NAVIGA
RULES 2016

SECTION A/B

EFFECTIVE: FROM 01.01.2016

FOR THE FOLLOWING MODEL CATEGORIES

A1 - water propellers racing models with an internal combustion engine up to 3,5 cm^3
A2 - water propellers racing models with an internal combustion engine up to 7.5 cm^3
A3 - water propellers racing models with an internal combustion engine up to 10 cm^3
B1 - air propellers racing models with an internal combustion engine up to 2.5 cm^3

A1E - water propellers racing models weight up to 1.2 kg with electric motors.
B1E - air propellers racing models weight up to 0.75 kg with electric motors

Rules for Competition of
High-Speed Cord Models Section A/B

Updated on 01.01.2016

1.0 TECHNICAL REQUIREMENTS

1.1. Definition of models

1.1.1. Pylon racers are freely built models, able to float, equipped with an internal combustion engine or electric motor, propelled either by a water propeller or an air propeller. They are fastened to a pylon by a cable and sail in a circle at the highest possible speed.

1.1.2. High speed models of class A are equipped with water propellers and models of class B - with air propellers. Both classes compete in the same distance.

1.2. Model classes

Section A/B is divided into the following classes:

Class A1: racing models equipped with an internal combustion engine with an engine capacity of up to 3,5 cm3, the maximum diameter of the final exhaust outlet of 7,0 mm and the weight of the model up to 1,2 kg, propelled by a water propeller.

Class A2: racing models equipped with an internal combustion engine with an engine capacity of up to 7.5 cm^3, the maximum diameter of the final exhaust outlet of 8,0 mm and the weight of the model up to 2,0 kg, propelled by a water propeller.

Class A3: racing models equipped with an internal combustion engine with an engine capacity of up to 10 cm^3, the maximum diameter of the final exhaust outlet of 10,0 mm and the weight of the model up to 2,5 kg, propelled by a water propeller.

Class B1: racing models equipped with an internal combustion engine, with an engine capacity of up to 2,5 cm^3, the maximum diameter of the final exhaust outlet of 5,0 mm and the weight of the model up to 0,75 kg with air propellers.

Class A1E: racing models equipped with electric motors, maximum voltage of the battery 42 and the weight of the model up to 1,2 kg, propelled by a water propeller.

Class B1E: racing models equipped with electric motors, maximum voltage of the battery 42 and the weight of the model up to 0,75 kg with air propellers.

1.3. Requirements for models

1.3.1. The models must keep their buoyancy with their engines stopped.

1.3.2. Classes B1, B1E pylon racers at standstill: the air propeller must be above water level in any position with the boat not fixed to a cable.

1.4. Bridle

1.4.1. The bridle is of free configuration and is part of the model. The diameter of wires and the toughness of the bridle must not be less than the diameter and the toughness of cords of the relevant class of models. For the damages, caused trough non-compliance with this regulation the competitor is personally responsible.

1.4.2. The length of the bridle measured from the axled line of the model to the ring of junction with the cord must be 1220 mm. The axled line of the model is the axis of the screw (airscrew, water screw) or, for twin-water screw models, the middle line between the axes of screws.

1.4.3. The connecting points of the bridle with the model and with the cable must be wrapped in metal pipes.

1.4.4. The junction of the wires of the bridle is free and can be realized by reeling and/or with the help of soft soldering.

1.4.5. A model with a bridle shorter than 1220 mm or a diameter of the wire not meeting the requirements under 1.4.1 shall not be allowed to start.

