

Preliminary rulebook

# LiPo Masters "**Advanced**" standard classes

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## 1 Objectives of the classes

The aim of the (standard) classes in this rulebook is to introduce new interested model boaters drivers and those who have switched to boats to the competition scene and also to hold the active driver. This should be achieved by attractive fast, technically not too high settled but technically traceable classes. The class attempt should be to conserve battery charge and be low priced, but at the same time also have a proper base speed. This should correspond to the level of Expert-boats (Last updated 2015). The classes are designed to provide virtually all the freedom in tuning of the hulls, but sacrificing components that can only be acquired through special skills or "relationships" (eg special propeller, lightweight hulls, motors with hollow shafts, better batteries, expensive loaders etc.). A simple battery selection without any special knowledge of the market and waiving any rework "stripping" of the batteries, regulators, etc. should constitute in a basic level. The communication of skills like: boat building and tuning, driving technique, being a start assistant and regulation, basic machining of metal propellers, etc. are in the foreground. Also "sponsorships" are appreciated, i.e. an experienced driver supports a Rookie (beginners) and brings him step by step closer to the water. He also supports him as a start assistant at the races. That's why top drivers should especially take these classes to share their knowledge! However, they will result in a separate ranking. This intention of this rulebook is to add the classes described here to the existing LM rulebook. In regards to the topics radio system, security, race etc. it is referred to the normal LM rulebook (Link).

## 2 Hulls

The hulls are classified in the following types:

MONOs = monohull

and

Hydros = Hydroplanes, Outrigger, catamarans, canards (possibly from 2017)

All changes in the hulls are allowed. The minimum weight of the boats **WITHOUT** batteries is:

Mono AS: min. XXX g

Mono BS: min. XXXX g

This weight refers to the drivable boat **WITHOUT** drive battery and possibly existing BEC batteries. The exact minimum tare weights of the boats will be determined during the year 2016 and defined for 2017. The addition of weights is allowed to bring the boats to the minimum weights. The additional weight must be placed at least 50% directly below or on the deck, near the center of gravity. This shall prevent lightweight constructions, which are balanced by skillfully placed additional weights such as lead, BEC batteries or by several millimeters thick laminated boat bottom. This is explicitly detailed listed, as the Experts are very inventive and this would bypass the objective of the classes.

All drivers confirm that pictures of their boats can be taken at any time and they can be measured. Should anyone use a new self-designed boat in the race, he is automatically committed, to provide interested drivers a copy of the hull or in case of wooden hulls sketches for an adequate standard market allowance within 90 days. If this will not be done, all with this boat retracted points will be deleted and the use of this boat will be restricted until further notice. This even applies if the boat was used only in 1 out of 4 runs of a race.

### 3 Motors

Permitted are only the following engines of the company Leopard:

Mono AS: Leopard 2860 3.5D with 2910 1 / min

Mono BS: leopard 3660 3,5Y 1480 1 / min

These engines have due to distribution and in combination with various ESCs slight differences in the idling speeds. This can usually be compensated in the setting of the timing. The compliance with the speed limit is responsibility of the participant!

Should the permissible idle speed of the engine deviate significantly upwards, so that it cannot be adjusted to the prescribed speed by timing, the engine is not permitted and should be replaced by the seller! The exact limits for idle speed will be determined during the year 2016 and defined for 2017.

Cheap tachometers for checking are available starting from 10 € (e.g. eBay). Only actual speed and voltage applied at the moment of measurement are measured, ie:

Speed / voltage = idle speed per volt

This speed increases or decreases slightly with more or less Timing. When in doubt, a lower timing should be chosen to not exceed the limit speed! Significant violation of the speed will result in disqualification. The speed values will be checked randomly. Furthermore, the speed should be checked from time to time. Everybody who wants to be on the safe side should check the speed on race day with the tachometer provided by the organizer.

A water cooling of the motor is required. The version is optional. Shortening of motor shaft and cable is not prohibited but should remain undone. The design of the plug-in connections / solder connections for the ESC cable is optional. The motors may only be opened to replace the bearing or to dry after ingress of water. All technical changes are prohibited and will result in disqualification. The motors have to be removable at any time.

**Tip:**

The replacement of a motor is a bit difficult in the Far East, so it's recommended to buy motors in Germany / EU.

**Note:**

For +10 1/min per volt no one's head will be ripped off. Rookies will definitely not. But the Experts should rather be below the permissible speed limit!

## 4 Powertrain, Rudder, Fins

Only the use of hydro powertrains are permitted, i.e. semi-submerged propeller and rudder. Only one powertrain is allowed, i.e. one motor, one drive shaft and one propeller. The positions and types of drive shaft, rudder and u. Fin (s) are free of choice.

## 5 Propeller (kurz Props)

Permitted are propellers with the profile (shape) of the "Graupner K-Series". This form can be found again in the following series of various manufacturer:

- series 2317.xx 2318.xx Graupner (plastic)
- aluminum series from Graupner,
- CNC aluminum and stainless steel series from Tenshock,
- brass & chrome cobalt series from Hydro & Marine.

