.15 | 14.59 |
| 16346 | 13.78 | 11.72 | | 44030 | 0.15 | 14.53 |
| 16853 | 13.03 | 11.91 | | 44589 | 0.15 | 14.47 |
| 17361 | 12.31 | 12.10 | | 45150 | 0.15 | 14.42 |
| 17871 | 11.61 | 12.30 | | 45711 | 0.15 | 14.37 |
| 18380 | 10.94 | 12.51 | | 46274 | 0.15 | 14.32 |
| 18891 | 10.31 | 12.69 | | 46837 | 0.15 | 14.27 |
| 19403 | 9.71 | 12.86 | | 47401 | 0.15 | 14.23 |
| 19916 | 9.15 | 13.02 | | 47967 | 0.15 | 14.18 |
| 20429 | 8.59 | 13.20 | | 48534 | 0.15 | 14.14 |
| 20944 | 8.07 | 13.36 | | 49101 | 0.15 | 14.11 |
| 21460 | 7.55 | 13.53 | | 49670 | 0.15 | 14.07 |
| 21974 | 7.06 | 13.70 | | 50240 | 0.15 | 14.03 |
| 22491 | 6.57 | 13.88 | | 50811 | 0.15 | 14.00 |
| 23010 | 6.10 | 14.05 | | 51383 | 0.15 | 13.97 |
| 23530 | 5.64 | 14.23 | | 51956 | 0.15 | 13.94 |
| 24051 | 5.19 | 14.40 | | 52530 | 0.15 | 13.91 |
| 24573 | 4.75 | 14.58 | | 53106 | 0.15 | 13.89 |
| 25096 | 4.29 | 14.79 | | 53682 | 0.15 | 13.86 |
| 25620 | 3.83 | 15.02 | | 54259 | 0.15 | 13.84 |
| 26145 | 3.39 | 15.23 | | 54837 | 0.15 | 13.82 |
| 26672 | 3.00 | 15.41 | | 55415 | 0.15 | 13.79 |
| 27199 | 2.58 | 15.63 | | 55994 | 0.15 | 13.78 |
| 27728 | 2.21 | 15.80 | | 56574 | 0.15 | 13.76 |
| 28257 | 1.89 | 15.93 | | 57154 | 0.15 | 13.74 |
| 28787 | 1.55 | 16.09 | | 57735 | 0.15 | 13.72 |
| 29319 | 1.26 | 16.21 | | 58316 | 0.15 | 13.71 |
| 29851 | 0.97 | 16.34 | | 58898 | 0.15 | 13.70 |
| 30384 | 0.69 | 16.45 | | 59480 | 0.15 | 13.69 |
| 30631 | 0.56 | 16.51 | | 60063 | 0.15 | 13.67 |
| 30918 | 0.50 | 16.48 | | 60646 | 0.15 | 13.66 |
| 31452 | 0.40 | 16.44 | | 61230 | 0.15 | 13.66 |

| Displacement (t) | MIN. GM (m) | MAX. KG (m) | | Displacement (t) | MIN. GM (m) | MAX. KG (m) |
|---|---|---|---|---|---|---|
| 31988 | 0.30 | 16.40 | | 61814 | 0.15 | 13.65 |
| 32525 | 0.20 | 16.36 | | 62399 | 0.15 | 13.64 |
| 32825 | 0.15 | 16.34 | | 62984 | 0.15 | 13.64 |
| 33063 | 0.15 | 16.28 | | 63404 | 0.15 | 13.63 |
| 33602 | 0.15 | 16.16 | | 63570 | 0.16 | 13.62 |
| 34142 | 0.15 | 16.04 | | 64156 | 0.22 | 13.56 |
| 34683 | 0.15 | 15.92 | | 64605 | 0.26 | 13.52 |
| 35224 | 0.15 | 15.81 | | 64742 | 0.30 | 13.48 |
| 35767 | 0.15 | 15.71 | | 65329 | 0.47 | 13.31 |
| 36311 | 0.15 | 15.60 | | 65917 | 0.63 | 13.14 |
| 36856 | 0.15 | 15.51 | | 66504 | 0.81 | 12.96 |
| 37401 | 0.15 | 15.41 | | 67093 | 0.96 | 12.82 |
| 37948 | 0.15 | 15.32 | | 67681 | 1.11 | 12.66 |
| 38495 | 0.15 | 15.23 | | | | |

# ICING CONSIDERATIONS

INSTRUCTIONS FOR THE GUIDANCE OF SURVEYORS ON
**INTACT STABILITY**
**IMO 2008 IS CODE**
**& Explanatory Notes**

MSIS 43

Rev 04.19

## Part B Chapter 6 – Icing Considerations

### 6.1 General

6.1.1 For any ship operating in areas where ice accretion is likely to occur, adversely affecting a ship's stability, icing allowances should be included in the analysis of conditions of loading.

6.1.2 Administrations are advised to take icing into account and are permitted to apply national standards where environmental conditions are considered to warrant a higher standard than those recommended in the following sections.

### 6.2 Cargo ships carrying timber deck cargoes

6.2.1 The master should establish or verify the stability of his ship for the worst service condition, having regard to the increased weight of deck cargo due to water absorption and/or ice accretion and to variations in consumables.[29]

6.2.2 When timber deck cargoes are carried and it is anticipated that some formation of ice will take place, an allowance should be made in the arrival condition for the additional weight.

[29] Refer to regulation 44(10) of the 1966 Load Line Convention and regulation 44(7) of the 1988 Load Line Protocol as amended

6.2.3 Allowance for ice accretion

.1 The ice accretion weight, w (kg/m$^2$), may be taken as follows:

$$w = 30 \times \frac{2.3(15.2L - 351.8)}{l_{FB}} \times f_{tl} \times \frac{l_{bow}}{0.16L}$$

where:

$f_{tl}$ = timber and lashing factor = 1.2

$L$ = length of ship in m

$l_{FB}$ = freeboard height in mm

$l_{bow}$ = length of bow flare region in m, to be taken as the distance from the longitudinal position at which the maximum breadth occurs on a water line located 0.5 metres below the freeboard deck at side to the foremost point of the bow at that waterline.

.2 The ice accretion weight, w (kg/m$^2$), over the timber deck region should be applied to each of the load cases as illustrated in figure 1:

MCA Note: Paragraph 6.2.3 and figure 1 below is from IMO Resolution MSC.398(95), which took effect from 5 June 2015

