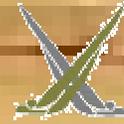


# *2.4 Metre International Class Association*



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*Special Edition*



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## Secretary's Report

Hello Everyone!! I do not like to be the messenger of difficult news, but it is necessary. I know many of you have been hearing rumors and some of these rumors have gotten out of control. It is important for you to understand, that the elapsed time from the time of discovery to the time of announcement was necessary to give the ICA time to fully grasp the magnitude of the situation and devise the best possible solution that is in the best interest of the ICA and the owners of a Norlin Mk III 2.4mR. The following pages contain information that affects *every* owner of a Norlin Mk III 2.4mR worldwide. Actually, the solution is quite simple and gives the affected boat owner two options. Compliance is required by 01 April 2006, in order to sail in a 2.4mR event.

I am sure that there will be questions and concerns, so this is how things will be handled. I am assuming all of you know who the representative of your NCA. If not, please visit <http://www.sailingsource.com/24metre/files/nca.htm>.

All questions concerning this issue are to be sent THROUGH YOUR NCA REPRESENTATIVE to the ICA Secretary. I will either answer or forward all questions to the appropriate individual.

*Thomas Franklin*

Thomas Franklin  
Secretary—2.4mR International Class Association





## **Decision of the Executive Committee Concerning the Weight of a Norlin Mk III Design**

From 01 April 2006 and beyond, when racing in the 2.4mR Class with a boat of the Norlin Mk III design, the boat weight according to Rule C.5.1 shall be 254 kg instead of what is stated in the certificate of the boat. Sailors claiming that their boat should have another weight must carry through a new fundamental measurement, which includes a tank test. Furthermore, the EC decided to make a motion to the 2006 AGM, in Helsinki that the ballast requirement of 182 kg stated in Appendix K, shall be reduced to 176 kg.

## **Background for the Executive Committee's Decision**

### **Motion From the Technical Committee**

**From 01 April 2006 and beyond, when racing in the 2.4mR Class with a boat of the Norlin Mk III design, the boat weight according to Rule C.5.1 shall be 254kg instead of what is stated in the certificate of the boat. This does not affect the Section K in the Rules for 2005.**

### **Background Information From the Technical Committee**

During the autumn of 2005, two different measurements were carried out in Sweden. The purpose of these measurements was to check the volume displacement of Norlin Mk III yachts.

Certificates issued by the certification authorities, NA or NCA, are based on measurement protocols made by the measurer when the fundamental measurement for the boat is fulfilled by the builder's measurer. The figures of these protocols are seldom checked by other measurers or by the NA/ NCA when issuing the certificates, especially not tests of the volume displacement, which requires a tank with water of known density. Everybody relies on the builder and the designer, who always have declared that the boat weight shall be 259–261kg.

When rebuilding an old Norlin Mk III boat in Gothenburg, it was required to check the volume displacement. At this point, it was noticed that something was wrong. A control was carried through on 10 September 2005 in Gothenburg of which six boats were of Norlin Mk III design. It was found that the boat weight according to Rule C.5.1 was about 254kg, and none of the checked boats were near 260kg. The chief measurer at that time was Per Lindell, who is an official measurer in Sweden and a member of the TC of the Swedish NA.

A report was made dated 29 September 2005 and the matter was handed over to the Swedish NCA. Håkan Kellner who is responsible for technical matters got in touch with Peter Norlin, and it was decided to make new independent measurements of six boats from the Stockholm area. This took place 04 December 2005 and the results verify the observations made in Gothenburg. The measurers in Stockholm were Stefan Ryott and Håkan Kellner. During the whole day of testing, Peter Norlin was present. The report of these measurements is dated 21 December 2005.

Based on the above mentioned reports, the TC of the International 2.4mR Class Association proposes the EC to take the following decision:

The definition of the design of a Norlin Mk III in this respect is a boat with P = 4650mm, E = 1960mm and J = 1560mm. For other figures, a fundamental measurement is required to be carried through which includes a tank test.



An amendment of the Rule, valid from 01 March 2007 is recommended, in order to decrease the additional 35kg lead weight to 30kg. From such an amendment will follow:

- The Norlin Mk III boat will have a boat weight of 254kg, which means approximately the same as today,
- Section K will correspond to the 2.4mR Rule.

The reason for this is to maintain the present good performance of the yachts in hard wind and rough sea.

Respectfully Submitted,  
The ICA Technical Committee

Håkan Kellner  
Rikard Bjurström  
Stefan Ryott

## **Background for the Technical Committee's Motion**

### **Measurement of Weight and Volume Displacement of Six Norlin Mk III 2.4mR Yachts**

**Date of Measurements: 04 December 2005**

**Date of report 2005-12-21**

**Official Measurers: Håkan Kellner (SWE 1128) and Stefan Ryott (SWE 850)**

### **Introduction**

This report documents measurements which took place at Jordbro outside Stockholm on the 4<sup>th</sup> of December 2005. The purpose of the measurements was to state if the founding made in Gothenburg when checking weights and flotation marks was correct or not. See report dated 29 September 2005 by Per Lindell.

