

# How to get a MULTI 2000 rating?

A.M.H. Rating Officers are on duty for most of the races in our Challenge or FFV calendar. As in many monohull rules (P.Y, I.R.C., etc..) we can also calculate a rating based on information supplied by the owner or skipper.

To help the Officer's task, we need to have the Data sheet completed as accurately and as soon as possible before the start of a race.

Our Officers are familiar with most multihull designs and if the owner finds some of the measurements hard to find, they can usually help to fill in the gaps.

-The A.M.H. is an association. Since 2007, a MULTI 2000 certificate will be charged (see fees below).

-All clubs or organizers may use MULTI 2000 rule and can rate the entrants themselves. The MULTI 2000 is available and all multihulls rated by the AMH are published for transparency.

It is possible to use the rating of an already measured multihull providing sails, propellers or weight are identical.

We just ask to receive a copy of the rating certificate and race results for our own information.

-We can also rate the boats or calculate the results for any club or organizing authority on request. If necessary, the measurer's expenses may have to be reimbursed.

MULTI 2000 was developed so that measurements are easy to take and check.

The main dimensions are straightforward and the owner can take accurate measurements.

The exact sail area may be given by the sailmaker. Otherwise, the sails may be measured on a flat area and their area computed with the rule formula.

The most difficult measurement is that of the weight in rating trim.

-Ideally, the boat is officially weighed but this is not always possible especially for the largest boats.

-The weight given by a crane while launching the boat is not very accurate. Weight of straps must be checked.

-A good way to calculate the displacement for the big multihulls is from the freeboard. With forward and aft freeboard measured, it is easy to calculate the displacement from the body plan. Every designer or builder should be able to do it.

-Without a measured weight, the builder published weight has to be used. This value is usually underestimated which will produce a rating that is unfair to the owner. It is necessary to know the definition of the builder's published weight:

Empty weight is the boat weight without equipment, sails, options and with empty tanks.

Loaded displacement is the weight of the boat while cruising, all tanks filled, with crew, dinghy, food, etc...

Every rating has to be calculated in rating trim. This is defined as the boat's weight with safety, galley and navigation equipment, mooring gear, sails and engine. Tanks empty, no food, no crew, no personal gear, no tender.

While been raced, the boat must carry at minimum the inventory with which she has been weighed.

Measured weight is fundamental to estimate the speed potential. It is the owner's duty and in the interest of all to provide a value as accurate as possible. It is extremely frustrating to compete in a race without a chance of winning because the builder's published weight is unrealistic. Ratings must be reliable so that data from the results of races can be used to improve the formula. Most of all, it would be a disgrace if anyone should win by giving an overestimation of the measured weight.

All racing must be fair. All rating certificates are available for anyone to check. The A.M.H. Rating Committee reserves the right to penalise or even exclude anyone who provides false information in an attempt to reduce a rating.



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# Data sheet MULTI 2000

**Owner or skipper**

Name .....  
 Address .....  
 Tel. and email: .....

**Boat**

Name .....  
 Sail number .....  
 Mode: .....  
 Builder .....  
 Designer .....

**Type \***

Dinghy cat single/double-handed, Catamaran, Trimaran, Foiler,  
 Proa

**Appendages \***

Fixed keels-Pivoting boards-Dagger boards-Fixed foils-Lifting foils

**Hulls**

Length overall LOA .....m  
 Length RL measured at mid-freeboard .....m  
 Beam overall .....m  
 Draft TE at rated displacement .....m

Measured weight W ready to sail with sails, engine(s), mooring,  
 safety and navigation equipment but without crew, food and tanks  
 empty .....kg  
 Weighing method (measured, estimated, Builder, ...)

