2019 04 25

***Dinghy 13 investigation with hull bi-convex option***

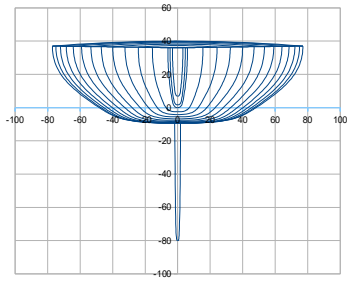
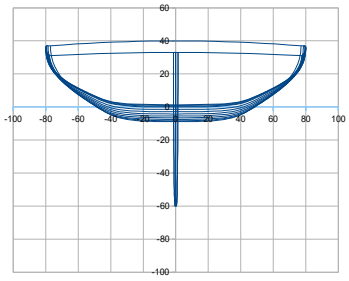
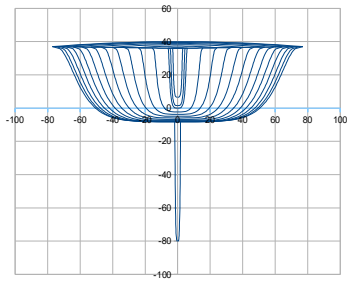
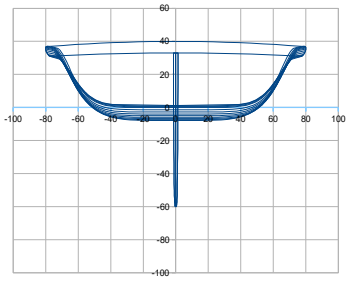
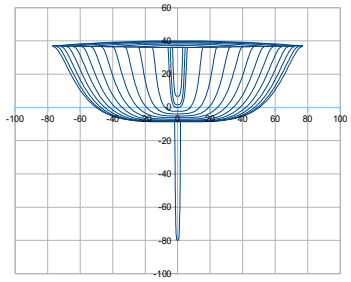
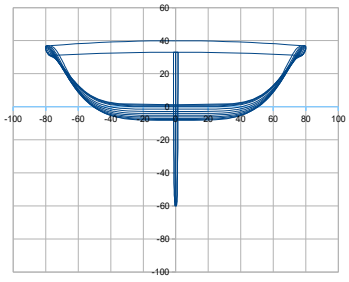
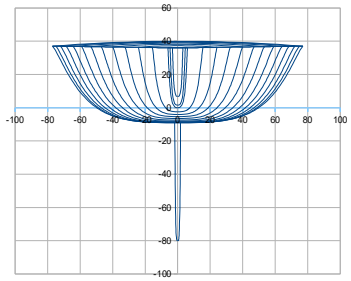
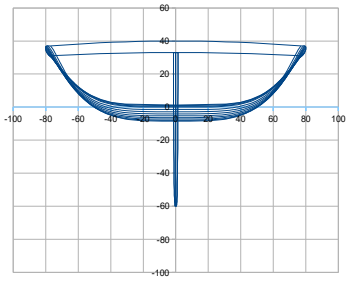
***Rev. 2 : Bi-convex soft 2* is compared with others *Convex-concav* or *Convex-straight* shapes sharing similar GZ curve (when payload at center)**

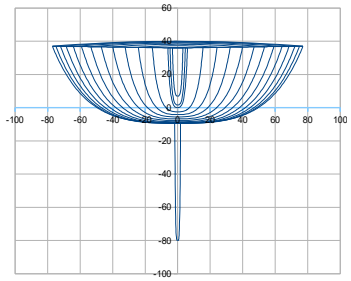
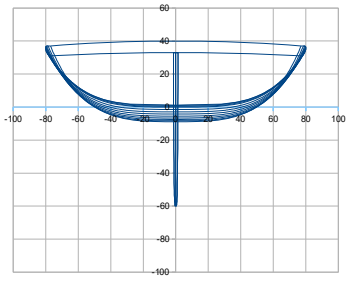
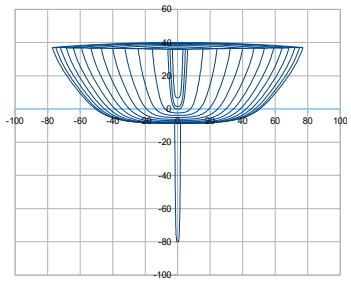
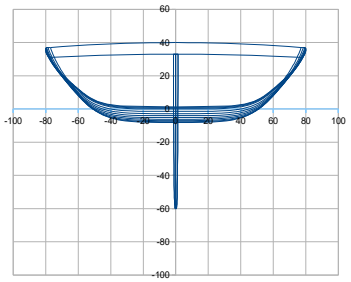
Common data : Lhull : 3,97 m (13 ft) ; Bhull : 1,60 m ; Light weight assumed 59 kg (with a 8 m2 sail)

With the design « payload » 95 kg (a heavy helmsman case) :

Lwl : 3,75 m

Bwl : from 0,97 m to 1,02 m as indicated here below.

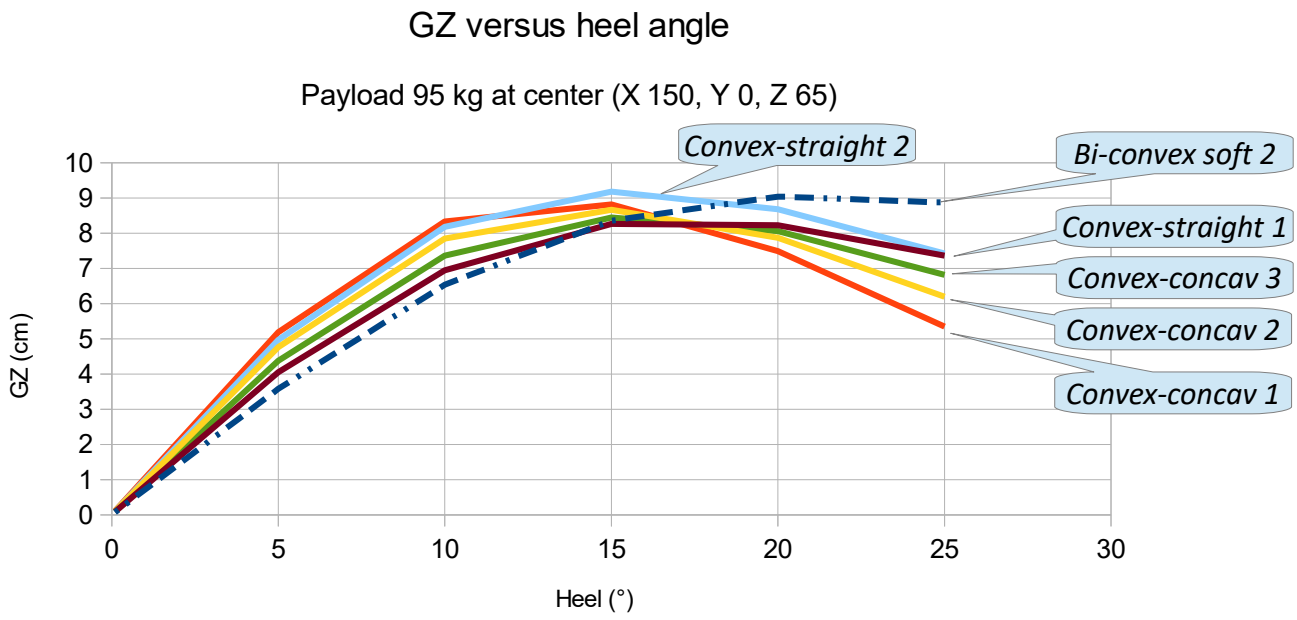
| | | |
|---|---|---|
| ***Bi-convex soft 2***<br>Bwl : 0,97 m<br>Cp : 56,2 %<br>Total Sw (at 10° heel) : 3,12 m2<br>GM 0,1° (payload at center) : 42,7 cm |  |  |
| ***Convex-concav 1***<br>Bwl : 1,02 m<br>Cp : 57,8 %<br>Total Sw (at 10° heel) : 3,11 m2<br>GM 0,1° (payload at center) : 63,8 cm |  |  |
| ***Convex-Concav 2***<br>Bwl : 1,01 m<br>Cp : 57,2 %<br>Total Sw (at 10° heel) : 3,13 m2<br>GM 0,1° (payload at center) : 58,6 cm |  |  |
| ***Convex-concav 3***<br>Bwl : 1,00 m<br>Cp : 56,5 %<br>Total Sw (at 10° heel) : 3,12 m2<br>GM 0,1° (payload at center) : 53,5 cm |  |  |

| | | |
|---|---|---|
| ***Convex-straight 1***<br>Bwl : 1,00 m<br>Cp : 55,9 %<br>Total Sw (at 10° heel) : 3,10 m2<br>GM 0,1° (payload at center) : 49,6 cm |  |  |
| ***Convex-straight 2***<br>Bwl : 1,02 m<br>Cp : 57,1 %<br>Total Sw (at 10° heel) : 3,12 m2<br>GM 0,1° (payload at center) : 61,3 cm |  |  |

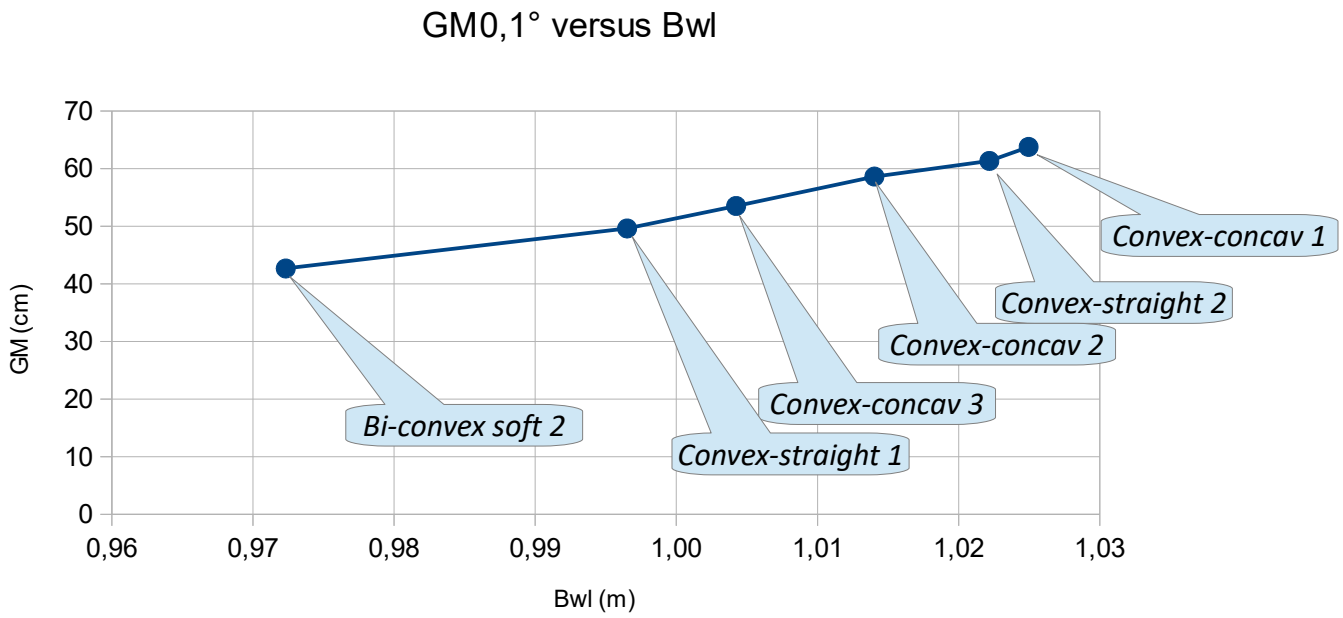
**Stability issue when considering the « payload » in the center :**

e.g. the (heavy) helmsman (95 kg) squatted in the boat center under the boom, with his center of gravity at Z +65 cm. It is typically the tack or gybe configuration. Here for the stability comparison it is assumed that the helsman is (temporarly) fixed like a statue in the center of the boat. and we look at the righting arm GZ evolution for heel up to 25°, due to external action (waves, dynamics of a manoeuver) and/or due to a transversal offset of the payload.