1.5. Cables

1.5.1. The cables are 14 552 mm long. The cables and the bridles must be made of steel. They must be able to resist at least a 180 kg/mm² tensile strength. In the different classes, their diameter and breaking force must be:

Classes A1, A1E – 0,60 mm – 50,86 kg

Classes A2 – 0,80 mm – 90,43 kg

Classes A3 – 1,00 mm – 141,28 kg

Classes B, B1E – 0,60 mm – 50,86 kg

1.5.2. All the rings of the cables must be made according to Figures 1a or 1b (see Annex 1).

1.5.3 The cable must be provided by the organizer, who had checked its tensile strength by force **T**, determined by the formula:

$$T = P_{max} \times V^{2}_{rec} / g \; R = P_{max} \times V^{2}_{rec} / 2024$$

where P_{max} is the maximum allowable weight (in kg) for this model class,

V_{rec} is the world record speed (in km/h) of this model class;

1.5.4. Before each race the starting-point judge must check the condition of cables.

1.6. Pylon

1.6.1. The pylon (a thick steel tube) must be firmly fixed to the centre of the racing circuit.

1.6.2. In order to hitch the cable, easy revolving ball-bearing must be mounted, equipped with a hitching ring. The distance between the centres of the pylon and the hitching ring is 152 mm.

1.6.3. The hitching ring must be fixed at a height of 500 mm +/- 20 mm above water level. That height must not change during a race.

1.7. Racing area, length of circuit and checking

1.7.1. The racing circuit must be a calm water surface so that the competitor, standing in water, can launch his model. The water at the starting-point must be from 600 to 800mm deep. The racing circuit must correspond to a figure as per Annex 2.

1.7.2. The length of the racing circuit is 500 m (five laps) and is made from:

- Distance from the pylon axis to the ball-bearings hitching ring: 152 mm
- Length of the cable between its coupling hooks: 14 552 mm
- Bridle with its ring: 1 220 mm
- Total radius: 15 924 mm
- Total diameter: 31 848 mm

1.7.3. The total length of the five laps is:31848 x 3,14 x 5= 500000 mm = 500 m

1.7.4. Before the beginning of a race the starting-point judge personally or trough the judges must check:

- The installation and dimensions of the cable, the ball-bearings hitching ring
- The length and condition of the bridle
- Diameter of the exhaust port
- The buoyancy of the models B1 and B1E

1.7.5. During a race, the starting-point judge must make sure that the cables are in conformity with the classes. If necessary, he must perform intermediary safety checks.

1.8. Judges team at the starting-point

The Judges team at the starting-point consists of:

- A starting-point judge as chief pontoon judge
- The secretary
- Three judges as Time-Keepers
- Two judges of the fuel distribution
- A judge in charge of bridle checking and diameter of the exhaust port

1.9. Minimum equipment on the starting-point for models A/B

- A pylon mast with adjustable ball-bearings hitching ring, which is fixed by the height as per 1.6.3;
- A starting platform/pontoon;
- Leading post;
- A table and chairs for the starting-point judge and the secretary, sheltered from the weather and isolated by a fence;
- Three stop-watches;
- One tensile strength measuring apparatus;
- One 15 m long measuring tape;
- A caliper-gauge or micrometer-caliper to measure the diameter of cables and of the exhaust port;
- A fuel-supplying system fitted with a fire-fighting device compatible with the fuel used; placed within a 5m safety perimeter, where a legible and visible notice will forbid anyone to smoke or make a fire;
- One boat;
- One first-aid kit placed in a conspicuous position;
- One notice-board showing the race circuit;
- One notice-board showing the provisional results.

1.10. Progress of the races

1.10.1. A racing event comprises five races.

1.10.2. The preparation time begins when the competitor hitches his model to the cable, which operation is ordered and controlled by the starting-point judge.

1.10.3. The competitor can have two assistants during the start.

1.10.4. It is the competitor's discretion to launch the model in the clock-wise or counter clock-wise direction.

1.10.5. Each competitor is only allowed one try within each launch. The model cannot be launched twice during preparation time, even if the competitor succeeds in recovering his model after a false start.

1.10.6. When a model is racing, the competitor may use all his preparation time. However, he must ask clearly and in time (i.e. by raising his arm) for the beginning of timing according to the rules.

1.10.7. Timing can be conducted by electronic means or by manual measurement, by means of stopwatches:

- In case of electronic timekeeping two timekeepers measure the time additionally by stopwatches.
- Manual measurement is conducted by three timekeepers.

1.10.8. In manual measurement the three scores must not differ by more than 0.1 sec. Time score deviating by more than 0,1 second shall be deleted. The actual result is equal to the mean of the remaining two. If the difference between the two stop-watches is more than 0,1 sec, then the start shall be repeated. If two of the three stopwatches show the same time, the third aberrant time is deleted. If one stopwatch fails, then the result is determined based on the time of the other two stopwatches as previous. If two stopwatches of the three fail, the start shall be repeated.

The repetition time of the start is appointed by the starting-point judge.

1.10.9. In the electronic measurement only, obtained in this way, the result is written in the assessment. At failure of electronic readings, the actual result is equal to the mean of the two stop-watches, as described above.

1.10.10. Before the start of the competition the starting-point judge tests the accuracy of the measuring time electronic system and the stopwatches. The starting-point judge gives permit for the start only if satisfied that the electronic system and the stop-watches show the same reading.

1.10.11 The stop-watches are activated when the model crosses the line between the pylon and the leading post (see Annex 2).

1.10.12 One of the 3 time-keepers counts in a loud voice the number of laps made by the model. The stop-watches are stopped when the model has finished its fifth lap.

1.10.13 If a model finishes its race before the timing begins or if it does not make the five laps during the timing, its try is nullified (false start) and cannot be made again.

1.10.14 During the time of evaluation, a model of classes B1, B1E must touch the surface of the water at least twice at each lap.

1.10.15 If during a race something disjoints from the model the result shall not be considered.

1.11. Placing

1.11.1. The race with the best time is registered in evaluating and determining of the placing.

1.11.2. If several competitors have achieved the same best time (correspondingly speed), the definition of places is accepted according to the results of the second, third better run, etc. If the placing is not determined so, then these competitors receive the same places.

1.11.3. The times performed will be converted according to the formula speed (in km/h) = 1800/Time (in second). That speed shall be the result of the race.

1.12. List of results

The results sheets must include:

- The kind of race
- The class
- The competitor's surname, name, the country of competitor
- The model and registration number
- The result of each race (the time in seconds and in a fraction of a second, the speed in km/h)
- The best result
- The final ranking
- The judges' names and countries
- The signature of the chief judge, starting-point judge and secretary.

2.0. SPORT-TECHNICAL PRESCRIPTION

2.1. Definition concerning the competitors

2.1.1. Age groups

In the racing events organized according to the NAVIGA Rules competitors are divided into two age brackets: Juniors and Seniors.

2.2. Registration of the competitors and their models

2.2.1. The competitors must be entered for continental or world championships through their federation, member of NAVIGA.

2.2.2. Each competitor may register two models in each class and participate with them.

2.2.3. A Group AE model meeting the construction requirements for two or for all three classes in the group can only be registered and start in one of the classes. Changing over to another class in the course of the competition is not permitted.

2.2.4. Models with electric motors in classes A1E, A2E, A3E and B1E can use radio control at the beginning and end of their run. During the timed part of the run the transmitter cannot be used to control any part of the model. It must be held above the competitor's head or placed on the timekeepers' table and in full view of the judges. Failure to observe this rule will lead to disqualification.

2.2.5. The weight of the models is checked during the registration.

2.2.6. The competitor is allowed to choose the model he uses for a race. He is allowed to bring the two models to the preparation area but he is allowed to bring only one model to the starting point. After the beginning of the preparation time he is not allowed to change models.

2.2.7. The competition model and the replacement model must bear the registration number.

2.2.8. The lasting registration number and the distinctive sign of the country must be fixed permanently and be indelible on the hull of each model:

XYZ – H3

where XYZ is the distinctive sign of the country,

H3 is the National Registration Number.

2.2.9. The registration number must not be fixed on removable parts such as a bonnet.

2.2.10. After the closing of registration the organizers of the racing event must confirm the registration officially by announcing it in written in a notice-board for the purpose.

2.3. Starting sequence

2.3.1. The first start sequence of competitors is set under the guidance of a starting-point judge by drawing lots. Sequence of further attempts is set backward to the previous one.

2.4. Call time

2.4.1. Call time lasts two minutes. During this lapse of time, the starting-point judge must call the competitor by his name three times.

2.4.2. A competitor loses his rights to take part in the race if he does not appear with his model at call time.

2.4.3. When a competitor is called, the next competitor must be advised to be ready.

2.4.4. If a competitor does not appear at the starting point or refuses the current start then the call time of the next competitor is increased to 3 minutes.

2.5. Fuels and filling up the tanks

2.5.1. For models of category A/B, equipped with spark plug engines, only standard fuel without any additives is allowed.

The standard fuel must be a mixture of 80% methanol and 20% castor oil.

2.5.2. The standard fuel must be provided by the organizer of the racing event. In his invitation he must quote the price of the fuel or he must state that the fuel is provided free of charge.

2.5.3. Before each run competitors must go to the filling place with empty tanks. The judge must rinse the tank with standard fuel, and then let the competitors fill up the tank with the same fuel.

2.5.4. The injection of the fuel into the engine as an aid to starting is allowed only with the standard fuel. The filling of the pipette or syringe must be done by the judge of the fuel place.

2.5.5. The organizer is obliged to provide a container for collecting the fuel from the rinsing of tanks, its safe storing and destroying at the end of each starting day.

2.6. Preparation time

2.6.1. The preparation time for models with an internal combustion engine is 4 min, for classes with electric motors 2 min. running from the moment, when the model is fixed to the cable.

2.6.2. The starting-point judge must clearly and accurately show to the competitor the beginning of preparation time.

2.6.3. The competitor must be informed of the preparation time used every 30 seconds by acoustic or optical means.

2.7. Resumption of a race

2.7.1. If a model is damaged on the water during a race period, the race must not be resumed. The same rule is applied if the propeller or the model is hampered by a foreign body, water plants, bits or buoys, etc.

2.7.2. The resumption of a race is allowed only in the following cases:

a) breaking of the cable or an imperfection of the pylon provided that the competitor is not responsible for it.
b) breakdown of the stop-watches.

2.8. Interruption of a race

2.8.1. The interruption of a whole set of races may be decided by the chief judge.

2.8.2. The interruption of races at the starting point may be decided by the starting point judge.

2.8.3. If a racing event is interrupted for more than 60 min., all the races must be repeated by all competitors.

2.9. Marking and result publication

2.9.1. All the results of a racing event must be immediately conveyed to the starting point by acoustic or optical means. The verbal announcement must be made in one official language of NAVIGA, in addition to the local language. The verbal announcement must be considered provisional.

2.9.2. The results must be written on the result lists. When a racing event is over, the results must be checked and published as provisional by the secretary and by the starting-point judge.

2.9.3. Within an hour after the provisional results have been published, they must be confirmed as final and official, and published as such. No protests shall be admitted thereafter.

2.9.4. Competitors who have obtained no result with their models in a class are not classified. Their names must appear at the end of the result list in alphabetical order.

2.10. Checking of the models of the first three competitors during World and Continental championships and record establishment

2.10.1. During World and Continental Championships or at record scoring the first three placed models of each class must be checked for conformity to construction regulation and for the cubic capacity of engines.

2.10.2. The judges must measure the real cubic capacity of the combustion engine. The cubic capacity of the combustion engine must correspond to the class where the model belongs.

2.10.3. Combustion engines cubic capacity must be checked when the engine is cold.

2.10.4. If a speed record seems to be beaten, the model must not leave the starting-platform until the judge has checked the model.

2.10.5. The competitor has to show his model to the judges. He must do the preparatory work (for instance opening of the engine). If a competitor refuses to submit to the checking or does not do the preparatory work, he will be disqualified.

