WHF016

Endurance Racing, Competition Regulations

WORLD HOVERCRAFT FEDERATION

PROPELLING GLOBAL HOVERSPORT

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World Hovercraft Federation

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1. Introduction

1.1 Preamble

A. Endurance Racing (Er) was originally conceived as an alternative to the current formula racing classes. The key elements are team racing with a focus on reliability, durability, fuel economy and sound reduction.

B. History: Discussion commenced at World Hovercraft Championship (WHC) 2000 and continued at WHC2002 to add another dimension to racing at WHC's. The working party established post WHC2004 presented a proposed structure which, in a modified form, was trialled at WHC2006 in France. Endurance Racing was officially accepted at WHF2008 meeting to be included in future WHC's where possible. The rules were adjusted and further refined for the Er races held England at WHC2010 and World Cup 2012.

C. Endurance Racing is presented as a development class for both machines and racing format. The rules, therefore, are constructed to provide a greater degree of flexibility for the race organisers.

D. Note: Endurance Racing varies from all other WHF racing classes in that it allows for unlimited team member participation and does not place restrictions on motor and/or propulsion type, capacity, quantity or size. Additionally Er provides for alternative race formats such as the recommended Le Mans style start.

1.2 Objectives

A. The key elements of the WHF Er are team participation, extended race duration with restrictions on refuelling/energy replenishment and a composite point scoring system with a focus on performance at the lowest sound signature.

B. A number of races should be held over a number of days. The number of races and race duration will be at the discretion of the event organisers in consultation with the WHF authorities. The minimum race duration should be one hour.

C. The race duration, sound checks and fuel/energy consumption elements are designed to encourage technical development and innovation towards quieter, more economical and reliable craft in a competitive environment.

D. The length of the races and consideration of fuel/energy consumption are expected to be progressively increased as Er develops in the future.

E. The use of computerised lap scoring via craft transponders addresses the traditional problems of lap scoring accuracy for this type of event and is encouraged to be used.

F. Er has the potential to provide intrinsically safer racing by adjusting the focus from outright performance to considerations of fuel/energy consumption and sound output.

G. To add an international flavour to WHC Er events, teams are encouraged to represent their respective countries.

1.3 Management

A. The control of an Er event is handed by the authorised event organisers.

B. Wherever possible Er should be an intrinsic part of World Hovercraft Championships. Er may also be a stand alone event or form part of other events as approved by the WHF.

C. A Director of Endurance Racing is appointed by the WHF board to manage, develop and promote future endurance racing events. This appointment should be reviewed at the time of WHF governing board appointments.

1.4 Interpretation

A. Mandatory clauses are denoted by “SHALL”.

B. Recommended but not mandatory practice is denoted by “SHOULD”. or ‘MAY’. Applicants SHOULD expect questioning on why these recommended practices have not been met.

1.5 Reference Publications

Ref No.	Title	Issuing Organisation
WHF001	Hovercraft Racing Competition Regulations.	World Hovercraft Federation
WHF002	Construction Regulations for Racing Hovercraft	World Hovercraft Federation
WHF007	Protest Procedures for WHF Events	World Hovercraft Federation
WHF008	Scrutineering and Compliance Procedure	World Hovercraft Federation

1.6 Precedence

A. This rule book SHALL be read in Conjunction WHF001. All rules defined in WHF001 apply to ER racing, unless specifically excluded or modified in the following sections.

B. Any rule detailed in this book (WHF016) takes precedence over rules contained in the WHF001, if there is contradiction.

C. The sections in the remainder of this document align with the paragraph numbers used in WHF001

2. Hovercraft Meeting Officials

As defined in WHF001.

3. Craft Specification

3.1 Scrutineering

All WHF001 rules apply.

3.2 Lanyard Kill Switch

All WHF001 rules apply

3.3 Type

A. Craft specification/description applies to an vehicle commonly known as a Hovercraft or Air Cushion Vehicle, which is supported on a cushion of air and propelled by accelerating air

B. Note: There are no restrictions on motor and/or propulsion type, capacity, quantity or size

4. Driver

4.1 Driver Eligability

Additional Rule:

A. WHF001 rules apply
B. The team may include junior driver/pilot as part of a team but the team must not be made up exclusively of junior drivers.

4.2 Protective Wear

A. WHF001 rules apply

4.3 Drug and Alcohol

A. WHF001 rules apply

4.4 Junior Drivers

A. Drivers must be aged between 11 and 16 years. (The driver must not be more than 16 years of age before the start of the event.

B. A responsible adult shall supervise the Junior Drivers and be present during scrutineering and briefings.

5. Driver Numbers/ Craft Identification

All WHF001 rules apply

6. Insurance

All WHF001 rules apply

7. The Race Course

7.1 The Paddock

All WHF001 rules apply

7.2 Grid

A. For the Le Mans style start, craft should be positioned on one side of the starting grid, sequentially positioned and approx. 30 degrees to the racing direction

B. If a Le Mans start is not used then WHF001 rules apply

7.3 The Course

A. WHF001 rules apply except where the planned race course is in excess of 3 km in length. In this case special consideration is required by the Director of Endurance Racing (or delegate) prior to the event.

7.4 The Pits

Additional Rules:

A. Area known as Active Pit Area (APA) must be provided for a safe and secure area for mandatory and/or optional pit stops during the race. The APA must be adequately delineated and sized with consideration for reduced entry speeds and provision for safe rejoining of the race.

B. During race progression, substantial craft maintenance can only be carried out in the APA by approved persons. The number of approved persons per team allowed in the APA shall be at the Race Director's discretion.

C. Approved persons in the APA should be appropriately safety attired such as suitable clothing to cover limbs and closed in footwear.