>>> in the present study, the hull variants are shaped to give very similar GZ curve :

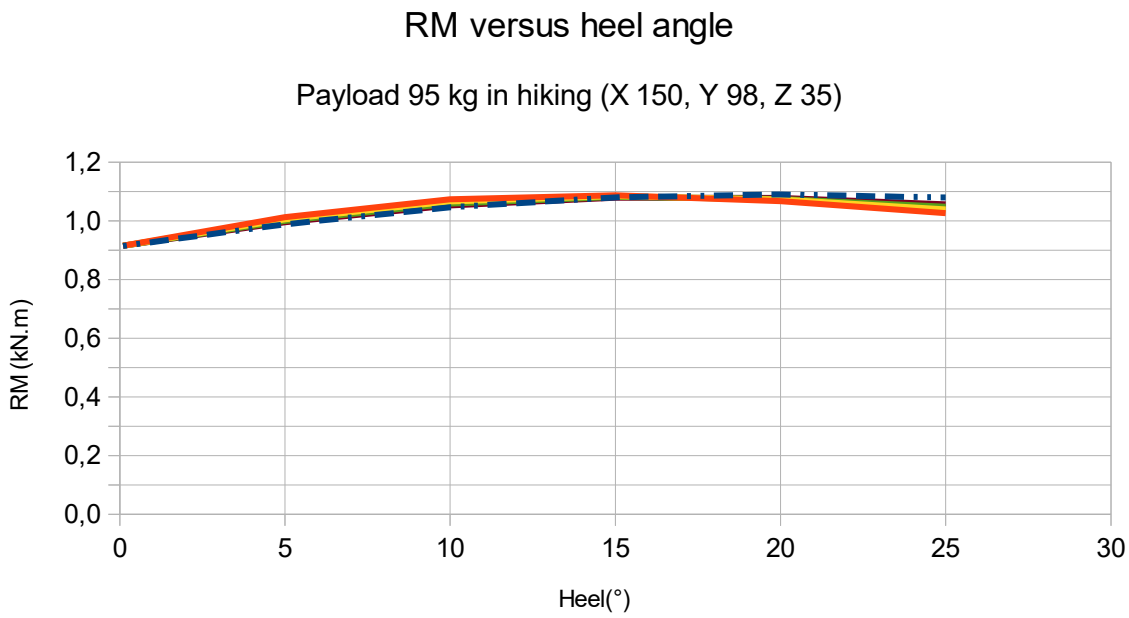


**Initial stability when upright in this payload condition :**



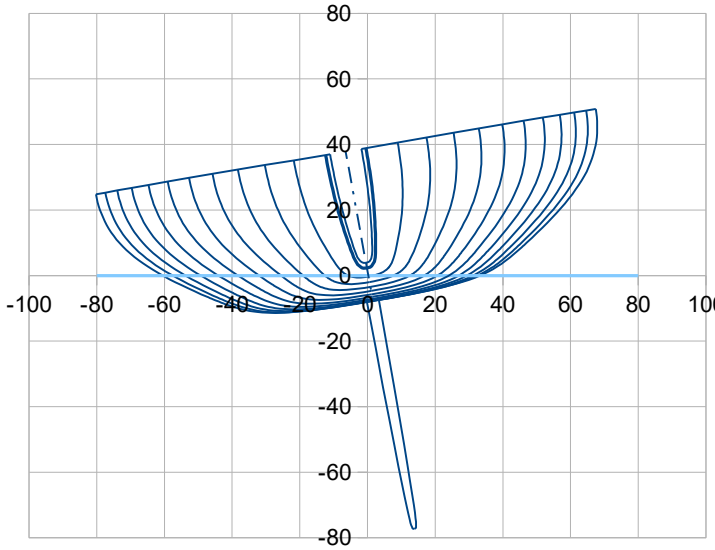

>>> the GM0,1° is roughly linear with Bwl

**Righting moment when the « payload » is hiking at windward** :
e.g. the helmsman is hiking with its center of gravity estimated at about Y = B/2 + 15 cm and Z = 35 cm (and X still at 150 cm)

