Naviga M class
Rules 2026

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A. General safety regulation valid for all Classes

The following rules are valid for all classes equipped with electric motors

1. All boats must be equipped with a so-called kill switch according to drawing (Annex B). The kill switch must be connected in such a way that in case of emergency, the competitor, start assistant, rescue boat people or any another person can interrupt the power between motor and batteries or in case of “limiter only” classes, between the limiter and motor control circuitry. If for some reason, the people in the rescue boat or any other person cannot disconnect the kill switch, that particular boat is taken out of the race and disqualified for that heat. The kill switch cannot be mounted on lids or other removable parts of the boats. The kill switch can be mounted on either side. The loop must be made out of red cable. As kill switch, a pair of factory made common connector type (like XT-60, XT-90 or T-Deans) are allowed as long as it is equipped with a red wire loop of at least 20mm diameter.
At World Championships the kill switch will be checked at the registration. If during the registration it is noted that the kill switch does not correspond to the regulations, an alteration is not allowed. The competitor is not allowed to compete with that model. Each National Organization is requested to pay attention that the kill switch is correctly installed. Only approved version of the kill switch, as shown in Annex B are permitted.

2. When using a separate receiver battery, these boats must be equipped with an on/off switch for the radio control equipment that is operated from the outside of the boat. The competitor has to show this to the Platform Judge. Switches under sliding lids are not permitted. If receiver power is supplied by a so-called BEC system, no extra switch is needed.

3. The hulls of boats in the classes FSRE, Eco, Mini Eco, Eco Expert, Eco Team, Mini Eco Team, Mono/Hydro must have an easily visible, bright colour . (This easily visible, bright colour must be in contrast to water and must amount at least 1/3 of the bottom and top of the hull). This should contribute to the clear visibility of a capsized model. Dark, for example black, deep-blue or similar colours are not permitted. Fluorescent coloured stripes or sections are advisable for this. For Mono or Hydro boats it is advisable to have breakaway rudder and/or turn fin to prevent serious damage to other boats and/or the racecourse. Note, all white coloured boat does not contrast to water.

4. Should the recovery boat have to drive onto the course during a heat, the recovery boat always has the right of way. The recovery boat is to be passed at slow speed. Any danger for the recovery boat and its occupants is absolutely to be avoided. If the recovery boat is touched by a boat during a heat, this amounts to an automatic disqualification of the competitor, even when the rescue boat is stationary at the side of the lake. In case of an accidental or unavoidable touch a 1 lap penalty can occur (this lies in the discretion of the Platform Judge). Should the recovery boat run over or against a dead boat, no penalty is given.

5. Only Nickel Metal Hydride, LiPo or LiFe batteries are permitted as a propulsion pack. Dimensions and weight restrictions are fixed in each class Rules and regulations. Turning down cells on a lathe to gain weight is not permitted. The nominal Voltage of a single NiMh (max. height of the cell with expansions 45 mm) cell may not exceed 1,42V , for LiPo the nominal Voltage of a single cell cannot exceed 4,23V and for LiFe not higher then 3,65V per cell. Overcharging of batteries is not allowed. This is the case when at the Voltage check a Voltage is measured higher than the maximum Voltage multiplied by the number of cells used. If this is the case, the competitor has over charged the cells, or used an inappropriate charge mode in order to obtain a higher Voltage. The competitor is then disqualified for that heat. The competitor has to state the type and number of cells used to the people in charge of weighing and measuring batteries.

Pressing LiPo cells or NiMh cells that have "ballooned" in any device to press them back into their original shape and size, whether it be before use, after charging or after a race, in – or outside of a boat, is strictly forbidden for reasons of safety. Batteries that have "ballooned" should not be used anymore for safety reasons. On a second offense, the competitor will be disqualified.

The disposal of batteries of any kind in non-approved containers on the grounds or in the wild is strictly forbidden. On a second offense the offender will be expelled from the whole event. The Organizer has to make sure proper approved containers are available for the disposal of batteries.

It is advisable to have full shrink tube, however in order to be able to water cool the batteries, the shrink tube does not need to fully enclose the pack. However even after removing the cooling plates, each battery pack used in the boat must remain a solid block. Meaning, some sort of permanent fixation (strong rubber bands, armoured tape etc.) has to make sure the packs do not fall apart when the cooling plates are removed. In plain words: a battery pack without the cooling plates installed MUST still be a solid block in which the individual cells cannot put any strain on the tabs, causing possible rupture of those tabs.

6. Juniors up to the age of 12 may only compete in the different Mini classes, Eco classes, FSRE, Mono 1 and Hydro 1 (this does not apply for the classes F1E, and F3). For as long as a class is run for Seniors, Juniors can participate. Even if there are not enough Junior participants/represented countries. In the event not enough Junior participants are there to fill up a series in the group racing classes, they will run alongside with Seniors.

7. Juniors up to the age of 12 may not be used as start assistants for safety reasons.

8. The points 4 and 7 also apply for those classes with internal combustion engines.

9. At World and Continental Championships the Organizers must have a Civil Liability Insurance towards Naviga. This insurance must cover personal and 3rd party insurance.

10. On all racing platforms as well as in the Pit area, adequate fire protection material has to be present, (fire extinguisher, fire blankets and buckets of dry sand,). Each

competitor is responsible for the safe transport and handling of their batteries. This also applies for their residence during their stay as on the grounds. On the grounds, batteries are to be charged in either LiPo bags or LiPo cases. All competitors are advised to bring their own fire blanket in case of emergency. The Organizer as well as Naviga cannot be held responsible for any injuries or damages.

11. Heating of LiPo batteries is allowed up to 40 degrees Celsius. Heating of batteries is only allowed in solid state heating cases.

12. At a World Championship or Continental Championship event, Medical Personal have to be present at all times. Every race platform must have a First Aid kit available. Should these requirement as well as any other safety precaution not be met by the Organizer, the event will be interrupted by the Naviga Representative, and if not corrected even stopped.

13. The Platform Judge is entitled to, if the regulations are not abided by, exclude the competitors from the run. The correct function of the kill switch will be checked at the registration and before every heat by the Platform Judge. The correct colouring of the model is checked at the registration, If no registration occurs, the Platform Judge inspects the model before every heat.

14. A protest against the General safety regulation is not possible.

15. Every competitor agrees to have his boat recovered after it sank. At any event, the Organizers have to make sure a diver can salvage a sunken boat. Diving for a lost boat is to be done during the lunch break or at the end of that day's races. The cost for such a recovery (i.e. the cost of a diver) is at the expense of the competitor. As long as the diver is busy there is to be absolutely NO driving boats anywhere on the lake.

Please note!!
In the classes Eco, Mini-Eco, Mono / Hydro, a recovery of dead in the water boats takes place only after a heat, except if a boat looks like it is going to sink. If a boat is recovered outside the area of the landing stage during a heat, it may not be used in this heat any more.

B. General guidelines

Requirements for race platform:

For each participant in heat racing, a 1,5m space should be available. In the classes F1 and F3 this space should be at least 3m. The width of the platform should be at least 1 meter. In Eco, Hydro, Mono, Eco Team and FSRE each racer takes position according to his race number. Positioning is done from left to right. If more than 1 heat is run in a class, the positioning will be reversed at each heat, in other words in Heat 1 the starting position number 1 is on the left and in the second heat the starting position 1 will be on the right.

