As per 01-01-2018 there are 2 options when using Lipo batteries to power boats in the M class.

First option: Weight and Voltage controlled batteries.

Mini Eco, mini Eco Team, mini Mono, mini Hydro: Battery weight upto max 113grams but 30mm (of at least AWG 16 or 1,3mm^2) cable to each pole and full shrinktube.

Eco expert, Eco expert Team, Mono 1, Hydro 1: Battery weight upto 285 grams but 30mm (of at least AWG 12 or 3,3mm^2) cable to each pole and full shrinktube.

Mono 2, Hydro 2: Battery weight upto 570 grams but 30mm (of at least AWG 12 or 3,3mm^2) cable to each pole and full shrinktube.

FSR-E: Battery weight upto 855 grams but 30mm (of at least AWG 12 or 3,3mm^2) cable to each pole and full shrinktube.

Full battery weights and requirements for all classes in Anex A1A update 2018

Second option: Energy Limiter.

Mini Eco, Mini Eco Team, Mini Mono, Mini Hydro: No minimum, no maximum weight for batteries, but 30mm (of at least AWG 16 or 1,3mm^2) cable to each pole and full shrinktube.
Maximum Energy to be used: 20Wh or 1200Wmin.

Eco expert, Eco expert team, Mono 1, Hydro 1: No minimum, no maximum weight for batteries, but 30mm (of at least AWG 12 or 3,3mm^2) cable to each pole and full shrinktube.
Maximum Energy to be used: 58Wh or 3480Wmin.

Mono 2, Hydro 2: No minimum, no maximum weight for batteries, but 30mm (of at least AWG 12 or 3,3mm^2) cable to each pole and full shrinktube.
Maximum Energy to be used: 116Wh or 6960Wmin

FSR-E: No minimum, no maximum weight for batteries, but 30mm (of at least AWG 12 or 3,3mm^2) cable to each pole and full shrinktube.
Maximum Energy to be used: 174Wh or 10440Wmin.

These values can be updated once per year, at the beginning of the year by e mail voting with all affiliated M class countries.

Ramp down time is set to 5 seconds for all values and/or classes.

Dead time after limit is reached is set to 60 seconds for all values and/or classes.

Full Energy chart in Anex A1C 2018

All used limiters must meet the following requirements:
- it must be waterproof
- limit set for the class cannot be changed or can be prevented from being changed during competition by the racer
- accuracy of limiter is +/- 1%
- when the limit is reached the boat will slow down at first than stop - the limiter must re-arm after some time (to give the possibility to go back to the platform) but still show that the Energy value has been consumed visually
- cannot be reset by disconnecting kill switch (to prevent racer to reset the Energy value during the heat for example when cleaning the leaves from the propeller)
- limiter device is a non-dismountable device (covered with some mass to prevent people from dismantling it).

As for practical use, the following procedure in regard to Voltage, weight and Energy value is mandatory at Continental or World Championships:

At registration all Limiters are to be checked for correct settings and the program port sealed with a non-removable sticker (stickers that cannot be removed without breaking them). If at any point the program needs to be changed (in the case 1 limiter is used for several classes), this can only be done by Race control and afterwards re-sealed. If at any point the sticker is not there, the device in question is to be verified by Race control and if it has incorrect or changed settings the competitor is to be banned from further competing in that Championship, If the settings are verified and correct, the device will be re-sealed.

Before the heat Voltage (all batteries) and weight (only for weight restricted batteries) is checked as it was before. Limiter equipped boats must be checked for correct program or Energy Value and for the presence of the seal (visually), then they can proceed to the preparation area to close up the boat.
After the heat all batteries are checked for Voltage. Boats will stay closed and only opened in the battery check area under the penalty of DSQ for that heat!
In the Team races (mini Eco and Eco Team) and in FSR-E boats can only be opened on the platform after informing the assistant Judge and under his/her supervision. In regard to any battery/limiter change over between boats from the same Team. Teams of 2 people/3 batteries(limiters) should clearly inform the Platform Judge about this before the heat. Again under penalty of DSQ for that heat.

