



Stability calculation according to ISO 12217-1-2017 Small craft Stability  
and buoyancy assessment

By Xiamen DAWN DESIGN

Company: 厦门道恩建筑设计有限公司

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604B-588 Yuntong Center, No.95 Xiangyunnyilu road, Xiamen area of  
China(Fujian) Pilot Free Trade Zone

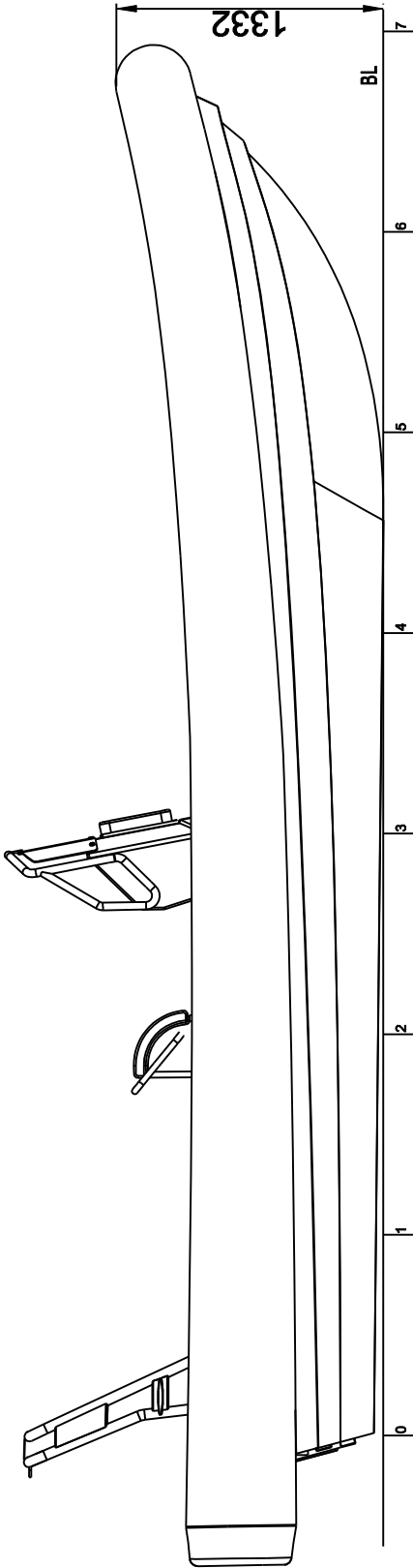
Owner: 王弘涛

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| <br>DAWN YACHT DESIGN<br>厦门道恩建筑设计有限公司 |  |   |  | ITEM                      |  | PROJECT: |  | PA 760 |  |    |  |    |  |
|  |  |   |  | PATROL 760                |  | Cat.     |  | cat. C |  |    |  |    |  |
| Signature  |  | REV.  |  |                           |  | PAPER    |  | SCALE  |  |    |  |    |  |
| Design by  |  |  |  | Stability<br>calculations |  | R3       |  | A4     |  |    |  |    |  |
| Checked by   |  |   |  |                           |  | sheet    |  | 1      |  | of |  | 16 |  |
| Technic by   |  |   |  |                           |  |          |  |        |  |    |  |    |  |
| Approved by  |  | DATE  |  | 2018.07                   |  |          |  |        |  |    |  |    |  |

# CONTENT

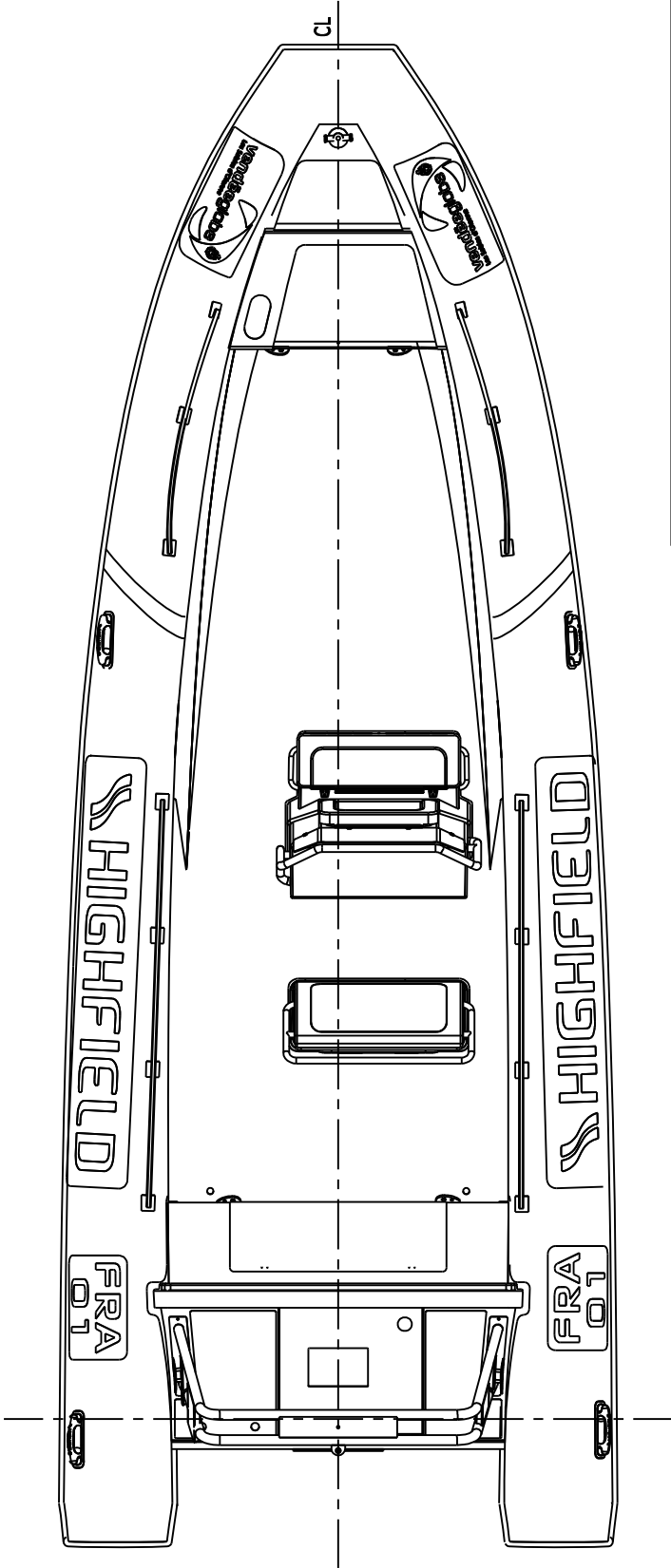
1. General Arrangement
2. Weight Estimation
3. Stability Calculation worksheet
4. Windage Area Calculation
5. Hydrostatics tables
6. Offset load test
7. Buoyancy Calculation
8. Crew area
9. Righting arm
- 10 Swamped Stability
11. Maximum power

PATROL760 CAT. C



SPECIFICATION

|                        |         |
|------------------------|---------|
| Loa                    | 7600mm  |
| Beam                   | 2830mm  |
| Draft                  | 442mm   |
| Lwl                    | 6703mm  |
| Inside Length          | 5920mm  |
| Inside Width           | 1630mm  |
| Weight                 | 875Kg   |
| Deadrise               | 24°     |
| Max Pax                | 12      |
| Max Load (incl. motor) | 1450Kg  |
| Recommended HP         | 200     |
| Max HP                 | 300     |
| Shaft                  | XL      |
| Tube                   | 56-40cm |
| Airtight Chambers      | 6       |
| Design category        | C       |



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|---|-----------|-------|---------------------|---------------|--|-----------------------|-------|-------|--|
| <div>DND</div> <div>DAWN YACHT DESIGN</div> |           |       |                     | Drawing Title |  | Project Name: PA760   |       |       |  |
|   |           |       |                     | PATROL 760    |  | Drawing NO.: 76-01-01 |       |       |  |
| Design by                                   | Signature | S.C/L | General Arrangement |               |  |                       | PAPER | SCALE |  |
| Checked by                                  |           |       |                     |               |  |                       | A3    | 1:25  |  |
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| Approved by                                 |           |       |                     |               |  | SHEET                 |       |       |  |
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## PA 760 Weight estimation CAT.C