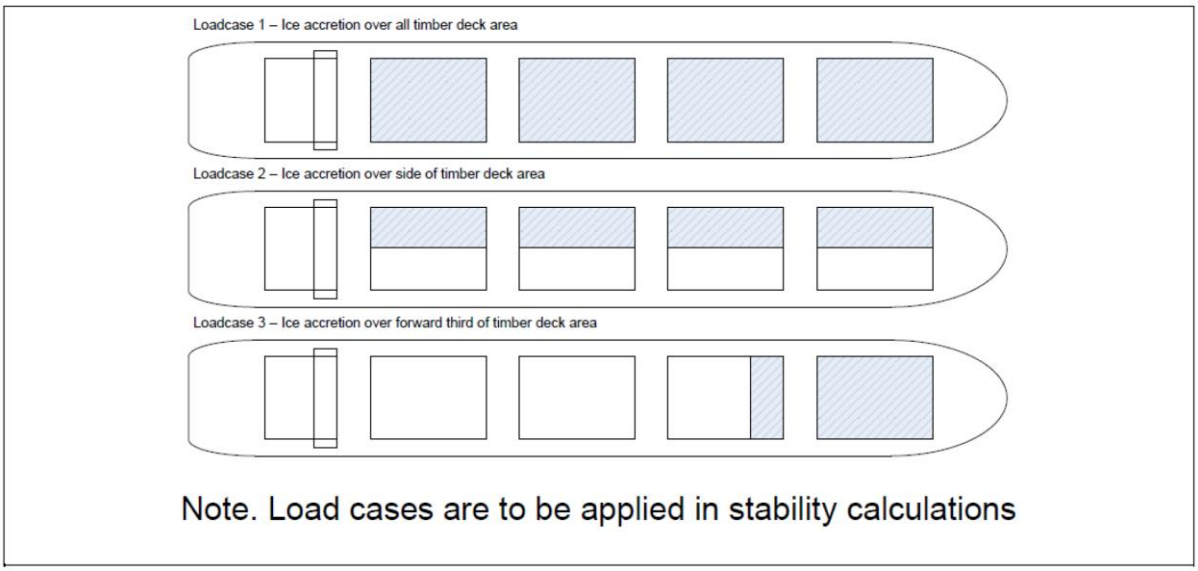



**Figure 1 – Ice accretion load cases for timber deck cargoes**

# PART D

# GRAIN LOADING DATA

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# GRAIN SHIFT MOMENT DATA

## (1) GRAIN VOLUMETRIC SHIFT MOMENT OF FILLED LOADS WITH ENDS TRIMMED

| Comp. | Grain Volume $m^3$ | LCG m foap | TCG m | VCG m | GRMV $m^4$ |
|---|---|---|---|---|---|
| NO.1 CARGO HOLD | 13009.86 | 160.513 | 0 | 10.584 | 986.42 |
| NO.2 CARGO HOLD | 15333.25 | 131.364 | 0 | 10.270 | 1104.05 |
| NO.3 CARGO HOLD | 14553.08 | 101.025 | 0 | 10.295 | 997.30 |
| NO.4 CARGO HOLD | 15333.27 | 70.684 | 0 | 10.270 | 1104.05 |
| NO.5 CARGO HOLD | 13404.64 | 41.070 | 0 | 10.693 | 1004.05 |

## (2) GRAIN VOLUMETRIC SHIFT MOMENT LOADS WITH ENDS UNTRIMMED

| Comp. | Grain Volume $m^3$ | LCG m foap | TCG m | VCG m | GRMV $m^4$ |
|---|---|---|---|---|---|
| NO.1 CARGO HOLD | 12604.79 | 160.499 | 0 | 10.584 | 3521.93 |
| NO.2 CARGO HOLD | 14911.39 | 131.350 | 0 | 10.270 | 4246.32 |
| NO.3 CARGO HOLD | 14263.64 | 101.015 | 0 | 10.295 | 3123.88 |
| NO.4 CARGO HOLD | 14911.39 | 70.670 | 0 | 10.270 | 4246.32 |
| NO.5 CARGO HOLD | 13238.40 | 41.073 | 0 | 10.693 | 3071.28 |

# GRAIN DATA FOR PARTLY FILLED HOLDS

## NO.1 CARGO HOLD (FR183~217)

| Height above BL (m) | Height from tank bottom (m) | Grain Volume ($m^3$) | LCG foap (m) | CGY (m) | CGZ (m) | GRMV ($m^4$) | Ullage (m) |
|---|---|---|---|---|---|---|---|
| 1.780 | 0.00 | 0.00 | 159.580 | 0.000 | 1.781 | 0.00 | 18.720 |
| 2.180 | 0.40 | 217.44 | 159.616 | 0.000 | 1.981 | 2388.33 | 18.320 |
| 2.580 | 0.80 | 443.76 | 159.651 | 0.000 | 2.185 | 4794.67 | 17.920 |
| 2.980 | 1.20 | 678.95 | 159.684 | 0.000 | 2.392 | 7147.35 | 17.520 |
| 3.380 | 1.60 | 923.02 | 159.716 | 0.000 | 2.601 | 9414.00 | 17.120 |
| 3.780 | 2.00 | 1175.97 | 159.747 | 0.000 | 2.811 | 11578.25 | 16.720 |
| 4.180 | 2.40 | 1437.80 | 159.777 | 0.000 | 3.024 | 13628.15 | 16.320 |
| 4.580 | 2.80 | 1708.50 | 159.806 | 0.000 | 3.239 | 15562.54 | 15.920 |
| 4.980 | 3.20 | 1990.09 | 159.821 | 0.000 | 3.458 | 17405.81 | 15.520 |
| 5.380 | 3.60 | 2284.08 | 159.818 | 0.000 | 3.679 | 19170.41 | 15.120 |
| 5.780 | 4.00 | 2586.94 | 159.821 | 0.000 | 3.902 | 20801.55 | 14.720 |
| 6.180 | 4.40 | 2897.98 | 159.828 | 0.000 | 4.125 | 22299.75 | 14.320 |
| 6.580 | 4.80 | 3215.12 | 159.846 | 0.000 | 4.348 | 23666.74 | 13.920 |
| 6.980 | 5.20 | 3537.71 | 159.871 | 0.000 | 4.570 | 24885.88 | 13.520 |
| 7.380 | 5.60 | 3865.44 | 159.902 | 0.000 | 4.791 | 25914.35 | 13.120 |
| 7.780 | 6.00 | 4197.32 | 159.936 | 0.000 | 5.011 | 26776.97 | 12.720 |
| 8.180 | 6.40 | 4532.46 | 159.971 | 0.000 | 5.231 | 27506.81 | 12.320 |
| 8.580 | 6.80 | 4868.53 | 160.002 | 0.000 | 5.448 | 28112.06 | 11.920 |
| 8.980 | 7.20 | 5204.92 | 160.030 | 0.000 | 5.664 | 28579.67 | 11.520 |
| 9.380 | 7.60 | 5541.58 | 160.054 | 0.000 | 5.877 | 28899.04 | 11.120 |
| 9.780 | 8.00 | 5878.49 | 160.076 | 0.000 | 6.090 | 29068.47 | 10.720 |
| 10.180 | 8.40 | 6215.66 | 160.095 | 0.000 | 6.301 | 29084.90 | 10.320 |
| 10.580 | 8.80 | 6553.25 | 160.113 | 0.000 | 6.511 | 28941.38 | 9.920 |
| 10.980 | 9.20 | 6891.32 | 160.130 | 0.000 | 6.720 | 28639.37 | 9.520 |
| 11.380 | 9.60 | 7230.00 | 160.146 | 0.000 | 6.929 | 28173.93 | 9.120 |
| 11.780 | 10.00 | 7569.49 | 160.161 | 0.000 | 7.138 | 27545.73 | 8.720 |
| 12.180 | 10.40 | 7909.85 | 160.176 | 0.000 | 7.346 | 26754.70 | 8.320 |
| 12.580 | 10.80 | 8251.09 | 160.191 | 0.000 | 7.554 | 25801.87 | 7.920 |
| 12.980 | 11.20 | 8593.30 | 160.205 | 0.000 | 7.762 | 24746.04 | 7.520 |
| 13.380 | 11.60 | 8936.52 | 160.219 | 0.000 | 7.970 | 23619.14 | 7.120 |
| 13.780 | 12.00 | 9276.94 | 160.236 | 0.000 | 8.176 | 22443.73 | 6.720 |
| 14.180 | 12.40 | 9608.64 | 160.256 | 0.000 | 8.377 | 21251.31 | 6.320 |
| 14.580 | 12.80 | 9928.96 | 160.278 | 0.000 | 8.570 | 20046.08 | 5.920 |
| 14.980 | 13.20 | 10236.32 | 160.302 | 0.000 | 8.757 | 18806.31 | 5.520 |
| 15.380 | 13.60 | 10529.24 | 160.325 | 0.000 | 8.935 | 17552.77 | 5.120 |
| 15.780 | 14.00 | 10807.13 | 160.346 | 0.000 | 9.106 | 16226.44 | 4.720 |
| 16.180 | 14.40 | 11065.25 | 160.369 | 0.000 | 9.266 | 14814.68 | 4.320 |