Geens Walter
Naviga M section leader
31/12/2017

A 1 A Cell count, battery weight and runtime overview 2018

Classes	Number/ max weight LiPo	number NiMh	Number/ max weighgt LiFePo	Runtime	Min.boatweight length	Motor
Eco	2S1P/2S2P/3S1P/3S2P 285gr Hardcase allowed	7 SubC	Max 510 gr. Type 26650 Max. 6 cells (3S2P)	6 minutes	1000 gr.	Open
Eco Team	3x2S1P/2S2P/3S1P/3S2P à 285 gr Hardcase allowed	3x7 SubC	3x Max 510 gr. Type 26650 3x Max. 6 cells (3S2P)	18 minutes	1000 gr. Per boat	Open
Mini Eco	2S1P/2S2P/3S1P/3S2P 113 gr.	7x2/3 AF	3 cells 18650 or 2 cells 26650	6 minutes	430 mm 450 gr.	Open
Mini Eco Team	3x2S1P/2S2P/3S1P/3S2P à 113 gr.	3x7x2/3 AF	3x3 cells 18650 or 3x2cells 26650	18 minutes	3x430 mm 3x450 gr.	Open
Mini Mono	2S1P/2S2P/3S1P/3S2P 113 gr.	7x2/3 AF	3 cells 18650 or 2 cells 26650	6 minutes	450 mm 450 gr.	Open
Mono I	2S1P/2S2P/3S1P/3S2P à 285 gr. Hardcase allowed	7 SubC	3S2P max 6 cells 26650	6 minutes	-	Open
Mono II	From 4S1P/4S2P upto 6S1P/6S2P 570 gr. Hardcase allowed	8-14 SubC	Max. 12cells 4-6S2P type 26650	6 minutes	-	Open
Mini Hydro	2S1P/2S2P/3S1P/3S2P 113 gr.	7x2/3 AF	3 cells 18650 or 2 cells 26650	6 minutes	450 mm 450 gr.	Open
Hydro I	2S1P/2S2P/3S1P/3S2P à 285 gr. Hardcase allowed	7 SubC	3S2P max 6 cells 26650	6 minutes	-	Open
Hydro II	From 4S1P/4S2P upto 6S1P/6S2P 570 gr. Hardcase allowed	8-14 SubC	Max. 12cells 4-6S2P type 26650	6 minutes	-	Open
FSRE	855 gr. Max 43 Volt No battery changes allowed Hardcase allowed	Max 21 SubC Battery changes allowed	Max 18 cells 26650 Battery changes allowed	15 minutes	-	Open
F1E	43 V 1400 gr.	30 cells any type max 43 V	24 cells max 43 V	5 minutes		Open
F3E	43 V 1400 gr.	30 cells any type max 43 V	24 cells max 43 V	5 minutes		Open

Classes	Number of LiPo	Limit value	Ramp down time	Dead time	Run time	Min. Boat length	Motor
Eco	**2S1P/2S2P/3S1P/3S2P Hardcase allowed**	**3480Wmin 58Wh**	**5 seconds**	**60sec**	**6 minutes**	**1000gr.**	**Open**
Eco Team	**3x2S1P/2S2P/3S1P/3S2P Hardcase allowed**	**3x3480Wmin 3x 58Wh**	**5 seconds**	**60sec**	**18 minutes**	**1000gr.Per boat**	**Open**
Mini Eco	**2S1P/2S2P/3S1P/3S2P**	**1200Wmin 20Wh**	**5 seconds**	**60sec**	**6 minutes**	**430mm 450gr.**	**Open**
Mini Eco Team	**3x2S1P/2S2P/3S1P/3S2P**	**3x1200Wmin 3x 20Wh**	**5 seconds**	**60sec**	**18 minutes**	**3x430mm 3x450gr**	**Open**
Mini Mono	**2S1P/2S2P/3S1P/3S2P**	**1200Wmin 20Wh**	**5 seconds**	**60sec**	**6 minutes**	**450mm 450gr.**	**Open**
Mono I	**2S1P/2S2P/3S1P/3S2P Hardcase allowed**	**3480Wmin 58Wh**	**5 seconds**	**60sec**	**6 minutes**		**Open**
Mono II	**From 4S1P/4S2P upto 6S1P/6S2P**	**6960Wmin 116Wh**	**5 seconds**	**60sec**	**6 minutes**		**Open**
Mini Hydro	**2S1P/2S2P/3S1P/3S2P**	**1200Wmin 20Wh**	**5 seconds**	**60sec**	**6 minutes**	**450mm 450gr.**	**Open**
Hydro I	**2S1P/2S2P/3S1P/3S2P Hardcase allowed**	**3480Wmin 58Wh**	**5 seconds**	**60sec**	**6 minutes**		**Open**
Hydro II	**From 4S1P/4S2P upto 6S1P/6S2P Hardcase allowed**	**6960Wmin 116Wh**	**5 seconds**	**60sec**	**6 minutes**		**Open**
FSRE	**Max 43 Volt No battery changes allowed Hardcase allowed**	**10440Wmin 174Wh**	**5 seconds**	**60sec**	**15 minutes**		**Open**