**Loa(m) = 7,6m**

**Lh(m) = 7,6m**

**Bmax (m) =2,83m**

| HULL                 |              | weight | XG (m)      | YG(m)        | ZG(m)       | Mx             | My            | Mz            | NOTE |
|----------------------|--------------|--------|-------------|--------------|-------------|----------------|---------------|---------------|------|
| Hull Plates          |              | 260.0  | 2.84        | 0.00         | 0.36        | 739.18         | 0.00          | 93.60         |      |
| Structures           |              | 120.0  | 2.80        | 0.00         | 0.10        | 336.00         | 0.00          | 12.00         |      |
| Stiffeners           |              | 90.0   | 2.80        | 0.00         | 0.10        | 252.00         | 0.00          | 9.00          |      |
| Stern extension      |              | 50.0   | 0.25        | 0.00         | 0.65        | 12.50          | 0.00          | 32.50         |      |
| Inflatable tube      |              | 60.0   | 2.73        | 0.00         | 0.80        | 163.80         | 0.00          | 48.00         |      |
| Floor                |              | 50.0   | 2.95        | 0.00         | 0.42        | 147.50         | 0.00          | 21.00         |      |
| Bow step             |              | 50.0   | 5.75        | 0.00         | 0.80        | 287.50         | 0.00          | 40.00         |      |
| Console              |              | 40.0   | 2.93        | -0.20        | 0.85        | 117.20         | -8.00         | 34.00         |      |
| Console leaning post |              | 35.0   | 1.99        | -0.20        | 0.70        | 69.65          | -7.00         | 24.50         |      |
| Aft seat             |              | 35.0   | 0.75        | 0.00         | 0.55        | 26.25          | 0.00          | 19.25         |      |
| Stern arch           |              | 40.0   | 0.10        | 0.00         | 1.50        | 4.00           | 0.00          | 60.00         |      |
| deck                 |              | 30.0   | 2.80        | 0.00         | 0.42        | 84.00          | 0.00          | 12.60         |      |
| Bow cleat            |              | 5.0    | 6.47        | 0.00         | 1.00        | 32.35          | 0.00          | 5.00          |      |
| Grab handles         |              | 5.0    | 3.60        | 0.00         | 0.96        | 18.00          | 0.00          | 4.80          |      |
| Ladder               |              | 5.0    | 0.00        | 0.00         | 0.60        | 0.00           | 0.00          | 3.00          |      |
| <b>TOT.</b>          | <b>875.0</b> |        | <b>2.62</b> | <b>-0.02</b> | <b>0.48</b> | <b>2289.93</b> | <b>-15.00</b> | <b>419.25</b> |      |

| Fixed MACHINERY |             |      |             |             |             |              |             |              |  |
|-----------------|-------------|------|-------------|-------------|-------------|--------------|-------------|--------------|--|
| Steering system |             | 15.0 | 2.00        | 0.00        | 0.70        | 30.00        | 0.00        | 10.50        |  |
| Start battery   |             | 20.5 | 0.80        | -0.50       | 0.85        | 16.40        | -10.25      | 17.43        |  |
| Cables          |             | 22.0 | 2.00        | 0.50        | 0.20        | 44.00        | 11.00       | 4.40         |  |
| <b>TOT.</b>     | <b>57.5</b> |      | <b>1.57</b> | <b>0.01</b> | <b>0.56</b> | <b>90.40</b> | <b>0.75</b> | <b>32.33</b> |  |

|                  |  |       |      |       |      |         |        |        |  |
|------------------|--|-------|------|-------|------|---------|--------|--------|--|
| Tot. Empty Craft |  | 932.5 | 2.55 | -0.02 | 0.48 | 2380.33 | -14.25 | 451.58 |  |
|------------------|--|-------|------|-------|------|---------|--------|--------|--|

| Standard Equipment |              |       |              |             |             |               |              |               |       |
|--------------------|--------------|-------|--------------|-------------|-------------|---------------|--------------|---------------|-------|
| Outboard           |              | 312.5 | -0.22        | 0.00        | 0.85        | -70.00        | 0.00         | 265.63        | 300HP |
| Dry bag            |              | 1.0   | 2.80         | -0.20       | 0.77        | 2.80          | -0.20        | 0.77          |       |
| Foot pump          |              | 2.0   | 2.80         | 0.00        | 0.50        | 5.60          | 0.00         | 1.00          |       |
| Paddles            |              | 4.0   | 0.50         | 0.00        | 0.45        | 2.00          | 0.00         | 1.80          |       |
| Repair kit         |              | 2.0   | 0.50         | 0.00        | 0.50        | 1.00          | 0.00         | 1.00          |       |
| <b>TOT.</b>        | <b>321.5</b> |       | <b>-0.18</b> | <b>0.00</b> | <b>0.84</b> | <b>-58.60</b> | <b>-0.20</b> | <b>270.20</b> |       |

| Additional eq.                   |             |      |             |             |             |               |              |              |  |
|----------------------------------|-------------|------|-------------|-------------|-------------|---------------|--------------|--------------|--|
| LIFEJACKETS                      |             | 10.0 | 3.00        | 0.00        | 0.80        | 30.00         | 0.00         | 8.00         |  |
| SAFETY EQUIPMENT IN DASHBOARD    |             | 5.0  | 2.80        | -0.20       | 1.00        | 14.00         | -1.00        | 5.00         |  |
| Others non in standard equipment |             | 25.0 | 2.80        | 0.50        | 0.60        | 70.00         | 12.50        | 15.00        |  |
| <b>TOT. Addition</b>             | <b>40.0</b> |      | <b>2.85</b> | <b>0.29</b> | <b>0.70</b> | <b>114.00</b> | <b>11.50</b> | <b>28.00</b> |  |

|          |  |       |      |      |      |        |      |       |  |
|----------|--|-------|------|------|------|--------|------|-------|--|
| Liferaft |  | 103.0 | 5.70 | 0.00 | 0.90 | 587.10 | 0.00 | 92.70 |  |
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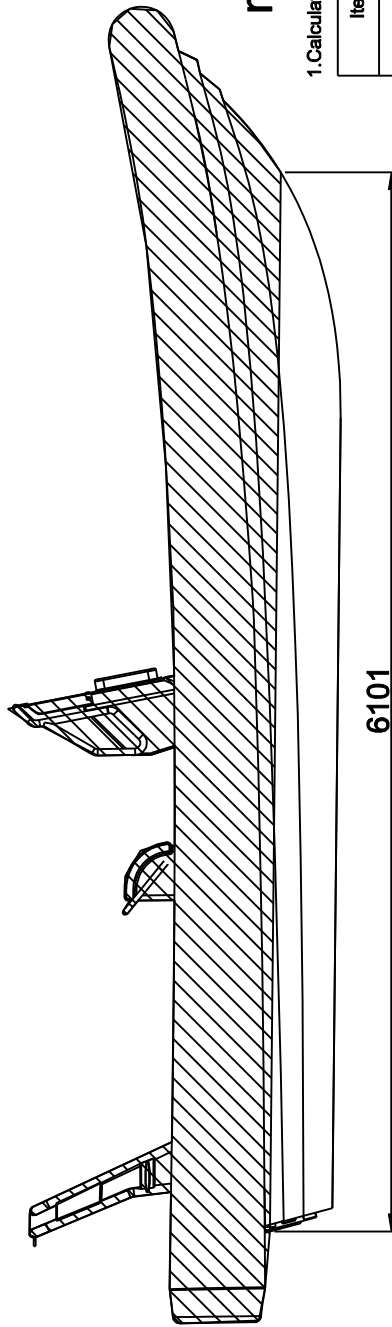
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|-----------------------------|------------------|--------|------|-----------|------|---------|---------|---------|--|
| Minimum Operating condition | Tot.             | 1472.0 | 2.18 | -0.01     | 0.63 | 3202.83 | -21.70  | 925.72  |  |
| 0.05                        |                  |        |      |           |      |         |         |         |  |
| 0.68                        |                  |        |      |           |      |         |         |         |  |
| FULL LOAD                   |                  |        |      |           |      |         |         |         |  |
|                             | light craft      | 1254.0 | 1.85 | -0.01     | 0.58 | 2321.73 | -14.45  | 721.77  |  |
| 285                         | FUEL             | 203.1  | 2.90 | 0.00      | 0.27 | 588.07  | 0.00    | 54.83   |  |
| 15                          | drinking water   | 14.3   | 2.80 | 0.00      | 0.55 | 39.90   | 0.00    | 7.84    |  |
|                             | personal prov.   | 60.0   | 2.80 | 0.00      | 0.80 | 168.00  | 0.00    | 48.00   |  |
|                             | additonal eq     | 40.0   | 2.85 | 0.29      | 0.70 | 114.00  | 11.50   | 28.00   |  |
|                             | life raft        | 103.0  | 5.70 | 0.00      | 0.90 | 587.10  | 0.00    | 92.70   |  |
| 12                          | passengers+crews | 900.0  | 2.63 | 0.00      | 1.10 | 2367.00 | 0.00    | 990.00  |  |
|                             |                  |        |      |           |      |         |         |         |  |
| FULL LOAD                   | Tot.             | 2574.3 | 2.40 | 0.00      | 0.75 | 6185.80 | -2.95   | 1943.13 |  |
|                             |                  |        |      |           | 0.05 |         |         |         |  |
| 0.80                        |                  |        |      |           |      |         |         |         |  |
| Loaded Arrival              |                  |        |      |           |      |         |         |         |  |
|                             | light craft      | 1254.0 | 1.85 | -0.01     | 0.58 | 2321.73 | -14.45  | 721.77  |  |
| 285                         | FUEL             | 21.4   | 2.90 | 0.00      | 0.27 | 61.90   | 0.00    | 5.77    |  |
| 15                          | drinking water   | 1.5    | 2.80 | 0.00      | 0.55 | 4.20    | 0.00    | 0.83    |  |
|                             | personal prov.   | 60.0   | 2.80 | 0.00      | 0.80 | 168.00  | 0.00    | 48.00   |  |
|                             | additonal eq     | 40.0   | 2.85 | 0.29      | 0.70 | 114.00  | 11.50   | 28.00   |  |
|                             | life raft        | 103.0  | 5.70 | 0.00      | 0.90 | 587.10  | 0.00    | 92.70   |  |
| 12                          | passengers+crews | 900.0  | 2.63 | 0.00      | 1.10 | 2367.00 | 0.00    | 990.00  |  |
|                             |                  |        |      |           |      |         |         |         |  |
| Loaded Arrival              | Tot.             | 2379.9 | 2.36 | 0.00      | 0.79 | 5623.93 | -2.95   | 1887.07 |  |
|                             |                  |        |      |           | 0.05 |         |         |         |  |
| 0.84                        |                  |        |      |           |      |         |         |         |  |
| Crews                       | crew no.         |        |      |           |      |         |         |         |  |
|                             | 1.0              | 85.0   | 1.34 | -0.86     | 1.10 | 113.99  | -73.19  | 93.50   |  |
|                             | 2.0              | 85.0   | 2.44 | -0.86     | 1.10 | 207.15  | -73.19  | 93.50   |  |
|                             | 3.0              | 85.0   | 3.69 | -0.77     | 1.10 | 313.40  | -65.71  | 93.50   |  |
|                             | 4.0              | 85.0   | 4.19 | -0.72     | 1.10 | 356.41  | -61.03  | 93.50   |  |
|                             | 5.0              | 85.0   | 4.69 | -0.63     | 1.10 | 398.65  | -53.47  | 93.50   |  |
|                             | 6.0              | 85.0   | 5.20 | -0.53     | 1.10 | 441.75  | -44.88  | 93.50   |  |
|                             | 7.0              | 85.0   | 5.77 | -0.44     | 1.10 | 490.03  | -37.74  | 93.50   |  |
|                             | 8.0              | 85.0   | 0.98 | -0.42     | 1.10 | 83.47   | -35.53  | 93.50   |  |
|                             | 9.0              | 85.0   | 1.54 | -0.40     | 1.10 | 131.24  | -34.17  | 93.50   |  |
|                             | 10.0             | 85.0   | 2.40 | -0.35     | 1.10 | 204.26  | -29.58  | 93.50   |  |
|                             | 11.0             | 85.0   | 3.88 | -0.32     | 1.10 | 330.14  | -27.12  | 93.50   |  |
|                             | 12.0             | 85.0   | 4.39 | -0.26     | 1.10 | 373.15  | -22.44  | 93.50   |  |
| Tot. Crews                  |                  | 1020.0 | 3.38 | -0.55     | 1.10 | 3443.61 | -558.03 | 1122.00 |  |
|                             |                  |        |      |           |      |         |         |         |  |
| Crew offset test condition  |                  |        |      |           |      |         |         |         |  |
|                             | light craft      | 1254.0 | 2    | 0         | 1    | 2322    | -14     | 722     |  |
| 285                         | FUEL             | 203.1  | 2.90 | 0.00      | 0.27 | 588.07  | 0.00    | 54.83   |  |
| 15                          | drinking water   | 14.3   | 2.80 | 0.00      | 0.55 | 39.90   | 0.00    | 7.84    |  |
|                             | personal prov.   | 60.0   | 2.80 | 0.00      | 0.80 | 168.00  | 0.00    | 48.00   |  |
|                             | additonal eq     | 40.0   | 2.85 | 0.29      | 0.70 | 114.00  | 11.50   | 28.00   |  |
|                             | life raft        | 103.0  | 5.70 | 0.00      | 0.90 | 309.00  | 0.00    | 56.65   |  |
| 12                          | passengers+crews | 1020.0 | 3.38 | -0.55     | 1.10 | 3443.61 | -558.03 | 1122.00 |  |
|                             |                  |        |      |           |      |         |         |         |  |
| Crew offset test condition  | Tot.             | 2694.3 | 2.59 | -0.21     | 0.76 | 6984.30 | -560.98 | 2039.08 |  |
|                             |                  |        |      | additonal | 0.05 |         |         |         |  |
|                             | Tot.             | 2694.3 | 2.59 | -0.21     | 0.80 | 6984.30 | -560.98 | 2039.08 |  |