2.10.6. If the results of the measurement do not correspond to the instructions the model is disqualified. In that case, the following models to be checked move one step forward in the checking list.

2.11. Equipment of the competitors' park

The competitors' park must be settled in an enclosure with the necessary means to ensure the competitors' safety and quiet.

Each competitor must have at his disposal:

- ❖ One table and chair, which will be protected from direct sunlight or bad weather.
- ❖ Protected electric point (220V/10A)
- ❖ Drinking water bottles must be available.

Within 50 m around the competitors' enclosure: public conveniences and a wash-basin in conformity with European standards of hygiene must be accessible to competitors and accompanying persons.

2.12. In accordance with General NAVIGA Rules

The following items are determined in accordance with General NAVIGA Rules:

- ➢ Age limitation of juniors
- ➢ Place of races
- ➢ The starting area, the place of preparation and the access conditions
- ➢ Safety Conditions and Requirements concerning models with electric motors and batteries used in them
- ➢ Oaths of the competitors and judges
- ➢ Regulations of protests
- ➢ Conditions of setting up a record
- ➢ Attribution of titles during World and Continental Championships
- ➢ Distinctions awarded to the competitors and homage paid to the winners of the World and Continental Championships

3.0. SAFETY AND SECURITY MEASURES

Any fire, flame or incandescent product unrelated to the engine is strictly forbidden in the starting area (starting platform, judges' table and fuel supply) and near the electric appliances placed by the organizers and signaled conspicuously.

All the areas where competitors and spectators might stand around the racing circuits must be closed. Wire fences or safety nets able to stand the impact of the models shall be provided. Their height must be at least 2.10 m above water-level.

After launching the model the competitor and his assistants must immediately get out of the race area and stay behind the wire fences in the safety area.

The starting-point judge is entitled to dismiss competitors who do not respect the safety rules stated in the present Rules.