**Rig**

Mast length ..... m  
 Efficient height of rig V ..... m  
 Mainsail luff P ..... m  
 Mast circumference CM (if rotating) ..... m  
 Measured mainsail area SM .....m<sup>2</sup> E = ..... m, E1 = ..... m, E2 = .....m E3 =  
 ..... m, T = ..... m, B = ..... m  
 Measured mizzen area SA .....m<sup>2</sup>  
 Largest jib luff LJ ..... m  
 Head stay \*: Hanks  
     Furler, circumference CF ..... m  
     Head foil, circumference CE ..... m  
 Measured largest jib area SJ .....m<sup>2</sup>  
 Measured drifter or gennaker area SD .....m<sup>2</sup> LP = ..... m  
 Measured spinnaker area SS .....m<sup>2</sup> DH = ..... m, DF = ..... m, DMG = .....m  
 Drifter, gennaker or spinnaker tack distance forward the bows TA .....m<sup>2</sup> SF = ..... m, SL1 = ..... m, SL2 = .....m,  
 SMG = ..... m  
 Measured headroom HSB on 0,30m wide and 0,2 \* L long floor ..... m

**Engines**

Speed VM under engine ..... knots  
 Number of propellers .....  
 Type of propellers \*: Fixed blades, Feathering, Variable pitch,  
 Outboard, Cat drive

**Data from \***

Rating officer-Builder-Designer-Owner-Other rating certificate .....

Date and measurer signature:

Rating :   
 Class :   
 Certificate Number:   
 End of validity :

\* select the right answer **Yellow zones recommended but optional  
 declaration of exact measures of your sails**

AMH stamp

# MULTI 2000 Rating

$$R (\text{Rating}) = RL^{.3} * RS^{.4} / RW^{.325} * K * Q * PF * HF (\text{métrique})$$

RL	Rated length measured between the forward and aft perpendiculars of the multihulls taken at mid-freeboard
LOA	Length overall taken from the most forward bow to the most aft stern
$RS = (RSM + RSJ + RSD) * CA + .1 * RSS$	Rated sail area
$RSM = SM + P * CM / 2$	Rated mainsail area
$SM = (E + 4 * E1 + 2 * E2 + 4 * E3 + T) * P / 12 + E * B / 1.5$	Measured mainsail area
P	Mainsail luff measured between two black bands on the mast or between the lowest possible mainsail tack and the highest possible mainsail head
E	Mainsail foot
B	Height of the foot roach
E1	Mainsail girth at ¼ height parallel to the foot
E2	Mainsail girth at ½ height parallel to the foot
E3	Mainsail girth at ¾ height parallel to the foot
T	Headboard or top of "square head" sail width In the case of unusual mainsail shapes, the measurer shall measure extra girths
CM CM = 0	Circumference of a rotating mast For a non rotating mast
$RSJ = SJ + LJ * (CE - CF) / 2$	Rated jib area
$SJ = LJ * LP / 2 + CJ * RJ / 1.5$	Measured jib area
LJ	Jib luff measured between two black bands on the head foil or furling gear or between the jib tack and the jib halyard block
LP	Jib perpendicular measured from the after jib clew position to the most forward head stay
RJ CJ	Leach roach of the largest overlap jib. It will always be positive or nil Leach length of the jib measured if RJ > 0
CE CF	Head foil circumference Jib furler circumference All headsail set on a head stay will be measured as a jib
$RSD = (SD * TF - SJ) / 4$ RSD = 0	Rated drifter area if SD * TF > SJ Rated drifter area if SD * TF ≤ SJ
$SD = DH / 6 * (DF + DMG * 4)$	IYRU measured area of a drifter or gennaker. All headsail set flying which cannot be measured as a spinnaker will be measured (drifter, gennaker, code 0, etc...) when the DMG is less than 75% of DF
DH	drifter height measured between headboard perpendicular to foot
DF	Drifter foot
DMG	Mid-height drifter girth
$TF = TA / (.149 * LOA + .329)$ TF = 1	If TA > .149 * L + .329 If TA ≤ .149 * L + .329
TA	Greatest distance forward the bows where a drifter or a spinnaker may be tacked, from a bowsprit or a spinnaker pole For unusual stem shapes, the measurer will define the fair position of the bow
$A = 2 * V^2 / (RSM + RSJ + RSD)$	Rig aspect-ratio
$CA = .401 + .1831 * A - .02016 * A^2 + .0007472 * A^3$	Aspect-ratio correction
V	Vertical height of the rig measured between: -the lowest of the mast step or jib tack and the top of the mast for a rotating mast. -the lowest mainsail or jib tack and the top of the mast for a non-rotating mast
$RSS = SS * TF - SJ - RSD$ RSS = 0	Rated spinnaker area if SS * TF > SJ + RSD Rated spinnaker area if SS * TF ≤ SJ + RSD
$SS = (SL1 + SL2) * (SF / 12 + SMG / 3)$	Measured spinnaker area
SL1 & SL2	Spinnaker luffs
SF	Spinnaker foot
SMG	Mid-height spinnaker girth All headsails set flying whose SMG is greater than 75% SF will be measured as a spinnaker
The greatest number of sails allowed will be the smallest of LOA / 1.6 (rounded) or 8. This <b>will not</b> include a storm jib smaller than .1 * (SM + SJ)	
$RW = W - 1.7384 * LOA^2 + 92.38 * LOA - 388$ RW = W + 150 RW = W + 75	Rated weight if LOA > 6.66 Rated weight if LOA ≥ 6.66 Rated weight for single-handed dinghy cats
W	Measured weight in kg with sails, engine(s), mooring, safety and