D. If race duration is scheduled for less than 90 minutes then no refuelling/energy replenishment is allowed.

E. During race duration, refuelling/energy replenishment can only be carried out in the APA.

F. There are no restrictions of a craft rejoining the race where it has been recovered.

8. Race Procedure

8.1 Flags

All WHF001 rules apply

8.2 Grid

A. Grid positions for the first race shall be determined randomly by the Race organisers.

B. In subsequent races, grid positions shall be determined by the number of Race points from previous races. The higher the number of points, the better the grid position. (Race points include bonus points).

C. Late drivers will be positioned at the back of the starting grid.

8.3 Starting the Race

A. The Le Mans style start is the recommended starting method. When used;

a) All engines should be turned off

b) Drivers/Pilots are to be positioned opposite their craft on the other side of the track

c) Only Drivers/Pilots are to start their respective craft

d) If the Le Mans start is not used, WHF001 rules apply

8.4 Finishing the Race

A. The minimum race duration should be 60 minutes and shall be determined and disseminated prior to the event.

B. The race concludes as the leading craft crosses the finish line after expiry of the predetermined time (e.g. 60 minutes).

C. Note: This provides an additional bonus of two Lap Points to the leading craft for being first across the finish line, at which time Lap scoring ceases.

D. In the event a leading craft fails on the last lap, the race concludes when the second placed craft (based on Lap Points) next crosses the finish line.

8.5 Red Flag

A. If an accident occurs which poses real danger to drivers, spectators or others, or when medical assistance is required on the course the race will be stopped using the red flag. In that case, after the interruption, and subject to organisational / programme considerations the race will continue for the outstanding time.

8.6 Scoring and Results

A. Lap scoring shall be done by at least three persons and always by an odd number.

B. Results should be displayed for public viewing either electronically during the race or as soon as possible after the race and shall become final one hour after public release. The release time must be stated on the results. Any protest must be made in accordance with WHF007.

C. LAP POINTS : For race circuits of 3km or less, each craft receives two points for each completed lap of the race. Points per lap for longer race circuits will be addressed at the time of event organisation.

D. BONUS POINTS are awarded for sound levels below 93dBA. For each 1 dBA less than 93 dBA, a bonus of 2% will be awarded. Eg.: 1dBA below = 2%. 2dBA below = 4%

E. Race Result Example:

Team A completes 59 full laps and craft measures 93dBA
Therefore 59 x 2 = 118 Lap Points
Sound Check 93dBA - 93dBA = 0dBA
Bonus 2% x 0dBA = 0%
118 Lap points + 0 bonus = 118 Race points

Team B completes 50 full laps and craft measures 83 dBA
Therefore 50 x 2 = 100 Lap Points
Sound check 93dBA - 83dBA = 10dBA
Bonus 2% x 10 (dBA) = 20%
100 Lap Points + 20 %bonus = 120 Race points

Therefore Team B is 2 points ahead for that race

8.7 General

All WHF001 rules apply

8.8 Additional Rules

A. Each team is required to make a minimum of two compulsory pit stops during each race. This allows for driver/pilot interchange where applicable. Craft must come to a complete stop.

B. The Race Director has the discretion to exclude a team, or to impose a Lap Point penalty of 2 to any team for dangerous or obstructive driving.

C. SOUNDS CHECKS

a) Sound checks are required for each race in the series.

b) Prior to race start, all participating craft are to be noise tested and documented. Any craft producing 93 dBA and over (at 25M) will not be permitted to start.

c) If at any time during the race, a craft is recorded to have a higher sound reading than 93 dBA, it will not be allowed to continue to race until it is rectified.

d) Only craft that cross the finish line will be directed to a designated area where they are impounded for a sound measurement check for the purpose of determining bonus points allocated for lower sound readings.

e) To enhance the integrity of the final sound check, race officials are encouraged to record sound measurements of the craft at various discreet locations during the race.

8.9 Practice & Qualifying

A. Practice

WHF001 rules apply

B. Qualifying

To ease program congestion, qualifying is not required. For initial grid positions (see point 8.2).

8.10 Classification

The WHF reserve the right to inspect proposed sites prior to approval being given. Except under exceptional circumstances, the race must take place over a course which includes land and water.

9. World Championship Races

9.1 Limitations

Maximum weight: Craft unladen weight shall not exceed 400 kgs

9.2 Awards

A. At the conclusion of the programmed ER event, points from each race will be totalled including any bonus points gained.

B. The team with the greatest number of overall points will be the winning team.

C. In the event that two teams are on equal points, the team who has completed the greatest number of laps during the entire ER will be declared the winner.

D. If the points are still equal, the team with the quietest craft will be declared the winner.

9.3 Protest Procedure

WHF001 rules apply

9.4 Sound Limits

A. Static sound measurements are made on craft at a distance from the craft of 25 metres with instrument(s) set 1.2 metres above the ground. The instrument(s) will be set to measure dBA with the integration time set to 'slow'. The craft will be positioned in a fixed position on flat open grassland with all engines on maximum power. (An official will verify that throttles are fully open). Measurements will be taken on both sides and on all four corners of the craft. The average of the 6 static readings, rounded to the nearest 1 dBA, will be used to calculate sound bonus points. Craft will not be permitted to compete with an average sound reading above 93dBA.

B. In addition flyby sound measurements at 25metres on all craft in the race should be taken automatically. At the Race Director's request additional measurements may be made at particular points of the course. Any craft whose flyby sound level exceeds 93dBA on more than three occasions will be disqualified.

C. In the case of mechanical failure resulting in a noise level greater than 93 dBA, the driver must immediately reduce speed in order to maintain an acceptable sound level, return to the pits to take remedial action or stop and wait to be recovered.

9.5 Anti-Social Behaviour

WHF001 rules apply