The measurements took place inside a store building in which yachts are stored during the winter. The temperature inside the building was about 15 degrees Celsius. The displacement control was made in a water basin made for this purpose in 1993. The basin was filled with fresh water with the temperature of 10 degrees Celsius. The water density was calculated to 999.7kg/m<sup>3</sup>.

The weights of the boats were recorded using the balance of the Swedish 2.4mR Association. The balance was calibrated the day before the measurement day and also checked again three week after. The calibrations were made using crowned weights. These weights and also the balance used were compared to another balance of the Swedish 2.4mR Association, which just turned back after repair and calibration.



## Boats Measured

A number of boats were selected in beforehand for this purpose. The boats were picked out from different years of production in order to cover the population of the Norlin Mk III fleet.

All boats were produced in moulds and delivered from Vene-Björndahl, in Finland. The yachts measured are shown in table 1.



Sail No	Plaque No	When Built	Comments
SWE 263	Sk 270	1991	Original Björndahl boat
SWE 369	169	1998	Original Björndahl boat
SWE 406	360	2002	Original Björndahl boat
SWE 420	R 355	2001	Original Björndahl boat rebuilt inside by Henrik Johnsson
SWE 422	431	2004	Original Björndahl boat finished by Ulf Arvidsson
SWE 426	449	2004	Original Björndahl boat rebuilt inside by Henrik Johnsson

**Table 1. List of Boats That Were Measured**

## Measurement Procedure

The boats were placed in a horizontal position. A tape measure was laid on the floor, which was perfectly horizontal. Plumb lines were attached to the stem and the stern so the overall length could be measured. The LWL station at the stern was marked (the existing measurement marks were checked). The aft overhang was measured. The LWL length which is 2978mm was set out from the aft LWL station, and the forward LWL station was marked out (the existing measurement mark was checked). The forward overhang was measured to the plumb line. The LWL level was marked on the skeg 36mm under the hull at the aft LWL station. Even the beam of the boat in the deck level at the 0.55 LWL station was measured.





## Tank Test Procedure

The purpose of the tank tests was to control the volume displacement of the Norlin Mk III design. For that purpose only the total weight and its distribution was of interest. Consequently, the mast, boom, sails and loose equipment could be represented by lead weights placed in the relevant positions. The extra weight of 35kg was converted in order to compensate to the difference in water density according to Appendix H.3.

The boat weight 254kg gives total weight 189kg which gives the volume displacement of  $289/1.025 = 281.95$  litre which gives a weight in actual water of  $282 \times 0.9997 = 281.87$ kg.



The extra weight shall then be reduced by  $289 - 281.87 = 7.13$ kg.  
The corresponding weight reduction for a 260kg boat is 7.28kg.

The boat was lifted by a fork-lift truck and the weight was recorded. Then it was placed in the basin and weights were added or taken away in order to have the boat floating on its floatation marks. The boat was then lifted and the weight recorded.

## Measurement Results

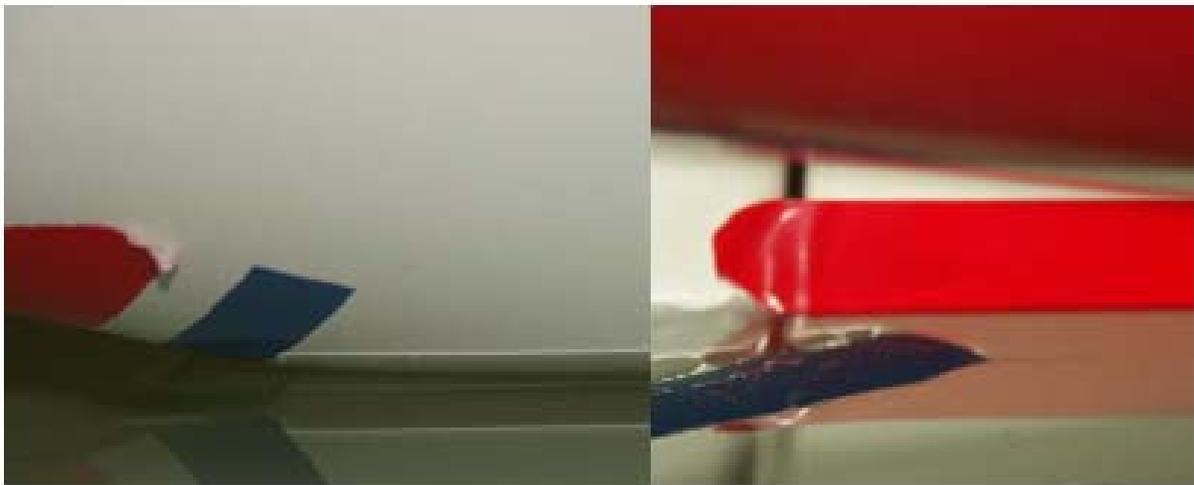
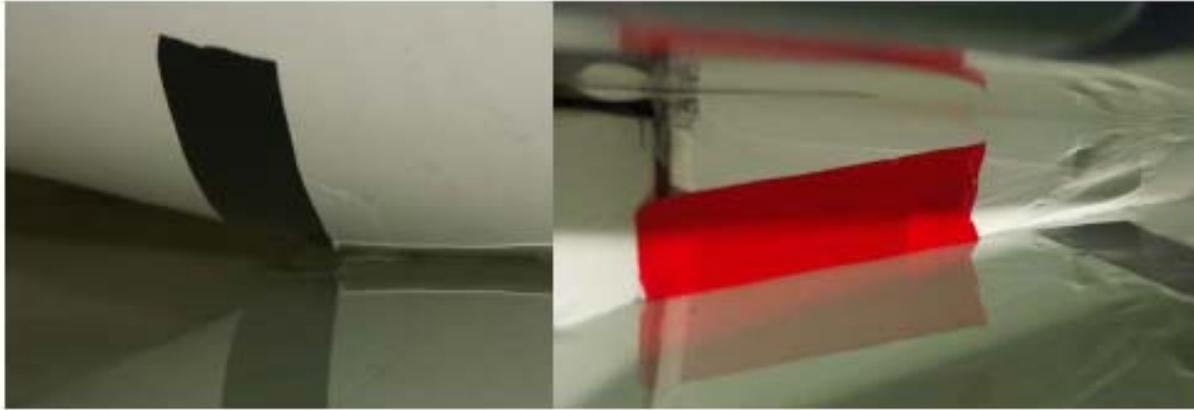
The results are shown in table 2.