| Height above BL (m) | Height from tank bottom (m) | Grain Volume ($m^3$) | LCG foap (m) | CGY (m) | CGZ (m) | GRMV ($m^4$) | Ullage (m) |
|---|---|---|---|---|---|---|---|
| 16.580 | 14.80 | 11307.15 | 160.391 | 0.000 | 9.418 | 13346.37 | 3.920 |
| 16.980 | 15.20 | 11533.68 | 160.411 | 0.000 | 9.563 | 11841.49 | 3.520 |
| 17.380 | 15.60 | 11744.83 | 160.429 | 0.000 | 9.700 | 10328.05 | 3.120 |
| 17.780 | 16.00 | 11946.79 | 160.445 | 0.000 | 9.833 | 8758.67 | 2.720 |
| 18.180 | 16.40 | 12148.67 | 160.461 | 0.000 | 9.969 | 7522.75 | 2.320 |
| 18.580 | 16.80 | 12344.43 | 160.482 | 0.000 | 10.102 | 6465.35 | 1.920 |
| 18.980 | 17.20 | 12489.02 | 160.495 | 0.000 | 10.202 | 5326.74 | 1.520 |
| 19.380 | 17.60 | 12626.08 | 160.500 | 0.000 | 10.300 | 4112.11 | 1.120 |
| 19.780 | 18.00 | 12763.14 | 160.505 | 0.000 | 10.399 | 2901.61 | 0.720 |
| 20.180 | 18.40 | 12900.21 | 160.510 | 0.000 | 10.501 | 1924.48 | 0.320 |
| 20.500 | 18.72 | 13009.86 | 160.513 | 0.000 | 10.584 | 986.42 | 0.000 |

**Note**
**The tabulated GRMV = 1.12 x Calculated GRMV**

## NO.2 CARGO HOLD (FR145~183)

| Height above BL (m) | Height from tank bottom (m) | Grain Volume ($m^3$) | LCG foap (m) | CGY (m) | CGZ (m) | GRMV ($m^4$) | Ullage (m) |
|---|---|---|---|---|---|---|---|
| 1.780 | 0.00 | 0.00 | 130.610 | 0.000 | 1.781 | 0.00 | 18.520 |
| 2.180 | 0.40 | 281.83 | 130.878 | 0.000 | 1.981 | 3741.92 | 18.120 |
| 2.580 | 0.80 | 573.25 | 130.885 | 0.000 | 2.185 | 7412.11 | 17.720 |
| 2.980 | 1.20 | 874.00 | 130.888 | 0.000 | 2.390 | 10864.10 | 17.320 |
| 3.380 | 1.60 | 1184.06 | 130.889 | 0.000 | 2.597 | 14115.04 | 16.920 |
| 3.780 | 2.00 | 1503.44 | 130.890 | 0.000 | 2.806 | 17177.87 | 16.520 |
| 4.180 | 2.40 | 1836.62 | 130.927 | 0.000 | 3.019 | 20050.84 | 16.120 |
| 4.580 | 2.80 | 2183.65 | 130.983 | 0.000 | 3.236 | 22737.93 | 15.720 |
| 4.980 | 3.20 | 2545.12 | 131.031 | 0.000 | 3.455 | 25355.21 | 15.320 |
| 5.380 | 3.60 | 2924.91 | 131.077 | 0.000 | 3.679 | 27950.99 | 14.920 |
| 5.780 | 4.00 | 3314.62 | 131.115 | 0.000 | 3.903 | 30322.54 | 14.520 |
| 6.180 | 4.40 | 3713.22 | 131.146 | 0.000 | 4.126 | 32464.80 | 14.120 |
| 6.580 | 4.80 | 4113.29 | 131.172 | 0.000 | 4.345 | 34337.77 | 13.720 |
| 6.980 | 5.20 | 4513.37 | 131.193 | 0.000 | 4.561 | 35891.30 | 13.320 |
| 7.380 | 5.60 | 4913.44 | 131.210 | 0.000 | 4.774 | 37093.46 | 12.920 |
| 7.780 | 6.00 | 5313.51 | 131.225 | 0.000 | 4.986 | 37944.04 | 12.520 |
| 8.180 | 6.40 | 5713.59 | 131.238 | 0.000 | 5.195 | 38550.21 | 12.120 |
| 8.580 | 6.80 | 6113.66 | 131.249 | 0.000 | 5.404 | 38964.07 | 11.720 |
| 8.980 | 7.20 | 6513.73 | 131.259 | 0.000 | 5.611 | 39179.39 | 11.320 |
| 9.380 | 7.60 | 6913.81 | 131.268 | 0.000 | 5.818 | 39200.40 | 10.920 |
| 9.780 | 8.00 | 7313.89 | 131.276 | 0.000 | 6.023 | 39029.09 | 10.520 |
| 10.180 | 8.40 | 7713.96 | 131.283 | 0.000 | 6.229 | 38662.79 | 10.120 |
| 10.580 | 8.80 | 8114.04 | 131.289 | 0.000 | 6.433 | 38096.93 | 9.720 |
| 10.980 | 9.20 | 8514.12 | 131.294 | 0.000 | 6.638 | 37332.62 | 9.320 |
| 11.380 | 9.60 | 8914.20 | 131.300 | 0.000 | 6.841 | 36367.30 | 8.920 |
| 11.780 | 10.00 | 9314.28 | 131.304 | 0.000 | 7.045 | 35202.86 | 8.520 |
| 12.180 | 10.40 | 9714.36 | 131.309 | 0.000 | 7.248 | 33845.72 | 8.120 |
| 12.580 | 10.80 | 10114.44 | 131.313 | 0.000 | 7.451 | 32308.25 | 7.720 |
| 12.980 | 11.20 | 10514.52 | 131.316 | 0.000 | 7.654 | 30698.30 | 7.320 |
| 13.380 | 11.60 | 10914.60 | 131.320 | 0.000 | 7.856 | 29063.22 | 6.920 |
| 13.780 | 12.00 | 11306.08 | 131.322 | 0.000 | 8.055 | 27397.78 | 6.520 |
| 14.180 | 12.40 | 11680.39 | 131.324 | 0.000 | 8.244 | 25709.65 | 6.120 |
| 14.580 | 12.80 | 12037.50 | 131.326 | 0.000 | 8.426 | 24034.19 | 5.720 |
| 14.980 | 13.20 | 12377.43 | 131.328 | 0.000 | 8.601 | 22323.46 | 5.320 |
| 15.380 | 13.60 | 12700.17 | 131.330 | 0.000 | 8.768 | 20609.19 | 4.920 |
| 15.780 | 14.00 | 13005.72 | 131.331 | 0.000 | 8.928 | 18852.74 | 4.520 |
| 16.180 | 14.40 | 13286.17 | 131.332 | 0.000 | 9.077 | 17004.79 | 4.120 |
| 16.580 | 14.80 | 13548.61 | 131.334 | 0.000 | 9.218 | 15159.33 | 3.720 |
| 16.980 | 15.20 | 13794.35 | 131.336 | 0.000 | 9.353 | 13302.21 | 3.320 |
| 17.380 | 15.60 | 14023.41 | 131.337 | 0.000 | 9.481 | 11451.13 | 2.920 |