**ISO 12217-1 NON-SAILING BOATS OF LENGTH GREATER THAN OR EQUAL TO 6m  
CALCULATION WORKSHEET No. 1**

Weihai Haifei Marine Ltd. PATROL 760

| Design Category intended: <b>C</b>   |                 | Monohull / multihull: <b>Monohull</b> |        |                |
|--|-----------------|---------------------------------------|--------|----------------|
| Item   | Symbol          | Unit                                  | Value  | Ref.           |
| Length of hull as in ISO 8666  | $L_H$           | m                                     | 7.60   | 3.3.1          |
| Length of waterline in loaded arrival condition  | $L_{wl}$        | m                                     | 6.29   | 3.3.2          |
| <u>Empty Craft condition mass</u>  | $m_{EC}$        | kg                                    | 932.5  | 3.4.1          |
| standard equipment   |                 | kg                                    | 321.5  | 3.5.12         |
| water ballast in tanks which are notified in the owner's manual to be filled when the boat is afloat |                 | kg                                    | 0.0    | 3.4.2          |
| Light craft condition mass   | $m_{LC}$        | kg                                    | 1254.0 | 3.4.2          |
| <b>Mass of:</b>  |                 |                                       |        |                |
| Desired crew limit   | CL              | ----                                  | 12     | 3.5.3          |
| Mass of:   |                 |                                       |        |                |
| desired crew limit at 75 kg each   |                 | kg                                    | 900.0  |                |
| provisions + personal effects  |                 | kg                                    | 60.0   | 3.4.4          |
| drinking water   |                 | kg                                    | 14.3   | 3.4.4          |
| fuel   |                 | kg                                    | 203.1  | 3.4.4          |
| lubricating and hydraulic oils   |                 | kg                                    | 0.0    | 3.4.4          |
| black water  |                 | kg                                    | 0.0    | 3.4.4          |
| grey water   |                 | kg                                    | 0.0    | 3.4.4          |
| water ballast  |                 | kg                                    | 0.0    | 3.4.4          |
| other fluids carried aboard  |                 | kg                                    | 0.0    | 3.4.4          |
| stores, spare gear and cargo (if any)  |                 | kg                                    | 0.0    | 3.4.4          |
| optional equipment and fittings not included in basic outfit   |                 | kg                                    | 40.0   | 3.4.4          |
| inflatable life raft(s) in excess of essential safety equipment                                      |                 | kg                                    | 103.0  | 3.4.4          |
| other small boats carried aboard   |                 | kg                                    | 0.0    | 3.4.4          |
| margin for future additions  |                 | kg                                    | 0.0    | 3.4.4          |
| Maximum load = sum of above masses   | $m_L$           | kg                                    | 1320.3 | 3.4.4          |
| <u>Maximum Load condition mass</u>   | $m_{LDC}$       | kg                                    | 2574.3 | 3.4.5          |
| mass to be removed for loaded arrival condition  |                 | kg                                    | 194.4  | 3.4.6          |
| <u>Loaded Arrival condition mass</u>   | $m_{LA}$        | kg                                    | 2379.9 | 3.4.6          |
| Mass of:   |                 |                                       |        |                |
| minimum number of crew according to 3.4.3  |                 | kg                                    | 75.0   | 3.4.3a)        |
| non-consumable stores and equipment normally aboard  |                 | kg                                    | 40.0   | 3.4.3b)        |
| inflatable life raft   |                 | kg                                    | 103.0  | 3.4.3          |
| Load to be included in Minimum Operating Condition   | $m'_L$          | kg                                    | 218.0  | 3.4.3          |
| <u>Light craft condition mass</u>  | $m_{LC}$        | kg                                    | 1254.0 | 3.4.2          |
| Mass in the Minimum Operating Condition  | $m_{MO}$        | kg                                    | 1472.0 | 3.4.3          |
| <b>Is boat sail or non-sail?</b>   |                 |                                       |        | 3.1.2          |
| nominal sail area  | $A_S$           | m <sup>2</sup>                        | 0.0    | 3.3.8          |
| sail area / displacement ratio = $A_S / (m_{LDC})^{2/3}$   |                 | -----                                 | 0.0000 | 3.1.2          |
| CLASSIFIED AS [non-sail if $A_S / (m_{LDC})^{2/3} < 0.07$ ]  | SAIL/NON-SAIL ? |                                       |        | NON-SAIL 3.1.2 |

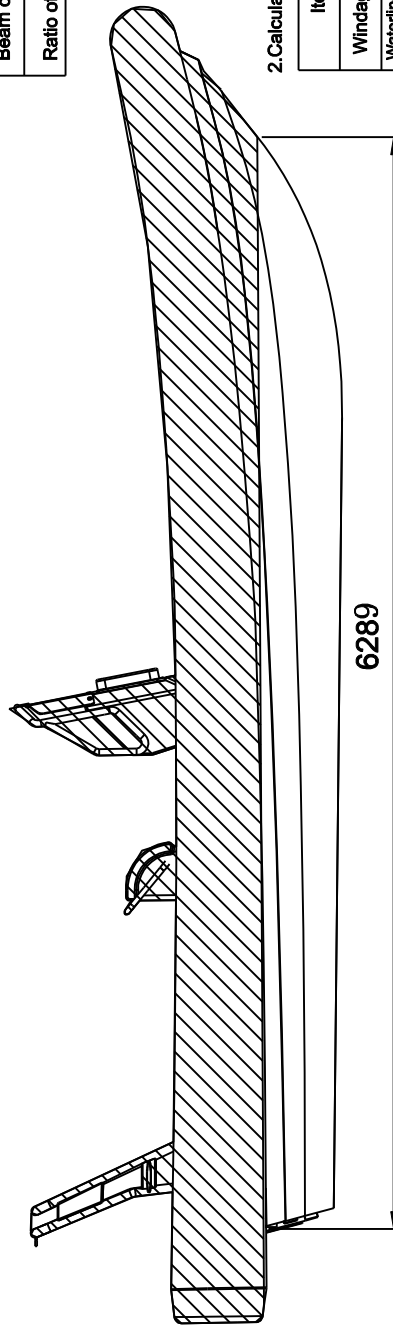
NB If NON SAIL, continue using these worksheets, if SAIL, use ISO 12217-2



mMo

1. Calculation AT mMo

| Item                                | Symbol   | Unit  | Value              |
|-------------------------------------|----------|-------|--------------------|
| Windage area                        | $A_{LV}$ | $m^2$ | 5.10               |
| Waterline length of hull            | $L_{WL}$ | m     | 6.10               |
| Beam of hull                        | $B_H$    | m     | 2.83               |
| Ratio of $A_{LV}/(0.5L_{WL} * B_H)$ |          | -     | $\approx 0.59 < 1$ |



mLA

2. Calculation AT mLA

| Item                                | Symbol   | Unit  | Value             |
|-------------------------------------|----------|-------|-------------------|
| Windage area                        | $A_{LV}$ | $m^2$ | 4.45              |
| Waterline length of hull            | $L_{WL}$ | m     | 6.29              |
| Beam of hull                        | $B_H$    | m     | 2.83              |
| Ratio of $A_{LV}/(0.5L_{WL} * B_H)$ |          | -     | $\approx 0.5 < 1$ |

DND

DAWN YACHT DESIGN

|             |           |  |  |
|-------------|-----------|--|--|
| Design by   | Signature |  |  |
| Checked by  | S.C       |  |  |
| Reviewed by |           |  |  |
| Approved by |           |  |  |

DATE 2018.07

Drawing Title

Project Name: PA760

PATROL 760

Drawing NO.: 76-01-04

Windage Area Calculation

|       |        |
|-------|--------|
| PAPER | SCALE  |
| A3    | 1:30   |
| SHEET | 1 of 1 |

|               |  |
|---------------|--|
| VERSION No.   |  |
| UPDATING DATE |  |
|               |  |
|               |  |
|               |  |
|               |  |