Boat	SWE 263	SWE 369	SWE 406	SWE 420	SWE 422	SWE 426
LOA measured	4,184	4,186	4,182	4,170	4,190	4,180
LOA Certificate	4,182	4,181	4,182	4,180	4,184	4,180
Overhang aft, measured	0,655	0,663	0,655	0,655	0,663	0,655
Overhang aft, certificate	0,655	0,655	0,655	0,655	0,657	0,655
Overhang fwd measured	0,551	0,545	0,549		0,549	0,547
Overhang fwd certificate	0,549	0,548	0,549	0,547	0,549	0,547
LWL measured	2,978	2,978	2,978	2,978	2,978	2,978
LWL certificate	2,978	2,978	2,978	2,978	2,978	2,978
Beam 0,55 LWL station				0,804	0,805	0,804
Recorded weight in FW	280	282	282	283	280	280
Weight in SW	287,1	289,3	289,1	290,1	287,1	287,1
Weight acc to C.5.1	251,1	254,3	245,1	255,1	252,1	252,1
Weight acc to certificate	259	259	259	259	260	260

Table 2: Results



All floatation situations were substantiated by photographs of which some examples are showed below.



## Possible Errors

### Errors in Length Measurement

When reading the plumb peak to the tape measure the error could be  $\pm 1$ mm.

When locating the LWL station at the aft end, which is in the centre line of the rudder stock where it leaves the hull, it was rather difficult to find this point exactly, why the error could be  $\pm 1$ mm. Total error of water line length could then be  $\pm 2$ mm. This will approximately correspond to 1.1kg (water line area 144dm<sup>2</sup> x 0.02 dm x 0.4).

### Errors in Weighing

The balance used shows the weight in kg without decimals, which means that the error could be  $\pm 0.5$ kg. The calibration after the measurements and the comparison with another balance showed that the balance used was correct. When lifting the boat out of water, the surface of the boat was wet, this may give an extra weight of approximately 0.1kg, but this was taken into account as the added or reduced weights was recorded already when checking the floatation.



### **Flotation Position**

When checking how the water level fits to the floatation marks, the capillary forces make it difficult to decide the exact weight. The errors could be 2-3kg, giving a too small weight recorded. This was especially relevant to the first boats checked. On the last ones, a floating strip of cloth was a good help to see the exact water level.

### **Conclusions**

It was found that it is evident that the volume displacement of the normal Norlin Mk III does not correspond to the boat weight 259-261kg. The actual boat weight should be 254kg. The differences between the boats were rather small. The recorded differences in table 2 show however that there are differences of 2-3kg, but these are mostly due to the difficulties of seeing the exact line of the intersection between the hull and the water surface.

The purpose of the measurements was to state whether the results of the measurements made in Gothenburg 10 September 2005 are correct or not. These measurements made 04 December 2005 show that they are correct.

### **Possible Consequences**

The consequences of these observations will probably be that all boats of this design will have to sail with a boat weight according to C.5.1 of 254kg, unless they are re-measured to apply to the Rule of Rating by changing the weight and the sail area correspondingly.

In order to keep the performance of the design, in the future, it might be a solution to change the extra weight of 35kg to 29 or 30kg. However, this needs an amendment of the Rule, which can be in force earliest in year 2007.