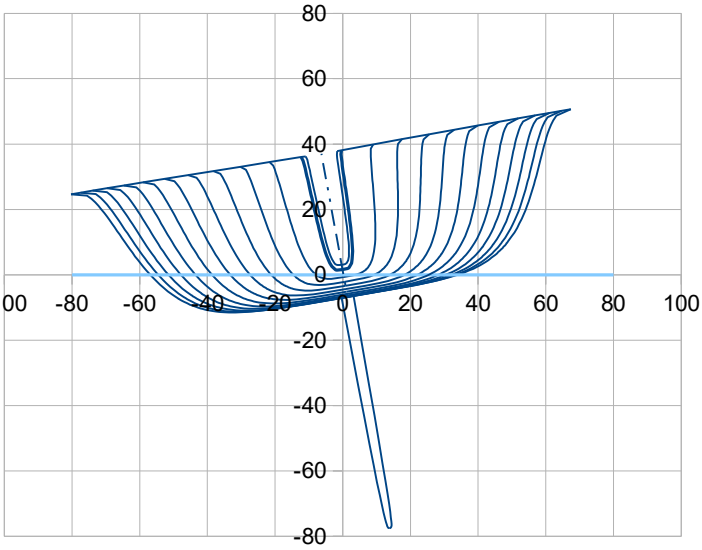


**Comparison at 10° heel angle :**

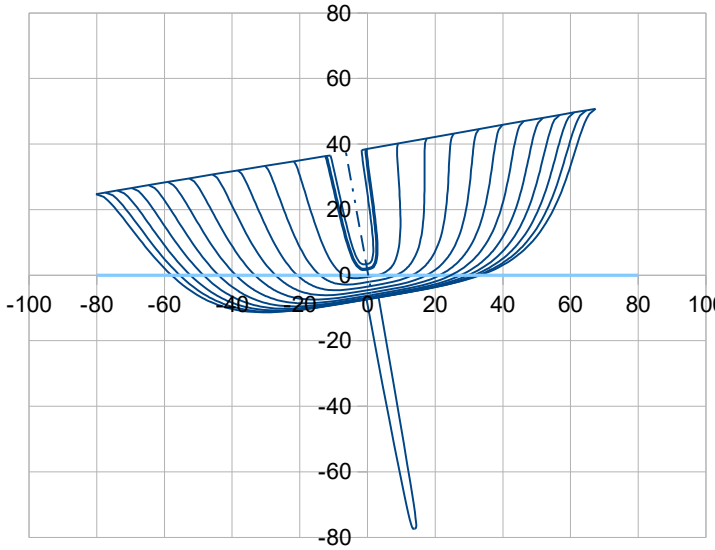
***Bi-convex soft 2***



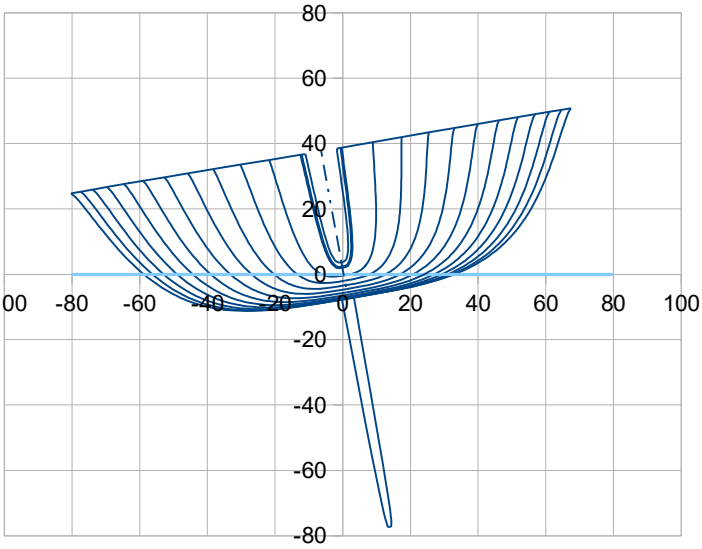

***Convex-concav 1***



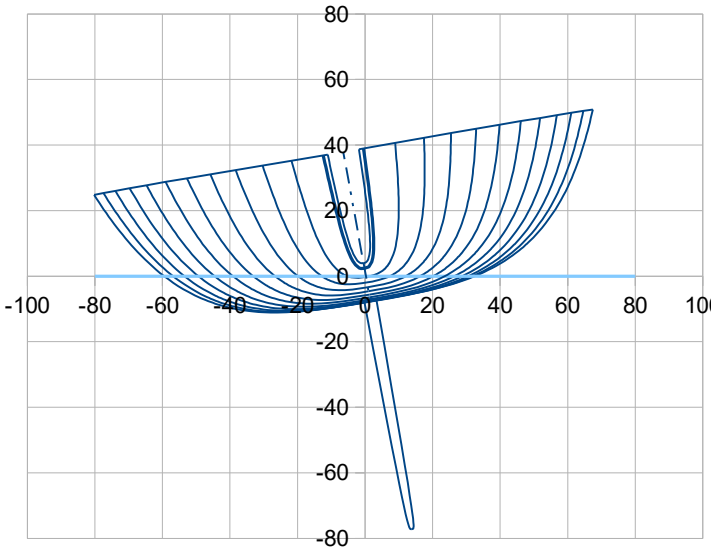

***Convex-concav 2***



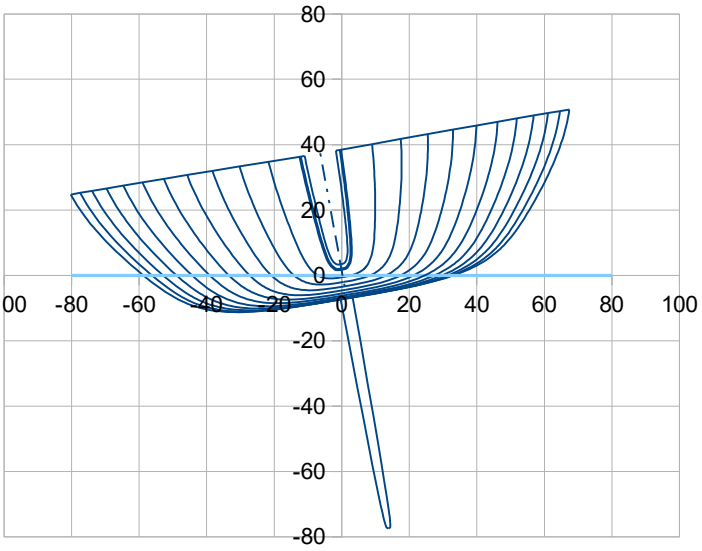

***Convex-concav 3***




***Convex-straight 1***

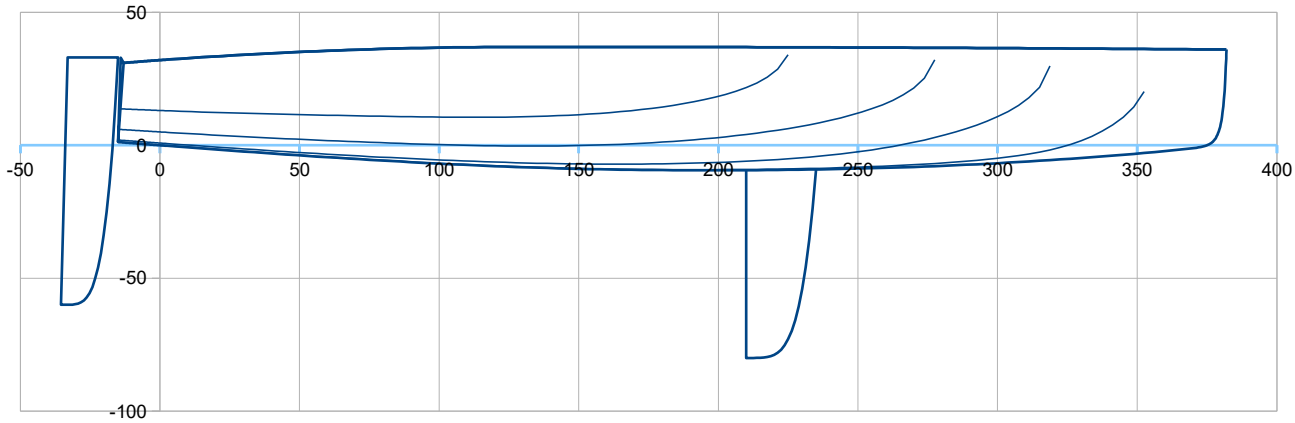


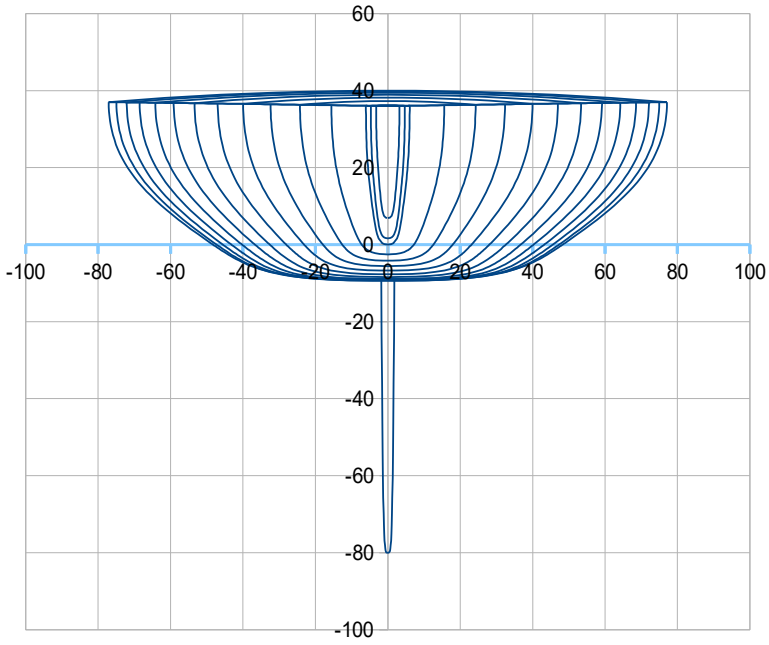

***Convex-straight 2***

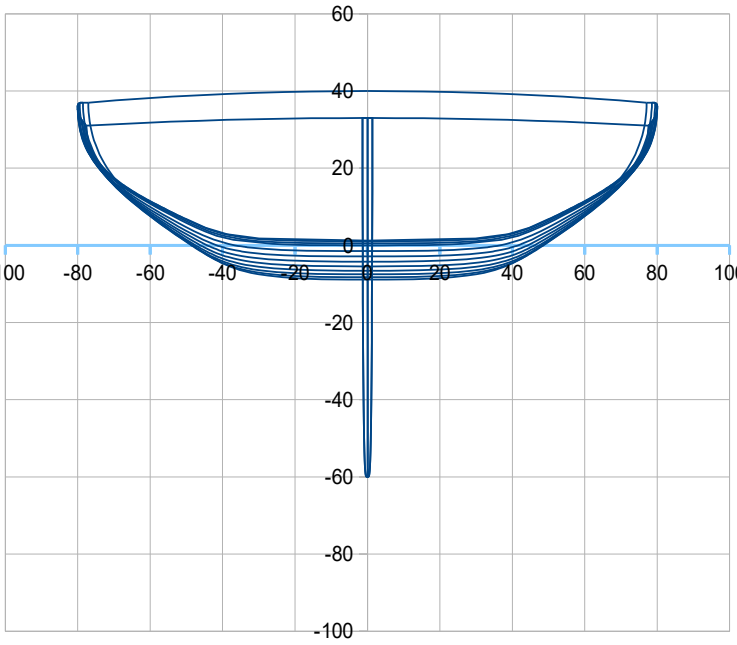


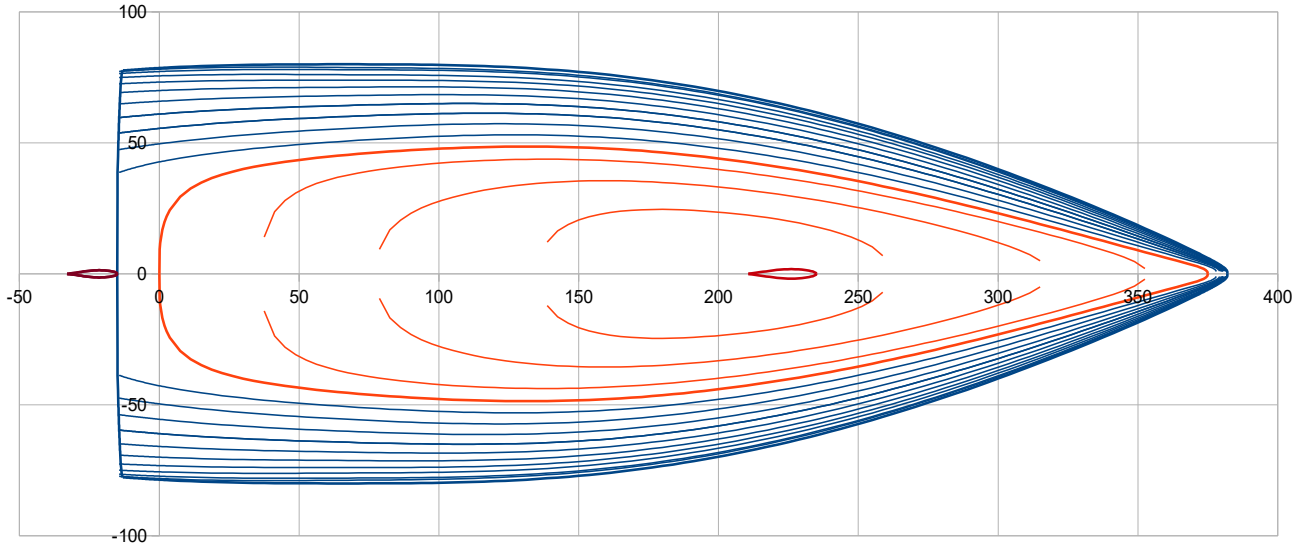
# Annexes

## Bi-convex soft 2



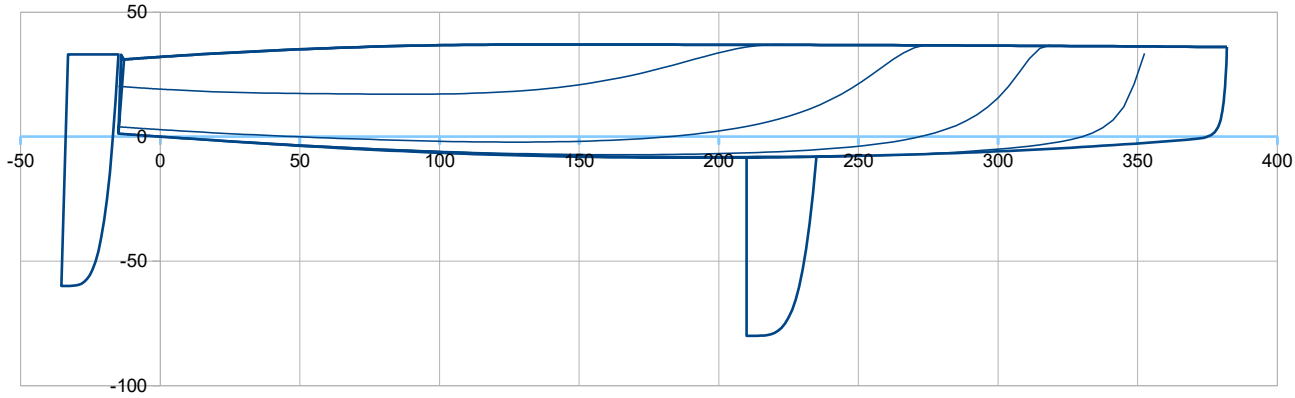



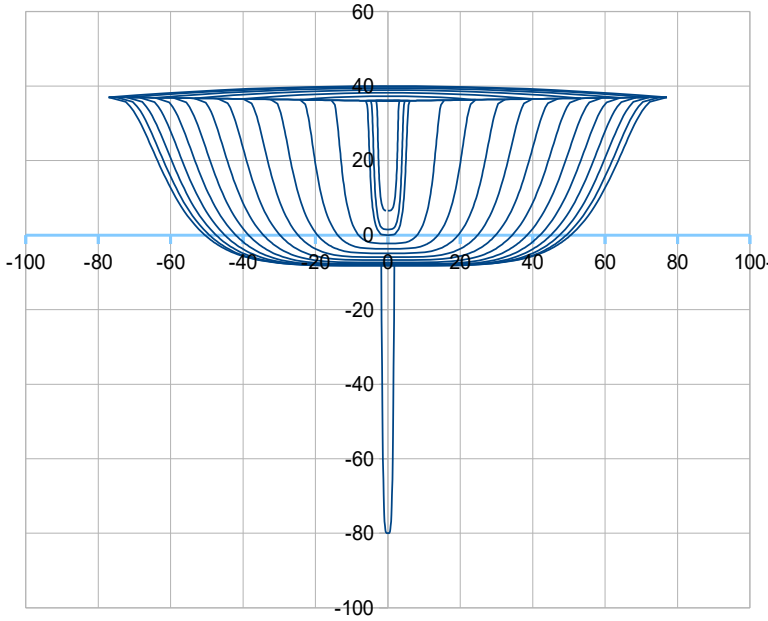



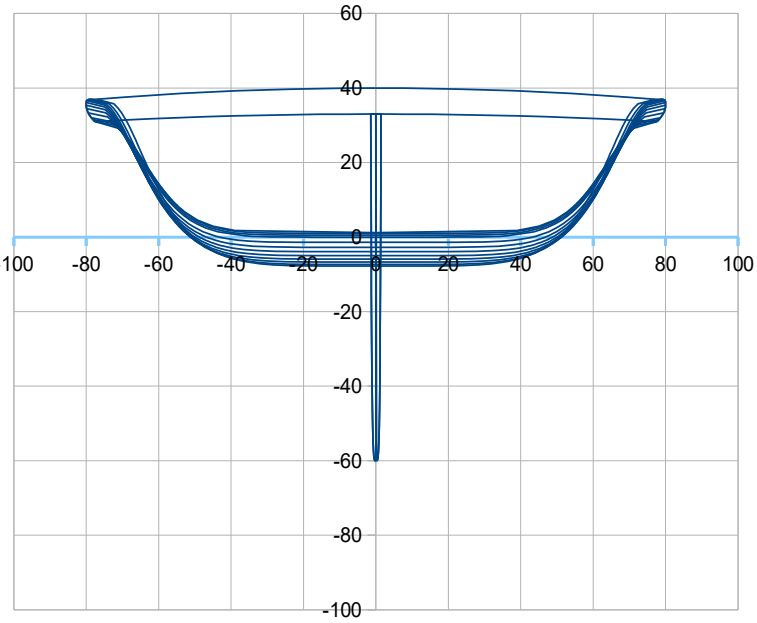
Hydrostatics (upright, displacement with payload 95 kg) :

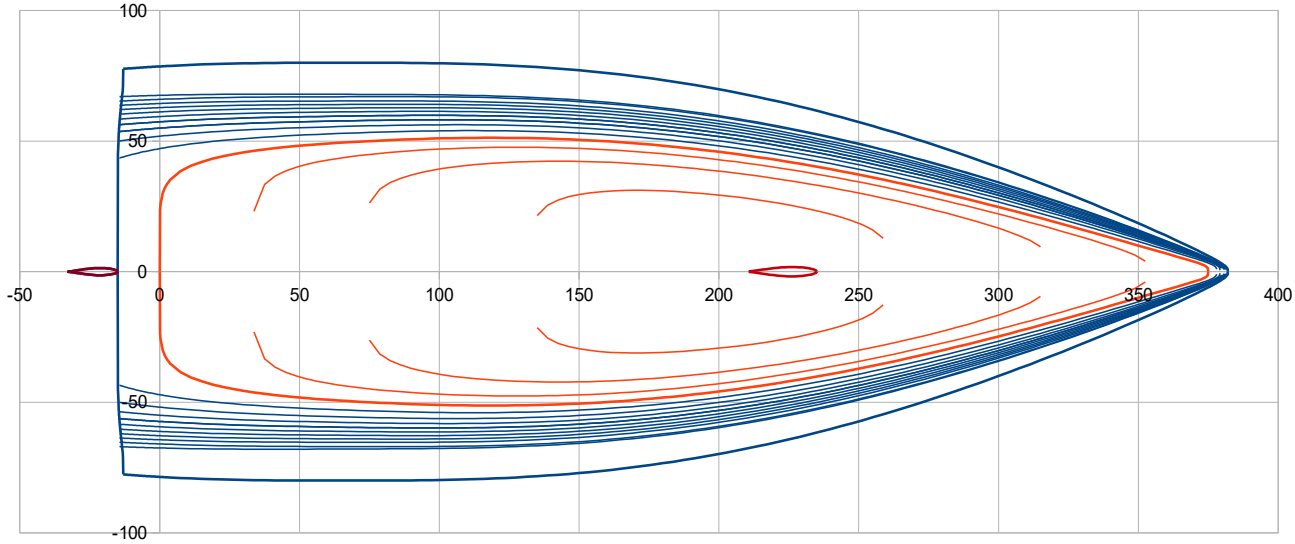
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **2.1 Hull** | | | | | | | | | |
| **Loa (m)** | **3,97** | **Lwl (m)** | **3,75** | >Hull speed | 4,7 | (at Fn 0,4) | | | |
| *>> ft* | *13,02* | | *12,30* | | | | | | |
| **B (m)** | **1,60** | **at X (% Lwl)** | **18,0** | | | | | | |
| *>> ft* | *5,25* | | | | | | | | |
| **Bwl (m)** | **0,97** | **at X (% Lwl)** | **35,0** | > Bwl / B | 0,608 | | | | |
| *>> ft* | *3,19* | | | | **Freeboards (m) >** | | **Aft** | **Midship** | **Fore** |
| **Tc (m)** | **0,094** | **at X (%Lwl)** | **50** | | | | **0,31** | **0,37** | **0,36** |
| *>> ft* | *0,31* | | | | | *>> ft* | *1,02* | *1,21* | *1,18* |
| **Displacement at H0 (m3)** | | **0,14531** | **at Xc (m)** | **1,743** | **Xc (%Lwl)** | | **46,47** | **Zc (m)** | **-0,035** |
| | *>> lbs* | *328* | *w. seawater* | *1025* | *kg/m3* | | | *>> ft* | *-0,11* |
| Disp at h (cm) | -0,376368726 | 0,13558 | at Xc (m) | 1,753 | Xc (%Lwl) | | 46,75 | Zc (m) | -0,007 |
| Disp at h (cm) | 0,376368726 | 0,15541 | at Xc (m) | 1,731 | Xc (%Lwl) | | 46,17 | Zc (m) | -0,062 |
| **Cp (%)** | **56,22** | | | | | | | | |
| **Sf (m2)** | **2,66** | **at Xf (m)** | **1,575** | **Xf (%Lwl)** | **41,99** | | >>> Xc – Xf (%Lwl) | | 4,48 |
| *>> ft2* | *28,59* | *>> ft* | *5,17* | | | | | | |
| **Angle immersed sheer li (°)** | | **25,6** | at section C4 (40% Lwl) | | | | | | |
| **Sw (m2)** | **2,71** | >Sw/D^(2/3) | 9,80 | | | | | | |
| *>> ft2* | *29,15* | | | | | | | | |
| **Shull (m2)** | **6,60** | **at X (m)** | **1,617** | **Z (m)** | **0,066** | | | | |
| *>> ft2* | *71,02* | *>> ft* | *5,30* | *>> ft* | *0,22* | | | | |
| **Sdeck (m2)** | **4,82** | **at X (m)** | **1,459** | | | | | | |
| *>> ft2* | *51,86* | *>> ft* | *4,79* | | | | | | |
| **2.2 Daggerboard** | | | | | | | | | |
| **Volume (m3)** | **0,00282** | **at X (m)** | **2,226** | **X (%Lwl)** | **59,36** | | **Z (m)** | **-0,37** | |
| **Draft oa (m)** | **0,80** | | **Sw (m2)** | **0,30** | | | **Sxz (m2)** | **0,14** | |
| *>> ft* | *2,62* | | *>> ft2* | *3,24* | | | *>> ft2* | *1,56* | |
| **CLR (m)** | **2,288** | **CLR (%Lwl)** | **61,00** | method : keel profile extended to the waterline, 25% c at 45% draft oa | | | | | |
| *>> ft* | *7,50* | | | | | | | | |
| **2.3 Rudder(s)** | | | | | | | | | |
| **Number** | **1** | | | | | | | | |
| **Volume (m3)** | **0,00143** | **at X (m)** | **-0,246** | **X (%Lwl)** | **-6,57** | | **Z (m)** | **-0,054** | |
| **Sw (m2)** | **0,18** | *>> ft* | *-0,81* | | | | **Sxz (m2)** | **0,09** | per rudder |
| *>> ft2* | *1,92* | | | | | | *>> ft2* | *0,92* | |
| **2.4 Hull + Daggerboard + Rudder(s)** | | | | | | | | | |
| **Displacement at H0 (m3)** | | **0,14956** | **at Xc (m)** | **1,733** | **Xc (%Lwl)** | | **46,21** | **Zc (m)** | **-0,041** |
| | **Disp. (kg)** | **153,3** | *>> ft* | *0,53* | | | | *>> ft* | *-0,13* |
| | *>> lbs* | *338* | | | | | | | |
| | **Sw (m2)** | **3,19** | >Sw/D^(2/3) | 11,31 | Lwl/D^(1/3) | | 7,06 | | |
| | *>> ft2* | *34,30* | | | *DLR* | | *81* | *M(lbs/2240)/(Lwl(ft)/100)^3* | |
| **2.5 Data from the mass spreadsheet** | | | | | | | | | |
| **Boat with payload** | **M(kg)** | **153,3** | **at Xg (m)** | **1,566** | **Xc (%Lwl)** | | **41,77** | **at Zg (m)** | **0,587** |
| Light boat | | 58,3 | | 1,675 | | | | | 0,485 |

***Convex-concav 1***



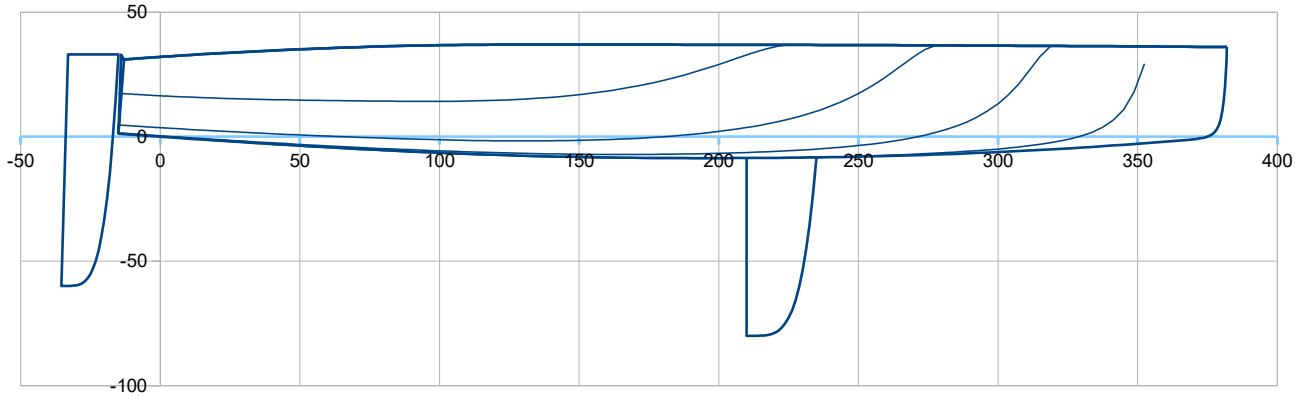



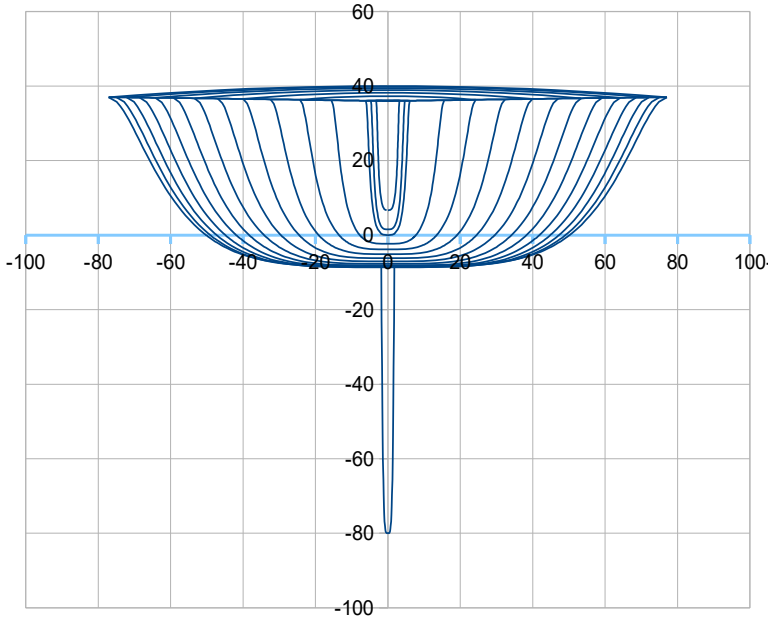



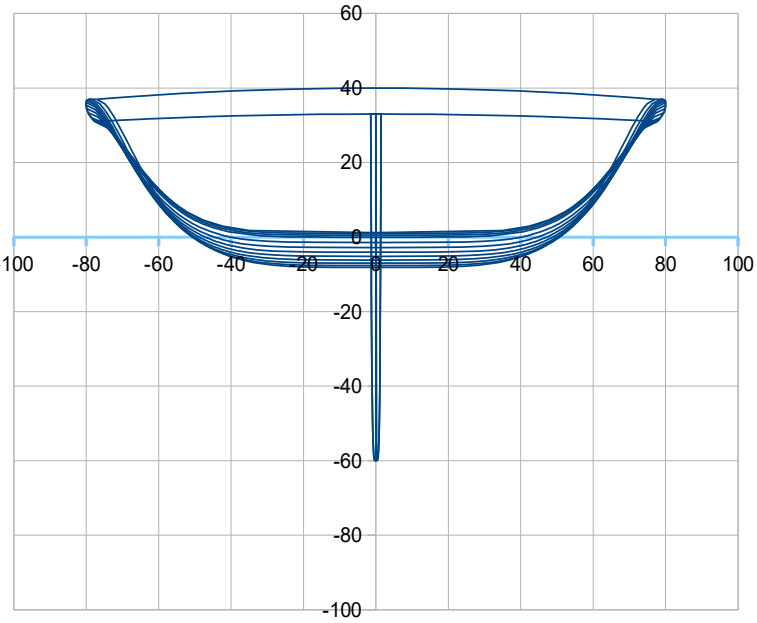
Hydrostatics (upright, displacement with payload 95 kg) :