| Height above BL (m) | Height from tank bottom (m) | Grain Volume ($m^3$) | LCG foap (m) | CGY (m) | CGZ (m) | GRMV ($m^4$) | Ullage (m) |
|---|---|---|---|---|---|---|---|
| 17.780 | 16.00 | 14242.50 | 131.339 | 0.000 | 9.605 | 9558.88 | 2.520 |
| 18.180 | 16.40 | 14461.50 | 131.340 | 0.000 | 9.732 | 8227.07 | 2.120 |
| 18.580 | 16.80 | 14666.99 | 131.342 | 0.000 | 9.853 | 6917.69 | 1.720 |
| 18.980 | 17.20 | 14821.94 | 131.347 | 0.000 | 9.946 | 5527.65 | 1.320 |
| 19.380 | 17.60 | 14976.88 | 131.352 | 0.000 | 10.042 | 4054.15 | 0.920 |
| 19.780 | 18.00 | 15131.82 | 131.357 | 0.000 | 10.140 | 2723.51 | 0.520 |
| 20.180 | 18.40 | 15286.76 | 131.362 | 0.000 | 10.239 | 1651.87 | 0.120 |
| 20.300 | 18.52 | 15333.25 | 131.364 | 0.000 | 10.270 | 1104.05 | 0.000 |

**Note**
**The tabulated GRMV = 1.12 x Calculated GRMV**

## NO.3 CARGO HOLD (FR109~145)

| Height above BL (m) | Height from tank bottom (m) | Grain Volume ($m^3$) | LCG foap (m) | CGY (m) | CGZ (m) | GRMV ($m^4$) | Ullage (m) |
|---|---|---|---|---|---|---|---|
| 1.780 | 0.00 | 0.00 | 100.270 | 0.000 | 1.781 | 0.00 | 18.520 |
| 2.180 | 0.40 | 266.01 | 100.538 | 0.000 | 1.981 | 3533.45 | 18.120 |
| 2.580 | 0.80 | 541.11 | 100.545 | 0.000 | 2.185 | 6999.50 | 17.720 |
| 2.980 | 1.20 | 825.00 | 100.548 | 0.000 | 2.390 | 10259.48 | 17.320 |
| 3.380 | 1.60 | 1117.68 | 100.549 | 0.000 | 2.597 | 13329.60 | 16.920 |
| 3.780 | 2.00 | 1419.16 | 100.550 | 0.000 | 2.806 | 16222.06 | 16.520 |
| 4.180 | 2.40 | 1733.92 | 100.587 | 0.000 | 3.020 | 18935.23 | 16.120 |
| 4.580 | 2.80 | 2062.00 | 100.643 | 0.000 | 3.236 | 21472.86 | 15.720 |
| 4.980 | 3.20 | 2404.01 | 100.691 | 0.000 | 3.456 | 23951.25 | 15.320 |
| 5.380 | 3.60 | 2763.81 | 100.737 | 0.000 | 3.681 | 26418.93 | 14.920 |
| 5.780 | 4.00 | 3133.01 | 100.775 | 0.000 | 3.905 | 28673.18 | 14.520 |
| 6.180 | 4.40 | 3510.64 | 100.806 | 0.000 | 4.128 | 30709.59 | 14.120 |
| 6.580 | 4.80 | 3889.66 | 100.832 | 0.000 | 4.347 | 32490.37 | 13.720 |
| 6.980 | 5.20 | 4268.68 | 100.853 | 0.000 | 4.563 | 33968.26 | 13.320 |
| 7.380 | 5.60 | 4647.70 | 100.871 | 0.000 | 4.777 | 35113.21 | 12.920 |
| 7.780 | 6.00 | 5026.72 | 100.886 | 0.000 | 4.988 | 35924.83 | 12.520 |
| 8.180 | 6.40 | 5405.74 | 100.899 | 0.000 | 5.198 | 36504.20 | 12.120 |
| 8.580 | 6.80 | 5784.76 | 100.910 | 0.000 | 5.406 | 36900.62 | 11.720 |
| 8.980 | 7.20 | 6163.79 | 100.920 | 0.000 | 5.614 | 37108.25 | 11.320 |
| 9.380 | 7.60 | 6542.81 | 100.928 | 0.000 | 5.820 | 37131.14 | 10.920 |
| 9.780 | 8.00 | 6921.83 | 100.936 | 0.000 | 6.026 | 36971.16 | 10.520 |
| 10.180 | 8.40 | 7300.85 | 100.943 | 0.000 | 6.232 | 36625.90 | 10.120 |
| 10.580 | 8.80 | 7679.87 | 100.949 | 0.000 | 6.436 | 36091.00 | 9.720 |
| 10.980 | 9.20 | 8058.89 | 100.955 | 0.000 | 6.641 | 35367.23 | 9.320 |
| 11.380 | 9.60 | 8437.91 | 100.960 | 0.000 | 6.844 | 34452.28 | 8.920 |
| 11.780 | 10.00 | 8816.93 | 100.965 | 0.000 | 7.048 | 33348.28 | 8.520 |
| 12.180 | 10.40 | 9195.96 | 100.969 | 0.000 | 7.251 | 32061.30 | 8.120 |
| 12.580 | 10.80 | 9574.98 | 100.973 | 0.000 | 7.454 | 30603.25 | 7.720 |
| 12.980 | 11.20 | 9954.00 | 100.977 | 0.000 | 7.657 | 29076.14 | 7.320 |
| 13.380 | 11.60 | 10333.02 | 100.980 | 0.000 | 7.860 | 27525.94 | 6.920 |
| 13.780 | 12.00 | 10703.90 | 100.983 | 0.000 | 8.058 | 25953.58 | 6.520 |
| 14.180 | 12.40 | 11058.50 | 100.985 | 0.000 | 8.248 | 24370.53 | 6.120 |
| 14.580 | 12.80 | 11396.82 | 100.986 | 0.000 | 8.430 | 22805.35 | 5.720 |
| 14.980 | 13.20 | 11718.85 | 100.988 | 0.000 | 8.604 | 21213.68 | 5.320 |
| 15.380 | 13.60 | 12024.61 | 100.990 | 0.000 | 8.771 | 19617.99 | 4.920 |
| 15.780 | 14.00 | 12314.08 | 100.991 | 0.000 | 8.931 | 17989.96 | 4.520 |
| 16.180 | 14.40 | 12579.35 | 100.993 | 0.000 | 9.080 | 16279.81 | 4.120 |
| 16.580 | 14.80 | 12827.51 | 100.994 | 0.000 | 9.221 | 14566.83 | 3.720 |
| 16.980 | 15.20 | 13059.89 | 100.996 | 0.000 | 9.356 | 12842.04 | 3.320 |
| 17.380 | 15.60 | 13276.49 | 100.997 | 0.000 | 9.483 | 11122.45 | 2.920 |