On every race platform a first aid kit, a fire extinguisher, fire blanket and bucket of dry sand has to be present. It is up to the Platform Judge to verify the presence of these items. There is to be no racing till these items are accounted for.

The access to the racing platform, in particular the path leading up to it should be safe and without any obstructions. The surface of the platform has to be so that tripping or sliding is impossible, even in wet conditions. The platform should also be separated from spectators in such a way the competitors are not hindered by any spectators.

The racing platform has to be solid and not shift or move out of place. The surface of the platform cannot be higher than 250mm above the (normal) surface of the water. Due to extreme weather conditions (such as extreme drought or flooding) this can vary. Floating platforms have to be fixed in such a way, they cannot move in any direction except the rise and fall of the water level.

The Organizer has to provide 2 boats for recovery of dead models (1 on each side of the Start line). At a World or Continental Championship these boats have to be equipped with a motor (electric). The rescue boats have to be protected (preferably with foam) adequately. At all times the rescue boat has to be manned by at least 2 adults, knowledgeable persons appointed by the Organizer. In the event of difficult recovery like for instance in the F1 class, the start helper can accompany the rescue boat in order to safely retrieve the dead boat. The rescue boat operators are to be equipped with life jackets, and wear them during rescue.

Rescue boats that can easily be damaged (Zodiac type, inflatable boats) are not permitted.

Retrieving of dead boats is under the supervision of the Starting Judge, in such a way that retrieving is done in the shortest of time without hindering or damaging other boats, in a way that everyone is treated the same. The rescue boat will proceed in a direct line towards the dead boat(s) and always has the right of way. Passing boats have to slow down and if needed move out of the way. Should any boat cause a threat to the rescue boat, the Platform Judge can sanction the participant by deducting a lap and in case of repeat a red card. In the event of an avoidable collision with the rescue boat, the Platform Judge must sanction with a red card (see safety regulations for this). For an unavoidable collision, (for instance the rescue boat touches a dead boat) there is to be no penalty.

Dead boats are to be retrieved in order of their position on the race course. A boat that

seems to be sinking is to be rescued first.

The following items must be present at the race platform:
- 1 digital weighing scale
- 1 digital Volt meter - it is advisable to use a meter with minimum accuracy of 0.1%
- 1 computer for lap counting
- paper forms for manual counting (see Annex D3)
- 4 digital stopwatches for F1/F3, at least 1 stopwatch in other classes
- 1 appropriate 1computer lap counting system in other classes than F1/F3

Personnel for the race platform

On a race platform in the classes Mono / Hydro, FSRE, Eco, Eco Team, F1 and F3 the following personnel have to be present:
- at least 1 Platform Judge, in case there are more, 1 of them is the head judge
- at least 2 Platform Judges for Mini Eco Team and Eco Team, 1 of them is the head judge
- 2 or 3 judges or experienced people to record missed buoys
- 3 timekeepers in the classes F1 and F3
- 1 knowledgeable person to operate the lap counting computer
- 2 people to call out the passing boats (1 for manual counting, 1 for computerized lap counting)
- 1 knowledgeable person to verify the results of the lap counting.

C. Guidelines for participants

Age groups

Specified in General Rules

Participation to World, Continental or European Championships:

Only persons affiliated to a Governing Body, known and recognized by Naviga and who are aware of the Rules can participate at Worlds or Continental Championships. Their membership to their Governing Body should be at least from the year of participation and should still be active. All models used by the participant should comply with the Rulebook. With the validation of the Rules for Championships 2015, it is now possible for participants from countries that joined Naviga on probation basis, to participate at Continental or World Championships. This is allowed only for 1 event, after that only by becoming a full member of Naviga.
Up to 5 participants per country and per class (except for Eco Team and Mini Eco Team where only 1 Team is allowed per country) can enter both Continental and World Championships. The reigning Continental or World champion is automatically qualified and thus not included for the respective Championship in the 5 participants. In Eco Team, Mini Eco Team (both Juniors and Seniors) the number of teams is limited to 2 for the country with the reigning champion team.
In the case a reigning, individual junior Continental or World champion becomes senior at the next Continental or World Championship, he/she has the right to defend his/her title as senior. The maximum possible number of individual participants can therefore not be more than 6 in Junior classes and 7 in Senior classes if all these requirements are met.

D. General technical specs

Types of propulsion

Boats in the M section can be powered by electric or ic motors according to the specs of the class.

Fuel and refuelling of models

Models in the class F1-V, equipped with glow plug motors, can use any fuel desired. The participant can have a refill bottle on the platform for refuelling. It is not allowed to top up the bottle during ones time window. The amount of nitromethane in the fuel is limited to 25% w/w or as stated in the effective EU regulations at any time, whichever is less.
Applied from 2 February 2022. this is maximized to 16% w/w. (See Regulation (EU) 2019/1148 of the European Parliament and of the Council)
The Organizer has to verify when fuel is supplied to competitors, if this percentage is respected.

Loudness, loudness measurements and rules for measuring noise

IC motors must be equipped with a muffler which according to the General Rules, dampens the noise to the set level of 80 db/A. (for classes F1V and F3V)

The equipment used to measure the sound level had to be within a tolerance of +/- 2,0 db/A and have to be according to IAC standards. The equipment should be provided by the Organizers. A certificate of accuracy by a recognized Authority has to be present. This certificate has to be dated within a 1 year period of validity. Every measurement has to be done in such a way no doubt can exist over the accuracy of the measurement. Only personal familiar with procedure, equipment can be appointed to make the measurements.
Procedure and equipment to be used can be found in Annex D6.

Race order for Finals

In the following classes finals should be run at International Events as well as in Continental and World Championships:

Eco, Mini Eco, Mini Mono, Mono 1, Mono 2, Mini Hydro, Hydro 1, Hydro 2, FSR E, Mini FSR E, Eco Team, Mini Eco Team

When the Finals are made up (look at Class Rules for this), starting order for the finals is decided. The person with the top qualifier result gets to choose his spot on the race platform for the final first. Next the second best chooses his spot and so on till all spots are assigned for.
In case no finals are held at least 3 heats per class should be run, it is advised however to run 4 heats per class of which the best 2 results then add up to make the final score. If because of weather conditions or other unforeseen events finals cannot be held, or not enough heats can be run to make up the addition of results, the best 2 results will make up the final score. If only 2 heats can be run, the best result will then count as final result.
This condition occurs when a race cannot be properly held without risking damage to both models and participants. (i.e. Thunder storm, strong winds, heavy rainfall or snow and so on). Team leaders (who have participants in the respective heats or finals), as well as the Section Leader take a vote whether the event should take place or not. Should the vote be a tie, the Section Leader has the deciding vote.

Proper use of remote control equipment

At official Naviga events only remote controls with a maximum bandwidth of 20kHz are to be used. Radio systems working on 2.4Ghz are also allowed. The simultaneous use of at least 8 sets has to be guaranteed. For safe use these radio controls should be working without interfering other equipment in a 20 MHz window. Frequencies in between the official channels are not allowed. Permission to use radio controls is governed by each individual country affiliated to Naviga. Also the frequency bands that can or cannot be used are to be defined by each individual countries' laws.