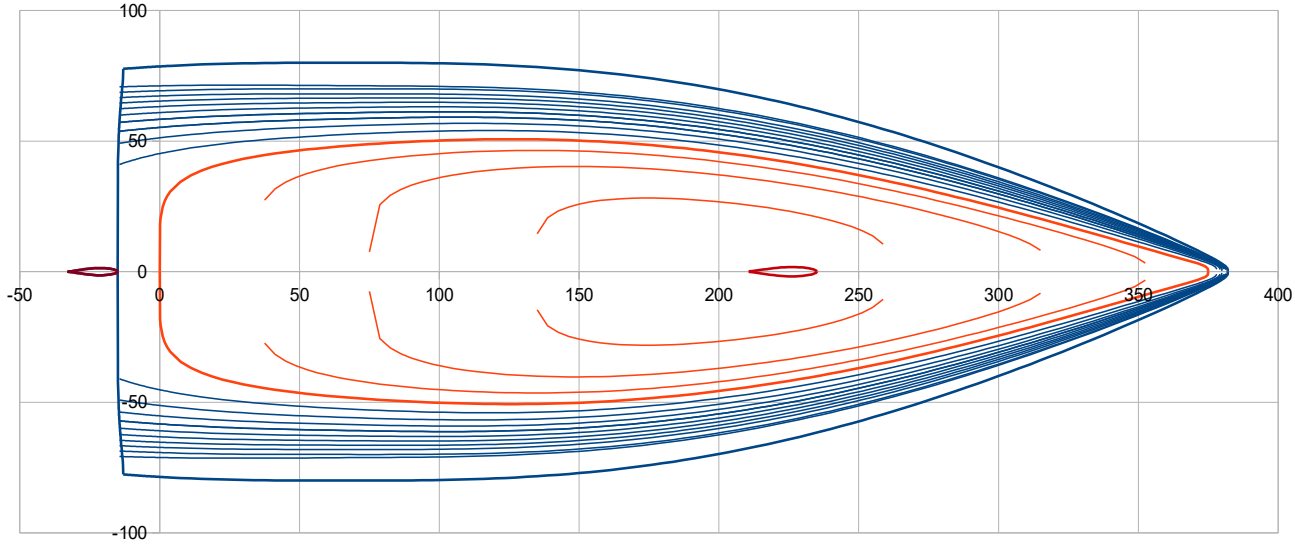
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **2.1 Hull** | | | | | | | | | |
| **Loa (m)** | **3,97** | **Lwl (m)** | **3,75** | >Hull speed | 4,7 | (at Fn 0,4) | | | |
| *>> ft* | *13,02* | | *12,30* | | | | | | |
| **B (m)** | **1,60** | **at X (% Lwl)** | **18,0** | | | | | | |
| *>> ft* | *5,25* | | | | | | | | |
| **Bwl (m)** | **1,02** | **at X (% Lwl)** | **32,0** | > Bwl / B | 0,641 | | | | |
| *>> ft* | *3,36* | | | | | **Freeboards (m) >** | **Aft** | **Midship** | **Fore** |
| **Tc (m)** | **0,082** | **at X (%Lwl)** | **50** | | | | **0,31** | **0,37** | **0,36** |
| *>> ft* | *0,27* | | | | | *>> ft* | *1,02* | *1,21* | *1,18* |
| **Displacement at H0 (m3)** | | **0,14533** | **at Xc (m)** | **1,717** | **Xc (%Lwl)** | | **45,79** | **Zc (m)** | **-0,031** |
| | *>> lbs* | *328* | *w. seawater* | *1025* | *kg/m3* | | | *>> ft* | *-0,10* |
| Disp at h (cm) | -0,335085322 | 0,13603 | at Xc (m) | 1,726 | Xc (%Lwl) | | 46,04 | Zc (m) | -0,003 |
| Disp at h (cm) | 0,335085322 | 0,15502 | at Xc (m) | 1,706 | Xc (%Lwl) | | 45,50 | Zc (m) | -0,059 |
| **Cp (%)** | **57,83** | | | | | | | | |
| **Sf (m2)** | **2,86** | **at Xf (m)** | **1,551** | **Xf (%Lwl)** | **41,35** | | >>> Xc – Xf (%Lwl) | | 4,44 |
| *>> ft2* | *30,81* | *>> ft* | *5,09* | | | | | | |
| **Angle immersed sheer li (°)** | | **25,6** | at section C4 (40% Lwl) | | | | | | |
| **Sw (m2)** | **2,89** | >Sw/D^(2/3) | 10,45 | | | | | | |
| *>> ft2* | *31,08* | | | | | | | | |
| **Shull (m2)** | **6,63** | **at X (m)** | **1,619** | **Z (m)** | **0,075** | | | | |
| *>> ft2* | *71,34* | *>> ft* | *5,31* | *>> ft* | *0,25* | | | | |
| **Sdeck (m2)** | **4,82** | **at X (m)** | **1,459** | | | | | | |
| *>> ft2* | *51,86* | *>> ft* | *4,79* | | | | | | |
| **2.2 Daggerboard** | | | | | | | | | |
| **Volume (m3)** | **0,00287** | **at X (m)** | **2,226** | **X (%Lwl)** | **59,36** | **Z (m)** | **-0,36** | | |
| **Draft oa (m)** | **0,80** | | **Sw (m2)** | **0,31** | | **Sxz (m2)** | **0,15** | | |
| *>> ft* | *2,62* | | *>> ft2* | *3,29* | | *>> ft2* | *1,58* | | |
| **CLR (m)** | **2,288** | **CLR (%Lwl)** | **61,00** | method : keel profile extended to the waterline, 25% c at 45% draft oa | | | | | |
| *>> ft* | *7,50* | | | | | | | | |
| **2.3 Rudder(s)** | | | | | | | | | |
| **Number** | **1** | | | | | | | | |
| **Volume (m3)** | **0,00143** | **at X (m)** | **-0,246** | **X (%Lwl)** | **-6,57** | **Z (m)** | **-0,054** | | |
| **Sw (m2)** | **0,18** | *>> ft* | *-0,81* | | | **Sxz (m2)** | **0,09** | per rudder | |
| *>> ft2* | *1,92* | | | | | *>> ft2* | *0,92* | | |
| **2.4 Hull + Daggerboard + Rudder(s)** | | | | | | | | | |
| **Displacement at H0 (m3)** | | **0,14962** | **at Xc (m)** | **1,708** | **Xc (%Lwl)** | **45,55** | | **Zc (m)** | **-0,038** |
| | **Disp. (kg)** | **153,4** | *>> ft* | *0,52* | | | | *>> ft* | *-0,12* |
| | *>> lbs* | *338* | | | | | | | |
| | **Sw (m2)** | **3,37** | >Sw/D^(2/3) | 11,96 | Lwl/D^(1/3) | 7,06 | | | |
| | *>> ft2* | *36,28* | | | *DLR* | *81* | *M(lbs/2240)/(Lwl(ft)/100)^3* | | |
| **2.5 Data from the mass spreadsheet** | | | | | | | | | |
| **Boat with payload** | **M(kg)** | **153,4** | **at Xg (m)** | **1,567** | **Xc (%Lwl)** | **41,78** | **at Zg (m)** | | **0,588** |
| Light boat | | 58,4 | | 1,675 | | | | | 0,488 |

***Convex-Concav 2***



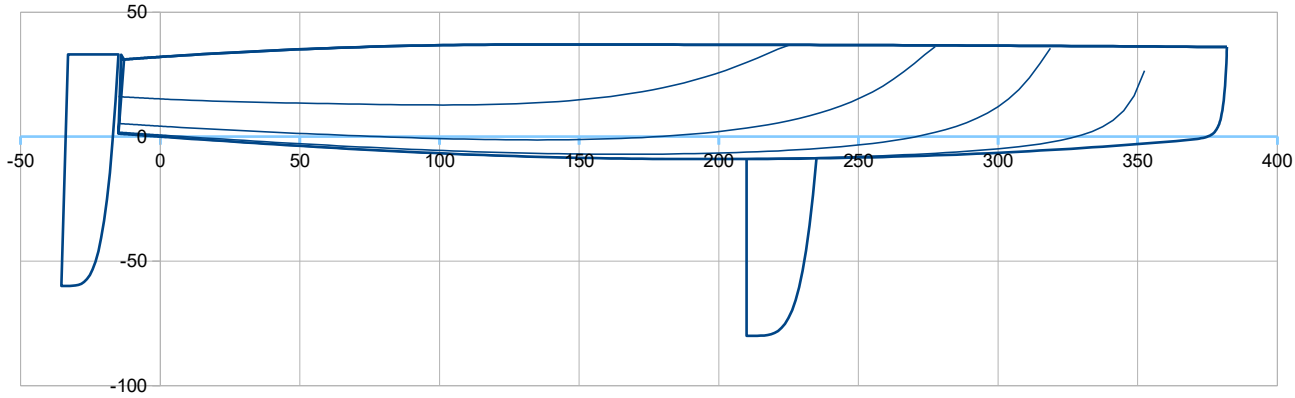



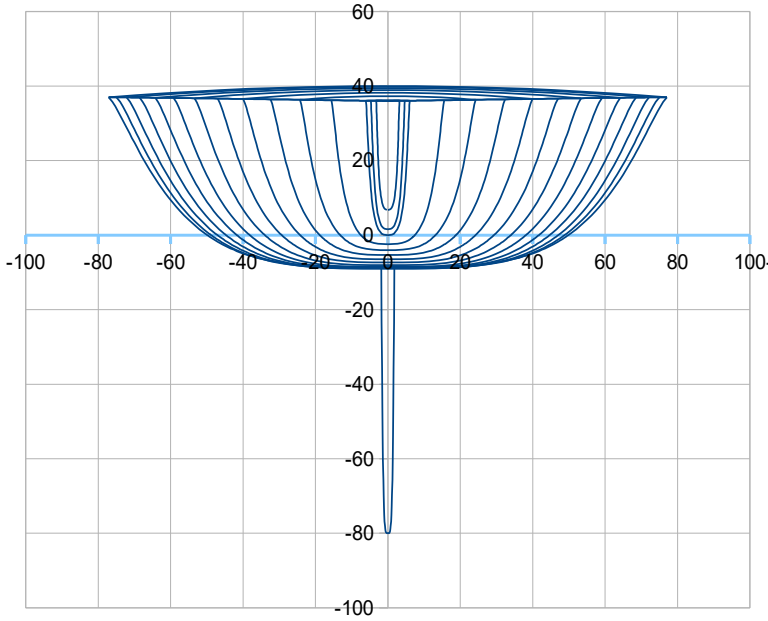



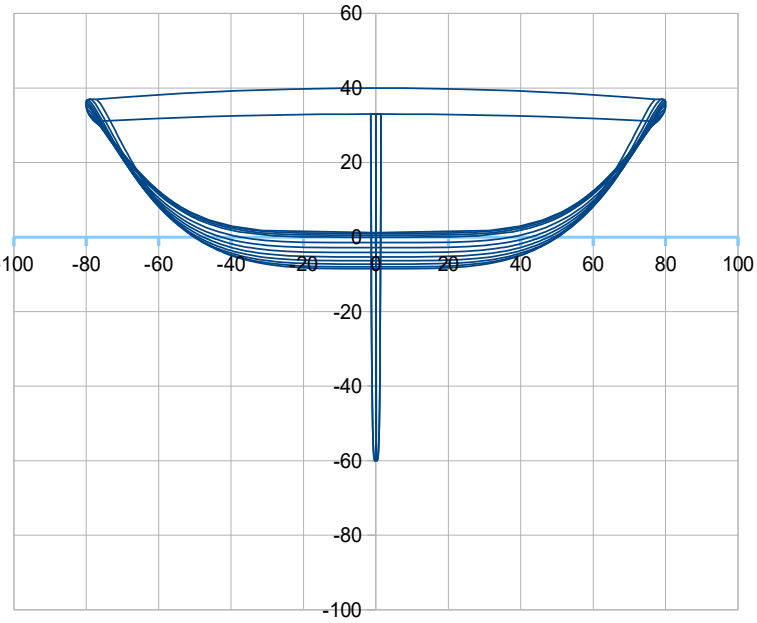
Hydrostatics (upright, displacement with payload 95 kg) :