| Height above BL (m) | Height from tank bottom (m) | Grain Volume ($m^3$) | LCG foap (m) | CGY (m) | CGZ (m) | GRMV ($m^4$) | Ullage (m) |
|---|---|---|---|---|---|---|---|
| 17.780 | 16.00 | 13483.65 | 100.999 | 0.000 | 9.608 | 9364.16 | 2.520 |
| 18.180 | 16.40 | 13690.74 | 101.000 | 0.000 | 9.734 | 8038.30 | 2.120 |
| 18.580 | 16.80 | 13886.82 | 101.002 | 0.000 | 9.856 | 6728.93 | 1.720 |
| 18.980 | 17.20 | 14041.77 | 101.008 | 0.000 | 9.955 | 5338.88 | 1.320 |
| 19.380 | 17.60 | 14196.71 | 101.013 | 0.000 | 10.055 | 3865.38 | 0.920 |
| 19.780 | 18.00 | 14351.65 | 101.018 | 0.000 | 10.158 | 2534.75 | 0.520 |
| 20.180 | 18.40 | 14506.59 | 101.024 | 0.000 | 10.263 | 1463.11 | 0.120 |
| 20.300 | 18.52 | 14553.08 | 101.025 | 0.000 | 10.295 | 997.30 | 0.000 |

**Note**
**The tabulated GRMV = 1.12 x Calculated GRMV**

## NO.4 CARGO HOLD (FR71~109)

| Height above BL (m) | Height from tank bottom (m) | Grain Volume ($m^3$) | LCG foap (m) | CGY (m) | CGZ (m) | GRMV ($m^4$) | Ullage (m) |
|---|---|---|---|---|---|---|---|
| 1.780 | 0.00 | 0.00 | 69.930 | 0.000 | 1.781 | 0.00 | 18.520 |
| 2.180 | 0.40 | 281.83 | 70.198 | 0.000 | 1.981 | 3741.92 | 18.120 |
| 2.580 | 0.80 | 573.25 | 70.205 | 0.000 | 2.185 | 7412.11 | 17.720 |
| 2.980 | 1.20 | 874.00 | 70.208 | 0.000 | 2.390 | 10864.10 | 17.320 |
| 3.380 | 1.60 | 1184.06 | 70.209 | 0.000 | 2.597 | 14115.04 | 16.920 |
| 3.780 | 2.00 | 1503.44 | 70.210 | 0.000 | 2.806 | 17177.87 | 16.520 |
| 4.180 | 2.40 | 1836.62 | 70.247 | 0.000 | 3.019 | 20050.84 | 16.120 |
| 4.580 | 2.80 | 2183.65 | 70.303 | 0.000 | 3.236 | 22737.93 | 15.720 |
| 4.980 | 3.20 | 2545.12 | 70.351 | 0.000 | 3.455 | 25355.21 | 15.320 |
| 5.380 | 3.60 | 2924.91 | 70.397 | 0.000 | 3.679 | 27950.99 | 14.920 |
| 5.780 | 4.00 | 3314.62 | 70.434 | 0.000 | 3.903 | 30322.53 | 14.520 |
| 6.180 | 4.40 | 3713.23 | 70.466 | 0.000 | 4.126 | 32464.80 | 14.120 |
| 6.580 | 4.80 | 4113.30 | 70.492 | 0.000 | 4.345 | 34337.77 | 13.720 |
| 6.980 | 5.20 | 4513.38 | 70.513 | 0.000 | 4.561 | 35891.30 | 13.320 |
| 7.380 | 5.60 | 4913.46 | 70.530 | 0.000 | 4.774 | 37093.46 | 12.920 |
| 7.780 | 6.00 | 5313.54 | 70.545 | 0.000 | 4.986 | 37944.04 | 12.520 |
| 8.180 | 6.40 | 5713.62 | 70.558 | 0.000 | 5.195 | 38550.21 | 12.120 |
| 8.580 | 6.80 | 6113.69 | 70.569 | 0.000 | 5.404 | 38964.07 | 11.720 |
| 8.980 | 7.20 | 6513.77 | 70.579 | 0.000 | 5.611 | 39179.41 | 11.320 |
| 9.380 | 7.60 | 6913.85 | 70.588 | 0.000 | 5.818 | 39200.40 | 10.920 |
| 9.780 | 8.00 | 7313.93 | 70.596 | 0.000 | 6.023 | 39029.09 | 10.520 |
| 10.180 | 8.40 | 7714.00 | 70.603 | 0.000 | 6.229 | 38662.79 | 10.120 |
| 10.580 | 8.80 | 8114.08 | 70.609 | 0.000 | 6.433 | 38096.94 | 9.720 |
| 10.980 | 9.20 | 8514.16 | 70.614 | 0.000 | 6.638 | 37332.63 | 9.320 |
| 11.380 | 9.60 | 8914.24 | 70.620 | 0.000 | 6.841 | 36367.32 | 8.920 |
| 11.780 | 10.00 | 9314.32 | 70.624 | 0.000 | 7.045 | 35202.87 | 8.520 |
| 12.180 | 10.40 | 9714.39 | 70.629 | 0.000 | 7.248 | 33845.73 | 8.120 |
| 12.580 | 10.80 | 10114.47 | 70.633 | 0.000 | 7.451 | 32308.26 | 7.720 |
| 12.980 | 11.20 | 10514.55 | 70.636 | 0.000 | 7.654 | 30698.31 | 7.320 |
| 13.380 | 11.60 | 10914.63 | 70.640 | 0.000 | 7.856 | 29063.23 | 6.920 |
| 13.780 | 12.00 | 11306.11 | 70.642 | 0.000 | 8.055 | 27397.78 | 6.520 |
| 14.180 | 12.40 | 11680.41 | 70.644 | 0.000 | 8.244 | 25709.65 | 6.120 |
| 14.580 | 12.80 | 12037.52 | 70.646 | 0.000 | 8.426 | 24034.20 | 5.720 |
| 14.980 | 13.20 | 12377.45 | 70.648 | 0.000 | 8.601 | 22323.46 | 5.320 |
| 15.380 | 13.60 | 12700.19 | 70.650 | 0.000 | 8.768 | 20609.20 | 4.920 |
| 15.780 | 14.00 | 13005.74 | 70.651 | 0.000 | 8.928 | 18852.74 | 4.520 |
| 16.180 | 14.40 | 13286.19 | 70.652 | 0.000 | 9.077 | 17004.79 | 4.120 |
| 16.580 | 14.80 | 13548.63 | 70.654 | 0.000 | 9.218 | 15159.34 | 3.720 |
| 16.980 | 15.20 | 13794.38 | 70.656 | 0.000 | 9.353 | 13302.22 | 3.320 |
| 17.380 | 15.60 | 14023.44 | 70.657 | 0.000 | 9.481 | 11451.13 | 2.920 |