The Organizing Country has to announce the frequency bands that can be used along with the invitation to the event. Also has to be stated if not – allowed frequency bands can be used for the duration of the event. Should such an exemption be granted, any cost this might bring, are for the Organizers.

The Organizers cannot be held responsible for any trouble this might bring during the event, providing all the necessary information was provided with the invitation form.

For all radios and receivers it must be possible to change frequency or crystals swiftly. All competitors in the classes FSRE, Mono/Hydro, and Eco must have 4 different frequencies available for their radio control. In the classes F1 and F3 at least 2 different frequencies must be there (the frequency to be used will be announced at the Registration).

If at the radio check some sort of interference by another competitor or other influence is noticed, in a way the safe operation of a model is not guaranteed, the competitor has to be given a chance to repeat the heat or trial, if it is technically and time wise possible. It is technically not possible (at this point) to prove interference from outside when using 2.4Ghz equipment. Should someone claim interference from another radio system, it is up to the competitor to prove this.

Use of Energy Limiters

As of 01-01-2024 the use of an Energy Limiter is mandatory in all classes with exception of F1 / F3 classes.

Electric regulations per classes:
All mini categories except for mini FSRE: minimum battery weight of 140g, 30mm (of at least AWG 16 or 1.5mm²) cable to each pole.
Energy limiter set to: 21Wh or 1260Wmin.

Mini FSRE: minimum battery weight of 280g, no maximum weight for batteries, 30mm (of at least AWG 16 or 1.5mm²) cable to each pole.
Energy limiter set to: 42Wh or 2520Wmin.

Eco, Eco Team, Mono 1, Hydro 1: minimum battery weight of 360g, no maximum weight for batteries, 30mm (of at least AWG 12 or 3,3mm²) cable to each pole.
Energy limiter set to: 60Wh or 3600Wmin.
Mono 2, Hydro 2: minimum battery weight of 720g, no maximum weight for batteries, 30mm (of at least AWG 12 or 3,3mm²) cable to each pole.

Energy limiter set to: 120Wh or 7200Wmin.

FSR-E: minimum battery weight of 1080gr, no maximum weight for batteries, 30mm (of at least AWG 12 or 3,3mm²) cable to each pole.
Energy limiter set to: 180Wh or 10800Wmin.

Full battery weights and requirements for all classes in Annex A1 update 2024

For all limiters, use of the following general settings are mandatory:

- 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 Annex A1, for connection rules see Annex A3.

In all model categories that use energy limiter, for controlling motor speed only ESC that accepts and uses standard PWM control signal is allowed. Use of SBUS, PPM or any other radio control system can be used only if the motor control signal running to the ESC is converted to PWM. In order to maintain correct measuring, in all boats that use limiter, the battery negative pole and the receiver signal ground (negative pole) must be connected.

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 then stop – the limiter must re-arm after some time (to give the possibility to go back to the platform) but still show visually, that the Energy value has been consumed.
- cannot be reset by disconnecting the kill switch (to prevent the racer from resetting the Energy value during the heat for example when cleaning the leaves from the propeller)
- limiter device is a non tamperable device (covered with some material to prevent people from dismantling it).
- the limiter cannot be inserted into the power lines the wrong way neither current, nor voltage wise. This means, it must have different connectors on the current measuring (thick) line ends. (In case of MDLE and eLim it is the positive wire, in all other cases it is the negative wire.)
- the line through the voltage is measured (thin wire, if any) is directly connected to the wire that runs to the ESC from battery wire. (The other than the current measurement is made.) For full description of wiring and sample photos, consult Annexes A 3.

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

At registration all Limiters are to be checked for correct settings and minimum accuracy, then the program port sealed with a non-removable sticker (stickers that

cannot be removed without breaking them). If at registration a limiter fails the accuracy test and can not be calibrated by the race officials, it can not be used during the competition.

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 competition. If the settings are verified and correct, the device will be re-sealed.

At World or Continental Championships Energy Limiters can be rented from Naviga for the whole event until stock lasts. The rental fee is to be set by the Section Leader and is to be stated in the invitation, or at latest at registration. These limiters have to be returned at the end of the event. If a Naviga owned limiter is destroyed or lost in any way (for example in sunk boat), the racer or the racer's country federation is requested to reimburse this.

During a race the limiter is to be taken as part of the boat, just the way any other part of it.

The suggested and correct order of connecting limiter:
1. - ESC side black and red,
2. - signal in/output,
3. - battery wires. This order of making connections ensures maximum safety.

In the Team races (mini Eco Team 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 racers/3 batteries should clearly inform the Platform Judge about this before the heat. Again under penalty of DSQ for that heat.

Time keeping

In all classes that are run for a certain amount of time, the time is to be kept up to 1/100th of a second. Therefor only digital stopwatches are to be used.

Keeping time can be done either manually or electronically. For electronic time measurement only equipment that measures time automatically (AMB/MyLaps transponder system) can be used as official time keeping. Manual timekeeping has to be done simultaneously with the electronic timekeeping in case something should go wrong with the electronic timekeeping. In the event of failure of the electronic timekeeping system, organiser should take every effort to do a rerun of that heat. If it is by any reason not possible, the timekeeper(s) become the official race timer(s).

In the classes F1 and F3 time can be kept electronically with transponder system, if the technical equipments needed (MyLaps decoder, antenna, software) are available, or manually.
In case time is kept manually, this has to be done by 3 people. The procedure for this is as follows:

If 2 out of 3 stopwatches show the same time, the 3rd different time is ignored.

If all 3 stopwatches show a different time, the time, more then 1/10th of a second different is ignored. The official time will be then made up by adding the 2 stopwatches time and dividing that in 2. In this case the 3rd digit after the comma is adjusted to 0 or 5 if above/below.

Should any of the 3 stopwatches fail, the procedure as mentioned above is maintained.

If 2 or all 3 stopwatches fail, the run has to be redone. The Platform Judge will then declare when the run can be redone, taking all aspects into consideration.

The Platform Judge must verify the means of timekeeping for proper functionality before the start of each racing. The obtained results can only be cleared after the Platform Judge has given his consent.
The 3 timekeepers should be inline with the start/finish line behind one another, preferably on the platform. If this is not possible as close to the platform, as possible. During the run, the Platform Judge is to stay on the platform and overview the run.

Buoys

The race course is to be marked with buoys. Each buoy must be clearly visible in 2 colours (red/white). These coloured stripes must be vertical to the surface of the water.

The buoys must be cylindrical and made from, e.g. cork, styropor or other materials that do not cause damage to the boats. Wires or any other form of connection cannot stick out of the buoys. The buoys are to be connected at least 300 mm under the surface of the water.

The following dimensions are to be respected:

Classes F1/F3/Eco:
minimal diameter 100 mm, reaching vertically at least 100 mm and at most 200 mm out of the water. In the F3 class the diameter is 100mm +10/-0% and the distance between the buoys that make up the gates can be within a +/- 5% range (measured from middle of buoy to the middle of the other buoy). The triangular course has to be anchored in place.(Steel cable or cable in a material that does not stretch)

Classes Mono/Hydro and FSRE:
minimal diameter 200 mm, reaching vertically at least 200mm and at most 300mm out of the water. The course has to be anchored in place (steel cable or cable in a material that does not stretch).