	navigation equipment
$K = 1.28 - W * RL / RS / V / 1100$ $K = 1.28 + W * RL / RS / V / 1100$ $K = 1.28$	Type correction for catamarans (K will not be taken less than 1.245) Type correction for trimarans (K will not be taken more than 1.315) Type correction for praos
$Q = .907 + 1.55 * (TE / RL) - 4.449 * (TE / RL)^2$ $Q = 1.036$ $Q = 1.048$ $Q = 1.048$	Appendage correction for fixed keel(s): Appendage correction for pivoting board(s) Appendage correction for dagger board(s) Appendage correction for lifting foils
TE	Draft of the deepest of the keel(s) or rudders(s) measured in rating trim
VM	Measured speed under engine in knots
$PF = 1$ $PF = 1$ $PF = 1$ $PF = 1$ $PF = 0.99$ $PF = 0.98$ $PF = 0.98$ $PF = 0.96$	Propeller factor if there are no engines Propeller factor for outboard engines Propeller factor for lifting drives Propeller factor if $VM < (LOA / .3048)^{.5}$ Propeller factor for one feathering/folding propeller Propeller factor for one fixed blades propeller Propeller factor for two feathering/folding propellers Propeller factor for two fixed blades propellers
$LOA / 2.13$ (rounded) 1,90m 0,55m 0,45m 0,55m	Minimum number of berth Minimum berth length Minimum berth width on 1.25m length Minimum berth width at the foot Minimum height above the cushions
$LOA / 4.26$ 0.40m 0,30m 0,85m	Minimum settee length Minimum settee width Minimum height from the cabin sole to the cushion Minimum height above the cushions The settee may be combined with the required berths
HSB	Measured headroom above the cabin sole area
.2 * LOA	Minimum cabin sole length on 0.30m wide
$HM = 1.22$ $HM = .108333 * L + .353$ $HM = 2$	Base headroom if $LOA \leq 8m$ Base headroom if $8m < LOA \leq 15.2m$ Base headroom if $LOA > 15.2m$
$HF = 1 + .3 * (HM - HSB) / 1.96$ $HF = 1$	Headroom factor if $HSB < HM$ Headroom factor if $HSB \geq HM$
For the existing boats at the date of 31/12/1994 which will not conform to these accommodation limits, a grandfather clause will allow them to race but the headroom penalty still apply	
For all unusual configuration aiming to obtain a lower rating, the measurer shall consult the rating committee which will have all power to resolve the problem	