PATROL760 Hydrostatic tables

| Draft<br>mm | Displ.<br>kg | LCB<br>mm | TCB<br>mm | VCB<br>mm | Wet Area<br>m² | Awp<br>m² | LCF<br>mm | TCF<br>mm | VCF<br>mm | BMT<br>mm | BML<br>mm | Cb   | Cwp  | Cws  | Cvp  |
|-------------|--------------|-----------|-----------|-----------|----------------|-----------|-----------|-----------|-----------|-----------|-----------|------|------|------|------|
| 0           | 0.00         | 4588.46   | 0.00      | -0.06     | 0.00           | 0.00      | 4586.37   | 0.00      | 0.00      | 44.71     | 4288.10   | 0.47 | 0.94 | 8.72 | 0.50 |
| 100         | 86.41        | 2379.68   | -0.04     | 69.67     | 2.04           | 1.79      | 2304.67   | -0.01     | 100.00    | 234.17    | 43282.74  | 0.37 | 0.78 | 3.03 | 0.47 |
| 200         | 361.21       | 2350.25   | -0.01     | 135.02    | 4.22           | 3.58      | 2365.88   | 0.01      | 200.00    | 414.36    | 22739.53  | 0.37 | 0.75 | 2.97 | 0.49 |
| 250         | 579.07       | 2334.16   | -0.01     | 169.45    | 5.92           | 5.03      | 2268.49   | -0.01     | 250.00    | 769.98    | 20095.21  | 0.31 | 0.70 | 3.26 | 0.45 |
| 300         | 869.21       | 2322.82   | -0.01     | 204.97    | 7.37           | 6.23      | 2327.94   | -0.02     | 300.00    | 908.98    | 16855.46  | 0.32 | 0.71 | 3.29 | 0.45 |
| 350         | 1217.98      | 2326.20   | -0.01     | 239.56    | 8.93           | 7.49      | 2308.35   | -0.02     | 350.00    | 1137.91   | 15412.79  | 0.29 | 0.64 | 3.33 | 0.45 |
| 360         | 1296.27      | 2325.04   | -0.01     | 246.54    | 9.27           | 7.76      | 2307.78   | -0.01     | 360.00    | 1184.53   | 15023.69  | 0.30 | 0.66 | 3.35 | 0.45 |
| 370         | 1377.18      | 2324.23   | -0.01     | 253.50    | 9.59           | 8.01      | 2315.67   | -0.01     | 370.00    | 1210.19   | 14565.67  | 0.31 | 0.68 | 3.36 | 0.45 |
| 380         | 1460.44      | 2324.08   | -0.01     | 260.43    | 9.88           | 8.22      | 2328.62   | -0.01     | 380.00    | 1221.00   | 14098.55  | 0.32 | 0.69 | 3.35 | 0.46 |
| 390         | 1545.85      | 2324.76   | -0.01     | 267.31    | 10.16          | 8.42      | 2344.58   | -0.01     | 390.00    | 1221.27   | 13649.95  | 0.32 | 0.71 | 3.35 | 0.46 |
| 400         | 1633.21      | 2326.28   | -0.01     | 274.14    | 10.43          | 8.61      | 2362.31   | -0.01     | 400.00    | 1214.17   | 13232.12  | 0.33 | 0.72 | 3.34 | 0.46 |
| 420         | 1813.23      | 2331.68   | -0.01     | 287.63    | 10.93          | 8.93      | 2399.10   | 0.00      | 420.00    | 1185.98   | 12485.55  | 0.35 | 0.74 | 3.31 | 0.47 |
| 430         | 1905.65      | 2335.39   | -0.01     | 294.30    | 11.16          | 9.08      | 2417.33   | 0.00      | 430.00    | 1167.82   | 12154.86  | 0.35 | 0.74 | 3.29 | 0.48 |
| 440         | 1999.80      | 2339.31   | -0.01     | 300.92    | 11.51          | 9.34      | 2401.51   | -0.01     | 440.00    | 1226.17   | 12259.71  | 0.29 | 0.60 | 3.21 | 0.47 |
| 450         | 2098.18      | 2340.76   | -0.01     | 307.68    | 12.11          | 9.84      | 2343.15   | -0.02     | 450.00    | 1425.62   | 12701.75  | 0.28 | 0.61 | 3.27 | 0.46 |
| 460         | 2201.73      | 2339.85   | -0.01     | 314.61    | 12.71          | 10.34     | 2302.65   | 0.01      | 460.00    | 1608.13   | 12880.28  | 0.28 | 0.62 | 3.34 | 0.45 |
| 470         | 2310.32      | 2337.49   | -0.01     | 321.68    | 13.30          | 10.82     | 2279.80   | 0.01      | 470.00    | 1756.73   | 12872.23  | 0.28 | 0.64 | 3.40 | 0.44 |
| 480         | 2423.57      | 2334.57   | -0.01     | 328.85    | 13.84          | 11.25     | 2272.46   | 0.01      | 480.00    | 1867.67   | 12734.41  | 0.28 | 0.65 | 3.45 | 0.44 |
| 490         | 2541.04      | 2331.71   | -0.01     | 336.07    | 14.35          | 11.65     | 2274.19   | 0.01      | 490.00    | 1951.14   | 12554.31  | 0.29 | 0.66 | 3.49 | 0.43 |
| 500         | 2662.47      | 2329.26   | -0.01     | 343.32    | 14.83          | 12.02     | 2282.57   | 0.02      | 500.00    | 2013.64   | 12358.60  | 0.29 | 0.68 | 3.52 | 0.43 |
| 550         | 3318.84      | 2325.14   | -0.01     | 379.34    | 16.85          | 13.48     | 2335.49   | 0.00      | 550.00    | 2066.72   | 11472.74  | 0.32 | 0.73 | 3.57 | 0.44 |
| 600         | 3947.02      | 2358.29   | 0.04      | 410.31    | 22.47          | 10.65     | 2704.63   | 0.78      | 600.00    | 1739.94   | 9456.64   | 0.34 | 0.56 | 4.34 | 0.60 |
| 700         | 4950.74      | 2440.95   | 0.38      | 458.63    | 28.97          | 8.89      | 2816.97   | 2.44      | 700.00    | 1486.75   | 7854.09   | 0.35 | 0.45 | 4.95 | 0.78 |



# PA760 Offset load test -cat. C

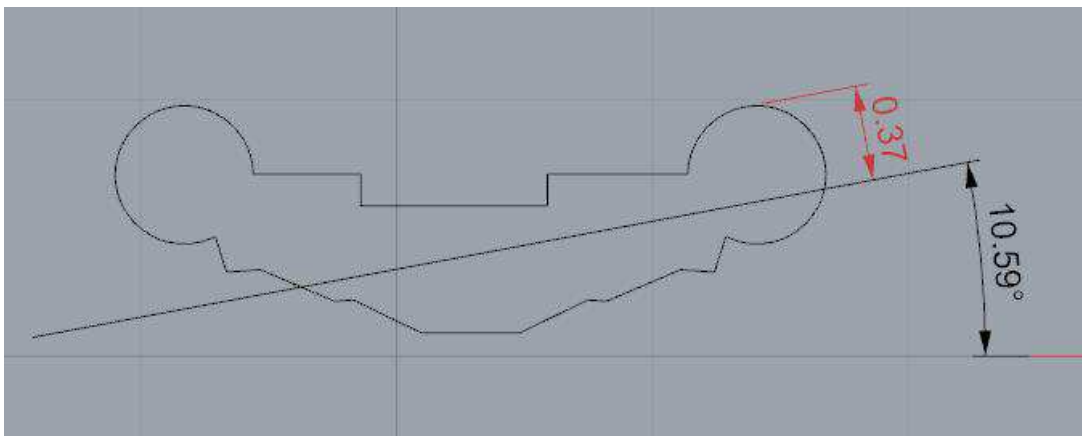
## 1.General

|                       |          |                   |
|-----------------------|----------|-------------------|
| Length Overall, LOA   | 7.600    | m                 |
| $L_H =$               | 7.600    | m                 |
| Beam Overall, Boa     | 2.830    | m                 |
| Depth Overall, D      | 1.330    | m                 |
| Waterline Length, Lwl | 6.935    | m                 |
| Waterline Beam, Bwl   | 2.102    | m                 |
| Navigational Draft, T | 0.517    | m                 |
| Displacement Weight   | 2694.300 | kgf               |
| Volume                | 2.602    | m <sup>3</sup>    |
| LCG                   | 2.590    | m                 |
| TCG                   | 0.210    | m                 |
| VCG                   | 0.800    | m                 |
| Fluid Density         | 1025.000 | kg/m <sup>3</sup> |
| LCB                   | 2.626    | m                 |
| TCB                   | 0.290    | m                 |
| VCB                   | 0.374    | m                 |
| Wetted Surface Area   | 14.947   | m <sup>2</sup>    |
| Waterplane Area, Awp  | 11.139   | m <sup>2</sup>    |
| LCF                   | 2.630    | m                 |
| TCF                   | 0.317    | m                 |
| Weight To Immerse     | 114.273  | kgf/cm            |
| Cb                    | 0.349    |                   |
| Cvp                   | 0.456    |                   |
| Cwp                   | 0.764    |                   |
| Cws                   | 3.502    |                   |
| I(transverse)         | 3.629    | m <sup>4</sup>    |
| I(longitudinal)       | 33.177   | m <sup>4</sup>    |
| BMt                   | 1.382    | m                 |
| BMI                   | 12.633   | m                 |
| GMt                   | 0.948    | m                 |
| GMI                   | 12.199   | m                 |
| Mt                    | 1.237    | m                 |
| MI                    | 12.488   | m                 |