Allowed models, how to be used and general state for racing

A competitor is allowed 2 models for each class he enters in. Both models have to be registered and marked. In case of repairs items from both models can be used as well as materials such as prop shaft, rudder, motor, speed controller. An extra hull or extra middle part or extra sponsons of a hydro cannot be used.

It is the competitor's choice which of the 2 models he wants to use for a series or trial. Both models can be brought to the preparation area, only 1 model is allowed however on the race platform. Once the competitor is on the race platform, he can no longer interchange models. During the time of the series or trial no changing of model is allowed as well. The second model can only be used is the following series or trial, even if the first model is damaged during the series/trial.

Any model can be used in more than 1 class, as long as the model meets the class regulations.

If a model gets damaged during a series/trial, this is no ground for having the series/trial redone. Even in the event of foreign influence like debris, water plants, parts of buoys or others.

A demand to redo a series/trial can only be done in accordance with the Platform Judge under 1 of the following conditions:

-Failure in timekeeping. -A proven case of radio interference. -Weather conditions deteriorate so badly between series, a fair competition is no longer possible.

Permanent registration numbers and race number shields

All models for the M class must have a permanent registration number. This permanent number is provided by the National Federation of the participant. The countries initials are a vital part of this number. This number must be unchangeable and be put firmly on the model. It cannot be placed on example: a lid, the sponsons or any other removable part (see Annex E1). For hydro's the permanent number can be on the outside, bottom part of the middle section.

2 models per class, per participant are allowed. Both models must have the same permanent registration number. The second model must also have the same race number as the first model. If the participant uses another model but these 2, this leads to immediate disqualification for that class.

The numbers and letters that make up the registration number must be black on a white background. The height of the letters and numbers is set at 20mm (see Annex E1). The class in which the model is used does not have to be stated on the model.

Race numbers

In all classes where laps are counted, all models must have a race number shield.

The dimensions for this shield are 80mm by 80mm. The shield should be made out of white none transparent material. The number on this shield must be in black with a height of 70mm and a width of at least 10mm (see Annex E2).

The number shield has to be mounted on or at the back of the boat, vertically and visible from both sides with at least 1 screw or bolt.

If the number is not clearly visible or transparent to the lap counters, no counting will be done, white areas with a race number painted on the boat are not allowed. No counting is done in case of a lost number shield. In case of a lost number shield, the competitor has to stop at the race platform in the next lap. After replacement of the number shield the competitor can carry on with the race.

Lap counting

Personnel for the race platform look under General Rules.

Lap counting is to be done by computer. Manual lap counting must be done simultaneously on a form (see Annex E3) for double security. Should the computer fail during a heat, the manual result will count. The time needed to finish the last lap will be called by the Platform Judge or delegated person and added to the manual timing sheet.
If a competitor has some laps counted, but some not counted (there are various reasons or possibilities for that), while other racers are counted normally, this is not a computer or system failure. No laps will be added manually by referring to the manual (hand) counting.

The Platform Judge will give the order to start the race and the clock directly from the platform. The signal to start the race will be given by whistle or by a computer generated beep. The end of the race will also be done by a whistle signal or computer beep. All models must finish the lap they were on at the time of the end signal. Boats that are on the race platform at the time of the end signal are not allowed to be put back in the water. The run in time for the last lap is max 60 seconds. It is to be observed, that in returning to the platform after the race has ended, NOT to cross under the antenna again.
For boat(s) that have exceeded the set limit for that class during the race, the run in lap is not counted if they can restart within the run in time of 60 seconds. This can be verified at the Voltage/Limit check out.

Lapcounting with transponders.

At Worlds and Continental Championships, lap counting must be done by means of a Transponder system. Boats should be built so they can accept a transponder. In the

invitation to the event, the use of a transponder system must be mentioned. Each participant brings his/her own transponder(s). Organizers can, but are not obliged to, have rental transponders (to be rented for the event). In case of destruction or loss, the cost of this rental transponder is to be paid by the person who rented it. Power has to be supplied by either the receiver or a separate battery. The placement of the transponder in the boat is not specified, but has to be in such a fashion it cannot move from its fixed placement. Participants are themselves responsible for not properly installed transponders and any malfunction resulting from that. Neither the Organizer nor Naviga will take any responsibility for lost transponders.

Manual counting is done simultaneously (see above).

Registration of participants and their models

Registration is done by the appointed Platform Judge.

After Registration has closed, the organizers must publish and show the different lists of classes and its participants.

Refusals to register for any class are to be explained.

All models (max 2 boats per competitor per class) must be marked. If this mark is not on the boat at any start, the boat cannot participate. If for some reason this mark has been lost, the participant has to report this to the organizers immediately. Only boats in race ready condition are to be registered. A race number and working kill switch should be present at registration. Batteries and propellers are not checked at registration.

There is to be no start till at least 1 hour after the lists of classes and participants have been made public.

Order of classes

The order of starting (F1/F3) is decided by the Organizers or by draw of luck. For filling in the series, the following is to be observed:

Participants from the same country are to be divided over different series. Frequencies are to be picked so that the next up or down channel is not used in order to avoid interference.

When 2 or more race platforms are used, the Organizers may decide which frequencies are to be used on which platform.
The Technical Committee of Naviga advises the following use of frequency channels for the different platforms:

F1 V:	27 Mhz:	channels 1 - 5
	40 Mhz:	channels 50, 52
	41 Mhz:	channels 401, 403

F1 E :	27 Mhz:	channels 6 – 9
	40 Mhz:	channels 54, 56
	41 Mhz:	channels 405, 406
F3 :	27 Mhz:	channels 10 - 17
	40 Mhz:	channels 51, 53, 92
	41 Mhz:	channels 400, 402, 404

Eco, FSRE, Mono/Hydro: all the other channels in these frequencies:

27 Mhz:	channels 19 – 32
40 Mhz:	channels 57 – 91
41 Mhz:	channels 407 – 420

The use of 2,4 Ghz is allowed in all classes.

In the invitation to the event, the Organizer must announce which frequencies are to be used for what classes. For Eco Team all frequencies are allowed. At registration each driver of a team has to register 4 frequencies.

If a participant does participate in several different classes, and these are held at the same time at different race platforms, the participant has the right to ask the Platform Judge to alter his start time or start order (for classes F1 and F3).

E.Procedure for racing

Roll call for competitors

The time for competitors to show up at the race platform is 2 minutes. The platform Judge is to call out for the competitor 3 times by name within this time to present himself at the race platform. When a competitor is called out for, the next one in line is to be summoned to start preparing his boat.

Should a competitor not be present with his boat, when his time is due, he loses the right to start in that run.

Should a competitor not be there, the preparation time for the next competitor in line is then 3 minutes. (class F1 and F3). In heat racing the heat will start without the missing competitor.

Changes in time tables can occur during an event. All competitors are themselves responsible for keeping track of any changes in the schedule, whether they are announced by word of mouth or in printing. Major changes in the time table are to be announced by the Main Judge. When major changes do occur, ample time for charging batteries is to be foreseen. All competitors must have their boats ready for use 15 min before their time is due.