Annex 1

Making the cables of class A/B: 2 advisable possibilities

Figure 1a/ NAVIGA pattern

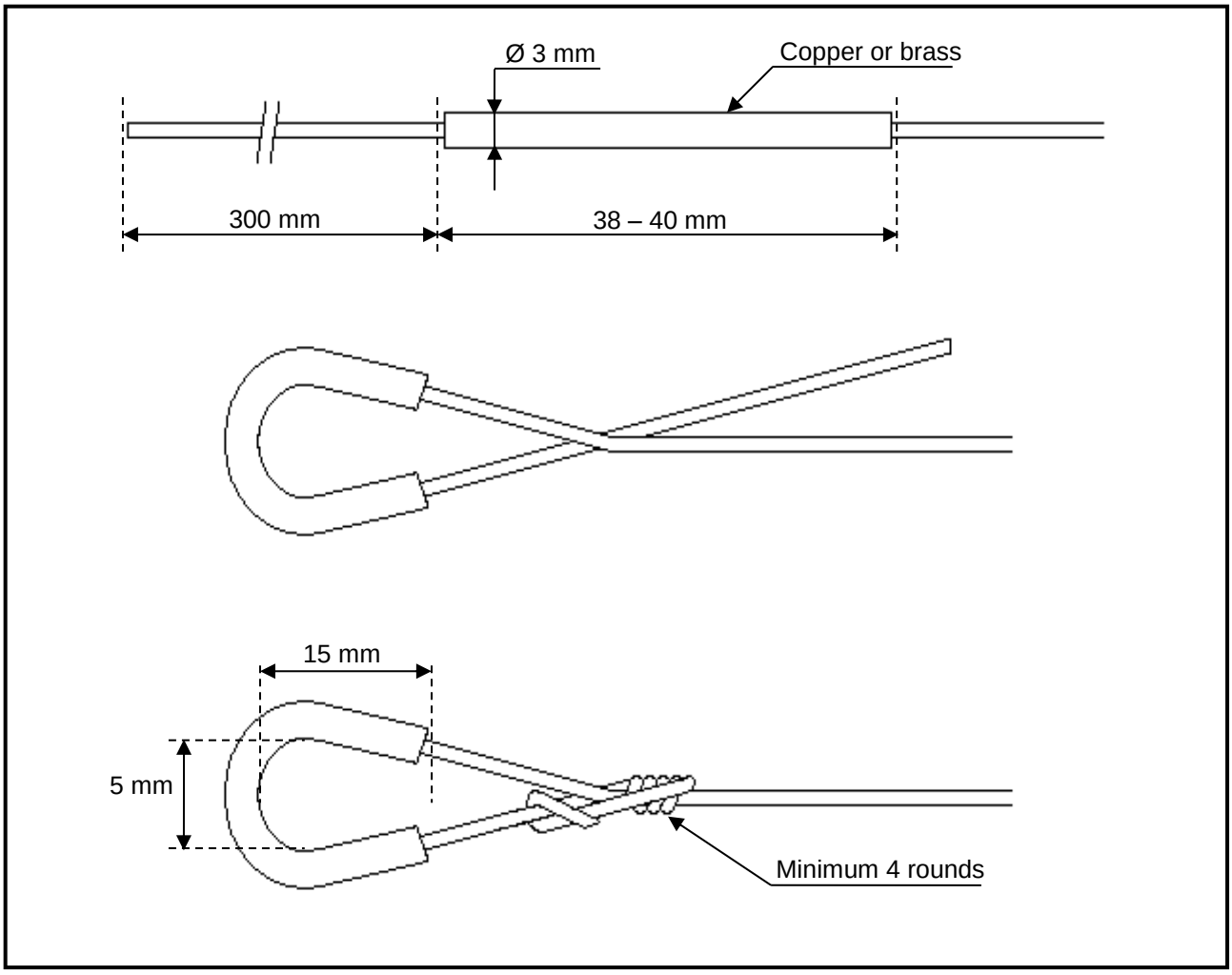
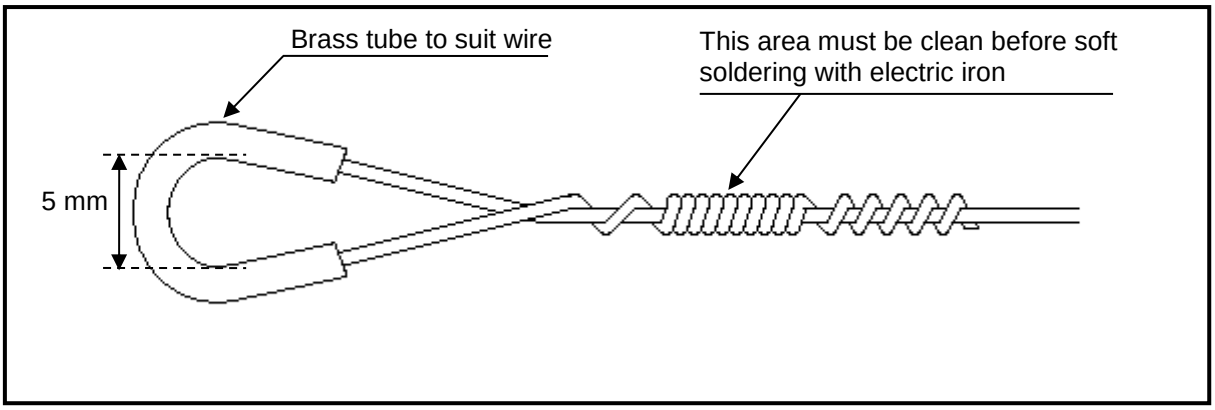


Figure 1b/ MPBA pattern

Reeling-up with a copper wire (tin welded) + non-welded reeling-up at the end of the cables in the shape of anti-breaking sheath.



Annex 2

Speed circuit A/B classes