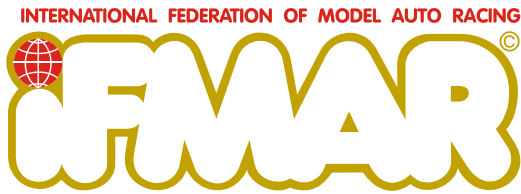


INTERNATIONAL FEDERATION OF MODEL AUTO RACING



**ELECTRIC MOTOR
APPROVAL
PROCEDURE**



Website: <http://www.ifmar.org>

IFMAR Electric Chairman

Frank Mostrey
Tenierslaan 28
B 1910 Kampenhout
Belgium

Phone: +32 16 65 75 18

Fax: +32 16 65 75 18

Email: electric.chairman@ifmar.org

Dear Madame/Sir

The 2010 IFMAR World Championships for the Electric ON- ROAD classes will be held in Germany from early July, 2010. Your company may wish to submit motors for approval previous to these IFMAR World Championships.

The approval is to ensure that all competitors have equal access to the latest motors and batteries, thus ensuring wherever possible, fair racing to decide the World Champion. IFMAR makes no representation as to the quality or efficacy of the products approved. If parts of an approved motor are changed, the motor must be sent to IFMAR for re-approval.

If your motors are already approved, you have no need to seek new approval unless changes have been made.

IFMAR approves the construction only. If you wish to submit new products (or products which are significantly changed since their last approval) to be approved, for official use at the 2010 Electric On-road W.C. and future IFMAR W.C. events you must send them for approval before 01 March 2010 with the various forms and documents attached. (Evidence of the availability of the product should be sent to the chairman)

By this date the samples of the products and the completed documents must be in my hands. ANY PRODUCT OR FORM RECEIVED AFTER THE CLOSING DATE CANNOT BE APPROVED FOR THE 2010 ELECTRIC ON-ROAD WORLD CHAMPIONSHIPS. Products not approved cannot be used at IFMAR World Championships.

The IFMAR Electric Section will look forward to receiving your products for approval.

Sincerely
Frank Mostrey
Electric Chairman, IFMAR

PLEASE READ THIS FIRST

Any manufacturer, distributor, agent or retailer may submit products for approval. Providing the products meet the specifications and requirements of the IFMAR rules in force at the time of approval, and are submitted by the closing date and meet the availability requirements of IFMAR rules, IFMAR will approve the product.

Please: Complete one separate IFMAR Motor Homologation Forms for each motor.

A/ Prepare one copy of the commercial documents required (Invoices, Advice notes, etc) which show receipt of 5,000/2000 parts and sale of 300 motors in accordance with the IFMAR Rules. Sent these together with three (3) motors and their Application form to the section chairman

B/ Send three (3) motors with a copy of the Motor Specification Checklist to WTS, Great Britain for checking.

C/ Approval and handling fee: Effect a pre-payment of 200 USD (at no cost for beneficiary) per presented motor into the accounts if IFMAR BEFORE the 1st of MARCH 2010:

IFMAR International bank Account: SE48 6000 0000 0000 4310 9969
Swift: HANDSESS
Handelsbanken BOX 135
60103 Norrkoping
Sweden

APPLICATION

A: This page of the motor approval request together with Copies of invoices, receiving notes, etc. for availability check as well as three (3) motors (ready to run) should be sent to:

IFMAR Electric Chairman
 Frank Mostrey
 Tenierslaan 28
 B 1910 Kampenhout
 Belgium
 Phone: +32 476 555 308
 Fax: +32 16 65 75 18
 Email: electric.chairman@ifmar.org

B: a copy of this page of the motor homologation form together with and a copy of the Motor Specification Checklist and three (3) motors should be sent to:

WTS
 23 Prince Rupert Road
 Stourport
 On Severn
 Worcestershire
 United Kingdom

| Motor submitted for approval: | |
|---|--|
| Brushed <input type="checkbox"/> | Brushless <input type="checkbox"/> -- Tick one |
| Brand / Trade name of Motor: | |
| Availability | Evidence (Invoices, etc.) |
| 300 sent to Hobby Stores, Distributors, OEM's | Number of attachments: |
| 5000 motors available at our Company | Number of attachments: |

Company Name:

Address:

Country:

Signed for and on behalf of the above submitter:

By: (Name & position):

NOTE: Please ensure that, when sending samples for approval, you state on the Customs Declaration Form "*Samples Only – No Commercial Value*". Make sure that the package you send is *free of costs for the receiver*. It would also be appreciated if you also notify by email: electric.chairman@ifmar.org that your products have been posted and if available a tracking number.

Shipments received against payment will not be accepted.
 Delayed or blocked products by authorities (beyond the submission date) will not be allowed to the approval process nor considered a reason to extend the deadline for submission.

Submissions that turn out to be subject or matter to complaints regarding international safety regulations or infringing patents will be withdrawn from the list, even after approval. In such case the submitter shall not make any claim against IFMAR, including IFMAR's representatives, employees, and subcontractors but shall indemnify these against any legal liability for claims or suits, including costs and expenses incidental thereto provided that IFMAR shall notify the submitter of any claims or suits without undue delay.



Electric MOTOR HOMOLOGATION PROCEDURE

IFMAR ELECTRIC MOTORS Basic information:

MOTORS

Only IFMAR approved motors may be used. Approved motors must meet the following specifications and be commercially available four (4) months prior to the World Championship. Availability requirements must be met at the time of submittal. Submittal deadline is 01 MARCH 2010.

Upon receipt of the inspection form from the laboratory confirming that the product meets all technical specifications and the Chairman is satisfied that all IFMAR availability requirements have been met the product will be included on the approved products list for use at WC events.