## 2.Heel angle requirement

During the test , the heel angle  $\Phi_o$  shall be not greater than

$$11.5 + \frac{(24 - L_H)^3}{520} \quad 19.98^\circ$$

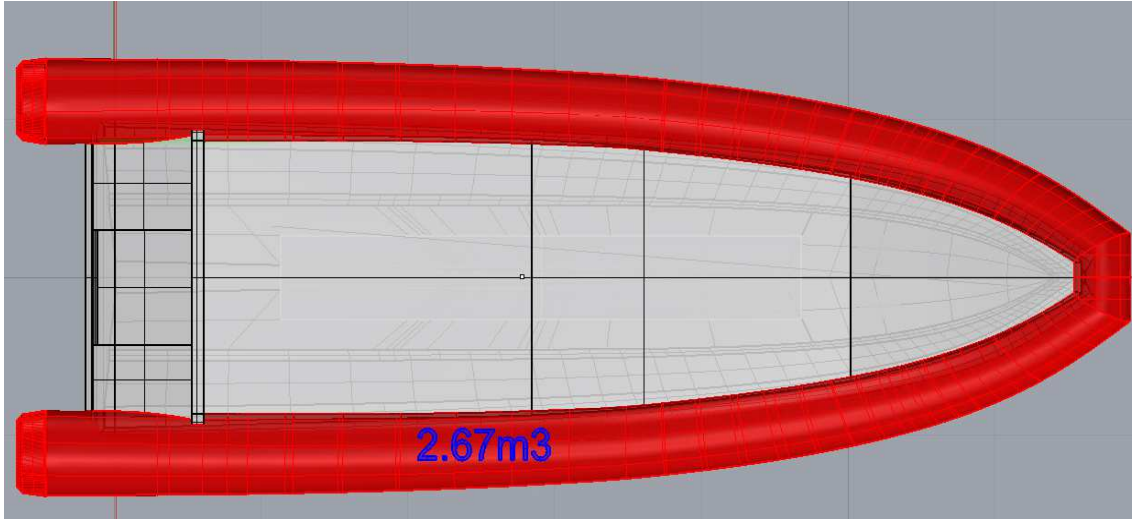


As shown from the graph , the real heel angle  $\Phi_o =$  10.59° < 19.98°

**Result: PASS**

# PA 760 Buoyancy

Inflatable Buoyancy tube: 2.67 m<sup>3</sup> (3.5)



Inherent buoyancy of the rigid parts of the boat:

0.324 m<sup>3</sup>

0.104 m<sup>3</sup>

0.428 m<sup>3</sup>

Aluminium mass: 875 Kg

outboard engine mass: 312.5 Kg

**Table 4 — Material densities**

| Material         | Density<br>kg/m <sup>3</sup> |
|------------------|------------------------------|
| Aluminium alloys | 2 700                        |

$$v = \frac{m}{\rho}$$

$v$  is the volume of an element, expressed in m<sup>3</sup>;  
 $m$  is the mass of that element, expressed in kg;  
 $\rho$  is the density of that element, expressed in kg/m<sup>3</sup>, as given in [Table 4](#).

**TOTAL BUOYANCY:** 3.098 m<sup>3</sup>

The total buoyant volume in m<sup>3</sup> ( $V$ ) shall be as follows:

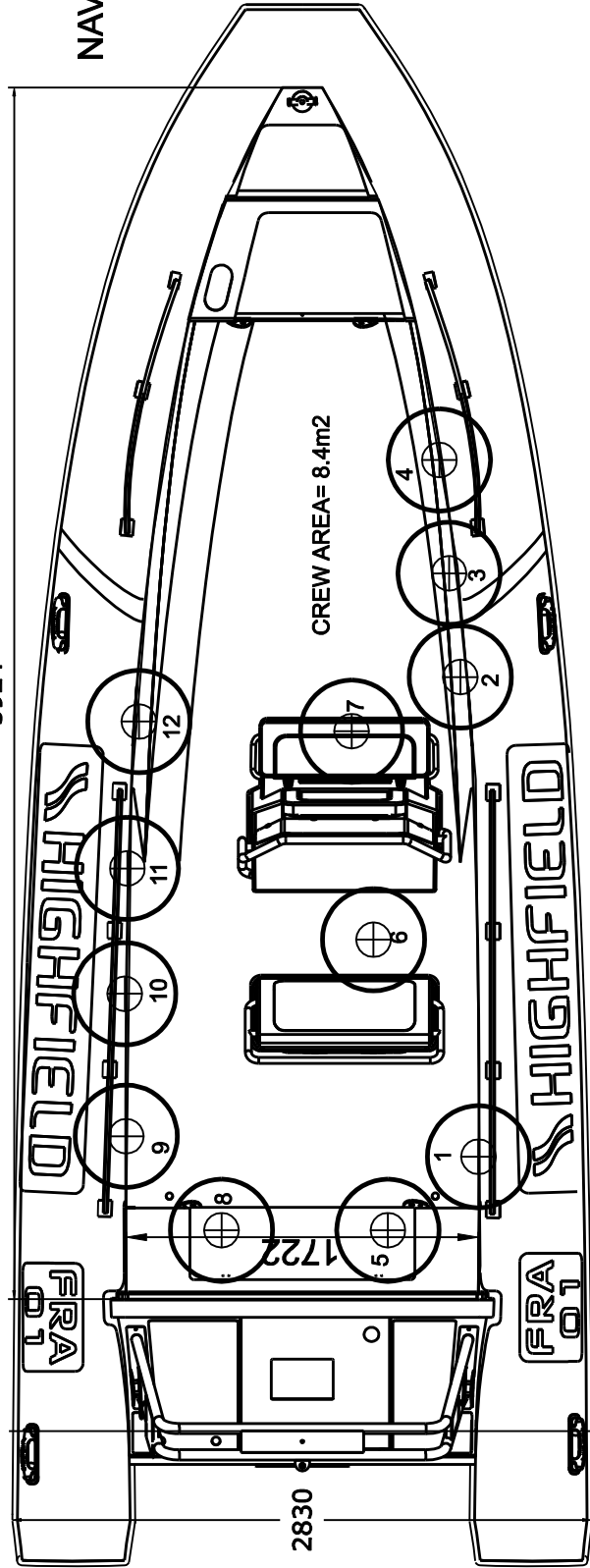
$$V > \frac{k \times m_{LDC}}{1\,000}$$

Where  $k$  is:

- 1,33 for boats assessed to design category B;
- 1,2 for boats assessed to design category C;

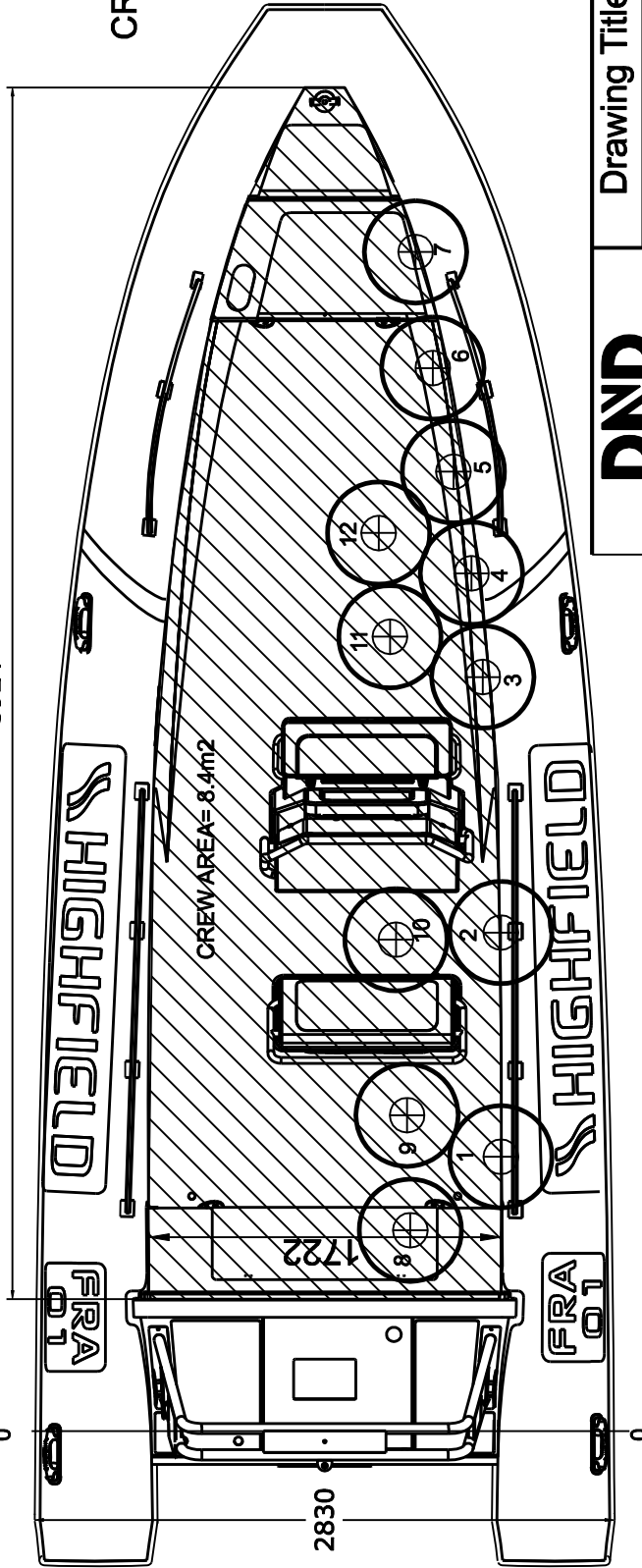
cat C      mLDC= 2574.3 Kg      1, 2xmLDC/1000=      3.089      <      3.098  
OK

