

# UL 290



Stability calculation according to ISO 12217-3-2017 Small craft Stability and buoyancy assessment

By Xiamen DAWN DESIGN

Company: 厦门道恩建筑设计有限公司

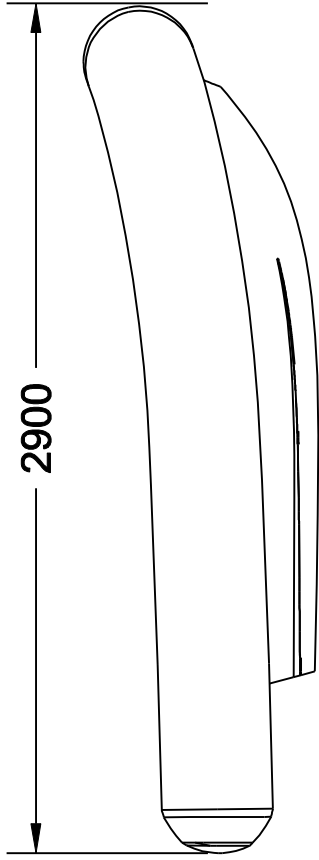
Address: 中国(福建)自由贸易试验区厦门片区翔云一路95号运通中心604B单元之五八八  
604B-588 Yuntong Center, No.95 Xiangyunyilu road, Xiamen area of  
China(Fujian) Pilot Free Trade Zone

Owner: 王弘涛

 DAWN YACHT DESIGN 厦门道恩建筑设计有限公司	<b>ITEM</b>		PROJECT:	UL 290	
	<b>UL 290</b>		Cat.	cat. C	
	Signature		REV.	PAPER	SCALE
Design by			R2	A4	
Checked by			sheet 1 of 8		
Technic by					
Approved by		DATE	2018.05		

# CONTENT

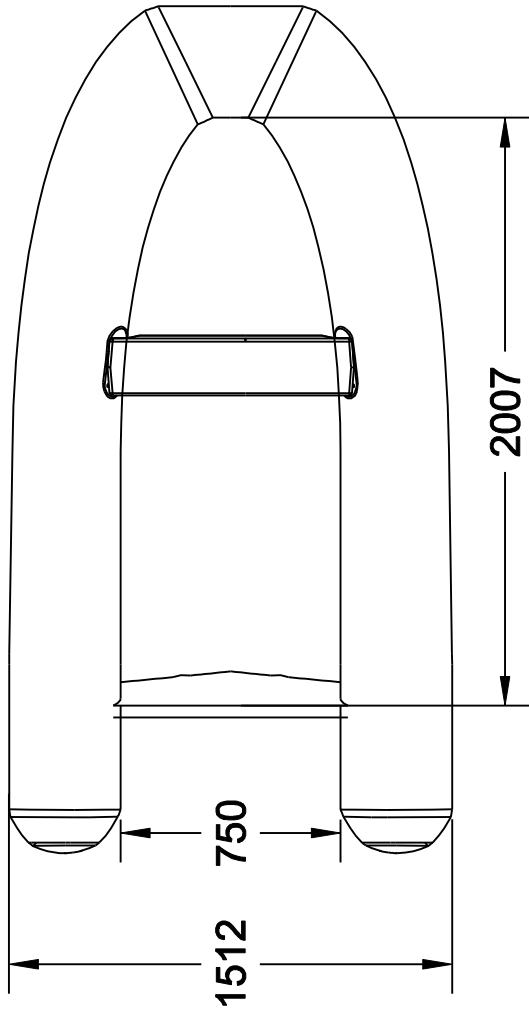
1. General Arrangement
2. Weight Estimation
3. Buoyancy Calculation
  - 3.1 Maximum power and buoyancy
  - 3.2 Maximum load and maximum number of passengers
4. Hydrostatics tables
5. Offset load test



2900

**SPECIFICATION**

Loa	2900mm
Beam	1512mm
Inside Length	2007mm
Inside Width	750mm
Weight	38Kg
Max Pax	4
Max Load	375Kg
Max HP	10
Shaft	Short
Tube	38cm
Airtight Chambers	3



1512

750

2007

**DND**

DAWN YACHT DESIGN

Signature	
Design by	S.C/L
Checked by	
Technic by	
Approved by	
DATE	2017.04.19

**Drawing Title**

**General Arrangement**

Project Name: UL290

Drawing NO: UL29-01-01

PAPER	A4	SCALE	1:25
SHEET	1	of	1
			R2

UL290 Weight			
Weight of the boat	38	kg	
Weight of the motor	60	kg	
test load	201	kg	4 passengers
TOTAL test mass:	<b>299.00</b>	kg	

The total test load  $m_t$ , in kilograms, shall be calculated using the following formula:

$$m_t = (0,67 \times n \times 75) + (0,67 \times 37,5) \text{ for a child, if applicable}$$

$n$  is the maximum permissible number of adults determined by the manufacturer (see 6.1), i.e. 75 kg for each permissible adult and 37,5 kg for a child, if applicable.

# Maximum power

## 6.2 Maximum motor power

This is applicable to Type V boats only.

The motor maximum power, in kilowatts, shall be determined by the manufacturer and shall not exceed that calculated using the following formula:

$$P_{\max} = 10 \times F(d) - 33$$

where

$P_{\max}$  is the maximum motor power rating, in kilowatts, determined in accordance with ISO 8665;

$F(d)$  is the dimensional factor =  $l \times b$

where

$l$  is the overall length of the boat, in metres, from the bow to the extremity of the rear float (excluding handholds or other fittings);

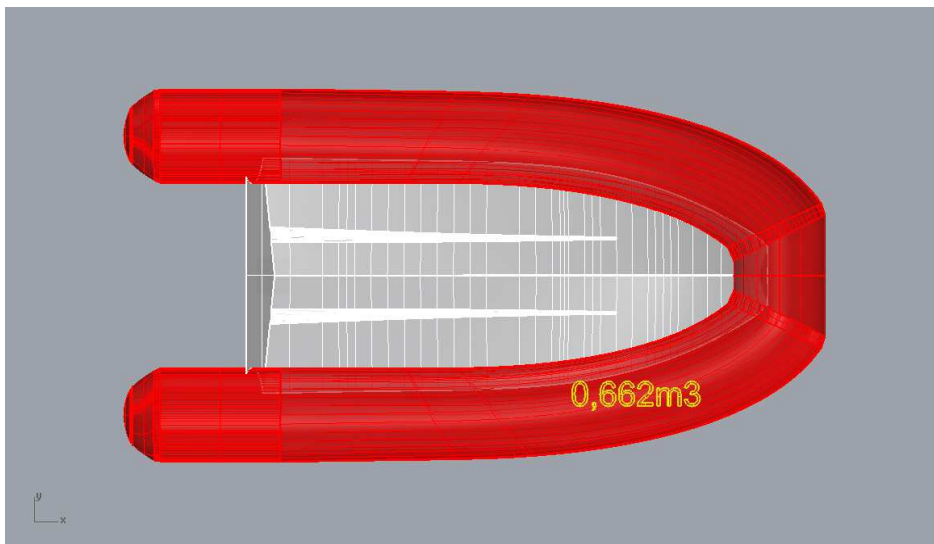
$b$  is the overall beam of the boat, in metres (excluding handholds or other fittings).

	l(m)	b(m)	Pmax Kw	Pmax HP
UL 290	2.9	1.530	11.37	<b>15.25</b>

# UL290 Buoyancy

Inflatable Buoyancy tube:

**0.662 m<sup>3</sup>**



# Maximum Load

The maximum load which may be carried by the boat shall be determined by the manufacturer and shall not exceed that calculated using the following formula:

$$m = (0,75 \times V \times 1000) - m_b$$

where

- $m$  is the maximum load capacity, in kilograms (total mass on board including persons, equipment, motor(s) and fuel);
- $V$  is the volume, in cubic metres, of the buoyancy of the boat;
- $m_b$  is the total mass, in kilograms, of the boat as supplied by the manufacturer [inclusive of all permanently installed equipment supplied with the boat: hull, fittings and similar items but without motor(s) and fuel]. Permanently installed engine(s) and drive systems shall also be included.

Buoyancy volume (m <sup>3</sup> )	M (kg)	m (kg)	Max load recommended by manufacturer:
m <sup>3</sup>	kg	kg	kg
0.662	38	458.5	375

## Maximum number of passengers

$$n = \frac{l_i}{0,38} - 1$$

where  $l_i$  is the inboard length, in metres.

Under no circumstances shall the value,  $n$ , expressed in body mass, exceed the maximum load capacity (see 6.4).

The value  $n$  shall always be rounded down to the nearest integer but, if the first decimal place is greater than 5, a child may be added, or if greater than 7, an adult may be added.

For calculations, the body mass of a child is defined as 37,5 kg and the body mass of an adult as 75 kg.

The data displayed on the builder's plate(s), see clause 8 e), shall include at least one adult and not more than one child.