Time for preparation

All boats are to be presented at the race platform ready for use (meaning taped up, with all necessary parts, nuts and bolts in place). Time for weighing, Voltage check or time to fuel up are not included in the set time window of the competitor (also observe the part of switches under lids in the Safety Rules).
At CC or WC the organizer has to prepare a sheltered preparation area. After being summoned, the battery Voltage or correct Limiter setting is checked, batteries weighed (when required), and when stated in the Rules boats weighed as well (with Naviga provided limiter included -where it applies). All this is to be done by properly trained people. After this the boats can be taped up. Next the Pontoon Judge will assign the position on the platform the participant must stand. After the race, the same area is to be used for further checks like battery Voltage, Limiter reading and weight according to the specific class rules.

Announcing the start of a trial

To avoid any misunderstanding, the competitor has to announce clearly to the Judge on the platform he is about to start his trial by a clear signal (raising an arm, calling out or other ways). This signal can also be given by the competitors helper (F1/F3). In heat racing the competitor is asked by the Pontoon Judge if he is ready. Should he so state, a delay is no longer possible.

In the F1/ F3 classes, the competitor has to allow the timekeepers to read and declare the realized time before making another attempt.

Cancelling a race or trial

Cancelling a complete event can only be decided by the Main Judge or Naviga 's Representative.

Cancelling a race or trial at any race platform is to be decided by the Platform Judge.

If during a race or trial a buoy gets destroyed, the following procedure is to be followed:

F1, F3: the trial is stopped, so is the time left. The boat is to be retrieved to the race platform. During this time no repairs, recharging or refuelling are allowed. After successful replacement of the buoy the remainder time is started once more.

All Mono / Hydro, Eco classes:
If a buoy or the transponder wire gets destroyed during a race, the race is stopped and re-run at a later time (if possible after the last group of that class). All boats that started the race can start in the re-run. Spare boat cannot be used in this case. If the track damage is a consequence of deliberate action (ie. trying to free a stuck boat in the buoy by using motor and removing the buoy) the racer who committed it cannot take part in repeated run. Recharging time has to be observed in such an event.

FSRE / All Eco-team classes:
If a buoy or the transponder wire gets destroyed during a race, the race is stopped by the Platform Judge by means of a whistle signal. All boats are to return to the race platform. Scored laps as well as time remaining are to be held. Repairs or recharging are not allowed at this point. After the successful repair of the racecourse or transponder wire the race is restarted by heading to the right hand bottom buoy.

Results and announcing results

The preliminary results of any race platform are to be made public within 2 hours. Printed lists are to be posted at a location known to all.

The result becomes official 1 hour after posting. In that 1 hour time window an Official Protest can be made against this result. After the 1 hour time period, no Protests can be accepted.
Posting results in the evening, after races have ended is not allowed when it is not certain ALL competitors or Team leaders have seen these results. The 1hour time window then starts the next morning at the time of the first start. The same goes for changes in the timetable.

Technical control of models

In several classes weighing of boats/ batteries and Voltage measurements are done. There is to be no second measuring of weight or Voltage if the set values are not met. The Voltage measurement is done by the competitor him/herself and verified by the appointed personal. Altering the weight of boat/battery on the scales is allowed for as long as the boat/battery remains on the scales. If the boat/battery is removed from the scales the weighing is ended. Should the weight or Voltage not meet the Regulations, the boat cannot participate in this heat/trial. Class Regulations are to be observed for this.

Before the heat Voltage (all batteries) and weight is checked. Limiter equipped boats must be checked for the presence of the seal and for correct connection (visually) then they can proceed to the preparation area to close up the boat.
After the heat, boats will stay closed and only opened in the battery check area under the penalty of DSQ for that heat!
Use of battery checker devices as substitution of Voltage meters are not allowed.

Before any race start in any class, the Platform Judge can verify the technical state of any model.

At World or Continental Championships or official International Naviga events the battery Voltage is to be measured directly on the battery before and/or after the race. The weight of the battery is checked before the race. It is up to organizer's decision to mark weighed batteries with safety marking label to prove that it has been weighed and approved. There is no need to weigh the battery before the heat if the label can be observed. Should a label be missing or damaged, the battery is to be weighed as usual. For safety reasons (over charging) Voltage is checked before the race. If these requirements are not met, the competitor cannot start in that race.

If the Voltage is too high before the race or the weight of the battery not according to class Rules, the participant is disqualified for that heat. Max Voltage before race is 4,23V per cell for LiPo, 3,65V for LiFePo and 1,42V for NiMh cells.

Adequate time should be provided for the competitors to properly close and tape up their boats.

In case a boat slows down not from limiter activity, Voltage is checked again to verify the minimal Voltage has not been exceeded. If the Voltage is too low after the race, the participant is disqualified for that heat. Min Voltage after race is set at 3,3V per cell for LiPo, 2,5V for LiFe. No under limit for NiMh cells The measurement is performed only once. The measurement cannot be influenced by any tools, such as resistors or chargers.
If a limiter with telemetry feature is used in the actual heat, telemetry data can be used to check battery voltage after the heat, but still the boat needs to be opened for visual check.

All these procedures are mandatory, should any competitor leave the race area without having everything checked, he is disqualified for that heat. For weighing and measuring Voltage, the equipment used by the Organizers, are the official ones.

Before the event, trials on weighing and Voltage can be done to test. For that purpose the equipment will be available at Registration.

At World championships the 3 best placed models are to be checked for conformity to the Rules and regulations after the Final.

Validating records set in the classes: F1 / F3

New records can be set in the classes F1 and F3. For new records to be validated, the following items are checked:
In the F1V classes: if the cylinder capacity of the engine is within the limit of the class the boat started in. If noise emission is within the Rules.

In the class F1E if the total weight of the battery does not exceed the max weight allowed. Voltage is checked for under voltage.

IC motors are to be measured when cold. A Tolerance of + 1% is acceptable.
Measuring the stroke of an engine is done through the glow plug fitting with a calliper. The engine is not to be opened till after that;
Measuring the bore of an engine is also done with a calliper, in the area between the top of the exhaust port and top dead point; 2 measurements are to be made (90 degrees opposite to one another) from these 2 measurements, the average is calculated.
For all measurement equipment setting standards are to be deposited.
Calculating the engine capacity from the measurements is done either by computer or by data sheet. (Annex D8)

Should a speed, elapsed time or number of points is obtained that is believed to be a new record, the boat involved cannot leave the race platform until scrutinizing of the model has taken place.

Each competitor is obliged to present his boat for scrutinizing and to assist with it. The preliminary actions are to be done by the competitor. Should the competitor refuse to do so, automatic disqualification is declared. Should the results of the scrutinizing not meet the set standards for the class, this also leads to a disqualification. In this case the next in line results move up 1 place and will be then also be scrutinised.

F. Penalties

All the following penalties are to be declared to the competitor immediately. There is no protest possible against this ruling.

If the noise level of 80db/A is exceeded or the Nitro percentage is too high in the classes F1V or F3V, the boat is disqualified for that trial or not allowed to start. This is the Platform Judge's decision.