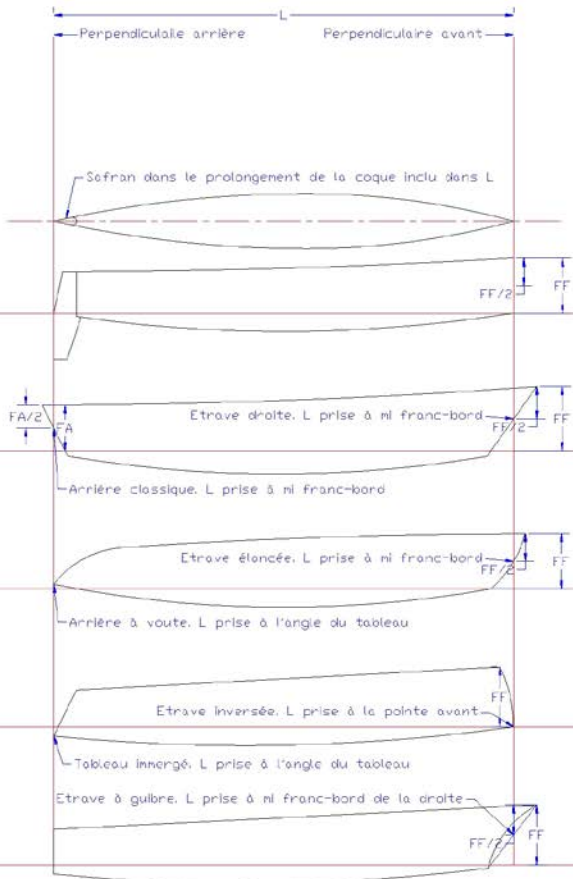
### Certificate fees

**2012 certificate** will be delivered for **30 €** for any kind of boat. That is an owner declared certificate, agreed by the AMH measurer. The **validity** is **4 years**.