| Height above BL (m) | Height from tank bottom (m) | Grain Volume ($m^3$) | LCG foap (m) | CGY (m) | CGZ (m) | GRMV ($m^4$) | Ullage (m) |
|---|---|---|---|---|---|---|---|
| 17.780 | 16.00 | 14242.53 | 70.659 | 0.000 | 9.605 | 9558.89 | 2.520 |
| 18.180 | 16.40 | 14461.53 | 70.660 | 0.000 | 9.732 | 8227.08 | 2.120 |
| 18.580 | 16.80 | 14667.02 | 70.662 | 0.000 | 9.853 | 6917.70 | 1.720 |
| 18.980 | 17.20 | 14821.96 | 70.667 | 0.000 | 9.946 | 5527.65 | 1.320 |
| 19.380 | 17.60 | 14976.90 | 70.672 | 0.000 | 10.042 | 4054.15 | 0.920 |
| 19.780 | 18.00 | 15131.85 | 70.677 | 0.000 | 10.140 | 2723.52 | 0.520 |
| 20.180 | 18.40 | 15286.79 | 70.682 | 0.000 | 10.239 | 1651.88 | 0.120 |
| 20.300 | 18.52 | 15333.27 | 70.684 | 0.000 | 10.270 | 1104.05 | 0.000 |

**Note**
**The tabulated GRMV = 1.12 x Calculated GRMV**

## NO.5 CARGO HOLD (FR35~71)

| Height above BL (m) | Height from tank bottom (m) | Grain Volume ($m^3$) | LCG foap (m) | CGY (m) | CGZ (m) | GRMV ($m^4$) | Ullage (m) |
|---|---|---|---|---|---|---|---|
| 1.780 | 0.00 | 0.00 | 42.008 | 0.000 | 1.781 | 0.00 | 18.520 |
| 2.180 | 0.40 | 201.67 | 41.962 | 0.000 | 1.981 | 2112.79 | 18.120 |
| 2.580 | 0.80 | 412.13 | 41.917 | 0.000 | 2.186 | 4257.37 | 17.720 |
| 2.980 | 1.20 | 631.39 | 41.875 | 0.000 | 2.393 | 6441.73 | 17.320 |
| 3.380 | 1.60 | 859.44 | 41.834 | 0.000 | 2.602 | 8566.67 | 16.920 |
| 3.780 | 2.00 | 1096.28 | 41.794 | 0.000 | 2.813 | 10643.77 | 16.520 |
| 4.180 | 2.40 | 1346.41 | 41.797 | 0.000 | 3.031 | 12671.19 | 16.120 |
| 4.580 | 2.80 | 1609.85 | 41.823 | 0.000 | 3.252 | 14635.93 | 15.720 |
| 4.980 | 3.20 | 1885.21 | 41.854 | 0.000 | 3.475 | 16635.30 | 15.320 |
| 5.380 | 3.60 | 2174.85 | 41.902 | 0.000 | 3.702 | 18709.15 | 14.920 |
| 5.780 | 4.00 | 2473.88 | 41.934 | 0.000 | 3.930 | 20651.20 | 14.520 |
| 6.180 | 4.40 | 2782.10 | 41.955 | 0.000 | 4.157 | 22464.38 | 14.120 |
| 6.580 | 4.80 | 3097.37 | 41.961 | 0.000 | 4.383 | 24141.02 | 13.720 |
| 6.980 | 5.20 | 3419.71 | 41.954 | 0.000 | 4.609 | 25674.90 | 13.320 |
| 7.380 | 5.60 | 3749.37 | 41.937 | 0.000 | 4.835 | 27032.41 | 12.920 |
| 7.780 | 6.00 | 4086.60 | 41.909 | 0.000 | 5.062 | 28230.19 | 12.520 |
| 8.180 | 6.40 | 4430.91 | 41.873 | 0.000 | 5.289 | 29277.86 | 12.120 |
| 8.580 | 6.80 | 4780.92 | 41.831 | 0.000 | 5.515 | 30162.43 | 11.720 |
| 8.980 | 7.20 | 5136.40 | 41.784 | 0.000 | 5.741 | 30883.46 | 11.320 |
| 9.380 | 7.60 | 5496.56 | 41.734 | 0.000 | 5.966 | 31433.79 | 10.920 |
| 9.780 | 8.00 | 5861.15 | 41.682 | 0.000 | 6.191 | 31809.29 | 10.520 |
| 10.180 | 8.40 | 6228.65 | 41.631 | 0.000 | 6.415 | 32005.64 | 10.120 |
| 10.580 | 8.80 | 6598.59 | 41.580 | 0.000 | 6.637 | 32013.46 | 9.720 |
| 10.980 | 9.20 | 6970.45 | 41.531 | 0.000 | 6.858 | 31823.98 | 9.320 |
| 11.380 | 9.60 | 7343.43 | 41.485 | 0.000 | 7.078 | 31430.53 | 8.920 |
| 11.780 | 10.00 | 7716.78 | 41.443 | 0.000 | 7.295 | 30837.15 | 8.520 |
| 12.180 | 10.40 | 8090.22 | 41.405 | 0.000 | 7.512 | 30043.88 | 8.120 |
| 12.580 | 10.80 | 8463.69 | 41.370 | 0.000 | 7.726 | 29054.88 | 7.720 |
| 12.980 | 11.20 | 8837.17 | 41.337 | 0.000 | 7.940 | 27926.38 | 7.320 |
| 13.380 | 11.60 | 9210.66 | 41.308 | 0.000 | 8.153 | 26704.22 | 6.920 |
| 13.780 | 12.00 | 9576.01 | 41.281 | 0.000 | 8.360 | 25393.16 | 6.520 |
| 14.180 | 12.40 | 9925.08 | 41.257 | 0.000 | 8.557 | 23990.01 | 6.120 |
| 14.580 | 12.80 | 10258.11 | 41.235 | 0.000 | 8.746 | 22557.89 | 5.720 |
| 14.980 | 13.20 | 10575.32 | 41.216 | 0.000 | 8.927 | 21066.22 | 5.320 |
| 15.380 | 13.60 | 10876.54 | 41.199 | 0.000 | 9.100 | 19544.17 | 4.920 |
| 15.780 | 14.00 | 11161.50 | 41.184 | 0.000 | 9.266 | 17962.91 | 4.520 |
| 16.180 | 14.40 | 11426.67 | 41.165 | 0.000 | 9.421 | 16277.43 | 4.120 |
| 16.580 | 14.80 | 11675.56 | 41.148 | 0.000 | 9.570 | 14577.19 | 3.720 |
| 16.980 | 15.20 | 11908.68 | 41.133 | 0.000 | 9.711 | 12850.75 | 3.320 |
| 17.380 | 15.60 | 12126.00 | 41.119 | 0.000 | 9.845 | 11134.49 | 2.920 |

| Height above BL (m) | Height from tank bottom (m) | Grain Volume ($m^3$) | LCG foap (m) | CGY (m) | CGZ (m) | GRMV ($m^4$) | Ullage (m) |
|---|---|---|---|---|---|---|---|
| 17.780 | 16.00 | 12333.90 | 41.106 | 0.000 | 9.975 | 9374.07 | 2.520 |
| 18.180 | 16.40 | 12541.72 | 41.093 | 0.000 | 10.108 | 8048.12 | 2.120 |
| 18.580 | 16.80 | 12738.39 | 41.083 | 0.000 | 10.235 | 6738.69 | 1.720 |
| 18.980 | 17.20 | 12893.33 | 41.080 | 0.000 | 10.338 | 5348.58 | 1.320 |
| 19.380 | 17.60 | 13048.28 | 41.077 | 0.000 | 10.443 | 3875.09 | 0.920 |
| 19.780 | 18.00 | 13203.22 | 41.074 | 0.000 | 10.550 | 2544.45 | 0.520 |
| 20.180 | 18.40 | 13358.16 | 41.071 | 0.000 | 10.659 | 1472.81 | 0.120 |
| 20.300 | 18.52 | 13404.64 | 41.070 | 0.000 | 10.693 | 1004.05 | 0.000 |