If the Battery weight is not according to class Rules, Battery Voltage either too high or too low according to class Rules, or an unsecured Limiter is used, the assigned personnel informs the Platform Judge, who will then disqualify the competitor for that race or trial.

If a race number shield becomes unreadable or missing during a race, the boat should be taken out of the water at the next passing. If this is not done, the Platform Judge may disqualify the competitor after warning him first. It is allowed for the competitor to replace the number shield by another correct one.

If a boat gets stuck in a buoy and the driver tries to escape from the buoy by using his motor, hereby removing the buoy from its fixed position, he is not allowed to start in the re-run.

If during a race or trial, someone else besides the competitor or his/her start helper or rescue boat crew touches the boat outside the race platform area, a disqualification for that heat/trial is the result.

If a competitor uses a frequency not assigned to him, he cannot start in that heat. Should this happen again, or should he use a non authorized frequency afterwards he will be expelled from the whole event.

A non-moving boat must be avoided. Hitting a non-moving boat when it was avoidable leads to a yellow card with a 1 lap deduction. If the same driver hits this non-moving boat a second time, a red card is given. Should the competitor think his/her boat is no longer working, he/she must declare this to the Pontoon Judge. Once the Pontoon Judge declares to the participants that a boat is "dead" that particular boat can no longer continue should for whatever reason it be able to. Hitting a dead boat leads to a red card penalty with disqualification for that heat.

Should a boat pop out of the water or suddenly spin out so a collision is unavoidable, no penalty will be called.

If a competitor leaves the race platform during a race, his radio control must stay in place. If the radio control leaves the platform, this leads to disqualification for that heat.

A slower boat can be passed on either side. The slower boat should then hold its course and in no way hinder the overtaking boat. Any obstruction will lead to a 1 lap penalty. If a slower boat repeats this, he will be disqualified for that heat. Any form of “Team” racing, hindering other competitors boats or even damaging them; will be sanctioned with a red card. A faster boat overtaking a slower boat can also not cause any obstruction to the slower boat. If a collision occurs caused by the faster boat, a yellow card will be given. Should this lead to the early retirement of the slower boat, a red card will be given. An obvious intentional missing of the top buoy or any other buoy in the Eco classes, in order to obstruct or hinder another boat which is rounding the buoys in regular fashion will lead to an immediate disqualification for that heat and if repeated to a disqualification and expulsion from the event.

Unsportsmanlike conduct, hindering another competitor, causing danger to spectators or hitting the race platform, causing intentional damage to the Lap counting equipment (transponder isle or wires) can be sanctioned by the Platform Judge at his own judgment,

a) First offense, official warning (yellow card)
b) At a second time or in case of reckless behaviour, a red card will be given (disqualification). The competitor is to take his boat out of the water immediately.

Fair play is to be respected at all times. Should a competitor behave in an unsportsmanlike manner towards other competitors or Judges, he will be disqualified immediately for the whole event by the Main Judge; (on advice from the Platform Judge). Any physical violence towards other people leads to an immediate expelling from the grounds. This also counts for start helpers. Further penalty will be decided afterwards by the Naviga Presidium.

Yellow card: 1 lap deduction
Red card: Disqualification from the heat

G. Class Regulations

Regulations for the class Eco /Mini Eco

Definition

Freely built model racing boats with electric underwater propeller propulsion (Hydro/Mono drive units and surface propeller propulsion that extend beyond the length of the hull are not permitted) with a minimum weight of 1 kg., Mini Eco minimum weight 450 gr and maximal hull length 430 mm. Energy Limiter is to be used set at level stated in Annex A1.

Extra items such as pieces as styropor or balloons etc. are not allowed if they are not a permanent fixed part of the boat (in example cockpit or flood chamber).

Competition objective

On a triangular course (as shown in Annex C1) the highest possible number of laps in the given time is to be driven. A minimum of 3 and a maximum of 6 models take part in each heat. Due to the lack of time the number of models per heat can be raised, after approval from the Platform Judge and the Section leader (or main referee) to 7. However, this should not be the norm (not at World or Continental Championships).

Special construction specifications, regulations and checks in the class ECO.

The size and style of the starting number plate can be found in the general rules and is valid for all classes.

Only one set of batteries may be used per heat, batteries are defined per Annex 1. The battery pack must be easy accessible in case it needs to be checked. If a separate battery is used for the receiver then a noticeable kill switch is to be used to break the circuit.

There is no restriction on the electric motor used to power the model.

The model is to be weighted before the race in a ready to race condition. The total weight including the receiver and battery plus their respective cables, connections and mounts, may not be less than 1000 gr in the class ECO. Not less than 450 gr (including start number plate) and a maximal length of 430mm for Mini Eco. For battery weight and battery Voltage see class rules.

Competition rules

The competition is carried out on a triangular course corresponding to the NAVIGA rules, with the exception of the turn buoy. The race direction is anti clockwise. The start line runs in a straight line to the uppermost buoy. Once the models are in the water, the race begins with an acoustic signal sounded by the Platform Judge or by lap counting computer. At this time the boat must lie with its stern to the landing stage. If the race number is at the back of the boat, this becomes the stern of the boat and has

to touch the landing stage. If a model has a late start and the first of the models that started correct has reached the bottom left buoy, then the late starter must start towards the bottom right buoy. In no way should he then hinder the oncoming models.

There are 3 or 4 heats in a Race. The results of the 2 best heats are added. The 6 competitors with the best results advance to a final heat, were the final result is determined (General Rules, technical specs, race order for finals).

Racetime see Annex A1

There is to be no turning back when missing a buoy. Missing a buoy (rounding the buoy on the wrong side) is a 1 lap penalty for every missed buoy.

During a race, boats that have broken down will be picked up by the rescue boat at the end of the heat, apart from when a boat sinks or might sink.

Even after a heat / race the model must correspond to the specifications of its class. The Platform Judge can check this at any time, even after a heat / race.

Regulations for the Eco-Team and Mini Eco Team classes

Definition

(Mini) Eco Team is a team event for boats of the (Mini) Eco class.

Race Rules

There is to be no turning back when missing a buoy. Missing a buoy (rounding the buoy on the wrong side) is a 1 lap penalty for every missed buoy.

At least 2 and at most 3 competitors make up an Eco team or Mini Eco team, using maximum 3 boats. For all boats used, the same built requirements are valid as in the Eco or Mini Eco class. This goes as well for allowed batteries, number of cells used as for general rules for racing. The following changes towards the Eco Rules are to be noticed.

Only 1 boat per team can be in the water. Dead boats are recovered during the race, the next boat of a team cannot start until the dead boat is in the rescue boat. For duration of a race see Annex A1. Only 3 sets of batteries per team are allowed. Charging batteries during a race is not allowed. Every team member can bring only 1 boat to the platform, and can also only drive his own boat. In case 2 racers takes part using 3 batteries in 2 boats, a 3rd person as mechanic can be a member of the team. However, he must not drive any of the boats. Swapping batteries within the team is allowed.
The start is given as in the Eco class. All further boats starting from the platform head to the right bottom buoy. Hitting the rescue boat leads to a general disqualification of the whole team. Mixed teams (participants from different countries) are not allowed at European or World Championships. Maximum 6 teams form a series. Unless using 2.4GHz system, at registration all participants from the team should provide 4 frequencies. In the Eco Team Junior class 1 senior person is allowed per team to give

aid and advice. This senior person can however not act as start helper. He can only interfere in the cause of events after the ok from the Platform Judge, when the team is in danger. There is no protest possible towards the Platform Judges decision.