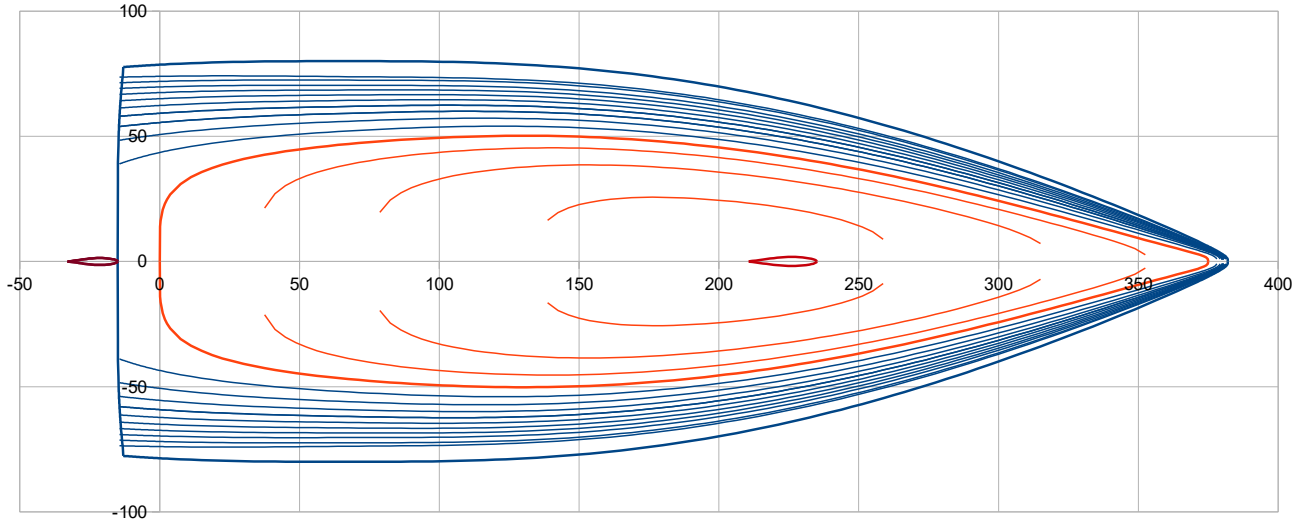
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **2.1 Hull** | | | | | | | | | |
| **Loa (m)** | **3,97** | **Lwl (m)** | **3,75** | >Hull speed | 4,7 | (at Fn 0,4) | | | |
| *>> ft* | *13,02* | | *12,30* | | | | | | |
| **B (m)** | **1,60** | **at X (% Lwl)** | **18,0** | | | | | | |
| *>> ft* | *5,25* | | | | | | | | |
| **Bwl (m)** | **1,01** | **at X (% Lwl)** | **33,0** | > Bwl / B | 0,634 | | | | |
| *>> ft* | *3,33* | | | **Freeboards (m) >** | | **Aft** | **Midship** | **Fore** | |
| **Tc (m)** | **0,086** | **at X (%Lwl)** | **50** | | | **0,31** | **0,37** | **0,36** | |
| *>> ft* | *0,28* | | | | *>> ft* | *1,02* | *1,21* | *1,18* | |
| **Displacement at H0 (m3)** | **0,14508** | **at Xc (m)** | **1,729** | **Xc (%Lwl)** | **46,10** | **Zc (m)** | **-0,032** | | |
| *>> lbs* | *328* | *w. seawater* | *1025* | *kg/m3* | | *>> ft* | *-0,11* | | |
| Disp at h (cm) | -0,349325417 | 0,13556 | at Xc (m) | 1,738 | Xc (%Lwl) | 46,35 | Zc (m) | -0,004 | |
| Disp at h (cm) | 0,349325417 | 0,15498 | at Xc (m) | 1,718 | Xc (%Lwl) | 45,80 | Zc (m) | -0,060 | |
| **Cp (%)** | **57,15** | | | | | | | | |
| **Sf (m2)** | **2,80** | **at Xf (m)** | **1,564** | **Xf (%Lwl)** | **41,72** | >>> Xc – Xf (%Lwl) | | 4,38 | |
| *>> ft2* | *30,19* | *>> ft* | *5,13* | | | | | | |
| **Angle immersed sheer li (°)** | **25,6** | at section C4 (40% Lwl) | | | | | | | |
| **Sw (m2)** | **2,83** | >Sw/D^(2/3) | 10,27 | | | | | | |
| *>> ft2* | *30,51* | | | | | | | | |
| **Shull (m2)** | **6,55** | **at X (m)** | **1,621** | **Z (m)** | **0,070** | | | | |
| *>> ft2* | *70,47* | *>> ft* | *5,32* | *>> ft* | *0,23* | | | | |
| **Sdeck (m2)** | **4,82** | **at X (m)** | **1,459** | | | | | | |
| *>> ft2* | *51,86* | *>> ft* | *4,79* | | | | | | |
| **2.2 Daggerboard** | | | | | | | | | |
| **Volume (m3)** | **0,00285** | **at X (m)** | **2,226** | **X (%Lwl)** | **59,36** | **Z (m)** | **-0,37** | | |
| **Draft oa (m)** | **0,80** | | **Sw (m2)** | **0,30** | | **Sxz (m2)** | **0,15** | | |
| *>> ft* | *2,62* | | *>> ft2* | *3,27* | | *>> ft2* | *1,57* | | |
| **CLR (m)** | **2,288** | **CLR (%Lwl)** | **61,00** | method : keel profile extended to the waterline, 25% c at 45% draft oa | | | | | |
| *>> ft* | *7,50* | | | | | | | | |
| **2.3 Rudder(s)** | | | | | | | | | |
| **Number** | **1** | | | | | | | | |
| **Volume (m3)** | **0,00143** | **at X (m)** | **-0,246** | **X (%Lwl)** | **-6,57** | **Z (m)** | **-0,054** | | |
| **Sw (m2)** | **0,18** | *>> ft* | *-0,81* | | | **Sxz (m2)** | **0,09** | per rudder | |
| *>> ft2* | *1,92* | | | | | *>> ft2* | *0,92* | | |
| **2.4 Hull + Daggerboard + Rudder(s)** | | | | | | | | | |
| **Displacement at H0 (m3)** | **0,14935** | **at Xc (m)** | **1,719** | **Xc (%Lwl)** | **45,85** | **Zc (m)** | **-0,039** | | |
| **Disp. (kg)** | **153,1** | *>> ft* | *0,52* | | | *>> ft* | *-0,13* | | |
| *>> lbs* | *337* | | | | | | | | |
| **Sw (m2)** | **3,32** | >Sw/D^(2/3) | 11,78 | Lwl/D^(1/3) | 7,07 | | | | |
| *>> ft2* | *35,70* | | | *DLR* | *81* | *M(lbs/2240)/(Lwl(ft)/100)^3* | | | |
| **2.5 Data from the mass spreadsheet** | | | | | | | | | |
| **Boat with payload** | **M(kg)** | **153,1** | **at Xg (m)** | **1,567** | **Xc (%Lwl)** | **41,79** | **at Zg (m)** | **0,588** | |
| Light boat | | 58,1 | | 1,676 | | | | 0,488 | |

***Convex-concav 3***



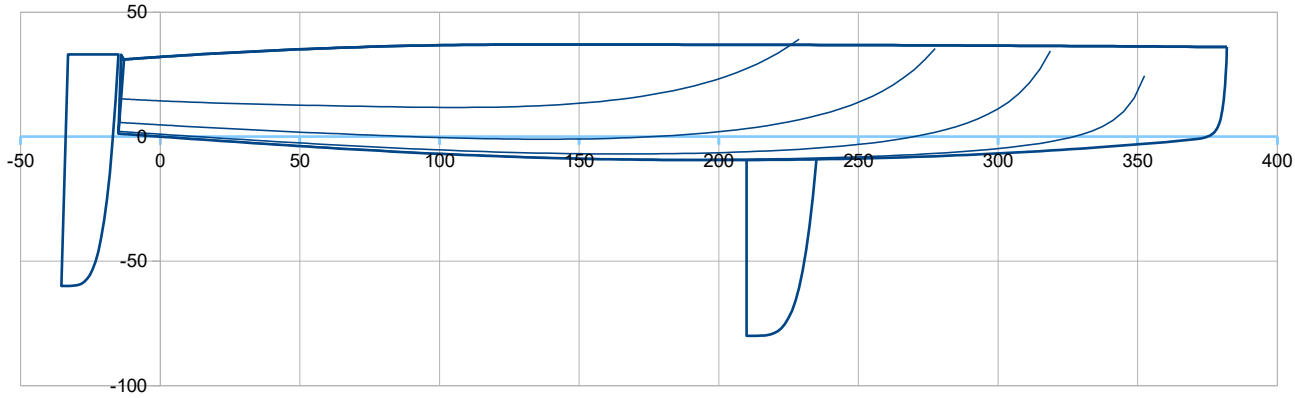



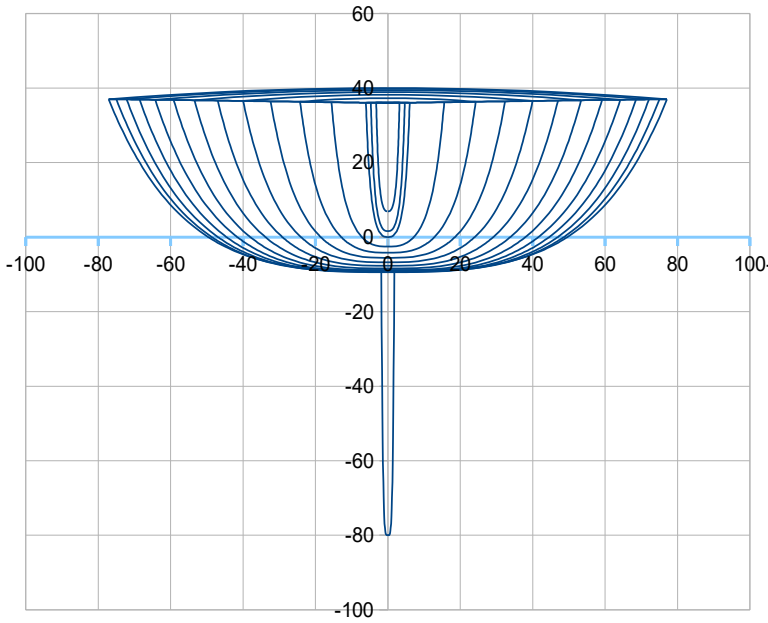



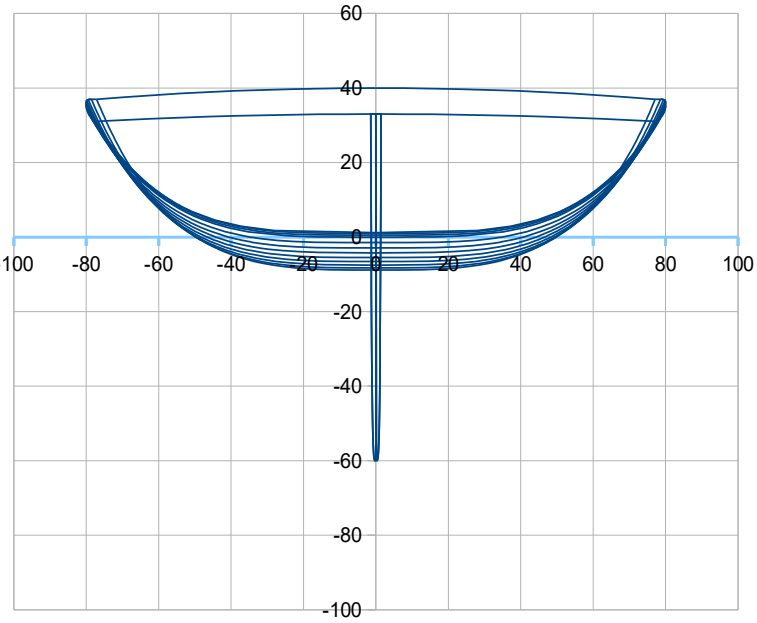
Hydrostatics (upright, displacement with payload 95 kg) :