**Note**
**The tabulated GRMV = 1.12 x Calculated GRMV**

# ALLOWABLE GRAIN SHIFT MOMENTS

| T<br>m | Displ.<br>t | VCG<br>9.80<br>m | VCG<br>9.90<br>m | VCG<br>10.00<br>m | VCG<br>10.10<br>m | VCG<br>10.20<br>m | VCG<br>10.30<br>m | VCG<br>10.40<br>m |
|---|---|---|---|---|---|---|---|---|
| 8.80 | 44589 | 49405 | 48419 | 47433 | 46446 | 45460 | 44474 | 43488 |
| 8.90 | 45150 | 49489 | 48490 | 47492 | 46493 | 45495 | 44496 | 43498 |
| 9.00 | 45711 | 49586 | 48575 | 47564 | 46553 | 45542 | 44531 | 43520 |
| 9.10 | 46274 | 49693 | 48670 | 47646 | 46623 | 45599 | 44576 | 43553 |
| 9.20 | 46837 | 49811 | 48775 | 47739 | 46703 | 45667 | 44631 | 43595 |
| 9.30 | 47401 | 49939 | 48890 | 47842 | 46794 | 45745 | 44697 | 43649 |
| 9.40 | 47967 | 50078 | 49017 | 47956 | 46896 | 45835 | 44774 | 43713 |
| 9.50 | 48534 | 50228 | 49155 | 48082 | 47008 | 45935 | 44861 | 43788 |
| 9.60 | 49101 | 50390 | 49304 | 48218 | 47132 | 46046 | 44960 | 43874 |
| 9.70 | 49670 | 50560 | 49462 | 48363 | 47265 | 46166 | 45068 | 43969 |
| 9.80 | 50240 | 50741 | 49630 | 48519 | 47408 | 46297 | 45186 | 44075 |
| 9.90 | 50811 | 50932 | 49808 | 48685 | 47561 | 46437 | 45314 | 44190 |
| 10.00 | 51383 | 51134 | 49997 | 48861 | 47725 | 46589 | 45452 | 44316 |
| 10.10 | 51956 | 51346 | 50197 | 49048 | 47899 | 46750 | 45601 | 44452 |
| 10.20 | 52530 | 51569 | 50408 | 49246 | 48085 | 46923 | 45762 | 44600 |
| 10.30 | 53106 | 51805 | 50630 | 49456 | 48282 | 47108 | 45933 | 44759 |
| 10.40 | 53682 | 52045 | 50858 | 49671 | 48484 | 47297 | 46110 | 44923 |
| 10.50 | 54259 | 52300 | 51100 | 49901 | 48701 | 47501 | 46302 | 45102 |
| 10.60 | 54837 | 52564 | 51352 | 50140 | 48927 | 47715 | 46502 | 45290 |
| 10.70 | 55415 | 52827 | 51602 | 50377 | 49152 | 47927 | 46702 | 45477 |
| 10.80 | 55994 | 53115 | 51877 | 50639 | 49401 | 48163 | 46925 | 45687 |
| 10.90 | 56574 | 53417 | 52166 | 50916 | 49665 | 48414 | 47164 | 45913 |
| 11.00 | 57154 | 53736 | 52472 | 51209 | 49945 | 48682 | 47418 | 46155 |
| 11.10 | 57735 | 54071 | 52794 | 51518 | 50242 | 48965 | 47689 | 46412 |
| 11.20 | 58316 | 54423 | 53133 | 51844 | 50555 | 49266 | 47976 | 46687 |
| 11.30 | 58898 | 54791 | 53489 | 52187 | 50885 | 49582 | 48280 | 46978 |
| 11.40 | 59480 | 55173 | 53858 | 52543 | 51228 | 49912 | 48597 | 47282 |
| 11.50 | 60063 | 55578 | 54249 | 52921 | 51593 | 50265 | 48936 | 47608 |
| 11.60 | 60646 | 55998 | 54657 | 53316 | 51974 | 50633 | 49291 | 47950 |
| 11.70 | 61230 | 56414 | 55060 | 53705 | 52351 | 50997 | 49642 | 48288 |
| 11.80 | 61814 | 56891 | 55523 | 54166 | 52798 | 51431 | 50063 | 48695 |
| 11.90 | 62399 | 57374 | 55993 | 54611 | 53230 | 51849 | 50467 | 49086 |
| 12.00 | 62984 | 57878 | 56484 | 55090 | 53695 | 52301 | 50906 | 49512 |
| 12.10 | 63570 | 58355 | 56948 | 55540 | 54132 | 52725 | 51317 | 49910 |
| 12.20 | 64156 | 58873 | 57453 | 56033 | 54612 | 53192 | 51772 | 50352 |
| 12.30 | 64742 | 59879 | 58451 | 56557 | 55125 | 53694 | 52263 | 50832 |
| 12.40 | 65329 | 59932 | 58487 | 57043 | 55598 | 54154 | 52710 | 51266 |
| 12.50 | 65917 | 60444 | 58986 | 57528 | 56070 | 54613 | 53155 | 51698 |
| 12.60 | 66504 | 60957 | 59485 | 58014 | 56543 | 55071 | 53600 | 52129 |
| 12.70 | 67093 | 61472 | 59987 | 58502 | 57017 | 55532 | 54047 | 52563 |
| 12.80 | 67681 | 61990 | 60491 | 58993 | 57494 | 55995 | 54497 | 52998 |