Regulations for the FSR E and Mini FSR E classes

Definition

In the FSR E/ Mini FSR E class only single hull boats with submerged drive and electric motors are allowed. Different types of hulls or drive systems are not allowed. So called Mono or Hydro boats or similar are not allowed. Using 2 motors or up to 2 prop shafts by using a gearbox for example are allowed. Energy Limiter is to be used set at level stated in Annex A1. Boat length/weght: se Annex A1.

The course to be used is the M course as described in Annex C5. It is made up from a modified Mono/Hydro oval. A heat consists of maximum 8 boats.
Race time: See Annex A1.

Start Procedure FSR E:
The start is towards the middle buoy (to be passed on the right hand side, next towards the left hand top buoy) after the signal is given. If a transponder system with an "island" is used, this island is to be passed on the right hand side. All boats should be in the water with their stern against the platform before the start is given, held in place by the start helper.
Start Procedure Mini FSR E:
The start is towards the bottom right buoy after the signal is given. All boats should be in the water with their stern against the platform before the start is given, held in place by the start helper.

On the bottom straight (parallel to the race platform) there are 2 buoys at the ends of bottom straight or four buoys (example, straight ends plus the 2 Eco triangle buoys). These 2 Eco triangle buoys cannot be passed on the inside. However should a boat get stuck in either of these 2 Eco triangle buoys this cannot be used as an argument or ground for a protest. Boats stopped dead in the water will be recovered by the rescue boat. Only batteries as stated in Annex A1 are to be used.
Charging batteries during a race is not allowed.

No turning back when missing a buoy. Missing a buoy (rounding the buoy on the wrong side) is a 1 lap penalty for every missed buoy.

In all 3 or 4 heats are run. The 2 best results are then added to make the final result. The top 6 qualifiers will then race for their final result in a Final heat (race order for finals).

In the last 2 minutes of FSR E and in the last minute of Mini FSR E race, the rescue boat will not be allowed to fetch any dead boat, unless it is sinking or looks like it will sink.

Regulations for the Mono, Mini Mono / Hydro and Mini Hydro classes

Boat requirements

Boats to be used in the Mono, Mini Mono, Hydro, Mini Hydro classes are boats that resemble real boats. This semi scale appearance can be achieved by painting windscreen, including things as driver, canopies, engines or exhaust pipes. In case of a kit boat by using the parts provided by the manufacturers such as lids and covers. Pure performance models are not allowed. Extra items to make a boat to self right such as pieces of foam or balloons are not permitted as long as they are not fixed part of the boat (canopy or flood chamber for example).
Mini Mono or Mini Hydro boats have a length restriction of 450 mm and a minimal weight of 450 gr. The length is the hull length (sponsons included in the case of Mini Hydro) measured from the transom to the nose, rudders and number plate not included even if it is part of the mould.

All boats must be propelled by 1 or more semi-submerged propellers and 1 or more motors. There is no restriction on motor(s) used.
Energy Limiter is to be used set at level stated in Annex A1.

All boats must have a race number that is clearly readable from both sides. The requirements for the race number is described in the General Rules. A second race number is allowed if in doing so, the visibility from both sides is guaranteed.

Batteries and battery weight, see Annex A1

Classes

There are the following classes:
Mini Mono single hull boats (observe length, weight and battery rules)
Mono 1 single hull boats
Mono 2 single hull boats

Mini Hydro multi hull boats (3 point boats, catamarans, observe length, weight and battery rules)
Hydro 1 multi hull boats (3 point boats, catamarans)
Hydro 2 multi hull boats (3 point boats, catamarans)

Run time see Annex A1

Rules for racing

Before the start boats in the Mini Mono or Mini Hydro class are to be weighed and measured.

Race course and number of participants

Boats go round a course, made up by 6 buoys, clockwise. Measurements for the

course are to be found in Annex C4. The distance from the bottom base line to the platform is 15 m. The distance from the left lower or right lower buoy to the banking, is to be minimum 15 m. On the start/ finish line an extra buoy must be placed, slightly inside the race course. Start and finish line must be 5 m left to starting place number 1.
In case of Mono1-2 and Hydro1-2, competitors are to be divided into groups of max 6 people, while in mini categories, groups of max.7 racers are to be formed during the heats. If possible all groups should be made up with equal numbers. In the course of the event, under manned groups are to be filled up.

3-4 heats per group are to be run. The 2 best results are added up. The 6 competitors with the best result make up a Final to the decide the overall winner. More info in General Rules, race order for finals.

The start procedure

After the command „boats in the water“ is given an acoustic signal will sound. At this point all boats must drive up to the 3 right hand side buoys, staying well outside of them, (according to drawing seen in Annex C4) up to the start line placed 5 meters from the left hand side of the Platform. If any boat hasn't crossed the bottom baseline within 3 seconds after the signal, starting is no longer allowed then. Slowing down or stopping completely during the start procedure is also not permitted. The start is declared by race control as follows:
6,3,2,1 start. Only after this command the actual race time starts. An early or “jump” start (crossing the start line before the command start is given, slowing down or stopping all together) will be punished with a 1 lap deduction. The Platform Judge must declare an early or jump start to the competitor after completion of the first lap.

Fairness is the most important rule

Overtaking can be done on any part of the course. Boats driving on the ideal line can only be passed on the outside. The ideal line is defined as the fastest line between any 2 points or buoys that make up the race course.

If a boat goes outside the ideal line, it can be passed on the inside. This also applies in both turns.

In overtaking, no competitor can hinder another boat by changing lanes or cutting across the ideal line towards a buoy.

Non-moving or dead boats are to be passed at a great distance. If such a boat is hit by any competitor, the Platform Judge will pass penalty according to the part “Rules for Racing“.

If a buoy is passed on the inside, a 5 second penalty is given to that competitor. If a second buoys is missed 1 lap will be deducted from the final score. Any further missed buoys will be penalized by another lap deducted for each missed buoy. Turning around trying to avoid missing a buoy is not allowed. Boats stopped dead in the water will be recovered only after the race has ended. Only in cases where the boat

is sinking, or looks like it will sink, the Platform Judge will summon an immediate recovery.

Even after the race, all boats must meet the class regulations. The Platform Judge can check on these even after the race has finished.

In general, race order in the separate classes are to be run as follows:
Mini Mono, Mono1-2 then Mini Hydro,Hydro 1-2
This order can be changed by the organizer with approval of the Section Leader /Main Judge. However, all the groups of one category must run one after another the same day.
Juniors will always run first.

Regulations for the classes F1V and F1E

F1V class

In the F1V class radio controlled boats with ic motors are used. There are the following sub classes in the F1V Class:

1. F1-V3,5: Freely built boat models with ic motor of max 3,5 cc, submerged propeller driven, driving a speed course as described in Annex C2.

2. F1-V 15: Freely built boat models with ic motor of over 3,6 cc and max 15 cc, submerged propeller driven, driving a speed course as described in Annex C2.