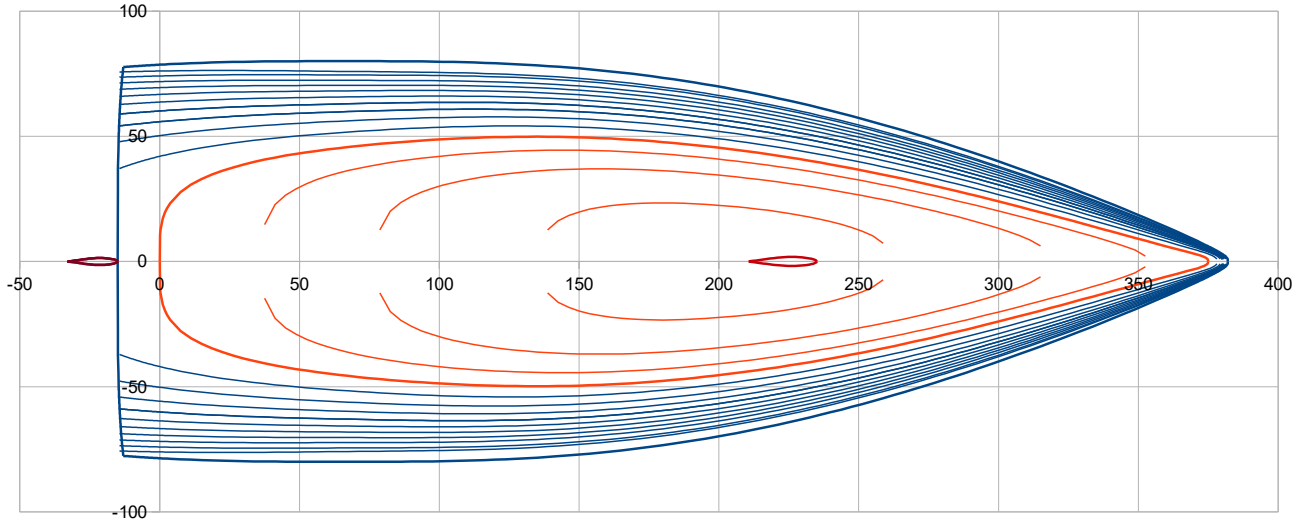
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **2.1 Hull** | | | | | | | | | |
| **Loa (m)** | **3,97** | **Lwl (m)** | **3,75** | >Hull speed | 4,7 | (at Fn 0,4) | | | |
| *>> ft* | *13,02* | | *12,30* | | | | | | |
| **B (m)** | **1,60** | **at X (% Lwl)** | **18,0** | | | | | | |
| *>> ft* | *5,25* | | | | | | | | |
| **Bwl (m)** | **1,00** | **at X (% Lwl)** | **35,0** | > Bwl / B | 0,628 | | | | |
| *>> ft* | *3,29* | | | | | **Freeboards (m) >** | **Aft** | **Midship** | **Fore** |
| **Tc (m)** | **0,09** | **at X (%Lwl)** | **50** | | | | **0,31** | **0,37** | **0,36** |
| *>> ft* | *0,30* | | | | | *>> ft* | *1,02* | *1,21* | *1,18* |
| **Displacement at H0 (m3)** | | **0,14499** | **at Xc (m)** | **1,740** | **Xc (%Lwl)** | | **46,39** | **Zc (m)** | **-0,033** |
| | *>> lbs* | *328* | *w. seawater* | *1025* | *kg/m3* | | | *>> ft* | *-0,11* |
| Disp at h (cm) | -0,363067944 | 0,13528 | at Xc (m) | 1,749 | Xc (%Lwl) | | 46,65 | Zc (m) | -0,005 |
| Disp at h (cm) | 0,363067944 | 0,15509 | at Xc (m) | 1,728 | Xc (%Lwl) | | 46,09 | Zc (m) | -0,061 |
| **Cp (%)** | **56,53** | | | | | | | | |
| **Sf (m2)** | **2,75** | **at Xf (m)** | **1,577** | **Xf (%Lwl)** | **42,06** | | >>> Xc – Xf (%Lwl) | | 4,33 |
| *>> ft2* | *29,61* | *>> ft* | *5,17* | | | | | | |
| **Angle immersed sheer li (°)** | | **25,6** | at section C4 (40% Lwl) | | | | | | |
| **Sw (m2)** | **2,79** | >Sw/D^(2/3) | 10,10 | | | | | | |
| *>> ft2* | *30,00* | | | | | | | | |
| **Shull (m2)** | **6,52** | **at X (m)** | **1,622** | **Z (m)** | **0,067** | | | | |
| *>> ft2* | *70,21* | *>> ft* | *5,32* | *>> ft* | *0,22* | | | | |
| **Sdeck (m2)** | **4,82** | **at X (m)** | **1,459** | | | | | | |
| *>> ft2* | *51,86* | *>> ft* | *4,79* | | | | | | |
| **2.2 Daggerboard** | | | | | | | | | |
| **Volume (m3)** | **0,00283** | **at X (m)** | **2,226** | **X (%Lwl)** | **59,36** | **Z (m)** | **-0,37** | | |
| **Draft oa (m)** | **0,80** | | **Sw (m2)** | **0,30** | | **Sxz (m2)** | **0,15** | | |
| *>> ft* | *2,62* | | *>> ft2* | *3,25* | | *>> ft2* | *1,56* | | |
| **CLR (m)** | **2,288** | **CLR (%Lwl)** | **61,00** | method : keel profile extended to the waterline, 25% c at 45% draft oa | | | | | |
| *>> ft* | *7,50* | | | | | | | | |
| **2.3 Rudder(s)** | | | | | | | | | |
| **Number** | **1** | | | | | | | | |
| **Volume (m3)** | **0,00143** | **at X (m)** | **-0,246** | **X (%Lwl)** | **-6,57** | **Z (m)** | **-0,054** | | |
| **Sw (m2)** | **0,18** | *>> ft* | *-0,81* | | | **Sxz (m2)** | **0,09** | per rudder | |
| *>> ft2* | *1,92* | | | | | *>> ft2* | *0,92* | | |
| **2.4 Hull + Daggerboard + Rudder(s)** | | | | | | | | | |
| **Displacement at H0 (m3)** | | **0,14925** | **at Xc (m)** | **1,730** | **Xc (%Lwl)** | **46,13** | | **Zc (m)** | **-0,040** |
| | **Disp. (kg)** | **153,0** | *>> ft* | *0,53* | | | | *>> ft* | *-0,13* |
| | *>> lbs* | *337* | | | | | | | |
| | **Sw (m2)** | **3,27** | >Sw/D^(2/3) | 11,61 | Lwl/D^(1/3) | 7,07 | | | |
| | *>> ft2* | *35,17* | | | *DLR* | *81* | *M(lbs/2240)/(Lwl(ft)/100)^3* | | |
| **2.5 Data from the mass spreadsheet** | | | | | | | | | |
| **Boat with payload** | **M(kg)** | **153,0** | **at Xg (m)** | **1,567** | **Xc (%Lwl)** | **41,79** | **at Zg (m)** | | **0,588** |
| Light boat | | 58,0 | | 1,677 | | | | | 0,487 |

***Convex-straight 1***



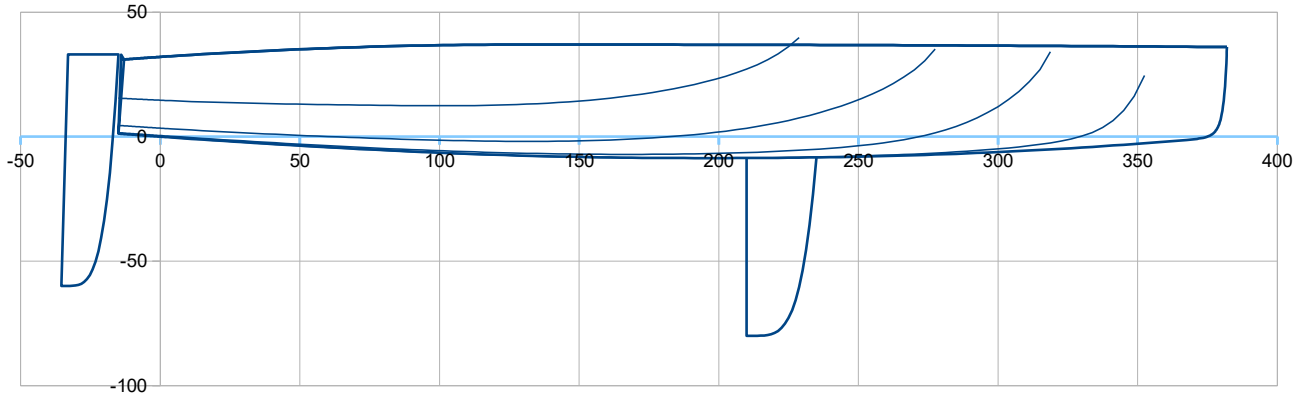



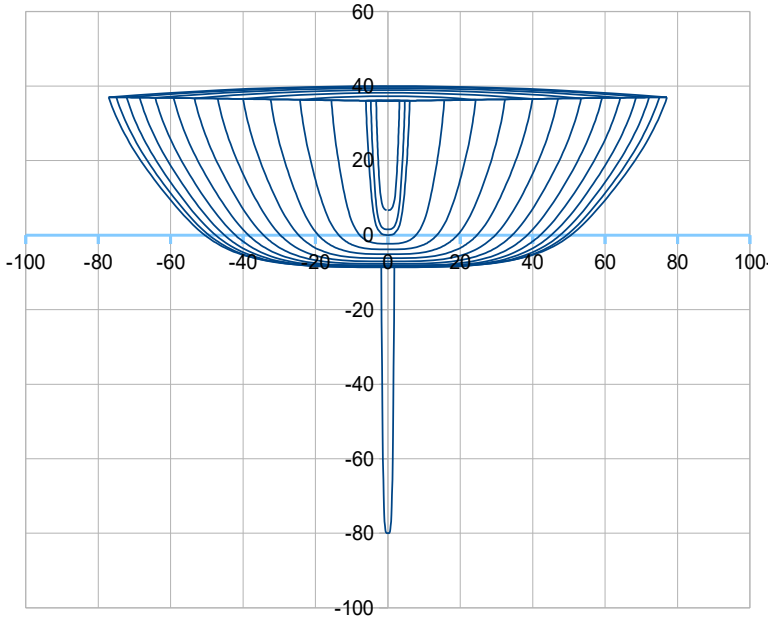



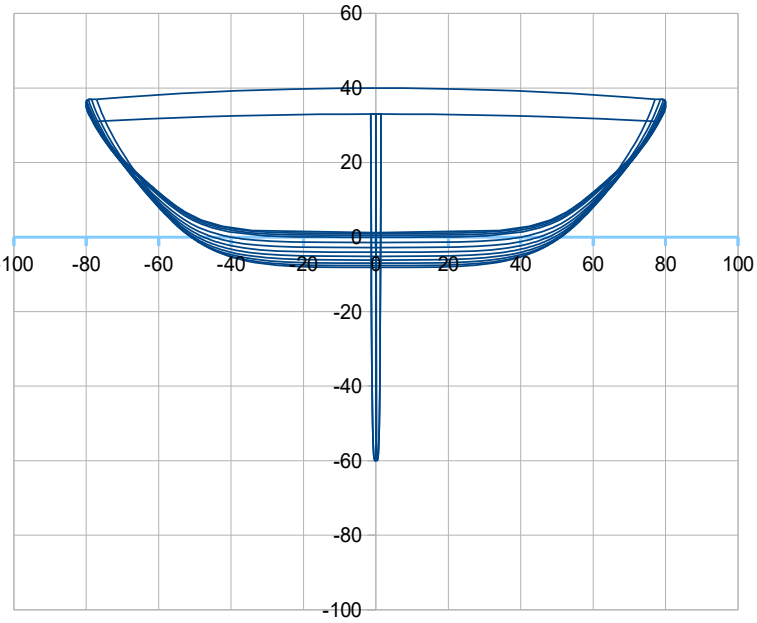
Hydrostatics (upright, displacement with payload 95 kg) :