Only 2 blade propellers are approved. The maximum permitted diameter is:

Mono AS: max. 36 mm

Mono BS: max. 40 mm (for Graupner K series Plastic max. 40.5 mm)

The reduction of the diameter of larger propeller to the nominal dimensions is not permitted.

Sharpening, balancing and polishing of propeller is allowed but without change of the profile. Significant deviations from the original profile which might bring benefits will result in disqualification. This is also valid for self made or reworked propeller, even then if they comply with the guidelines. This includes increasing the pitch due to bending or similar modifications. Bent Propeller may be adjusted to bring them back to their original form. For this purpose it is recommended to create a gauge, which is ideal to detect deformations on the propeller for repair. The propellers are also controlled by this form template. They allow at a glance whether diameter shape and profile are consistent.

A detailed description of authorized propeller / profile properties can be found in the section 10.1.

Furthermore, section 10.2 describes how to make such a gauge including photos.

### **Note 1:**

All propellers are subject to manufacturing tolerances. A few tenths of a millimeter can have an effect to the actual size of the propeller up or down. (Diameter) That is not substantially for the race; but of course we will keep an eye on it in 2016 and possibly act on it.

### **Note 2:**

We would like to expand this list. If there are other manufacturers known to have the K profile in their program, please contact us! Propeller with other profiles, for example, Octura or similar are not permitted. If you have doubts, please send us photo of the propeller.

## 6 Batteries

Default are Lipo cells from "standard" mass production series. The following minimum weights and voltages are mandatory:

Mono AS: min. 400 grams, max 3s until 2p

Mono BS: min. 800 grams, max. 6s until 2p

The packs should be used in the original shrink tubing and with original labels. The connecting cables of the batteries may be shortened and be equipped with the preferred connector system. Any other technical changes are prohibited.

The final charge voltage is 4.20 volts per cell. This voltage will also be achieved by cheap chargers. The final discharge voltage is not defined as the combination of engine and propeller does not take the battery to the limits under normal conditions in 6 minutes driving time. Preheating of the battery is allowed up to 40 degrees, except the manufacturer data prohibits this temperature range.

### **Note / tip:**

When you have doubts purchasing batteries select slightly heavier batteries. On one hand, the manufacturer's data is exaggerated and on the other hand, the extra weight is balanced by the higher electric strength. So there is no significant disadvantage, however, the battery life keeps improving, and that is the purpose of these classes!

## 7 Electronic Speed Controllers ("ESC")

Permitted are all mass production brands. The ESC must be operated with a fixed timing! Auto timing or speed regulated Governor Mode (for helicopters) are prohibited! If the appropriate timing to set the engine idle speed has been found ONLY these values or the adjacent values are allowed to operate this setting. The controller must not be technically modified. Except: Attachment of additional capacitors, cooling and water protection as well as shortening of the cables. It is permitted to use internal or additional BEC's and / or BEC batteries.

## 8 Driving times

The driving times are defined as follows:

Mono AS: 6 min

Mono BS: 6 min

## 9 Rating

In the rating of the runs the Rookies should be rated independently to the Experts (Expert = 10 times among the top 3 of any official RC boat races). The idea is that the Experts receive medals for 1<sup>st</sup> to 3<sup>rd</sup> place and will be honored separately at the end of the year. The rookies of each race get for the places place 1st-3rd (5 ?!) trophies (as motivation).

### **Note / tip:**

It makes no sense to throw new driver into a pool full of the sharks with no perspective of first achievements. Therefore separate ratings, but everybody on the water.

## 10 Appendix

### 10.1 Links for approved Propellers:

There are only approved 2 blade propellers either with 4.75mm Dogdrive or M4 threaded fasteners. The maximum permitted Diameter is:

Mono AS: max. 36 mm or smaller

Mono BS: max. 40 mm or smaller

Amongst others, the following propellers are approved:

Alu Tenshock:

<http://tenshock-motors.de/Prop-Schraube-Aluminium-CNC>

Tenshock steel:

<http://tenshock-motors.de/Prop-Steel-Edelstahl-Prop-Schraube>

Attention: Tenshock Mono AS steel propellers are allowed to a maximum of 35 mm! However, these may have up to 36 mm effective diameter.

Graupner Alu & Steel

<http://www.graupner.de/de/newsdetail/eed1b6d2-8a3d-4726-8eb3-bbb303a34d72>

Attention: Graupner Mono AS propellers are allowed to a maximum of 35 mm! However, these may have up to 36 mm effective diameter.

Hydro & Marine Chrome Cobalt

[http://hydromarine.de/index.php?cPath=9\\_105&MODsid=5a39921c9d9fe1239ed96cdacea749f1](http://hydromarine.de/index.php?cPath=9_105&MODsid=5a39921c9d9fe1239ed96cdacea749f1)

Exact order numbers etc. will be added.

## 10.2 Preparation of a propeller blade gauge



1. Cut slot in matching tube and cut it off (left) then
2. Deburr and squeeze it (right).



3. Mask Propeller (eg with masking tape), screws/slide onto a bolt and slide on sleeve tightly.



4. Mix / knead kneading epoxy, approximately 15-25g depending on the size of the propeller (left).
5. Embed propeller therewith, in doing so keep a small edge overlapping (mid + right).
6. Cut clean and expose.