In all classes 1 or more motors can be used. The total engine capacity cannot exceed the maximum engine capacity allowed for the class. The Main Judge has at all times the right to have the total engine capacity checked.

F1E class

In the F1E class freely built boats with electric motors are to be used using a submerged drive. There is no weight limit (neither minimum nor maximum weight) and the battery Voltage is limited to max 43V. The maximum weight in LiPo is 1400 gr. The goal is to drive around the Naviga triangle in 2 directions, according to Annex C2

Number of cells, weight, type of batteries and Voltage are to be as in Annex A1.

Prior to the start the Voltage is checked, this Voltage should be not higher as set in Annex A1. This measurement is done over the kill switch. The wiring and accessibility of batteries in the boat should be such that a clear check of the used batteries is possible.

General rules for starting and ending a run

During his run the competitor and his helper have to stay with in a designated area. The competitor as well as his helper can move around freely in this area. Only 1 helper is allowed per competitor.

A radio check is done before the start of each run. The Platform Judge will check to see if the assigned frequency is used by the competitor. Should this not be the case, the Platform Judge may refuse the competitor from making his run.

Recovery of dead boat within the set time frame is allowed.

After finishing a run, the competitor is to take his/her boat out of the water immediately and his/her radio to be switched off.

If a model gets out of control during a run, 1 minute is allowed to restart, if not the run will be considered as completed. If the competitor or his boat be hindered in any way (example radio interference caused by another competitor) he can claim a rerun after the end of his run. Only 1 rerun can be claimed.

When a competitor is forced to end his run due to these circumstances, and the Platform Judge allows a rerun, then the whole run is redone. Any times achieved in the missed run are then not valid.

Race procedure

Racing in the F1V and F1E classes are done in 3 runs, which are to be held over separate days at European and World Championships. A 5 minute run time is given to each competitor for his actual run.

Within the 5 minutes each competitor has, starting as he steps on the platform, he can make as many attempts as he wishes. Run time starts at the signal given by the Platform Judge. After the end of a run the Platform Judge will summon the next competitor to the platform as soon as possible. The competitor or his helper have to clearly show the start of the trial by raising an arm, calling out or other ways. This signal can also be given by the competitors helper. An attempt can be started at the signal given by the Platform Judge. Within the run time, repairs to the boat are allowed with the exception of motor changes or recharging or changing batteries. In the F1V class, refuelling is allowed only from a fuel bottle that was on the platform at the moment the run started. The time does not stop for refuelling. Changes or repairs to a boat during a run cannot be such, the boat does not meet the class specifications.

Recovery of a dead boat during a run is allowed, the run time is not stopped during recovery.

Every boat has to run the course twice in opposite directions. The start and finish line are the line from the top buoy to the turn buoy and the platform.

Once a boat crosses the start line, the attempt is considered as started and valid.
The attempt that is already started when 5 minutes run time elapses, can be finished. It is valid and counted for.

Timing of a trial starts as the start line is crossed with the bow of the boat, and ends as the finish line is crossed with the bow.

The start of a run will be from left to right. Touching buoys is not considered a fault. All buoys have to be passed on the outside. Going inside the line between 2 buoys is not considered a fault as long as no corner buoy is missed in so doing.

If a buoy is missed, the competitor has the right to turn back and round the buoy in the correct way, even if he crossed both lines between the buoys. He can then continue his run.

If any buoy is not passed in the correct way, the trial is not valid.

Validating a run

The result will be measured by the time keepers in seconds and 1/100 th of seconds. The best of all trials will be the official result.

In the event of equal times, the next best result of the competitor will depend on classification. Should after 2 joined results there still be an equal result between 2 competitors, the 3rd time will then decide the classification. Should 2 competitors still be equal after that, the competitor with the lower sound emission (F1V) will be declared winner, in F1E the further results will depend on classification.

Announcing results

After all series the result are to be put out containing the following:

- type or race
- class
- classification
- Name, surname and Nationality of the competitor
- results of noise emission measurement
- runs made including time accomplished
- best run made
- Name, Nationality and Referee number of the Judges
- Signature of the Main Judge and Platform Judge

Regulations for the class F3V and F3E

Freely built boats equipped with electric or internal combustion motors are to be used for the F3E and F3V class. In F3E/V only a boat propeller is to be used.

The race course is triangular, made up by 8 gates. (side length 30m see Annex C3). The course is to be driven in a set order. Points are awarded according to the time elapsed.

Race procedure

Racing in F3V and F3E is done in 3 separate heats, and for Worlds or European Championships, spread over 3 days. Each competitor has, included the time to prepare, a 5 minute time window (run time) to do his/her attempts.

In these 5 minutes, starting by stepping unto the race platform, as many attempts as wanted can be made. The Platform Judge will declare the course open after each trial as soon as possible, however allowing the timekeepers to reset their stopwatches. The competitor or his helper must clearly state the start of their attempt by raising an arm, calling out or other ways. An attempt can be started upon the signal given by the Platform Judge. During the run time repairs or modifications to the boat are allowed. Changing motor, refuelling, changing or recharging of the batteries however is not allowed. Retrieving of dead boat is allowed during a run.

If a boat has crossed the start line at the end of his run time, the trial is valid and counted for.

Racing is done on a triangular course as shown in Annex C3. The maximum time per trial is set at 150 seconds.

Timing of a trial starts as the 1st gate is passed with the bow of the boat, and ends as the last gate is passed with the bow.

From the set maximum time of 150 seconds each full 1/100th of a second remained (means the trial was finished earlier), worth 2/1000th of a point. 5 seconds thus make 1 point.

All 8 gates on the figure course are to be passed twice, in the correct order and in the shortest time possible. Points are earned for each gate passing according to the list in Annex D4. The maximum points of 120 are given for all gates passed without any buoy touch.

Each gate is only to be attempted once.

A gate is considered passed when the boat has passed the baseline between the 2 buoys making up that gate.

During any gate passing it is considered 1 touch fail, when any or both buoys are touched in one direction. A buoy is considered touched, when it visibly moves. Points

are deducted for faults according to the list in Annex D4.

A gate is considered missed, when the boat crosses the base line on which both buoys making up that gate, is passed outside the 2 buoys. In this case points for that gate are not given.

Gates not passed in the correct order are considered as missed

For batteries, weight, number of cells in the F3E, see Annex A1.

Validating a run in F3V or F3E

The result of an attempt is made up in points composed from two parts: (1) points for gates, penalty applied for faults and (2) points for time. Points for time are given by the following equation: $Points_{time} = (150-t)*0,2$, where "t" is the time of the trial in seconds and 1/100th of seconds. Supposing all gates were passed, the result can be pointed out from the lookup table Annex D5, by comparing the time in seconds and 1/100th of seconds to the list. This it to be decreased by the points for fails, according to Annex D4.

The best of all trials is taken as final result. In case of equal points, the next best result of all trials is then taken. Should there still be a draw the next best result(s) will be counted till there is no more equality in points.

After the series a List with results is shown, this list provides the following data:
- Type of event
- Class
- Order of ranking
- Surname, name of the competitor
- Time of race
- Penalties
- Total points
- Name and number of Judge
- Signature of Main Judge and Platform Judge.