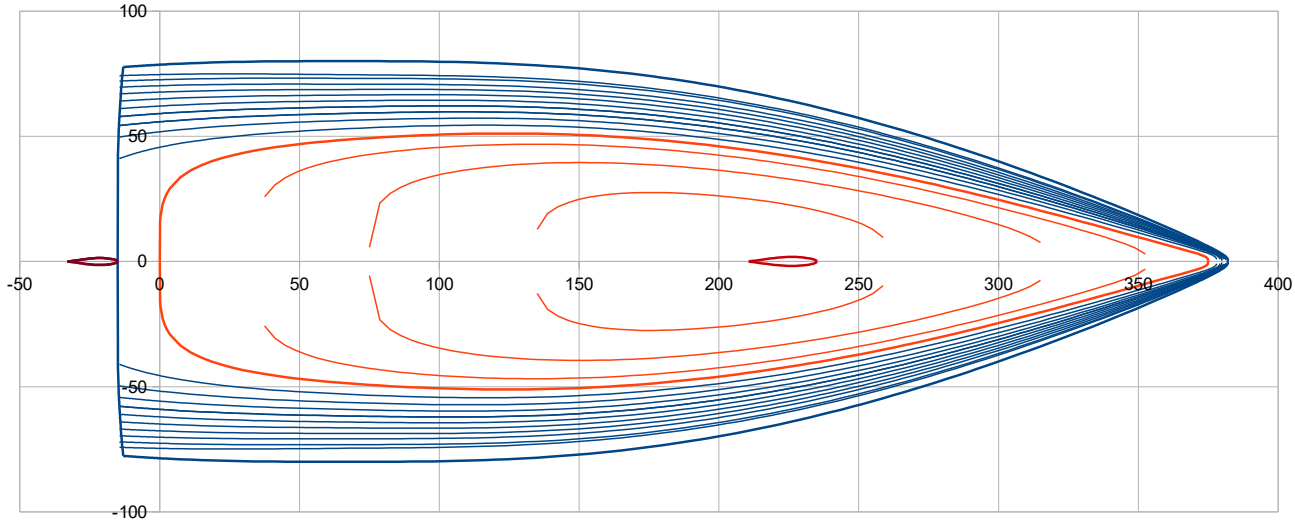
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **2.1 Hull** | | | | | | | | | |
| **Loa (m)** | **3,97** | **Lwl (m)** | **3,75** | >Hull speed | 4,7 | (at Fn 0,4) | | | |
| *>> ft* | *13,02* | | *12,30* | | | | | | |
| **B (m)** | **1,60** | **at X (% Lwl)** | **18,0** | | | | | | |
| *>> ft* | *5,25* | | | | | | | | |
| **Bwl (m)** | **1,00** | **at X (% Lwl)** | **36,0** | > Bwl / B | 0,623 | | | | |
| *>> ft* | *3,27* | | | | | **Freeboards (m) >** | **Aft** | **Midship** | **Fore** |
| **Tc (m)** | **0,094** | **at X (%Lwl)** | **50** | | | | **0,31** | **0,37** | **0,36** |
| *>> ft* | *0,31* | | | | | *>> ft* | *1,02* | *1,21* | *1,18* |
| **Displacement at H0 (m3)** | | **0,14498** | **at Xc (m)** | **1,750** | **Xc (%Lwl)** | | **46,67** | **Zc (m)** | **-0,034** |
| | *>> lbs* | *328* | *w. seawater* | *1025* | *kg/m3* | | | *>> ft* | *-0,11* |
| Disp at h (cm) | -0,376368726 | 0,13508 | at Xc (m) | 1,760 | Xc (%Lwl) | | 46,93 | Zc (m) | -0,007 |
| Disp at h (cm) | 0,376368726 | 0,15526 | at Xc (m) | 1,739 | Xc (%Lwl) | | 46,37 | Zc (m) | -0,062 |
| **Cp (%)** | **55,93** | | | | | | | | |
| **Sf (m2)** | **2,70** | **at Xf (m)** | **1,590** | **Xf (%Lwl)** | **42,40** | | >>> Xc – Xf (%Lwl) | | 4,27 |
| *>> ft2* | *29,08* | *>> ft* | *5,22* | | | | | | |
| **Angle immersed sheer li (°)** | | **25,6** | at section C4 (40% Lwl) | | | | | | |
| **Sw (m2)** | **2,74** | >Sw/D^(2/3) | 9,94 | | | | | | |
| *>> ft2* | *29,54* | | | | | | | | |
| **Shull (m2)** | **6,53** | **at X (m)** | **1,622** | **Z (m)** | **0,066** | | | | |
| *>> ft2* | *70,25* | *>> ft* | *5,32* | *>> ft* | *0,22* | | | | |
| **Sdeck (m2)** | **4,82** | **at X (m)** | **1,459** | | | | | | |
| *>> ft2* | *51,86* | *>> ft* | *4,79* | | | | | | |
| **2.2 Daggerboard** | | | | | | | | | |
| **Volume (m3)** | **0,00282** | **at X (m)** | **2,226** | **X (%Lwl)** | **59,36** | **Z (m)** | **-0,37** | | |
| **Draft oa (m)** | **0,80** | | **Sw (m2)** | **0,30** | | **Sxz (m2)** | **0,14** | | |
| *>> ft* | *2,62* | | *>> ft2* | *3,24* | | *>> ft2* | *1,56* | | |
| **CLR (m)** | **2,288** | **CLR (%Lwl)** | **61,00** | method : keel profile extended to the waterline, 25% c at 45% draft oa | | | | | |
| *>> ft* | *7,50* | | | | | | | | |
| **2.3 Rudder(s)** | | | | | | | | | |
| **Number** | **1** | | | | | | | | |
| **Volume (m3)** | **0,00143** | **at X (m)** | **-0,246** | **X (%Lwl)** | **-6,57** | **Z (m)** | **-0,054** | | |
| **Sw (m2)** | **0,18** | *>> ft* | *-0,81* | | | **Sxz (m2)** | **0,09** | per rudder | |
| *>> ft2* | *1,92* | | | | | *>> ft2* | *0,92* | | |
| **2.4 Hull + Daggerboard + Rudder(s)** | | | | | | | | | |
| **Displacement at H0 (m3)** | | **0,14922** | **at Xc (m)** | **1,740** | **Xc (%Lwl)** | **46,40** | | **Zc (m)** | **-0,041** |
| | **Disp. (kg)** | **153,0** | *>> ft* | *0,53* | | | | *>> ft* | *-0,13* |
| | *>> lbs* | *337* | | | | | | | |
| | **Sw (m2)** | **3,22** | >Sw/D^(2/3) | 11,45 | Lwl/D^(1/3) | 7,07 | | | |
| | *>> ft2* | *34,69* | | | *DLR* | *81* | *M(lbs/2240)/(Lwl(ft)/100)^3* | | |
| **2.5 Data from the mass spreadsheet** | | | | | | | | | |
| **Boat with payload** | **M(kg)** | **153,0** | **at Xg (m)** | **1,567** | **Xc (%Lwl)** | **41,79** | **at Zg (m)** | | **0,588** |
| Light boat | | 58,0 | | 1,677 | | | | | 0,487 |

***Convex-straight 2***



Hydrostatics (upright, displacement with payload 95 kg) :

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **2.1 Hull** | | | | | | | | | |
| **Loa (m)** | **3,97** | **Lwl (m)** | **3,75** | >Hull speed | 4,7 | (at Fn 0,4) | | | |
| *>> ft* | *13,02* | | *12,30* | | | | | | |
| **B (m)** | **1,60** | **at X (% Lwl)** | **18,0** | | | | | | |
| *>> ft* | *5,25* | | | | | | | | |
| **Bwl (m)** | **1,02** | **at X (% Lwl)** | **33,0** | > Bwl / B | 0,639 | | | | |
| *>> ft* | *3,35* | | | | **Freeboards (m) >** | | **Aft** | **Midship** | **Fore** |
| **Tc (m)** | **0,086** | **at X (%Lwl)** | **50** | | | | **0,31** | **0,37** | **0,36** |
| *>> ft* | *0,28* | | | | | *>> ft* | *1,02* | *1,21* | *1,18* |
| **Displacement at H0 (m3)** | | **0,14510** | **at Xc (m)** | **1,730** | **Xc (%Lwl)** | | **46,12** | **Zc (m)** | **-0,032** |
| | *>> lbs* | *328* | *w. seawater* | *1025* | *kg/m3* | | | *>> ft* | *-0,11* |
| Disp at h (cm) | -0,349325417 | 0,13553 | at Xc (m) | 1,739 | Xc (%Lwl) | | 46,38 | Zc (m) | -0,004 |
| Disp at h (cm) | 0,349325417 | 0,15505 | at Xc (m) | 1,719 | Xc (%Lwl) | | 45,83 | Zc (m) | -0,060 |
| **Cp (%)** | **57,05** | | | | | | | | |
| **Sf (m2)** | **2,82** | **at Xf (m)** | **1,566** | **Xf (%Lwl)** | **41,75** | | >>> Xc – Xf (%Lwl) | | 4,38 |
| *>> ft2* | *30,36* | *>> ft* | *5,14* | | | | | | |
| **Angle immersed sheer li (°)** | | **25,6** | at section C4 (40% Lwl) | | | | | | |
| **Sw (m2)** | **2,85** | >Sw/D^(2/3) | 10,32 | | | | | | |
| *>> ft2* | *30,69* | | | | | | | | |
| **Shull (m2)** | **6,55** | **at X (m)** | **1,620** | **Z (m)** | **0,066** | | | | |
| *>> ft2* | *70,47* | *>> ft* | *5,32* | *>> ft* | *0,22* | | | | |
| **Sdeck (m2)** | **4,82** | **at X (m)** | **1,459** | | | | | | |
| *>> ft2* | *51,86* | *>> ft* | *4,79* | | | | | | |
| **2.2 Daggerboard** | | | | | | | | | |
| **Volume (m3)** | **0,00285** | **at X (m)** | **2,226** | **X (%Lwl)** | **59,36** | **Z (m)** | **-0,37** | | |
| **Draft oa (m)** | **0,80** | | **Sw (m2)** | **0,30** | | **Sxz (m2)** | **0,15** | | |
| *>> ft* | *2,62* | | *>> ft2* | *3,27* | | *>> ft2* | *1,57* | | |
| **CLR (m)** | **2,288** | **CLR (%Lwl)** | **61,00** | method : keel profile extended to the waterline, 25% c at 45% draft oa | | | | | |
| *>> ft* | *7,50* | | | | | | | | |
| **2.3 Rudder(s)** | | | | | | | | | |
| **Number** | **1** | | | | | | | | |
| **Volume (m3)** | **0,00143** | **at X (m)** | **-0,246** | **X (%Lwl)** | **-6,57** | **Z (m)** | **-0,054** | | |
| **Sw (m2)** | **0,18** | *>> ft* | *-0,81* | | | **Sxz (m2)** | **0,09** | per rudder | |
| *>> ft2* | *1,92* | | | | | *>> ft2* | *0,92* | | |
| **2.4 Hull + Daggerboard + Rudder(s)** | | | | | | | | | |
| **Displacement at H0 (m3)** | | **0,14938** | **at Xc (m)** | **1,720** | **Xc (%Lwl)** | **45,87** | | **Zc (m)** | **-0,039** |
| | **Disp. (kg)** | **153,1** | *>> ft* | *0,52* | | | | *>> ft* | *-0,13* |
| | *>> lbs* | *338* | | | | | | | |
| | **Sw (m2)** | **3,33** | >Sw/D^(2/3) | 11,84 | Lwl/D^(1/3) | 7,07 | | | |
| | *>> ft2* | *35,87* | | | *DLR* | *81* | *M(lbs/2240)/(Lwl(ft)/100)^3* | | |
| **2.5 Data from the mass spreadsheet** | | | | | | | | | |
| **Boat with payload** | **M(kg)** | **153,1** | **at Xg (m)** | **1,567** | **Xc (%Lwl)** | **41,79** | **at Zg (m)** | | **0,588** |
| Light boat | | 58,1 | | 1,676 | | | | | 0,486 |