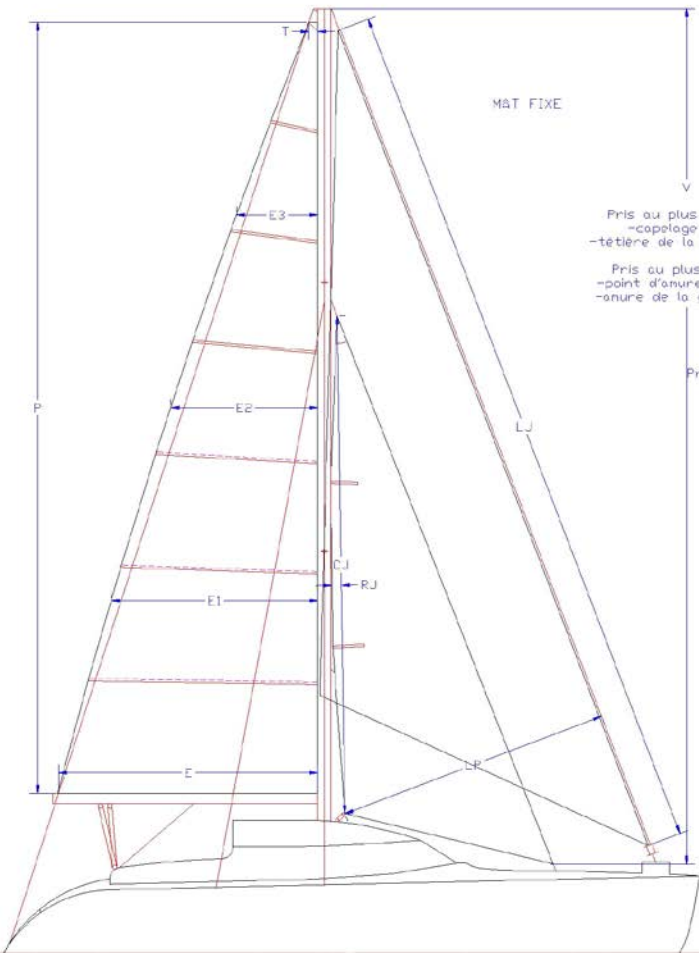
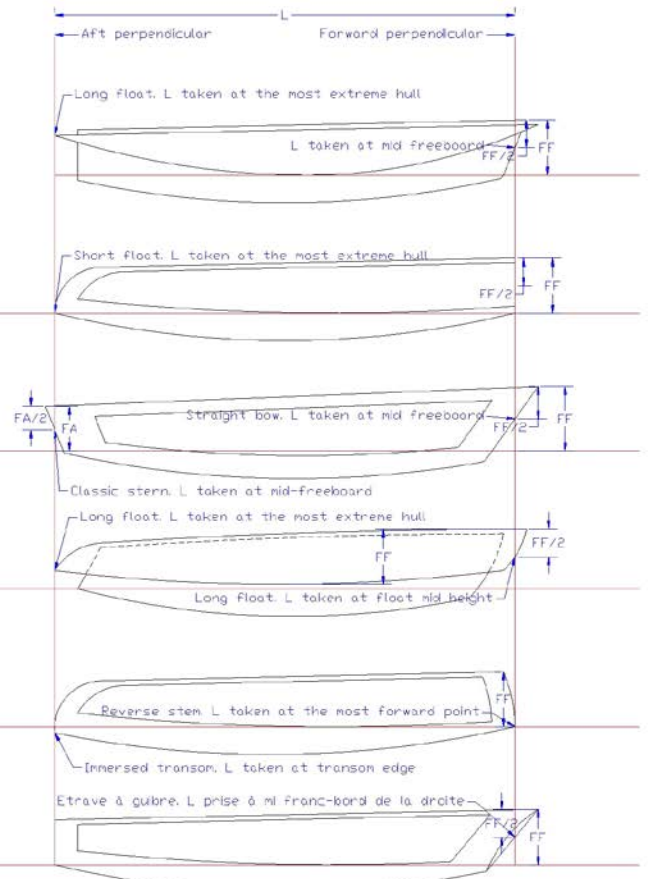
These above fees will apply for owner declared certificates. For boats asking to be physically measured, all incomings will be at its own charge.

These fees do not include sail's number attribution by FFV of 15€(or other national institution).

DATAMARANS

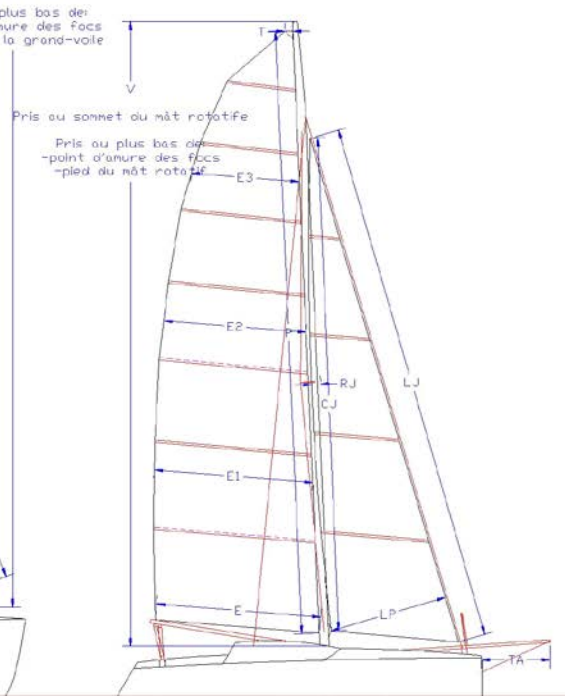


TRIMARANS



Pris au plus haut de:  
-copelage d'étai  
-têtière de la grand-voile

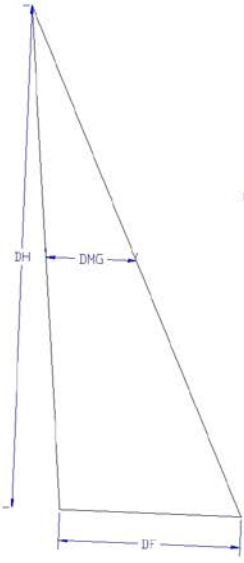
Pris au plus bas de:  
-point d'ancre des focs  
-ancre de la grand-voile



