

# R/CU FE Rulebook Revision Tracker

## Revisions Effective February 22, 2022

*No revisions made to the rulebook.*

## Revisions Effective February 9, 2021

### **Modified Section H, Number 1**

*Previously:*

1. Lipo battery packs shall be charged in a safe manner on a flameproof surface, or in a LiPo safe charging bag. A dry fire extinguisher or extinguishing agent, such as a bucket of sand, shall be kept near wherever batteries are being charged.

*Revision:*

1. Lipo battery packs **must** be charged in a safe manner on a flameproof surface, or in a LiPo safe charging bag. A dry fire extinguisher or extinguishing agent, such as a bucket of sand, **must** be kept near wherever batteries are being charged.
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## Revisions Effective January 30, 2020

### **Modified Section D, Number 1:**

*Previously:*

1. Power and drivetrain
  - a. Approved motors:
    - i. NEU 1527 1.5Y 850KV
    - ii. HET Typhoon 700-98 840KV
    - iii. Turnigy SK3-3994 850KV
    - iv. TP 4040 10Y 830KV

*Revision:*

1. Power and drivetrain
  - a. Approved motors:
    - i. NEU 1527 1.5Y 850KV
    - ii. HET Typhoon 700-98 840KV
    - iii. Turnigy SK3-3994 850KV
    - iv. TP 4040 10Y 830KV
    - v. **TP 4060 6Y 860KV**
      1. **Approved as a test motor for 2020.**
  - b. **Motors not on the approved motor list:**

- i. Shall not exceed the manufacturer's KV rating of 860 KV.
  - 1. If the motor case is not clear marked with the manufacturer's KV rating, the owner should be prepared to provide documentation of the maximum KV rating of the motor.
- ii. May not have a motor case exceeding the following dimensions:
  - 1. Length: 105 mm (4.134 in.), this includes any bearing protrusions.
  - 2. Diameter: 42 mm (1.654 in.).

**Modified Section D, Number 3:**

*Previously:*

**3. Batteries**

- a. A maximum capacity of 8S Lithium Polymer (LiPo) batteries are approved. The maximum total mAH capacity of the battery pack(s) will not exceed 6000 mAH. Only LiPo batteries with a cell rating of 4.20 or less volts per cell are approved.
- b. LiHV batteries with per cell capacities to 4.35 volts or higher are not approved.
- c. Manufacturer's minimum discharge of 30C constant shall be allowed.

*Revision:*

**1. Batteries**

- a. A maximum capacity of 8S Lithium Polymer (LiPo) batteries are approved. ~~The maximum total mAH capacity of the battery pack(s) will not exceed 6000 mAH.~~ Only LiPo batteries with a cell rating of 4.20 or less volts per cell are approved. ~~Maximum charged voltage is 33.84 volts.~~
- b. LiHV batteries with per cell capacities to 4.35 volts or higher are not approved.
- ~~c. Manufacturer's minimum discharge of 30C constant shall be allowed.~~

**Added Section E and F**

*Revision:*

**A. Brushless Motor KV Output Inspections**

- 1. The following formula will be used to determine a brushless motor KV output.

$$KV = \frac{RPM}{VOLTAGE \times 1.414 \times 0.95}$$

Supplemental formulas and variables:

$$RPM = f \times \frac{2}{p} \times 60$$

$f$  = frequency of the motor, as measured in hertz (Hz)

$p$  = number of poles in the motor

$VOLTAGE$  = voltage measured across the motor, as measured in volts (V)

1.414 is used to convert RMS voltage to peak voltage

0.95 is used to account for measurement error

- 2.** It is recognized that identical technical inspections of FE motors can provide different results for two or more identically represented motors. Because of this, R/CU is using 950 KV as a threshold where no motor can exceed this KV output. After the 2020 race season, this will also apply to motors on the approved motor list.
- 3.** For regular R/CU race events, the technical inspection of an FE motor will only be required if the boat in question is challenged by two other racers at the event. Technical inspections may be done without removal of the motor, via a multimeter with a drill motor attached to the drive shaft with the propeller removed. This process is outlined in Section F.

**B. Technical Testing Process for Determining a Brushless Motor KV Output:**

- 1.** Tools/motor information/KV formula needed for testing.
  - a.** Drill motor capable of at least 1200 RPM.
  - b.** Multimeter with frequency-checking capability.
  - c.** Number of poles on the motor to be tested (I.E. 2, 4, 6).
  - d.** Formula as stated in Section E.
- 2.** Testing the motor KV output:
  - a.** Attach the multimeter leads to any 2 of the 3 wires extending from the motor.
  - b.** Connect the motor shaft to the drill motor chuck. This can be done by removing the motor from the boat and direction attaching the drill chuck to the rear of the motor. If the motor is still in the boat, remove the propeller and attach the drill chuck to the stub shaft/cable driveline.
  - c.** Set the multimeter to "Frequency" mode and spin the motor with the drill until the reading is shown. Record the frequency.
  - d.** Set the multimeter to "Voltage" mode and spin the motor with the drill until the reading is shown. Record the frequency.