5924



CREW OFFSET TEST

5924



SPECIFICATION

Crew Area 8.4 m<sup>2</sup>

Max Pax 12

**DND**

DAWN YACHT DESIGN

Drawing Title

PATROL 760

Project Name: PA760

Drawing NO.: PA76-01-08

Crew Area

|       |        |
|-------|--------|
| PAPER | SCALE  |
| A3    | 1:25   |
| SHEET | 1 of 1 |

|             |         |
|-------------|---------|
| Signature   |         |
| Design by   | S.C/L   |
| Checked by  |         |
| Revised by  |         |
| Approved by |         |
| DATE        | 2017.06 |

# PA760 Righting Arm (Minimum operating)-cat. C

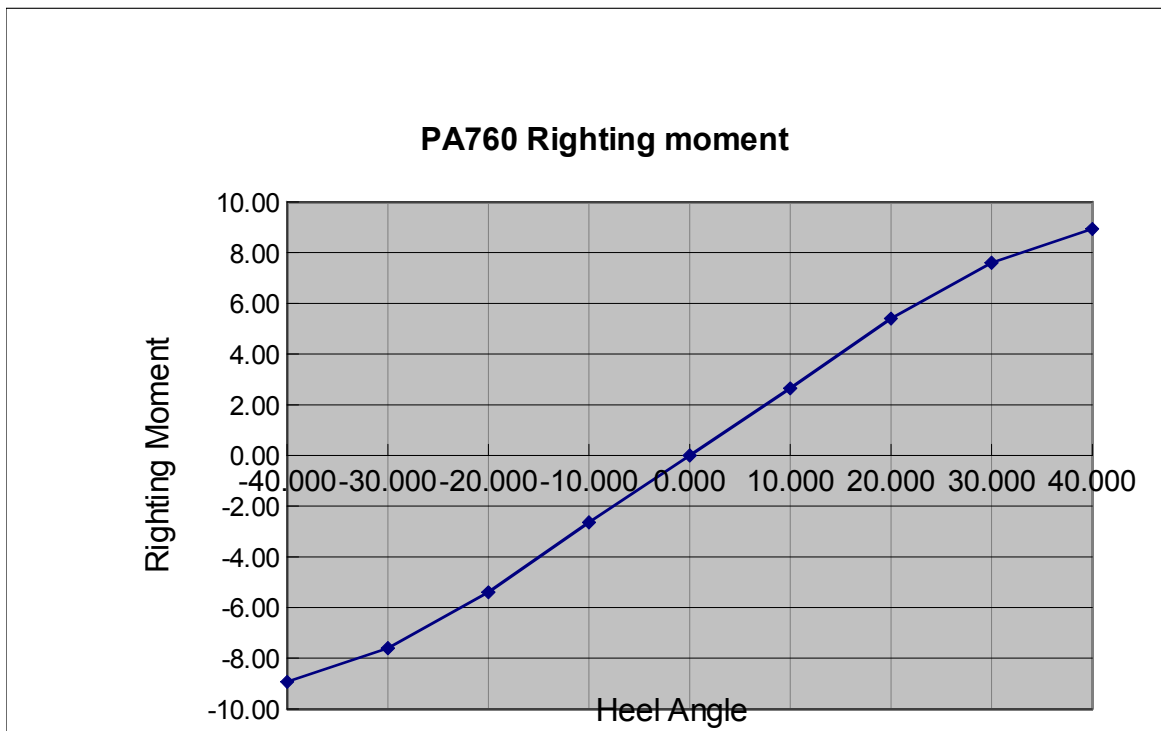
## 1.General

$L_{OA}$ = 7.6 m  
 $L_H$ = 7.6 m  
Displacement= 1472 Kg  
Design Category C  
Condition Minimum Operating

## 2.Righting arm

The righting moment curve and Heeling moment curve plot on the same graph , as below:

| Heel(deg) | Trim(deg) | Righting Arm (m) | Righting Moment (N*m) |  |
|-----------|-----------|------------------|-----------------------|--|
| -40.000   | 1.79      | -0.62            | -8.94                 |  |
| -30.000   | 1.30      | -0.53            | -7.60                 |  |
| -20.000   | 0.70      | -0.37            | -5.40                 |  |
| -10.000   | -0.08     | -0.18            | -2.64                 |  |
| 0.000     | -0.62     | 0.00             | 0.00                  |  |
| 10.000    | -0.08     | 0.18             | 2.64                  |  |
| 20.000    | 0.69      | 0.37             | 5.40                  |  |
| 30.000    | 1.29      | 0.53             | 7.60                  |  |
| 40.000    | 1.79      | 0.62             | 8.94                  |  |



# PA760 Righting Arm (Loaded Arrival)-cat. C

## 1.General

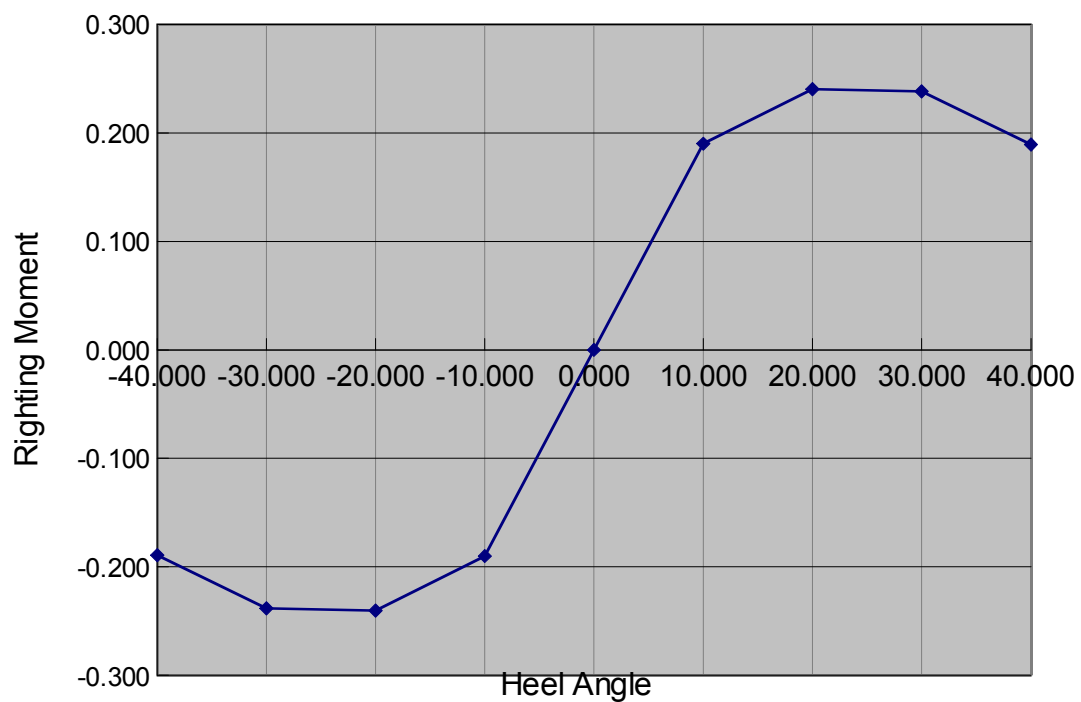
$L_{OA}$ = 7.6 m  
 $L_H$ = 7.6 m  
Displacement= 2379.9 Kg  
Design Category C  
Condition Loaded Arrival