	$l_i$	n		N. persons
UL 290	2	4.263		4

# Hydrostatics Report

Length Overall, LOA	2.900	m
$L_H =$	2.900	m
Beam Overall, Boa	1.510	m
Waterline Length, Lwl	2.562	m
Waterline Beam, Bwl	1.453	m
Navigational Draft, T	0.278	m
Displacement Weight	299.000	kgf
Volume	0.291	m <sup>3</sup>
LCG	0.658	m
TCG	0.000	m
VCG	0.196	m
Fluid Density	1025.000	kg/m <sup>3</sup>
LCB	0.658	m
TCB	0.000	m
VCB	0.196	m
Wetted Surface Area	3.208	m <sup>2</sup>
Waterplane Area, Awp	2.698	m <sup>2</sup>
LCF	0.648	m
TCF	0.296	m
Weight To Immerse	27.674	kgf/cm
I(transverse)	0.470	m <sup>4</sup>
I(longitudinal)	0.947	m <sup>4</sup>
BMt	1.612	m
BMI	3.248	m
GMt	1.346	m
GMI	2.983	m
Mt	1.535	m
MI	3.171	m
Heel Angle	0.000	deg
Trim Angle	1.476	deg
Cb	0.281	
Cwp	0.725	
Cvp	0.388	
Cws	3.713	

# Offset load test simulation

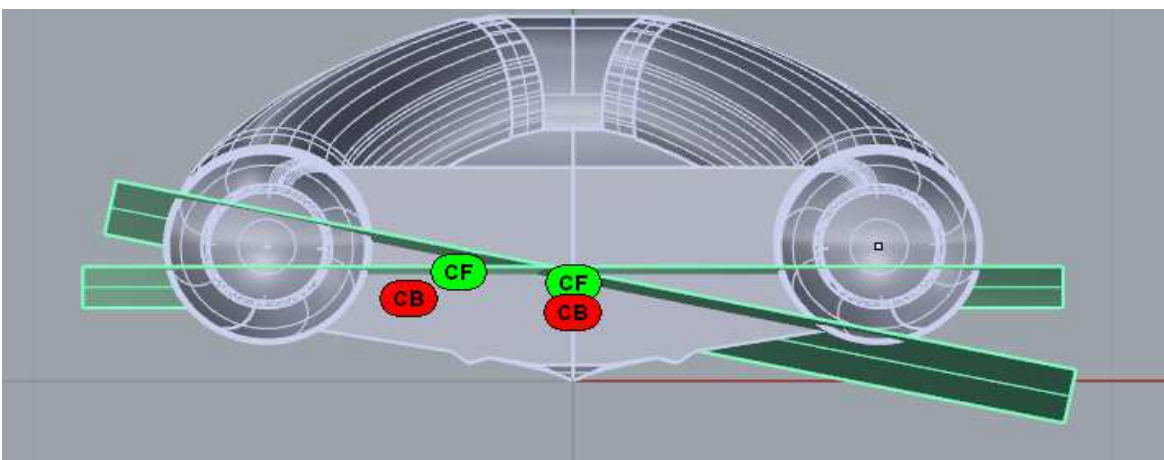
## 1. Test condition

	weight(kg)	x (mm)	y(mm)	z(mm)	Mx	My	Mz
boat	98	651	0	280	63798	0	27440
load	201.00	651	380	550	130851	76380	110550
	<b>299.00</b>	651.0	255.5	461.5	<b>194649</b>	<b>76380</b>	<b>137990</b>

## 1. General

Length Overall, LOA	2.900	m
$L_H =$	2.900	m
Beam Overall, Boa	1.510	m
Waterline Length, Lwl	2.648	m
Waterline Beam, Bwl	1.511	m
Navigational Draft, T	0.801	m
Displacement Weight	299.000	kgf
Volume	0.291	m <sup>3</sup>
LCG	0.651	m
TCG	0.256	m
VCG	0.462	m
Fluid Density	1025.000	kg/m <sup>3</sup>
LCB	0.661	m
TCB	0.335	m
VCB	0.242	m
Wetted Surface Area	2.759	m <sup>2</sup>
Waterplane Area, Awp	2.073	m <sup>2</sup>
LCF	0.756	m
TCF	0.279	m
Weight To Immerse	21.267	kgf/cm
I(transverse)	0.170	m <sup>4</sup>
I(longitudinal)	0.820	m <sup>4</sup>
BMt	0.584	m
BMI	2.815	m
GMt	0.351	m
GMI	2.581	m
Mt	0.504	m
MI	2.734	m
Heel Angle	-19.807	deg
Trim Angle	2.375	deg

## 2. Test



Water does not enter into the boat.