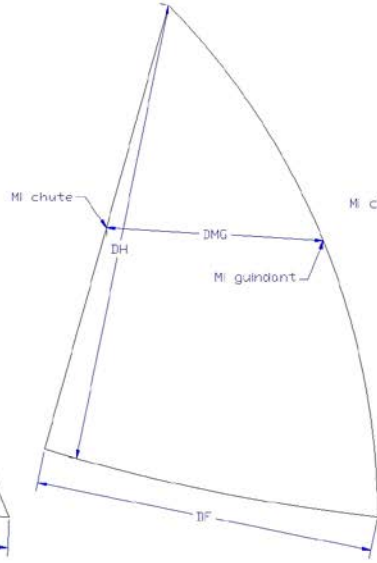
Pris au sommet du mât rotatif

Pris au plus bas de:  
-point d'ancre des focs  
-piéd du mât rotatif

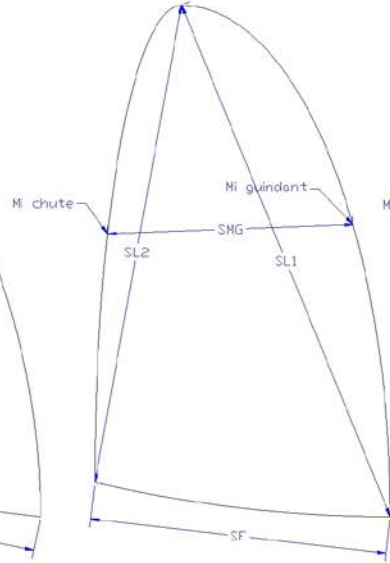
DRIFTER



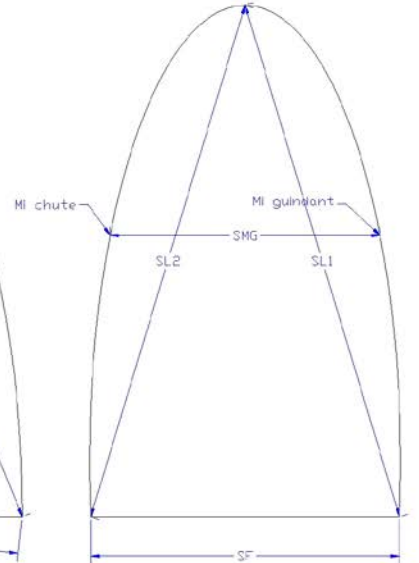
DRIFTER



SPI ASYMETRIQUE



SPI SYMETRIQUE





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2012 adhesion form

*To promote multihulls races or cruises is the association purpose.*

Type of adhesion:

- 50 € Owner of multihulls boat (included 1 certificate)
- 15 € Crew member
- 100 € Shipyard, architect, club or other commercial partner
- 400 € Internet AMH advertising (for members only)

Name : ..... surname : .....

Address : .....

Postal code : ..... City : .....

Tel : ..... mobile : .....

Email : .....

For owner or crew member:

Birth date : .....

Boat name : ..... Type : .....

Harbour : ..... Sail Number: .....

Club : ..... Class : .....

Rating : .....

Use of your email agreed for:

- News and AMH newsletter
- Communication to our commercial or political partners

Amount of adhesion: ..... €

Applied in ..... Date: .....

Signature to confirm your adhesion

Join at this form your cheque to the order of AMH and send them to the postal address of the association.