## 2.Righting arm

The righting moment curve and Heeling moment curve plot on the same graph , as below:

| Heel(deg) | Trim(deg) | Righting Arm (m) | Righting Moment (N*m) |  |
|-----------|-----------|------------------|-----------------------|--|
| -40.000   | 1.625     | -0.379           | -0.189                |  |
| -30.000   | 1.408     | -0.382           | -0.238                |  |
| -20.000   | 0.999     | -0.320           | -0.240                |  |
| -10.000   | 0.542     | -0.192           | -0.190                |  |
| 0.000     | 0.112     | 0.000            | 0.000                 |  |
| 10.000    | 0.541     | 0.192            | 0.190                 |  |
| 20.000    | 0.999     | 0.320            | 0.240                 |  |
| 30.000    | 1.408     | 0.382            | 0.238                 |  |
| 40.000    | 1.625     | 0.379            | 0.189                 |  |

PA760 Righting moment



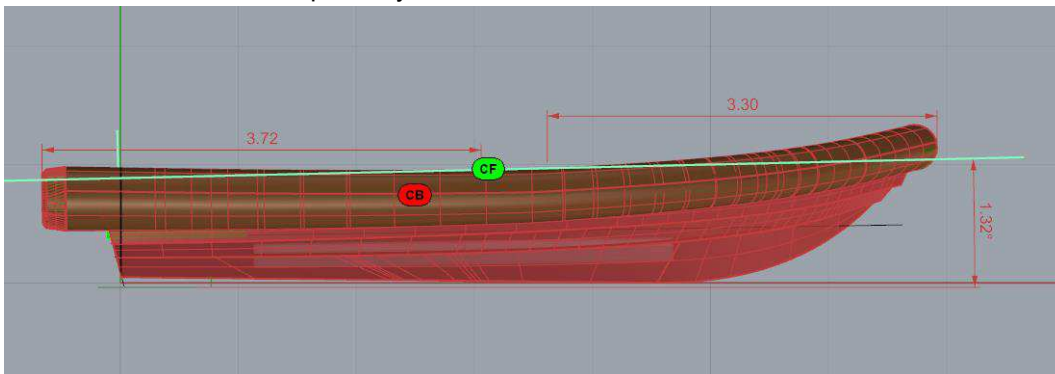
# PA760 Swamped stability

## 1.General

|                       |          |                   |
|-----------------------|----------|-------------------|
| Length Overall, LOA   | 7.600    | m                 |
| $L_H =$               | 7.600    | m                 |
| Beam Overall, Boa     | 2.830    | m                 |
| Depth Overall, D      | 1.330    | m                 |
| Waterline Length, Lwl | 7.555    | m                 |
| Waterline Beam, Bwl   | 2.786    | m                 |
| Navigational Draft, T | 0.902    | m                 |
| Displacement Weight   | 2416.000 | kgf               |
| Volume                | 2.676    | m <sup>3</sup>    |
| LCG                   | 2.500    | m                 |
| TCG                   | 0.000    | m                 |
| VCG                   | 0.800    | m                 |
| Fluid Density         | 1025.000 | kg/m <sup>3</sup> |
| LCB                   | 2.501    | m                 |
| TCB                   | 0.000    | m                 |
| VCB                   | 0.739    | m                 |
| Wetted Surface Area   | 17.714   | m <sup>2</sup>    |
| Waterplane Area, Awp  | 4.180    | m <sup>2</sup>    |
| LCF                   | 3.115    | m                 |
| TCF                   | 0.000    | m                 |
| Weight To Immerse     | 42.883   | kgf/cm            |
| Cb                    | 0.248    |                   |
| Cvp                   | 1.199    |                   |
| Cwp                   | 0.207    |                   |
| Cws                   | 4.200    |                   |
| I(transverse)         | 3.727    | m <sup>4</sup>    |
| I(longitudinal)       | 26.764   | m <sup>4</sup>    |
| BMt                   | 1.582    | m                 |
| BMI                   | 11.365   | m                 |
| GMt                   | 1.522    | m                 |
| GMI                   | 11.304   | m                 |
| Mt                    | 1.380    | m                 |
| MI                    | 11.162   | m                 |
| Design Category       | C        |                   |

## 2.Trim angle requirement

When the boat in the fully loaded condition is filled to overflowing with water , it shall float with not more than 10°from the unswamped fully loaded waterline



As shown from above , the trim angle  $\Phi =$

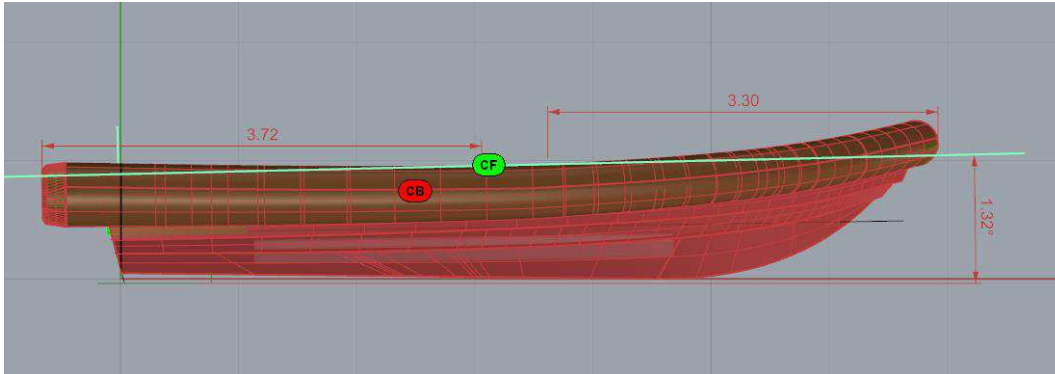
Result:

PASS

1.32 ° < 10°

### 3. $L_H$ requirement

When the boat in the fully loaded condition is filled to overflowing with water, it shall be more than  $2/3$  of  $L_H$  above the water



As shown from above,  $L_H' =$

7.020 m

$L_H'/L_H =$

0.924  $> 2/3 L_H =$

0.667

Result:

PASS

## PA760 Maximum power for initial testing

The maximum power for initial testing of outboard powered craft is determined based on the following:

- factor  $\lambda$ , calculated as follows:

$$\lambda = L_H \times B_T$$

where

$L_H$  is the length of hull, in metres, as defined in ISO 8666;

$B_T$  is the transom width, in metres, at or below the sheer, as defined in ISO 8666;

For craft with a factor  $\lambda$  greater than 5,1, the value of the maximum power for initial testing, expressed in kilowatts, is taken as the following (see Figure C.3):

- without remote wheel steering, deadrise angle  $\alpha < 5$ :  $4,2\lambda - 11$ ;
- without remote wheel steering, deadrise angle  $\alpha \geq 5$ :  $6,4\lambda - 19$ ;
- with remote wheel steering:  $16\lambda - 67$ .

PA760

Lh 7.6 m

Bt 2.83 m

$\lambda$  21.508  $\lambda > 5$

Deadrise >5 deg.

With steering wheel

277.128 KW      371.3515 HP

$$7\sqrt{L_H} \quad 19.29767 \text{ Kn}$$

$$V_{\max} > \quad 7\sqrt{L_H}$$

The test has to be performed with the maximum power.