| T<br>m | Displ.<br>t | VCG<br>10.50<br>m | VCG<br>10.60<br>m | VCG<br>10.70<br>m | VCG<br>10.80<br>m | VCG<br>10.90<br>m | VCG<br>11.00<br>m | VCG<br>11.10<br>m | VCG<br>11.20<br>m |
|---|---|---|---|---|---|---|---|---|---|
| 8.80 | 44589 | 42502 | 41516 | 40530 | 39544 | 38557 | 37571 | 36585 | 35599 |
| 8.90 | 45150 | 42499 | 41500 | 40502 | 39503 | 38505 | 37506 | 36508 | 35509 |
| 9.00 | 45711 | 42509 | 41498 | 40487 | 39477 | 38466 | 37455 | 36444 | 35433 |
| 9.10 | 46274 | 42529 | 41506 | 40482 | 39459 | 38436 | 37412 | 36389 | 35366 |
| 9.20 | 46837 | 42559 | 41524 | 40488 | 39452 | 38416 | 37380 | 36344 | 35308 |
| 9.30 | 47401 | 42600 | 41552 | 40504 | 39455 | 38407 | 37359 | 36310 | 35262 |
| 9.40 | 47967 | 42652 | 41591 | 40531 | 39470 | 38409 | 37348 | 36287 | 35226 |
| 9.50 | 48534 | 42715 | 41641 | 40568 | 39495 | 38421 | 37348 | 36275 | 35201 |
| 9.60 | 49101 | 42788 | 41702 | 40616 | 39530 | 38445 | 37359 | 36273 | 35187 |
| 9.70 | 49670 | 42871 | 41773 | 40674 | 39576 | 38477 | 37379 | 36280 | 35182 |
| 9.80 | 50240 | 42964 | 41853 | 40742 | 39631 | 38520 | 37409 | 36298 | 35186 |
| 9.90 | 50811 | 43067 | 41943 | 40819 | 39696 | 38572 | 37449 | 36325 | 35201 |
| 10.00 | 51383 | 43180 | 42044 | 40907 | 39771 | 38635 | 37499 | 36363 | 35226 |
| 10.10 | 51956 | 43303 | 42155 | 41006 | 39857 | 38708 | 37559 | 36411 | 35261 |
| 10.20 | 52530 | 43439 | 42277 | 41115 | 39954 | 38793 | 37631 | 36470 | 35307 |
| 10.30 | 53106 | 43585 | 42411 | 41237 | 40062 | 38888 | 37714 | 36540 | 35365 |
| 10.40 | 53682 | 43736 | 42549 | 41362 | 40176 | 38989 | 37802 | 36615 | 35427 |
| 10.50 | 54259 | 43902 | 42703 | 41503 | 40303 | 39104 | 37904 | 36705 | 35504 |
| 10.60 | 54837 | 44077 | 42865 | 41653 | 40441 | 39228 | 38016 | 36803 | 35590 |
| 10.70 | 55415 | 44252 | 43027 | 41802 | 40577 | 39352 | 38127 | 36901 | 35675 |
| 10.80 | 55994 | 44450 | 43212 | 41974 | 40736 | 39499 | 38261 | 37022 | 35783 |
| 10.90 | 56574 | 44662 | 43412 | 42161 | 40911 | 39660 | 38410 | 37158 | 35906 |
| 11.00 | 57154 | 44891 | 43628 | 42364 | 41101 | 39838 | 38574 | 37310 | 36045 |
| 11.10 | 57735 | 45136 | 43860 | 42584 | 41307 | 40031 | 38755 | 37477 | 36200 |
| 11.20 | 58316 | 45398 | 44108 | 42819 | 41530 | 40241 | 38952 | 37661 | 36371 |
| 11.30 | 58898 | 45676 | 44373 | 43071 | 41769 | 40467 | 39165 | 37862 | 36559 |
| 11.40 | 59480 | 45967 | 44651 | 43336 | 42021 | 40706 | 39391 | 38075 | 36759 |
| 11.50 | 60063 | 46280 | 44951 | 43623 | 42295 | 40967 | 39639 | 38310 | 36982 |
| 11.60 | 60646 | 46609 | 45267 | 43926 | 42585 | 41243 | 39902 | 38561 | 37220 |
| 11.70 | 61230 | 46933 | 45579 | 44225 | 42870 | 41516 | 40162 | 38808 | 37454 |
| 11.80 | 61814 | 47328 | 45960 | 44593 | 43225 | 41857 | 40490 | 39124 | 37758 |
| 11.90 | 62399 | 47705 | 46324 | 44942 | 43561 | 42180 | 40800 | 39421 | 38042 |
| 12.00 | 62984 | 48118 | 46723 | 45329 | 43934 | 42540 | 41148 | 39756 | 38364 |
| 12.10 | 63570 | 48503 | 47095 | 45688 | 44280 | 42873 | 41468 | 40063 | 38658 |
| 12.20 | 64156 | 48932 | 47512 | 46092 | 44672 | 43251 | 41834 | 40416 | 38998 |
| 12.30 | 64742 | 49401 | 47970 | 46540 | 45109 | 43679 | 42247 | 40816 | 39385 |
| 12.40 | 65329 | 49822 | 48378 | 46934 | 45491 | 44047 | 42604 | 41160 | 39717 |
| 12.50 | 65917 | 50240 | 48783 | 47326 | 45869 | 44412 | 42956 | 41499 | 40043 |
| 12.60 | 66504 | 50658 | 49188 | 47717 | 46246 | 44776 | 43307 | 41837 | 40368 |
| 12.70 | 67093 | 51078 | 49593 | 48109 | 46624 | 45141 | 43658 | 42176 | 40694 |
| 12.80 | 67681 | 51500 | 50002 | 48503 | 47005 | 45508 | 44013 | 42517 | 41022 |

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# APPENDICES

# TRIM & STABILITY WORKSHEET

**CONDITION:**

| Compartment | Capacity $m^3$ | Stowage Factor $m^3/t$ | Weight t | KG m | Vertical Moment m | Free Surface Moment tm | LCG foap m | Longitudinal Moment tm |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
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| | | | | | | | | |
| Total Free Surface Moments: | | | | | | | | |
| Deadweight | | | | | | | | |
| Lightship | | | | | | | | |
| **DISPLACEMENT** | | | | | | | | |

**HYDROSTATICS**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TMD: | | MCTC: | | LCB: | | LCF: | | |

Trim calculation:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | TMD: | | TMD: | | | $KM_T$: | |
| | CoT f: | | CoT a: | | | KG: | |
| **FINAL DRAUGHTS:** | **Fwd:** | | **Aft:** | | | **GM:** | |

# DRAUGHT SURVEY REPORT

| | | | |
|---|---|---|---|
| | | | metres |
| Draught Forward | | | |
| FP Correction | $\frac{\text{Dist. marks displaced}}{\text{Dist. between marks}} \times \text{Observed Trim}$ | | |
| Draught at FP | | | |
| Draught Aft | | | |
| AP Correction | $\frac{\text{Dist. marks displaced}}{\text{Dist. between marks}} \times \text{Observed Trim}$ | | |
| Draught at AP | | | |
| True Trim | | | |
| Draught (M) Port | | | |
| Draught (M) Stbd. | | | |
| Draught Midships Mean | | | |
| Amidship line correction | $\frac{\text{Dist. marks displaced}}{\text{LBP}} \times \text{True Trim}$ | | |
| Draught at Amidships | | | |
| Corrected Midships Draught | $\frac{d_{FP} + (6 \times d_M) + d_{AP}}{8}$ | | |
| TPC | | LCF foap | |
| | | | tonnes |
| Displacement | | | |
| 1st Trim Correction (Layer) | $\frac{\text{Dist. of LCF from Midships} \times \text{Trim} \times \text{TPC}}{\text{LBP}}$ | | |
| 2nd Trim Correction (Form) | $\frac{50 \times \text{True Trim}^2 \times (MCTC_2 \sim MCTC_1)}{\text{LBP}}$ | | |
| Corrected Displacement | | | |
| **DOCK WATER DISPLACEMENT** | $W \times \frac{\text{RD Dock Water}}{1.025}$ | | |