Definitions: **Brushed and brushless motors**

BRUSHED MOTORS

Specifications: '05' sized displacements.

Can diameter to be a maximum of 36.02mm

Can length to be Maximum of 53mm measured from the mounting face of the motor to the furthest point not including solder, tabs or lead wires.

Shaft diameter is .125 inch. Production Tolerances allowed.

Ceramic magnets only (cobalt and rare earth magnets specifically not allowed).

Current is supplied to the armature by 2 brushes.

Armature - The rotor is to have three poles with windings.

Stack length without epoxy - minimum 21mm and maximum is 22.8mm.

Only Copper wire is to be used for the winding.

No Split rotor is allowed.

The laminations have to be one after the other without anything between.

The thickness of the stack plates is 0.35mm + 0.05mm.

The armature has to be permanently marked by the manufacturer, detailing the number of 'winds' and the name of the manufacturer

A minimum of 5,000 units must be available at the time of approval. A minimum of three hundred (300) motors must have been sold to at least three (3) distributors or hobby shops or OEM's at the time of submittal. The manufacturer has to provide an address of a hobby shop or the like, that any driver who wishes to obtain these motors at the time of approval can do so.

Approved motors may be modified by re-winding, balancing, truing of commutators, epoxying, ball bearings, brushes and custom brush systems only.

No hybrid (mixing of parts from approved motors) allowed.

BRUSHLESS MOTORS:

General definition of a Brushless Motor:

- a) Sensored or sensorless motors are allowed.
- b) The motor has to be rebuildable. Ball bearings are allowed.
- c) If the motor is sensored:

- It must use a six position JST ZH connector model number ZHR-6 or equivalent connector with 6 JST part number SZH-002T-P0.5 26-28 awg contacts or equivalent.

Wire sequence must be as follows:

Pin #1 - Black wire ground potential

Pin #2 - orange wire phase C

Pin #3 - white wire phase B

Pin #4 - green wire phase A

Pin #5 - blue wire temp control, 10 k Thermistor referenced to ground potential

Pin #6 - red wire + 5.0 volts d.c. +/- 10%.

Compatible speed control must use the 6 position JST header part number X-6B-ZR-SMX-TF (where the X denotes the style of the header), or equivalent.

- The power connector has to be clearly marked A, B, C.

A for phase A

B for phase B

C for phase C

d) `05` size specifications

Can:

Overall maximum diameter is

36.02mm measured at whatever point yields the maximum dimension, excluding solder tabs or lead wires.

Overall minimum diameter is

34.00mm measured at whatever point yields the minimum dimension, excluding solder tabs or lead wires.

Maximum length is

53.00mm measured from the mounting face of the motor to the furthest most point of the end bell, not including solder tabs, lead wires or original manufacturer's logo or name.

Minimum length is 50.00mm measured from the mounting face of the motor to the furthest most point of the end bell, not including solder tabs, lead wires or original manufacturer's logo or name.

Motor mounting holes must be on 1.00- inch (25.40mm) centers.

Stack/Stator:

The Stack or Backiron must be continuous. The laminations have to be one after the other without anything in between. Stack/Backiron minimum length 19.30mm, maximum 21.00mm. The thickness of the Stack/Backiron laminations is 0.35+/-0.05 mm. All laminations must be of the same material. Inside diameter of Stack or Windings equals the central space between the laminations or assembly of windings and must accept 'plug' gauges of 12.5 mm minimum, 16.0 mm maximum. These dimensions to be measured with the centre of the 'plug' gauge in-line with the centre of the motor Can. (ie. Concentric to can).

Winding:

Delta and Y wound stators are permitted. Only circular (round) pure copper wire permitted. No turn limit.

Rotor:

Shaft diameter must be 0.125 inches (3.175mm). Only one piece, two pole bonded Neodymium or Ferrite magnetic rotors are permitted. Magnet minimum length 23.00mm, maximum 27.00mm. Magnet minimum diameter 12.00mm, maximum 5.50mm.

e) All motors must have the original manufacturer's logo or name moulded into the end bell.

f) A minimum of two thousand (2000) brushless motors must be available at the time of approval. A minimum of three hundred (300) brushless motors must have been sold to at least three (3) distributors or hobby shops or OEM's at the time of submittal. The manufacturer has to provide an address of a hobby shop or the like, that any driver who wishes to obtain these motors at the time of the approval can do so.

No hybrid (mixing of parts from approved brushless motors) allowed.

Motor Specification Checklist

| Fill in the grey shaded boxes below with the details of the motor being submitted for approval | | | For IFMAR use only | | |
|--|------------------------------------|-------------------|--------------------|-----|-----|
| Requirement | Nominal Size | Tolerance +/- Acc | Acc | Rej | n/a |
| Brushed <input type="checkbox"/> | Brushless <input type="checkbox"/> | -- Tick one | | | |
| Displacement | | | | | |
| Can Diameter | | | | | |
| Can Length | | | | | |
| Shaft Diameter | | | | | |
| Magnet Type | | | | | |
| Trade Name of Motor | | | | | |

Please fill in the details above for one type of motor. Use another form for more types of motors (photocopies accepted). Send this form with 3 (three) samples (fully built) of the motor to:

WTS
 23 Prince Rupert Road
 Stourport
 On Severn
 Worcestershire
 United Kingdom

Make sure there are no costs for receiver

NOTE: CLOSING DATE FOR APPROVAL: MARCH 01th, 2010

Company Name:

Address:

Country:

I agree that the above information is correct to the best of my knowledge. I accept that the samples submitted will be used to compare and check motors at the IFMAR World Championships.

Signed:..... Name: Position:

For IFMAR use only:

Approval by WTS, Date received:.....2010

The motor submitted DOES / DOES NOT meet the current applicable IFMAR specifications.

Signatory and Date: