

# UIM Aquabike Training Manual

2017 Edition  
UIMpowerboating.com



Dream ...

Train ...

Race ...

# Dear Friends of the Aquabike/Jet Ski Sport



Organisation  
recognised by the



INTERNATIONAL  
OLYMPIC  
COMMITTEE

Dear Friends of the Aquabike/Jet Ski Sport

I am delighted to present to you the new UIM Aquabike/Jet Ski training manual which is a most valuable addition to the UIM Youth Development programme "Propstars". The UIM are committed to providing a comprehensive training syllabus for all aspects of our sport and as Aquabike/Jet Ski is one of the fastest growing disciplines of the UIM it was considered indispensable that this most useful training aide be provided. Professional training for our future generations of Aquabike/Jet Ski racing competitors and officials is one of the highest priorities of the UIM; our goal is to establish a world-wide network of training centres to ensure the success and growth of our sport in all of its disciplines.

In recent years we have seen the UIM Propstars Programme start to attract new young talents who get trained and educated with and by our National Authorities. We are proud to see this increasing interest in many different territories and the setting up of training centres where the new generation of powerboaters are guided by experts on their way from the junior UIM classes to the senior UIM classes. The new UIM Aquabike training programme seeks to deliver a similar specialist training programme for competitors and officials of all ages. The secrets of

safe, responsible and environmentally friendly racing start with good training and attracting those who will be our Aquabike/Jet Ski stars of the future.

I now call upon you all to support this extremely important programme by setting up a training centre in your country, costs are extremely low as you can use whatever skis you have available, you just need to encourage a local volunteer to take on the role of a UIM Aquabike Propstars Ambassador.

I want to ensure that our Union will continue to grow and develop healthily and one of the best ways of achieving this is to build a firm foundation of training centres for our sport. I believe that we can do this and thereby build a bright future of our sport together.

Dr Raffaele Chiulli  
President - Union Internationale Motonautique.





# A brief history of the Jet Ski

The world of Jet Skiing started in the USA back in the 1970s and Bombardier were the first company to develop the Jet Ski which was designed to be the equivalent of a motor cycle on water. Their first model the Seadoo was produced in 1968; Kawasaki then joined the market and developed the first Jet Ski. The name “Jet Ski” is a registered trade mark of Kawasaki but over the years it has become the generally accepted house hold name for the product.

Clayton Jacobson a bank clerk and dirt bike enthusiast from Arizona USA is recognised as the inventor of the original Jet Ski.

Jet Skis, Personal Water Craft, and Aquabikes are names now used to describe this product which is manufactured world-wide by a number of different large corporations.

For the purpose of this training manual we will refer to these as Aquabike/Jet Ski.

# UIM Propstars Ambassadors/Instructors

## UIM Propstars Ambassadors/Instructors

The UIM Youth Development Programme Propstars continues to expand and is now attracting world-wide interest. As many of you know the principal aim of the programme is to train UIM Propstars Instructors/ Ambassadors so that they can deliver the Propstars programme in their own country to a wide range of potential competitors and Race Officials.

The UIM provide training for the new trainers, this Instructor Training is free, the UIM does not charge and the only costs involved to the National Authorities are those of travel and accommodation of the UIM Instructor. Once a National Authority has established a new training centre they are eligible to apply for UIM funding to help them purchase new training skis and grants of up to 50% are available through the UIM Propstars Programme.

## So what does it take to be a UIM Propstars Aquabike Ambassador:

1. A good UIM Propstars Ambassador must be passionate about our sport and want to help others to enjoy it.
2. Some knowledge of teaching is helpful but if you are truly passionate about your sport you will find the way to deliver the programme
3. Get your trainees out on the water as soon as possible, the class room stuff is important but on the water is where the action is.
4. Encourage your local best drivers/ pilots to get involved, this will help to inspire your trainees
5. This does not have to be expensive, use what skis and equipment you have.
6. Lastly and most importantly make it fun, if you are enjoying it so will your trainees.



## So who are we training:

The UIM Propstars Aquabike/Jet Ski programme is designed to attract new young riders into the sport but the syllabus works just as well for those of any age. Details of the key points for each module, Basic 1, Advanced 2 and Competition 3 are provided below.

Don't forget that this programme also can be adapted to train new race officials, Officer of the Day, Safety Officer, Race Secretary etc. In all of the modules below the activities will have to be controlled and this provides an ideal opportunity to introduce enthusiastic trainee officials to the sport.



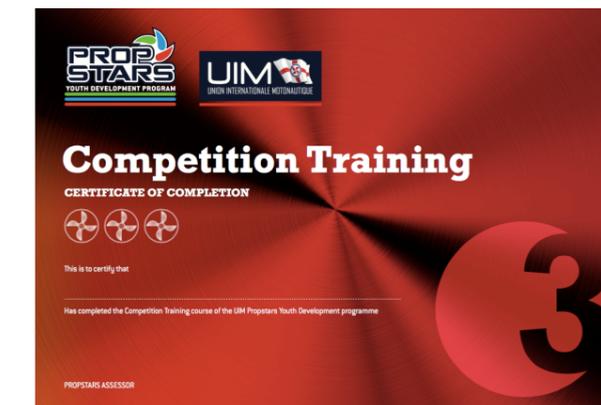
## The UIM Aquabike/Jet Ski modular training programme:

This new exciting Aquabike/Jet Ski training programme is structured into three distinct modules which are designed to cater for all levels of experience. If you are new to the sport then the Basic training programme is a must, if you then want to get into National Aquabike/Jet Ski racing then the Advanced level is the next step particularly as most of the UIM National Authorities run National Aquabike/ Jet-ski racing. By competing in National racing you will develop your race craft skills but then move on to the final Competition training module which will help to prepare you for the highly competitive world of UIM Aquabike/Jet Ski racing. So let's have a look at the three training modules in more detail.



**Basic Training Module 1:** The Basic Powerboat Training offers an ideal introduction to those new to the sport of UIM Aquabike/Jet Ski, the instruction provided will lay the foundation stones of knowledge which will prove to be invaluable as you progress through to the Advanced and Competition levels of this programme. Classroom based and on water practical instruction will be provided at each level.

**Advanced Training Module 2:** The Advanced course is designed to provide an introduction into Aquabike/Jet Ski racing and to teach candidates how to get started in the sport and safely compete at club and national levels.



**Competition Training Module 3:** As the name suggests this course is designed to familiarise the applicant with the skills necessary to compete in National Jet Ski racing and UIM Aquabike Racing at European and World Championship levels. A strong emphasis will be placed on racing water awareness skills and safety and considerable time will be spent out on the water in simulated racing conditions. In addition to the on water training the theory sessions will consider the racing rules and trainees will be taught the importance of complying with the rules of the sport and working with race officials.

# Basic Training ...

Basic Aquabike/Jet Ski Training offers an ideal introduction to those new to the sport, the instruction provided will lay the foundation stones of knowledge which will prove to be invaluable as you progress through the Advanced and Competition levels of this programme. Classroom based and on water practical instruction will be provided at each level so let's look at how you get started.

## Contents

### Introduction

11	• The jet pump	27
	• The steering nozzle	27
	• Engine Maintenance	28
	• Daily Checks	28
	• Annual Checks	29

### The Skis

- Sit Down (Runnabout)
- Stand up
- Freestyle

12		
13		
14		

### How the Jet Ski works

15		
----	--	--

### The Jet Pump, Engines, Control Systems and Maintenance

- The Jet Pump
- The Scoop and Ride Plate
- Engine types – Four Stroke
- Engine types – Two Stroke
- Engine operation
- The effect of the directional bucket
- Electronic Reverse bucket control
- Manual Reverse bucket control
- No reverse Bucket
- Handle Bar Controls, steering, forwards, reverse, throttle, reverse brake, trim, stop start
- Handle Bar Left Lever
- Handle Bar Right Lever
- Seadoo IBR (Intelligent Brake and Reverse) Dual levers
- Yamaha RiDE (Reverse and Intuitive Deceleration Electronics)
- Dual throttles
- Handle Bar Trim Control
- Control gauge and multi- functions
- Stop start control
- Kill Cords
- Engine stopping
- General Maintenance
  - The Hull

16		
17		
18		
19		
20		
21		
21		
21		
22		
22		
22		
23		
23		
23		
24		
24		
25		
26		
26		
27		
27		

### Trailing and Launching

- Trailer types
- Towing Rules
- Trailer maintenance
- Securing your ski for trailing
- Slipway launching
- Departing a slipway launch site
- Beach launching using a dolly
- Launching or Departing a beach launch site
- Slipway recovery
- Land based risks
- Water based risks

### Personal Equipment

- Life Vest, Racing vests, life jackets and buoyancy aids
- Kill cord
- Protective Helmets
- Protective Helmets for Racing
- Wet Suit
- Dry suit
- Whistle
- Gloves
- Boots
- Eye Protection
- Body Armour
- General recommendations
- Maintenance of your personal equipment
- On board safety equipment and essentials
- Flare Pack

30	
30	
31	
31	
32	
33	
34	
34	
34	
34	
35	
35	
35	
36	
37	
38	
38	
38	
39	
39	
40	
40	
40	
41	
41	
41	
42	
42	
42	



# The Skis

## The Skis

It is likely that you will be using a variety of different skis during your initial training period; the machines that you will use will be determined by what is available at your local training centre. The most popular makes are those provided by Seadoo, Yamaha and Kawasaki.

## Sit Down Skis also known as Runabout

These skis come in a variety of formats; they are predominately two seater but are also available as three seat machines which are great for families. Sit down or runabout skis are now available with engines from 60hp to over 300hp. The lower end machines although fitted with less power are extremely light and therefore are very sporty and it is likely that this is the type of machine that you will start your training on.

The high end machines with 200+ HP are heavier and therefore more stable in rough conditions, they also incorporate a range of sophisticated electronics designed to help you manage the machine.

The UIM Racing Classes in the Runabout category are: Runabout GP4 and GP3 are the entry level classes through GP2 to GP1 being the unlimited top end class. Full details of these UIM Classes can be found in the UIM Aquabike Rule book at [UIMpowerboating.com](http://UIMpowerboating.com)



# The Skis

## Stand Up Skis

In general stand up skis are becoming less popular particularly with the advent of the new sporty 60 and 90hp lightweight sit down machines. Stand up machines are however still used in racing and in order to ride one well you must be in good physical shape and it is essential that you develop a good riding technique.

The UIM Racing Classes in this category are GP3 entry level through to GP2 and GP1 being the unlimited top end class. Full details of these UIM Classes can be found in the UIM Aquabike Rule book at [UIMpowerboating.com](http://UIMpowerboating.com)



# The Skis

## Freestyle Skis

All skis used in UIM Pro Freestyle are purely bespoke and highly customised; they incorporate specialist hulls, pumps and engines. The hulls are much shorter than the standard stand up ski, they are also much lighter and are often made in light weight carbon fibre.

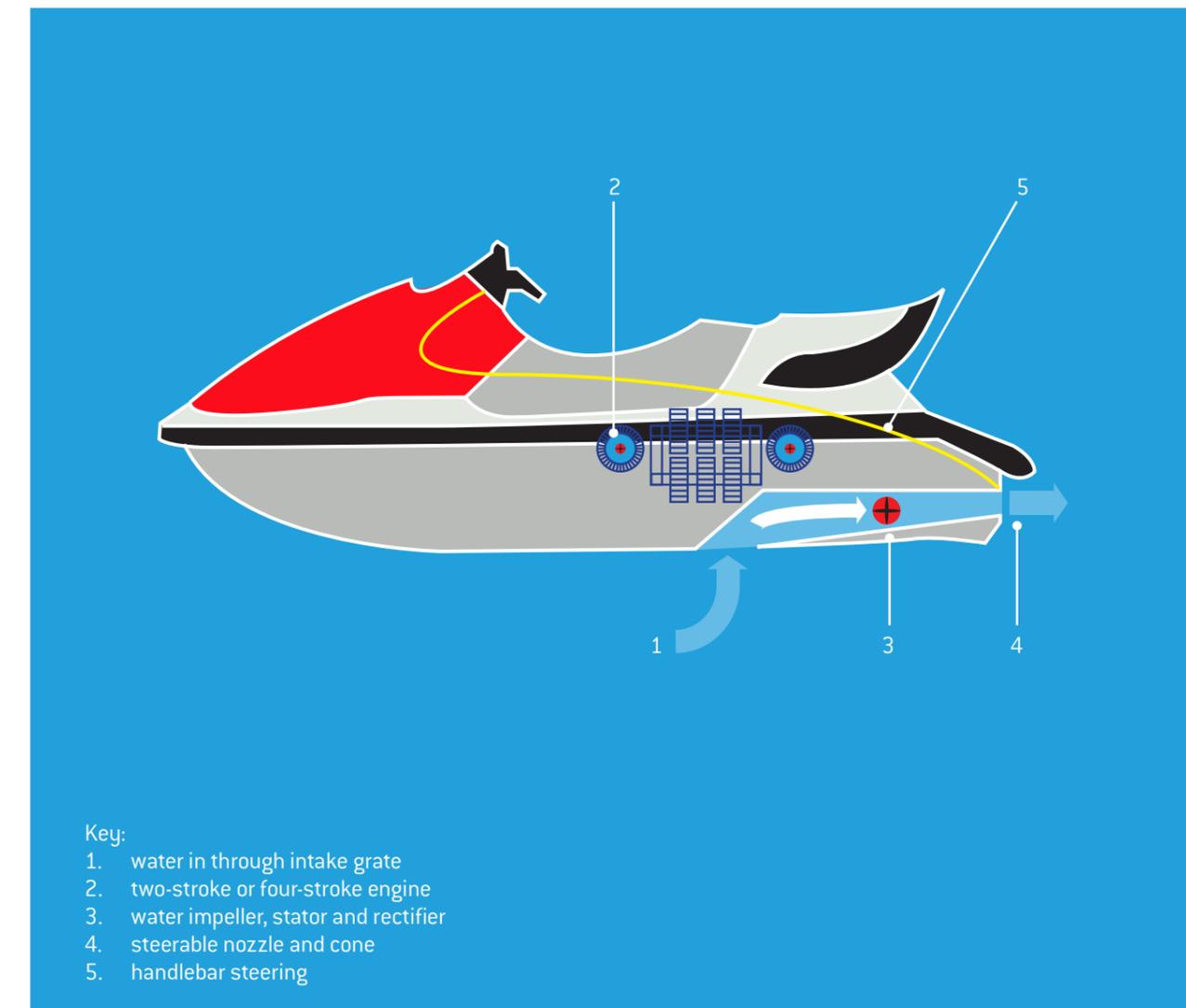
The shape of a Freestyle ski is also completely different; the underwater bow section is curved upwards to assist in creating jumps and providing lift. More detail on this category is included at the back of this manual in the Freestyle section. All rules governing UIM Freestyle can also be found at [UIMpowerboating.com](http://UIMpowerboating.com)



# How the Jet Ski Works

## How the Jet Ski Works

1. A typical Aquabike/Jet Ski is powered by an inboard petrol engine which can be either two stroke or four stroke. Engines vary considerably in HP, basic models generally have approx. 90hp and top of the range racing models now have over 300hp so learning to handle the basic machines first is vital.
2. The engine provides power to the Jet Pump which sucks in water through an open grate in the bottom of the hull and then expels it at high speed out through the nozzle at the rear of the ski. This nozzle is directional and thereby provides the steering.
3. Don't forget that the moment you start the engine the pump is running and therefore it will start to propel you forwards or backwards but more on that later.



Key:

1. water in through intake grate
2. two-stroke or four-stroke engine
3. water impeller, stator and rectifier
4. steerable nozzle and cone
5. handlebar steering

# The Jet Pump, Engines and Control systems

## The Jet Pump

1. The engine provides the power via a direct drive shaft to the Jet Pump which consists of an impeller similar to a propeller but in this case the impeller is located in a fixed tube similar to a cylinder on an engine, this is also called the stator. The impeller which has a number of fixed blades is designed to fit the stator extremely accurately and rotates at speed as the speed of the engine is increased. The impeller is the only moving part in the Jet Pump.
2. When boat propellers spin they cause the water to spin or turn in the direction that the propeller is rotating, impellers on a Jet Ski only turn in one direction as there is no gearbox on the engine so to overcome the effect of the impeller spinning the water which would tend to make the ski unstable and difficult to control they use a "flow rectifier" The flow rectifier consists of a series of fixed blades tilted in the opposite direction to the impeller which reduces the propeller effect and improves the output and performance of the pump.

The final part of the Jet Pump consists of a fixed nozzle, a cone and a steering nozzle so let's now look at how these work.

3. The Fixed nozzle has the effect of compressing the water output and thereby increasing the speed of the ski.
4. The Cone is mounted on the outlet side of the flow rectifier and inside the fixed nozzle. The cone is normally made out of alloy or plastic and its function is to optimise the flow of water and to reduce cavitation. The effect of cavitation is more fully described in the Competition section of this training manual.
5. The steering nozzle is mounted on the fixed nozzle where the water flow exits at high speed; this nozzle is directional and is directly controlled by the handlebars of the ski so when the handle bars are turned left or right so the ski will change direction. This steering nozzle can also change direction up or down thus acting as a trim control however this function is only normally found on runabout machines at the higher end of the market. Again more information is given on trim control in the Advanced section of this manual.
6. The Jet Pump body also incorporates a water inlet which provides cooling water to the engine and on some machines a vacuum system is used to suck out any water from inside the ski.



# The Jet Pump, Engines and Control systems

## The Scoop and Ride Plate

The scoop is located beneath the jet pump and its function is to direct a constant flow of water to the Jet Pump to optimise best performance.

The Ride Plate is designed to ensure your machine is always at the right angle to the water in all conditions and will give stability, control, and grip and thus more speed. The ride plate also ensures that the ski will leave a clean wake which will optimise the flow of the water jet again giving improved performance and speed.

Both of these items come in many different shapes and designs and part of correctly setting up a racing ski is to select the best one for your particular machine. Do however check that any modifications you make in this area comply with the racing rules either of your own country or if racing internationally the UIM.



# The Jet Pump, Engines and Control systems

## Engine Types

### Four - Strokes

The latest four stroke engines offer high performance, superior fuel economy and proven reliability. They are less noisy and conform to the latest environmental requirements. Engine manufacturers use more sophisticated design and manufacturing techniques which has meant there are far fewer unexpected breakdown and warranty issues during the operation and use of modern four-stroke engines.

Four-stroke engines are very similar to an automobile's. The air-fuel mixture flows into the combustion chamber through intake valves, and the exhaust leaves the engine via exhaust valves.

Because of these intake and exhaust valves (the valve train), a four-stroke engine is usually heavier than a two-stroke of the same horsepower. But, we see that changing; four-stroke manufacturers continue to pursue new ways to lighten the engines and extract more horsepower. The lubrication system on a modern four-stroke is like a car's, complete with oil pan and filter — and the engine needs periodic oil changes to keep things running smoothly.

The majority of four-stroke engines feature sophisticated computer engine management systems and fuel injection for good performance across the power band, low emissions, and unparalleled fuel economy which make home servicing more difficult and for this reason these engines should be regularly serviced by an approved dealer.

### Some of the Advantages of a modern four stroke engine:

- New four stroke engines are very good in runabout classes especially those that run endurance races, machines are heavier and more stable
- Excellent power to weight ratios
- Very good fuel economy
- Reliability is generally good
- Superchargers fitted in the top classes provide very fast acceleration
- Advanced Combustion Economy, clean fuel burn, protects the engine and gives good economy
- 4 stroke engines are now available in stand up and the machines are competitive but the overall advantages are limited particularly regarding weight and physical size of the engine.

There are however two negatives when comparing with two stroke engines. One is that many modern engines are now too sophisticated for home servicing (except for doing the basics). Secondly a four stroke engine is much heavier to lift than the older two stroke models. This makes working on these engines and moving them more difficult.



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### Four stroke engine disadvantages

- One of the main areas of problems is sensors, these can fail in race conditions which often results in the engine shutting down into guardian mode
- Engines are much larger, space is limited in a Jet Ski therefore much more difficult to work on
- Engines are much heavier
- There is no 4 stroke only class in UIM Aquabike racing
- All computer controlled
- Due to the complexity of some of these engines particularly in UIM GP1 Class it is essential to have a qualified mechanic as part of your support crew.

Modern four stroke engines will be found in most if not all runabout classes however for Stand up classes and especially Freestyle where weight is crucial two stroke engines are still used.

# The Jet Pump, Engines and Control systems

## Engine Types

### Two - Strokes

Traditional two stroke engines are noisy, burn more fuel and are less friendly to the environment.

In a two-stroke engine, the fuel-air mixture enters the combustion chamber via an opening in the side of the cylinder. The exhaust exits through another port in the cylinder.

Initially, two-stroke engines used carburetors to control the fuel-air mixture. But carburetted outboards aren't particularly efficient. They also use a lot of fuel, and tend to be unreliable.

Typically, a two-stroke engine is lighter than a similar-sized four-stroke engine because the two-stroke's method of operation doesn't require a valve train — camshafts, valves, belts or chains. Since the two-stroke isn't encumbered with a valve train, the engine has fewer moving parts. Thus, it has less rotating mass. A two-stroke engine can often accelerate faster than the same horsepower four-stroke.

The engine's internal components receive lubrication from oil mixed into the fuel.

Two stroke engines are used in all UIM Stand up Classes as these smaller machines require a light weight engine. They are also used in the highly specialist Freestyle Class for the same reason.



# The Jet Pump, Engines and Control systems

## Engine Operation

Most of the current four stroke engines used in modern Jet Skis are derived from motor cycle engines, these engines are complex, powerful and heavy particularly as many of the larger machines are fitted with super-charger to boost the power output. Unlike motorcycle engines air cooling is not possible so engines are water cooled.

Most engines are indirectly cooled, water is sucked up into the cooling system and passed around a closed inner water jacket via a system of heat exchangers and then ejected out through the exhaust. The closed inner water jacket is filled with coolant to protect the engine from salt water corrosion. Many recreational skis use a high velocity water tell-tale which squirts high into the air from the back of the machine, this tells the rider that the water cooling system is working properly.

As with all engines it is important to keep them well maintained and clean, the engine bay on an Aquabike/ Jet Ski is confined and difficult to work in. The engine bay should ideally be painted white so that any oil or exhaust leaks can be spotted immediately.

There is no gear box on an Aquabike/Jet Ski, the drive shaft is taken directly from the engine to the Jet Pump, it is therefore very important to ensure the capacity and power of the engine is correctly matched to the Jet Pump, more about that in the Competition section.



**CAUTION...**  
On some skis an external heat exchanger is fitted under the hull, if a capsize occurs this will be hot so be careful when righting the ski.

# The Jet Pump, Engines and Control systems



## The effect of the reverse bucket

Most modern skis have a reverse bucket which hinges over the water jet to re direct the water and enable the Jet Ski to go backwards. On modern sit down or runabout skis this operation is achieved by using the lever on the left handle bar and the on board electronics will activate the bucket but on some older machines it is necessary to pull up a lever close to the jockey seat.

**CAUTION SOME OLDER SKIS DO NOT HAVE A REVERSE BUCKET FACILITY AND THEREFORE NO REVERSE CONTROL IS POSSIBLE, SKIS WILL NOT STOP EASILY VERY IMPORTANT POINT TO CONSIDER WHEN USING THIS TYPE OF SKI.**

Remember when you start the engine the pump is running which will propel the ski forwards or backwards.



## Electronic Reverse bucket control

### Advantages

- Easy to use
- Neutral position simple to find
- Additional safety feature of IBR (Intelligent Brake Reverse)
- System can be switched off

### Disadvantages

- Additional cost of machines fitted with electronic systems
- When the system fails it can be expensive to repair
- Rider input and skills limited by system, similar to ABS on a car



## Manual Reverse Bucket Controls

### Advantages

- No expensive electronics to go wrong
- Machines cheaper to purchase

### Disadvantages

- Clunky old fashioned method of control. Levers and cables prone to break, difficult to maintain and unreliable
- No safety IBR system

## No Reverse Bucket

Machines with no reverse bucket are difficult to stop and consequently more dangerous. To stop a machine with no reverse bucket the technique is to fully turn the handle bars to one side or another and put the ski into a sideways slide, kill the power and stop. This is not easy for a rider new to the sport.

# The Jet Pump, Engines and Control systems

## Handle Bar Controls, steering, forwards, reverse, throttle, reverse brake, trim, stop start

**Under way at Low Speed:** The ski is steered by using the handle bars just the same as a motor bike or bicycle however you will need to apply small amounts of throttle which will provide the necessary thrust from the jet pump to give you directional control. The best way to do this in close quarters situations i.e. near a jetty, dock or other skis is to apply small bursts of power.

**Underway at High Speed:** At higher speeds a ski will require thrust from the jet pump to steer and therefore throttle must be used in order to steer and maintain control. Don't forget that if you go into a turn to avoid an object you must keep the power or throttle on, if you take all power off you will lose control of the ski which could be extremely dangerous.

Use **EXTREME CAUTION** when travelling fast in close proximity to other water users, follow the highway code of the sea, the International Regulations for the Prevention of Collisions at Sea at all times. More details can be found on this in the Basic Navigation section of this manual.



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### Handle Bar Left Lever

The lever on the left handle bar has multi functions:

1. One click on left lever will engage the neutral position, this means that the nozzle is pointing downwards and therefore little or no forward or reverse movement is occurring.
2. Depress the left lever fully and reverse thrust is selected, the on board computer electronics will activate the reverse bucket which re directs the thrust backwards and thereby slows the ski down. To increase the effect of this additional throttle can be applied by the right lever.



### Handle Bar Right Lever

The lever on the handle bar on the right side of the ski is the throttle, this is used to increase forwards thrust and to increase and decrease speed.



# The Jet Pump, Engines and Control systems

## Know the controls on your machine and how they work before going on the water

Before you take to the water know how the controls on your machine work, described below are some of the main types available today:

### Seadoo IBR (Intelligent Brake and Reverse) Dual levers

Control	Result
Right throttle lever	Forward gear, ski moves forwards
Right throttle lever	Ski accelerates forwards
Left control lever apply one click	Neutral engaged, nozzle points downwards
Left lever squeeze fully and hold	Reverse bucket engaged, ski moves backwards
Left Lever used whilst moving forwards	Reverse bucket engaged, ski slows down (brakes)

### Yamaha RiDE (Reverse and Intuitive Deceleration Electronics) Dual throttles

Right throttle lever	Forward gear, ski moves forwards
Right throttle lever	Ski accelerates forwards
Right and left throttle lever	Release both levers to engage neutral
Left throttle lever	Reverse bucket engaged, ski moves backwards
Left throttle lever	Reverse acceleration
Left throttle lever	Reverse bucket engaged, ski slows down (brakes)

**NOTE THE IMPORTANT CONTROL SYSTEM DIFFERENCES BETWEEN THE DIFFERENT MANUFACTURERS, ESPECIALLY HOW TO ENGAGE THE NEUTRAL POSITION.**

There are several other electronic systems available to assist rider control: OPAS, Off Power Assisted Steering and OTS off Throttle Steering, these systems kick in when power is taken off and full steering lock is applied, the machine senses that a course correction is urgently required and automatically kicks in with a burst of power to provide sufficient thrust to make the course correction.



# The Jet Pump, Engines and Control systems



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## Handle Bar Trim Control

Some skis have a variable trim control, trimming up will get you on the plane quicker especially if you have a passenger on board. Trimming up will also lift the nose of the ski upwards which is useful in choppy waters. Trimming down can also be useful especially on the start line in racing conditions, powerful machines will tend to accelerate very quickly from the start line and having the nose trimmed down to start with will help however quickly return to the neutral trim position once you have started as this will ensure optimum performance.

On some machines the trim is activated electronically via buttons on the handle bars and on older racing machines it is operated by squeezing the trim lever.



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## Control gauge and multi- functions:

The central control gauge will provide information and alarms on the following:

- Engine RPM
- Fuel time and distance to empty
- Speed
- Engine Coolant (alarm)
- Engine oil pressure (alarm)
- Position GPS on some models
- Compass heading
- Operational Mode, Cruise, Sport, Eco and no wake



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The operational modes are described in more detail below:

### Cruise mode:

In this mode the engine is not in high performance but delivering fuel efficient fast cruising.

### Sport Mode and sometimes Sport Plus:

Hang on in this mode you have got full performance

### Eco Mode:

The engine is delivering the most fuel efficient and economical power possible.

### No wake mode:

As the name suggests low power, minimal wake ideal for marinas and small rivers.

# The Jet Pump, Engines and Control systems

## Stop start control

Make sure that the battery is connected, the power is switched on, and if fitted the fuel valve is set to open. On most machines the stop start control is mounted on the left handle bar; do not start the engine whilst in shallow water, min depth approx. 1.0m as sand and debris can be sucked into the impeller and cause major damage.

**DON'T FORGET THAT THE ENGINE WILL NOT START UNLESS THE KILL CORD IS CORRECTLY FITTED**

**DON'T FORGET AS SOON AS THE ENGINE IS STARTED THE IMPELLER IS TURNING AND CONSEQUENTLY THE SKI CAN TRAVEL FORWARDS**

**DON'T FORGET THAT IN AN EMERGENCY YOU CAN STOP THE ENGINE BY REMOVING THE KILL CORD.**

**DO NOT RUN THE SKI UP ONTO THE BEACH WITH THE ENGINE RUNNING; AVOID ALL DEBRIS IN THE SEA ESPECIALLY PLASTIC, ROPE ETC.**



# The Jet Pump, Engines and Control systems

## Kill Cords

Kill cords are an essential part of the on board safety equipment the rider must always ensure the kill cord is securely attached to his/her person. The ski will not operate unless the kill cord is correctly fitted. If the rider is thrown off the ski the kill cord should immediately detach from its fitting on the ski and the engine will stop. Many new skis models have intelligent kill cord keys with electronics built into the key, the green learner key and the standard operation yellow key, we will look at the function of these keys next.

### **MOST IMPORTANT TO ENSURE KILL CORD IS PROPERLY ATTACHED TO YOU OTHERWISE RISK OF RUNAWAY SKI**

#### Kill Cord Green Key – Learner key

Most modern skis fitted with electronics will incorporate a Learning Key into the Kill Cord, these systems will electronically limit the power output of the engine which is a great help when starting to learn to ride and is especially helpful when trying to master the throttle controls on a powerful machine.



#### Kill Cord Standard Yellow Key

When the standard Yellow Kill Cord key is fitted the electronics return the machine to full power output.

### **ONLY EXPERIENCED RIDERS SHOULD OPERATE THE SKI IN THIS MODE.**



## Engine Stopping

The engine is stopped by pressing the stop/start button on the handlebars. Do not stop the engine until you are securely tied up and safe. The engine can also be stopped by removing the kill cord.



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# The Jet Pump, Engines and Control systems

## General Maintenance



## The Hull

Every time you wash down the ski it is a good idea to check for chips in the gel coat or more structural failures. Minor chips should be repaired as soon as possible as the damaged gel coat will absorb water over time and thereby deteriorate.



## The Jet Pump

The Jet Pump and surrounding area should be washed at the end of every day however it is also prudent to check the condition by looking through the water intake grating. Check the condition of the impeller look for any damage to the blades but also look for scratches or worse on the stator. Make sure the ride plate is in good condition a badly worn or damaged ride plate may make the machine uncontrollable.

Occasionally the Jet Pump will pick up debris such as stones from the beach, seaweed or plastic bags out at sea and this will seriously affect the performance of the machine. The best way to clear this is to take the machine into shallow water approx. 1m deep and then rock the back for the ski up and down thus forcing water up through the grating, this should clear any blockage.



## The Steering Nozzle

Check that there is no free play in the movement of the nozzle, hold the handlebars and try to move the nozzle, there should be no free movement.

# The Jet Pump, Engines and Control systems

## Engine Maintenance

It is extremely important to ensure that your engine is maintained to a very high standard at all times, you only have one engine so look after it and it will look after you. Poor maintenance can literally endanger your life particularly if you are cruising or racing in busy commercial waters. The following actions should be carried out on a regular basis.

## Daily Checks

### Daily Checks at start of day

1. Check oil levels daily and visually inspect the engine for any obvious defects.
2. Check fuel levels and that you have enough for your planned day.
3. Check that the battery is connected.
4. If you are operating a two stroke machine make sure you have enough oil for the petrol mix with you.



### Daily Checks at the end of the day

De-salting the ski and engine compartment is an essential part of daily maintenance, failure to do this will result in corrosion, unreliability and premature failure of components

1. Wash the ski down removing any salt deposits, pay particular attention to the area around the jet pump both entry and exit use a hose or jet wash spray for best results, also hose down the steering nozzle, ride plate and scoop.
2. Wash down the handle bars and controls and leather off when complete, also don't forget to clean the storage lockers.
3. If the engine has been used in salt water it is essential to fully flush the engine through with fresh water once you have finished for the day, this can be done ashore by means of a hose pipe and a special engine attachment. When flushing the engine make sure that



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you always start engine first before you connect the external water supply failure to do this will result in major engine damage.

4. Remove the jockey seat cowling, clean off any salt or water deposits; thoroughly wash the engine bay down allowing the water to run out of the drain holes in the transom.
5. Lightly spray the engine with protection oil such as WD40 or similar. Wipe off the excess fluid and replace the engine cover after checking that the control systems and cables are fully greased and operational
6. Disconnect the battery when storing the ski and remove the jockey seat cover for security, this will also help to reduce condensation in the engine bay.
7. Remove engine kill cord and store in a safe place
8. Finally wash down the trailer especially the areas around the wheels and bearings etc.



### Caution...

When starting the engine ashore do not stand directly behind the jet as debris may be thrown out.

# The Jet Pump, Engines and Control systems

## Annual Checks

### Engine

- Carry out annual maintenance services
- In accordance with manufacturers recommendations
- Replace spark plugs
- Check all coolant hoses and replace where necessary
- Remove impeller and check for any damage or wear and replace where necessary
- Disconnect battery, check electrolyte levels
- (if appropriate), clean battery terminals and grease, regularly place battery on trickle charge during winter
- Winterise engine (best done by authorised dealer) store in clean and dry environment.
- Replace all external anodes and internal engine anodes. Anodes are sacrificial plates or pencils usually made of zinc that protect the engine and drive system from electrolysis. These must be replaced annually otherwise serious damage may be caused. If in doubt consult your dealer.



### REMEMBER...

Don't just leave the engine out in the open un-serviced and untouched since the last time you used it, if you do it probably won't start or worse it may be seriously damaged



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### The Ski, hull, deck and equipment

- Fully wash down the ski inside and out and polish with a protective wax
- Store boat undercover or use a full winter cover for outside storage
- Remove bung and store in a safe place
- Remove all safety items, check for wear and replace or re new as necessary
- Remove paddles and re paint or varnish as necessary
- Remove all mooring lines clean and store in a dry place
- Check hull for any damage to gel coat and repair as necessary



### Trailer

- Fully clean trailer and check for any damage or wear.
- Check operation of trailer brakes if fitted and leave with brakes in the off position
- Check conditions of tyres and replace as necessary
- If the trailer has been used in sea water check condition of wheel bearings and replace as necessary, refer to authorized dealer
- Grease towing hitch and ensure fully operational
- If the dolly launching trailer is being used a number of the above checks will not be necessary

# Trailing and Launching

## Trailer Types

Choosing the right trailer for your requirements is important, if you use your ski close to home and only have a short distance to travel then choose a light compact model on which you can easily remove the lights and one that can be easily loaded and unloaded. If however you are transporting your ski over large distances on fast motorways then a more robust model is required. This will probably consist of larger wheels of approx. 12-13 inches [30-33cm].

Don't forget that when choosing a trailer you must take into account the capacity of the vehicle that is doing the towing, whether it be a 4x4 or a small saloon car. You won't want to be towing a heavy trailer with a small car over difficult ground or trying to pull a heavy rig out of deep water. Research in this area is vital.

# Trailing and Launching



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## Towing Rules

Trailing a ski or multiple skis requires that you comply with a number of statutory requirements. The weight of the ski or skis must be matched to the trailer so as to conform to the local traffic regulations of that country particularly with regard to width and overall weight. Strict rules apply in Europe and failure to comply with these can result in heavy fines being incurred.

Although many of the rules below have a UK bias they generally apply worldwide but check your local regulations beforehand.

- When towing a trailer you are restricted to a maximum speed. Check your local restrictions
- If you tow a small trailer without brakes, the weight of the trailer is limited to 50% of the kerb weight of the car or 750kg, whichever is less
- When towing larger trailers that have brakes fitted, the weight of the vehicle should not (as a rule of thumb)

exceed 85% of the kerb weight of the towing vehicle. If brakes are fitted they must work whether they are a legal requirement or not

- Most vehicle manufacturers state the maximum towing limit in their hand books, but you must bear in mind the total weight including passengers and luggage
- You must be licensed to tow. Make sure you have the appropriate licence that meets the requirements of your country
- Whilst towing you must have third party cover for your trailer as well as for the tow car
- The light board should be no more than 1.5m from the ground or 2.1m if the structure of the vehicle makes it impracticable. Indicators must flash in unison with those of the tow car and a dashboard warning light or buzzer must be fitted
- The number plate on the trailer must be identical in shape, and colour to that on the tow car

## Trailer Maintenance

- Make sure your trailer is regularly serviced and maintained. It is not wise to leave your trailer unused for the majority of the year before taking it out on the road without checking it for serviceability, brakes and tyres in particular
- If your trailer has brakes, a common problem that may occur is that brake cables and linkages could seize. This may cause the brakes to bind, over heating the wheel bearings. This may result in the wheel, complete with the hub assembly, parting company with the trailer
- Check all lights are working and that electrical cables do not drag on the road
- Many problems associated with towing a trailer are caused by incorrect loading. Try to put all heavy items over the axle and make sure they are secured to prevent movement when cornering or braking. If possible, put heavier items in the car and larger lighter items in the trailer
- The trailer should be level
- Towing in some countries requires that you carry a complete set of replacement light bulbs and a warning triangle. You are also required to carry a high visibility jacket in many European countries
- As long as the trailer is evenly loaded, nose weight is correct and the whole outfit sits level on the road you are unlikely to experience a problem with snaking
- A stabiliser will reduce snaking by increasing the turning friction between towing vehicle and trailer. However a stabiliser will not compensate for bad loading, weight distribution
- Ensure that you carry a spare wheel for the trailer and that this is in good condition

# Trailing and Launching

## Securing your Ski for trailing

The best method of safely securing a ski to a trailer is by using ratchet straps, these should be of suitable size for the rig and attached to strong points on the hull such as towing eyes on the transom or bow. Do not attach securing straps to the handlebars or jockey seat. Remember that most skis sit on a flatbed type trailer as this spreads the loads more efficiently.

Make sure that the tow is well balanced approx. 30-50 kg on the towing ball; this will reduce the tendency of the trailer to sway whilst being towed.



### CAUTION...

Don't forget that if the trailer starts to snake or sway whilst being towed **DO NOT APPLY THE BRAKES**, just ease the power off until you fully regain control.

# Trailing and Launching

## Slipway launching (If not using a launching dolly)

- Before launching check that the battery is connected, the ski is fuelled and the kill cord is connected.
- Test the engine to ensure it starts OK
- Check to make sure the drain plugs have been fitted
- Remove light board and cables
- Practice reversing your rig before you go to the slipway, this is not an easy task and the only way to master the skill is to practice
- Reverse slowly down the slipway under the guidance of another person particularly if the slipway is busy with other users, boats and people
- If the slipway is steep and slippery lower your trailer down the ramp by means of a long rope attached to the car so that your vehicle stays well above the slippery areas, failure to do this can result in ski, trailer and car ending up in the water
- Just before the ski goes in the water remove the ratchet straps. Once the ski is in the water minimum depth approx. 1m remove the trailer and start the engine. Check that the coolant water is circulating and that the engine is running smoothly



# Trailing and Launching

## Departing a slipway launch site

If you are two handed this is fairly simple as one crew can drive the car off the slipway and the second can take the ski to a convenient pontoon meeting point. If however you are single handed it is more complicated, often slipways are busy and you can't just drive away on the ski and leave your vehicle blocking the slipway so some pre launching planning is required. If you are single handed choose a location where you can park the car close to the slip way or a location where you can leave the ski close to the slipway whilst you park the car. Common courtesy applies at all times.



## Beach Launching using a dolly

This is not an easy task and one that will require the help of several people so if you don't have assistance try to launch using the trailer.

- Remove the ski from the trailer and place on the dolly or launch cart, this will require assistance from several other people
- Manoeuvre the cart or dolly across the beach into approx. 1.0m of water, at this point the ski is likely to float off the dolly. Remove dolly and follow the normal start procedure
- This process cannot be carried out in rough water either launching or recovery.



## Launching or Departing a beach launch site

Care needs to be taken when carrying out either of these man oeuvres, the main danger is of course the waves and if the sea is rough beach launching or recovery is not possible as either injury to yourself or damage to the machine is highly likely. Choose a calm day and a protected beach, you will definitely need help to move the ski across the beach and then to recover the launching dolly so plan this in advance. Pay attention to any local regulations that may restrict or prohibit beach launching.

# Trailing and Launching



## Slipway Recovery (If not using a launching dolly)

- Manoeuvre the ski close to the slip way, maintain a depth of approx. 1.0m of water, turn the engine off and jump into the water to control the ski
- Reverse the trailer into the water as for launching, push the ski onto the trailer and attach the winch strop to the bow of the ski
- Remove drain plugs to drain any water
- Avoid recovery with strong cross tides or winds where possible
- Winch the ski onto the trailer and drive off the slipway
- Water awareness skills start with an understanding of the dangers associated with activities both on and off the water. Basic Powerboat Training of this programme will consider the following topics:



### REMEMBER...

Pontoons and jetties: slippery surfaces, rope and general obstructions can increase the risk of tripping and falling to the water.



### REMEMBER...

Inadvertently falling into the water can lead to death, hypothermia or serious injury, this is one of the simplest risks to avoid.

## Land based risks

- Pontoons and jetties: slippery surfaces, rope and general obstructions can increase the risk of tripping and falling to the water. These hazards can become life threatening if the casualty falls into the water between a moored boat and a jetty or pontoon. The dangers are significantly increased if the waters are subject to strong tides or currents
- Slipways and hard standing areas: As we have seen slipways pose a number of dangers particularly if they are located in tidal waters with a large rise and fall of tide. Care must also be taken regarding parked trailers and boat movements particularly if boats are being moved by cranes or travel hoists

## Water based risks

- Inadvertently falling into the water can lead to death, hypothermia or serious injury, this is one of the simplest risks to avoid and a few simple precautions will help you to minimise the risk which in turn will enhance your confidence. A simple rule to follow is to always wear a life jacket and to ensure that you that you keep a firm hold of the ski at all times. This rule is important when training but applies equally when racing
- Dangers associated with collisions, either between skis, boats or obstructions can nearly always be avoided, a clear set of guidelines is provided in the International Regulations for the Prevention of Collisions at Sea (IRPCS), this is a water based version of the Highway.

# Personal Equipment



## Personal Equipment

The Personal equipment listed below is essential for both the safety and comfort of the rider. As with accessories in any sport fashion changes and the new colours or a new look for the season are what many riders will go for but take time to understand the importance of this essential kit and how it will work best for you.

# Personal Equipment



## Life Vest, Racing vests, life jackets and buoyancy aids

What is the difference between a racing vest commonly known as a life jacket and a buoyancy Aid.

**A RACING VEST OR LIFE JACKET WHEN CORRECTLY FITTED WILL ENSURE AN UNCONSCIOUS PERSON FLOATS FACE UP IN THE WATER. A BUOYANCY AID WILL NOT DO THIS.**

The choice of equipment you make is personal but this is the most important piece of equipment you will need and it should be worn at all times you are on the ski. Lifejackets and buoyancy aids are measured in Newtons 10 Newtons (10N) = 1KG. You should choose one of not less than 50Newtons. You should always make sure that all straps and zips are done up tightly before going out on the ski.

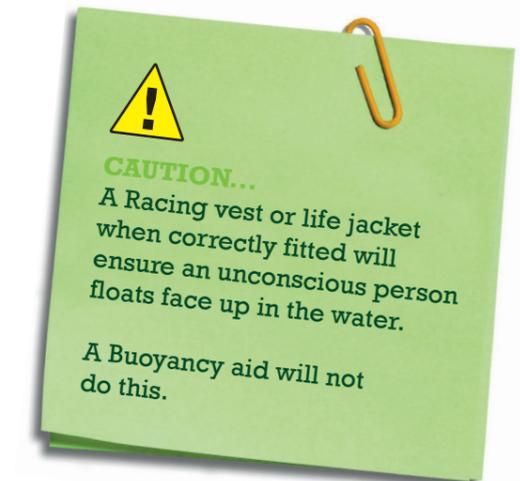
Failure to do this could result in the racing vest, life jacket or buoyancy aid pulling up over your head which will render it useless. Lacing ties and/or straps shall be adequate and in good condition. There should be lifting straps at the front or on the shoulders.

In all disciplines of racing strict rules apply which govern the type of racing vests or life jackets that are acceptable, some of the key points are as follows:

- Zips are not permitted as the sole means of fastening on a racing vest
- Where zips are used as an ancillary means of closure they must be in working order
- Tears or rips or bad repairs through which buoyancy material may leak out are not permitted
- Vests must have a lifting eye or strap attached to the

- main harness. Vests must not be able to ride up over the wearer's head, and must be secure to the body
- For lifejackets the disposition of the solid buoyancy must be such as to ensure that an unconscious person will float face up in the water. The vest must have impact protection material covering the back.

Please contact your National Authority for additional information if you are unsure of the type of product that is acceptable. If you are racing in International events the UIM Rules apply which can be found at [UIMpowerboating.com](http://UIMpowerboating.com)



# Personal Equipment



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## Kill cord

As we have previously mentioned Kill cords are an essential part of your personal on board safety equipment the rider must always ensure the kill cord is securely attached to his/her person. The ski will not operate unless the kill cord is correctly fitted.



**REMEMBER...**  
The ski will not operate unless the kill cord is correctly fitted.



## Protective Helmets

The wearing of helmets is mandatory in racing and highly recommended in recreational use, the helmet will protect you against impacts with the machine and the water which at high speed can often be violent. The wearing of a helmet also provides support for goggles vital for eye protection. As with most other water sports requiring the use of helmets there are few purpose made available for our sport so some research is required. Generally choose a Motocross style helmet with a removable internal liner also look for a helmet with a chin strap that secures with a double ring, some of the modern clips or snap attachments can fail as a result of corrosion from sea water.



## Protective Helmets for racing

Protective helmets must be worn at all times when racing and under the direction of the Officer of the Day. It is mandatory to wear a helmet made to a minimum standard to include Snell M2000, or M2005 or Snell SA2000 or SA2005. Helmets must have temple protection and must be coloured "orange" or an equivalent bright colour acceptable to the organising body. A correctly fitting helmet is essential, seek advice from your supplier but be aware that if there is excessive movement in the fit or you can pull your helmet off from behind it is useless. Look after your helmet at all times, it is a vital piece of safety equipment, if you drop your helmet onto a hard surface it is extremely likely that it will be irrevocably damaged. Check the current International requirements for helmets at [UIMpowerboating.com](http://UIMpowerboating.com)

# Personal Equipment



## Wet suit

A good fitting wet suit is essential for comfortable riding; wet suits are available in many different forms, weights (thickness), full suit or shorty and many different colours. The first thing to remember is that a wet suit does not keep you dry, when fitted correctly it will allow water to enter between the wet suit and the skin and your body heat will then warm this layer of water which in turn will keep you warm. This is a different principal to a dry suit which we will look at in a minute.

Wet suits are available as a full suit or a shorty covering the torso only; generally speaking the shorty suit is for summer use but clearly the choice of which one is best for you will depend on the location in which you are operating. You should chose a suit that fits snugly and is approx. 2-3mm thick, the thicker the suit the warmer it will be but a heavy suit will limit your movement which is not good.

Wet suits both full and shorty are available; these tend to have more padding so best to research this area thoroughly before purchasing.

## Dry Suit

A dry suit is designed to keep you dry and it uses rubber neck and cuff seals to achieve this as well as a heavy duty rubberised zip. You will need to wear a suitable base layer to keep you warm, many of the breathable base layers used in sailing or diving will work. Generally a dry suit will be used in cooler climates, wearing a dry suit takes time to adjust to, you will need to expel all the excess air from the suit as you put it on this is achieved by allowing the air to escape from the cuffs or the neck, if you don't do this you will end up like an inflated balloon!! and probably unable to swim. As with the dry suit you should also wear a life jacket or buoyancy aid.

# Personal Equipment



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## Whistle

It is always a good idea to have a whistle attached to your buoyancy aid or life jacket, it a great way of attracting attention especially if you are separated from your ski.



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## Gloves

An essential part of your personal equipment, a good pair of neoprene gloves will help you grip the controls and will also prevent blisters. Expect to go through several pairs in the course of a season and always carry a spare pair with you.



## Boots

This is another essential piece of personal equipment, a good fitting pair of boots with ankle support will provide stability, support and protection when both on and off the ski. Don't forget that wearing boots with a dry suit is more difficult and you will need to fit them whilst wearing the dry suit.

# Personal Equipment

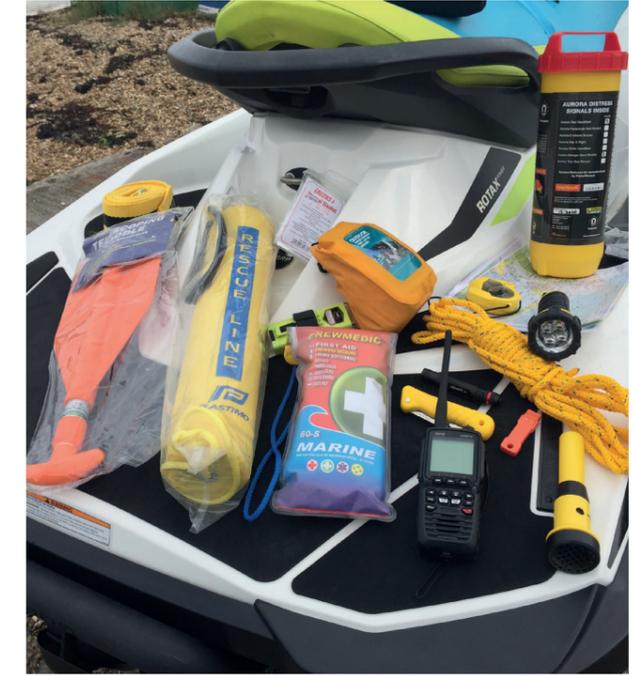


## Eye Protection

This is absolutely essential when riding on a ski, spray and rain hitting the face when travelling fast is extremely uncomfortable and will greatly reduce your ability to see where you are going. The glare from the sun is magnified whilst on the water so strong UV is there even when it is cloudy. Special goggles are available so choose one that suits you also don't forget that if you need to wear glasses the goggles will have to fit over them.

## Body Armour

The wearing of body armour is highly recommended in recreational riding but essential in racing. Like many modern products this comes in many forms and shapes and is comfortable to wear. Body armour is worn between the wet suit and the life jacket.



## General recommendations

Riding a ski is physical, challenging and fun; having the right mix of personal safety equipment is essential and will ensure that you gain maximum enjoyment from your sport. Don't forget that you should also carry some spare water; use sun bloc at all times and make sure that you have a spare kill cord located safely on the ski.

# Personal Equipment

## Maintenance of your personal equipment

Just like any aspect of water sport maintaining your personal equipment is essential, failure to do so will result in the equipment failing and spoiling your day on the water. Top tips for your personal kit:

- Rinse off your wet suit, dry suit, gloves, boots, helmet and goggles after every trip out on the water.
- Allow all equipment to drain off especially gloves and boots so make sure they are upside down so the water can drain out
- Store all equipment in a warm dry place, don't throw it into a corner and expect it to work next time out
- Check zips especially on dry suits, running a pencil down a zip will keep it running freely
- When dry treat dry suit cuffs and neck seals with powder to ensure ease of wearing next time out.

## On Board Safety Equipment and essentials

Operating any type of craft on the water requires that you take a responsible approach to the safety of your craft and your own personal safety. We have already looked at some of the equipment you need for your personal safety so now let's consider what else you should take with you. It is no longer acceptable to just go out to sea with little or no equipment and then rely on the rescue services to come to your assistance.

Failure to comply with the basic safety requirements in some countries may well result in a heavy fine or worse.



## Flare Pack

The minimum recommended equipment is that you carry: Two orange smoke and two red handheld flares. These should be packed in a waterproof container and stored in a convenient dry place. Don't forget that you should know how to operate this equipment, also don't forget that these are not buy and forget items they have a limited shelf life normally three years.

# Personal Equipment



## Tow line

A high visibility floating line of not less than 6.0m in length with an easy fit carbine hook suitable for towing.



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## Fire Extinguisher

A 2kg dry powder fire extinguisher secured in an accessible locker is required. Again check annually the condition and expiry dates



## Waterproof Torch

Used for signalling and inspection of intake pump, engine bay etc. Always make sure the batteries are working.

# Personal Equipment



## VHF Marine radio or a mobile phone

A multi-channel marine VHF radio in a waterproof case, this should normally be secured to your life jacket when cruising, this is not required or possible when racing. If you carry a mobile phone make sure you have local harbour masters and coastguard numbers stored in the memory.

An emergency call on a marine VHF radio is the best way of getting assistance; also some mobile phones will not work off shore.



## Waterproof compass and chart

A small waterproof chart of the area in which you are operating is essential, sand banks, dangers and hazards can cause serious damage to a Ski travelling at high speed not to mention the rider.

You should also carry a small hand held compass even if you know your operating area really well. Sudden rain storms or worse fog can plunge you into a survival state within minutes so be prepared.



## Knife with serrated edge

Essential for cutting rope etc. in emergencies, the knife must have a serrated edge for best results.



# Personal Equipment



## First Aid Kit

A small First Aid kit is essential, when you have an emergency nothing else will do.



## Anchor and line

A must for both recreational anchoring in a peaceful bay or securing your position in the event of a breakdown. Don't forget to secure this in a locker as you don't want it crashing around when at sea.

## Food and Drink

Clearly you are limited with space so bulky provisions cannot be considered but water and high energy bars are recommended.

## Tool kit, spares and spark plugs

Again it is not possible to carry a large tool kit but essentials like a spark plug spanner, a small adjustable spanner and a screw driver may well come in useful especially if a hose clip fails. Regarding spares the same applies, spare spark plugs and some cable ties don't take up much room and might come in handy. Don't forget a spare kill cord, if you lose the one on the ski you won't be going anywhere without a spare.

## Documentation

This is becoming more and more important so as a minimum make sure you have the following document with you at all times:

1. Log book or proof of ownership
2. Insurance details
3. International Certificate of Competence (ICC) this is essential if you are operating in the Mediterranean

Put all of these valuable documents in a waterproof bag and stow safely in a locker.

## Folding paddle

A small lightweight folding paddle might just help you get back to the shore in the event of a breakdown.

**FINALLY IF YOU ARE TRAVELLING OFFSHORE OR JUST ALONG THE COAST MAKE A PASSAGE PLAN AND TELL SOMEONE WHERE YOU ARE GOING AND WHAT TIME YOU WILL RETURN. YOU JUST NEED TO MAKE A SIMPLE CALL TO YOUR SHORESIDE CONTACT TO TELL THEM YOU ARE SAFE AND ALL IS WELL, IF THEY DON'T HEAR FROM YOU BY AN AGREED TIME THEY WILL CALL THE EMERGENCY SERVICES. THIS IS A SIMPLE SYSTEM THAT WILL HELP TO PROTECT YOUR SAFETY.**

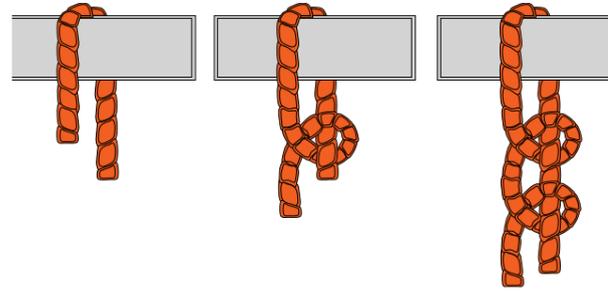
# Water awareness skills on land and water

## Rope Work

This section of the course is dedicated to understanding the right knots to use in different circumstances, a good knowledge of rope work is very important. Your instructor will help you to tie all of the different knots listed below and also help you to understand the different circumstances in which they should be used. It is very important to master these skills as good rope work will ensure your boat is safely secured at all times and that the knots don't jam which can be very dangerous.

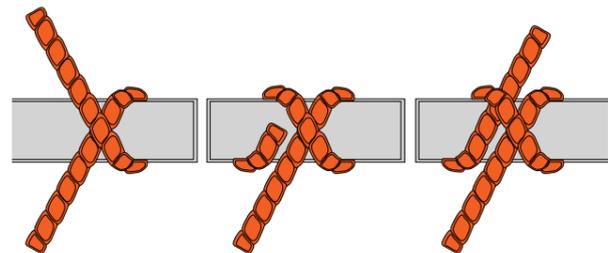
### Round Turn and Two Half Hitches

Easy to tie and can be undone whilst under load. Used to tie to handrails, rings, mooring bollards and posts etc.



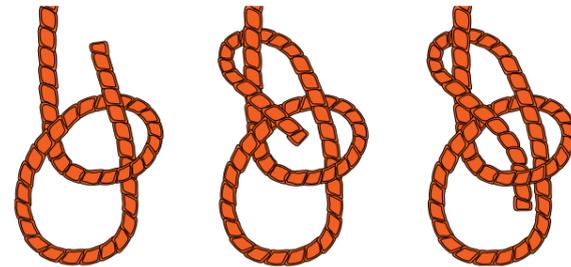
### Clove Hitch

Easy to tie but can work loose, typically used to tie fenders.



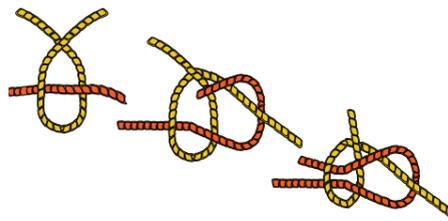
### Bowline

More difficult to tie but is one of the most useful knots in boating. This knot will take extreme loads and can still be released. Only disadvantage is that the knot cannot be undone whilst under load. Typically used when mooring boats or towing



### Sheet Bend

Easy to tie, used for joining two lines. Can only be undone when load released.

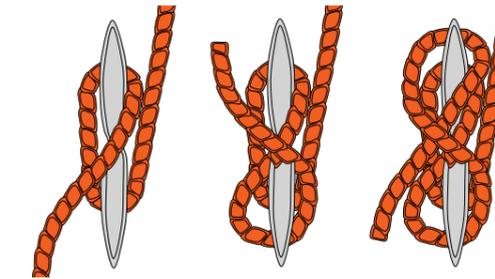


# Water awareness skills on land and water



## Securing to a cleat

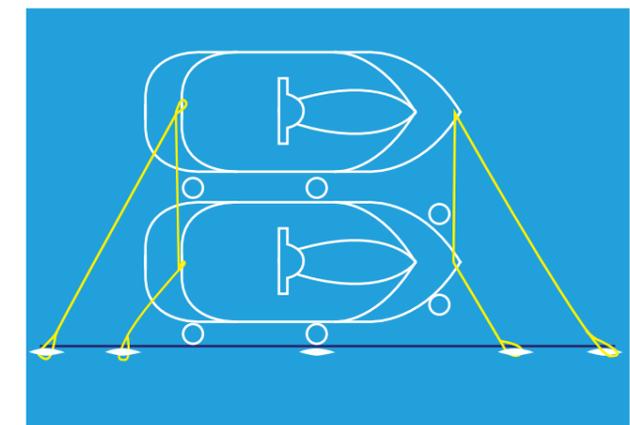
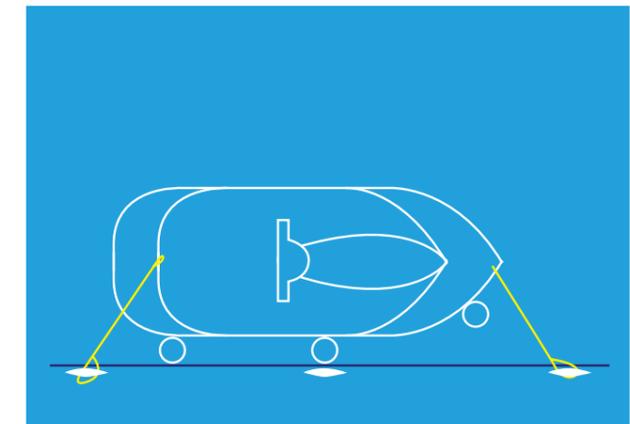
Quick and Easy to tie, two turns around cleat followed by figure of eight turns and complete with full turn. Do not cleat off as the knot can jam



## How to moor a ski

A ski should always be secured with a forward line sometimes called a bow line and an aft line sometimes called a stern line. To prevent the ski moving forwards or backwards secondary lines known as springs can be used.

Shore lines are often used if the ski is moored close to other ski say on a jetty or if moored in tidal waters where the movement of the water can cause the ski to drift into the skis ahead or astern. If a ski is moored next to another ski on a long trot it may be necessary to use additional shore lines to stabilise the whole raft of skis.



# Water awareness skills on land and water

## Getting underway on a sit down ski

If you are boarding a ski from a jetty or pontoon you need to make sure that your weight is evenly distributed over the machine, so try to lean across the machine and get your weight on both sides at the same time. Don't just jump on one side of the machine as you may very well end up in the water.

When boarding in shallow water say from a slip way make sure you manoeuvre the ski into approx. 1.0m of water first, walk around to the rear of the ski, lower the boarding ladder if fitted, climb onto the boarding ladder and then onto the ski keeping your body weight as low as possible. Take up the riding position on the jockey set, connect the kill cord and start the engine, slowly then move into deep water.

Don't forget our pre-launch checks:

- Before launching check that the battery is connected, the ski is fuelled, and the kill cord is connected.
- Test the engine to ensure it starts OK
- Check to make sure the drain plugs have been fitted
- Finally check that no lines are trailing which could foul the impeller.

As you motor away from the slipway or jetty there are many other considerations you need to take into account and we will look at these in the Pilotage section of this manual.



# Water awareness skills on land and water

## Getting underway on a stand up ski

Boarding a stand up ski from the water requires a different technique, first you should manoeuvre the ski into approx. 1.0m of water as before, this will ensure you don't suck up sand, stones or debris into the impeller. Attach the kill cord and if point the ski into the wind and in a safe direction.

Place both hands on the handle bars, elbows on the side deck or tray in a semi lying down position; try to get as much weight as far forwards as possible as this will help you to get on the plane more quickly. Start the engine and motor forwards, slowly increase speed and move your weight forwards bringing your knees up onto the deck.

When you feel comfortable and in control of the ski push the handle bars down and raise up from your knees onto your feet, once in the standing position make sure you have one leg in front of the other as this position will help you to control the ski. Your body should be flexible at this point, bend your knees to absorb any shocks from the waves and control your balance with one foot/leg behind the other.

It is a good idea to practice this in calm water first as it will help you to understand how to balance. If you have ever done any water skiing you will recognize the feeling especially if you have water skied on one ski as in this position you always have one leg behind the other.



# Water awareness skills on land and water

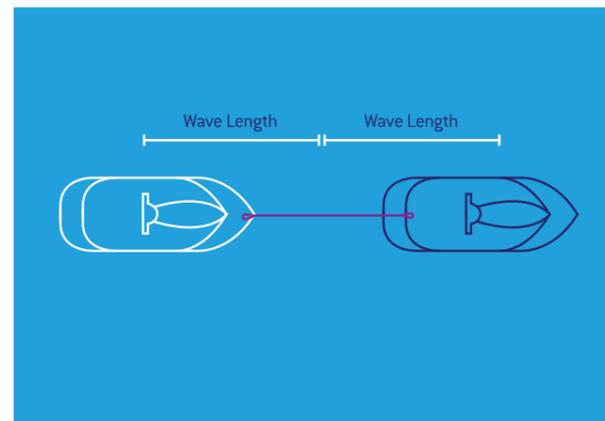
## Tow lines and towing

Towing a ski is very simple especially if you carry the recommended 6.0m tow line with you. If you are giving assistance to a broken down ski manoeuvre your ski close to the disabled ski into the wind and tide if appropriate, if the rider is still with the ski pass the tow line to the rider and then secure the tow line to the D ring or winch eye located on the bow of the ski. The tow line can either be secured by tying a bowline (described more above) or more simply by attaching the carbine hook in the tow line to the D ring. Once you have done this secure the other end of the tow line to the towing point on the rear of your ski with a round turn and two half hitches, pull all the slack line out of the water before you start your engine as this will ensure that the tow line does not get sucked into your impeller. Start your engine and very slowly move forwards paying out the slack in the towline, good communications with the rider on the other ski are helpful during this process. Once the strain is on the towline commence the tow at a safe speed to suit the conditions.

When you are ready to disconnect the tow slow down and communicate your intentions to the other rider, turn your ski into wind and tide as before ensuring that your ski is at 90 degrees to the ski being towed, this will prevent the towed ski crashing into the back of you. Disconnect the tow line and store safely.

If you have to tow a ski into a marina or restricted area it is very important to control your speed, don't forget the ski being towed has no means of stopping or slowing down. The best way to control your speed is by using small bursts of power, just enough for you to maintain both direction and control.

If you have to place the towed ski on a jetty or pontoon make sure you make your final approach into wind or into tide as this will help you to maintain control and speed of approach. If you are in any doubt about your ability to do this safely call for assistance, sometimes it is very useful to call the local harbour master on the VHF Radio and ask for his help.



# Water awareness skills on land and water

## Handling your ski on the water

This is a really important skill to master; the art of making a ski stand still in all conditions is something that will take time to develop and a lot of practice. It is possible to steer a ski with very little forwards momentum and one of the most common mistakes is to apply too much power. The most important factors to take into consideration are the momentum of the ski, the effects of the wind, tide or stream, and how to use the reverse bucket to both stop the ski and turn it round in its own length. It is also important to understand where the pivot point of the ski is as this will be important in close quarters handling. Before you attempt to carry out any manoeuvres you must know how the direction of the wind or tide will affect your ski.



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# Water awareness skills on land and water

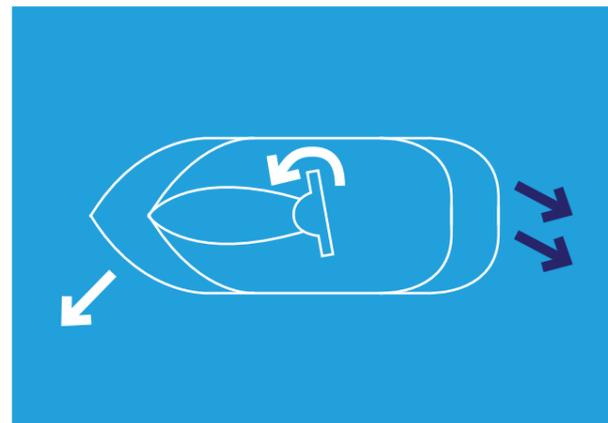
## Steering and the effects of thrust from the water jet.

One of the most important points to remember is that the moment you start the engine the jet pump is running and this will try to move the ski forwards or backwards. To go forwards apply one click to the control lever on the left side of the handlebars, this will direct the thrust forwards via the steering nozzle, to go faster simply apply a small amount of throttle.

To disengage forwards drive reduce throttle and click the left lever once more this will select the neutral position and the reverse bucket will direct the thrust downwards.

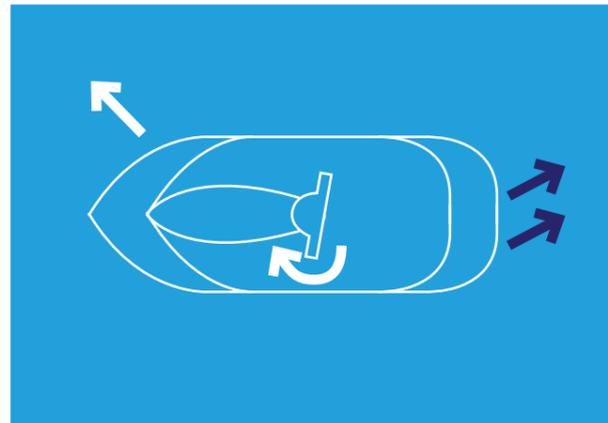
To engage reverse pull and hold the lever on the left side this will engage the reverse bucket and the thrust will be directed backwards, to increase the power of the jet simply apply more throttle.

On some of the older machines without electronic controls the method of engaging the reverse bucket is by a manual process. These older machines are fitted with a lever which you pull up to engage reverse and push down to disengage.



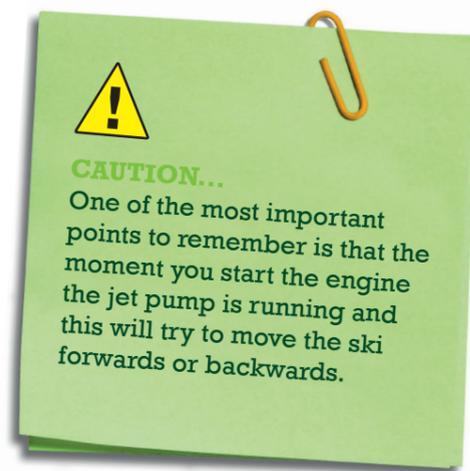
### Turn to the left (Port)

- Turn handlebars to Left
- Increase power to increase thrust to turn Left

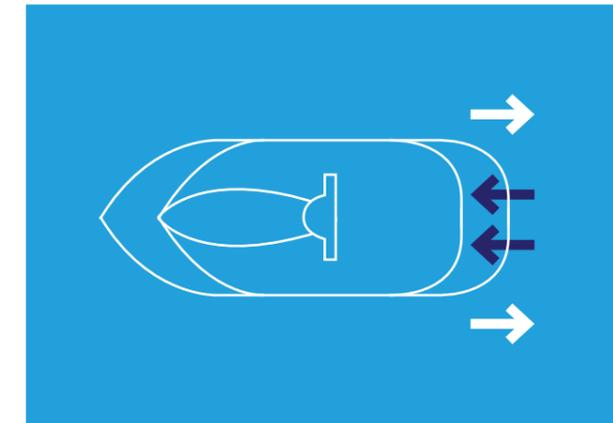


### Turn to the Right (Starboard)

- Turn handlebars to the Right
- Increase power to increase thrust to turn Right

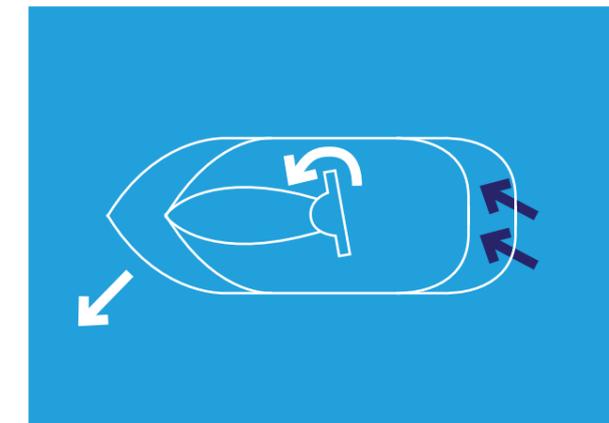


# Water awareness skills on land and water



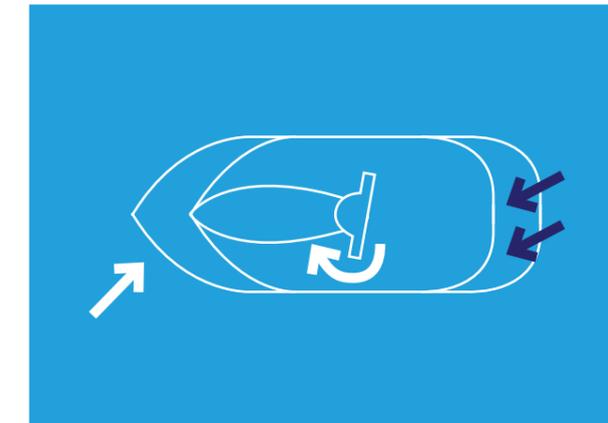
### Reversing (To reverse backwards in a straight line)

- Handlebars straight
- Increase power to increase thrust to go backwards



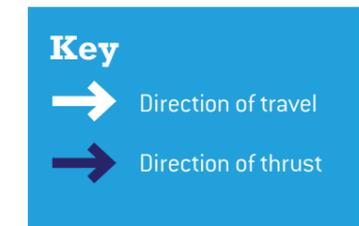
### Direction of rotation

- Rotating ski clockwise
- Handle bars to left ski goes left with forwards thrust
- If reverse bucket is engaged stern of ski will rotate in a clockwise direction



### Direction of rotation

- Rotating ski anti-clockwise
- Handle bars to right ski goes right with forwards thrust
- If reverse bucket is engaged stern of ski will rotate in an anti-clockwise direction



# Water awareness skills on land and water



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## Reverse bucket effect

As we have mentioned a ski will continue to move even after the neutral position has been selected, this is the same as cars but boats don't have brakes so the only way you can stop or slow down is to apply reverse bucket thrust.

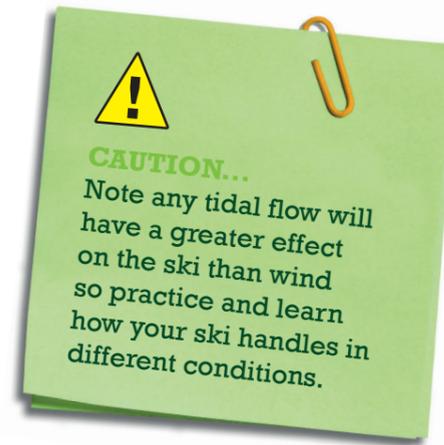


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## Mooring to a pontoon

Head to tide – first identify the direction in which the tide is flowing, approach the pontoon head to tide, prepare bow and stern lines and suitable fenders. Point the ski across the tide as per diagram, maintain sufficient forwards momentum to overcome the tide, as you get close to the pontoon engage a very small amount of reverse thrust firstly with handlebars straight then with the handlebars facing left this will both slow you down and swing the stern of the ski towards the pontoon. Secure bow and then stern lines.

Note any tidal flow will have a greater effect on the ski than wind so practice and learn how your ski handles in different conditions.



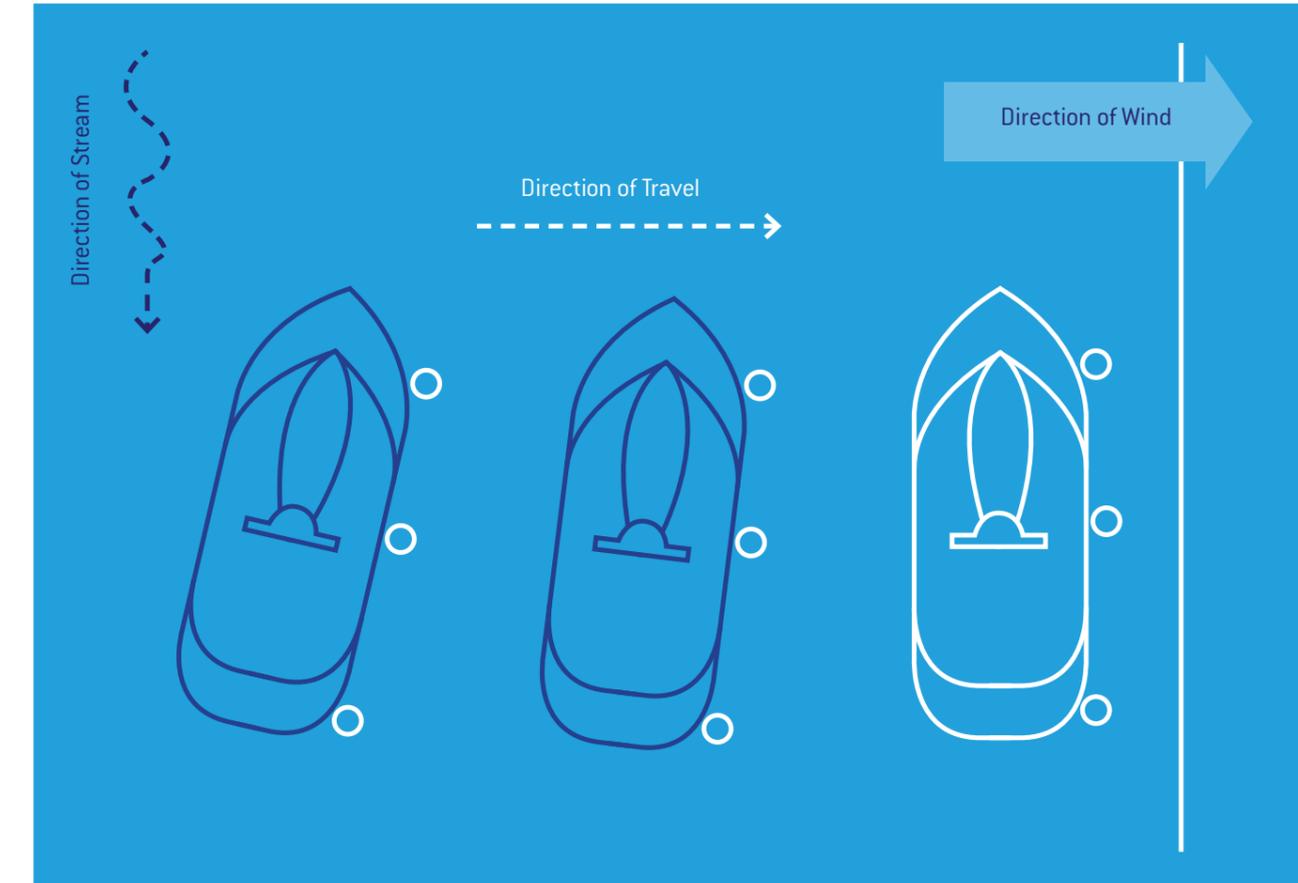
# Water awareness skills on land and water

## Wind on

Approach the pontoon as in the example above but this time do not use such an acute angle of attack as the wind will do the job for you. If you hold the ski stationary against the tide the wind will simply blow you onto the pontoon.

## Ferry glide technique

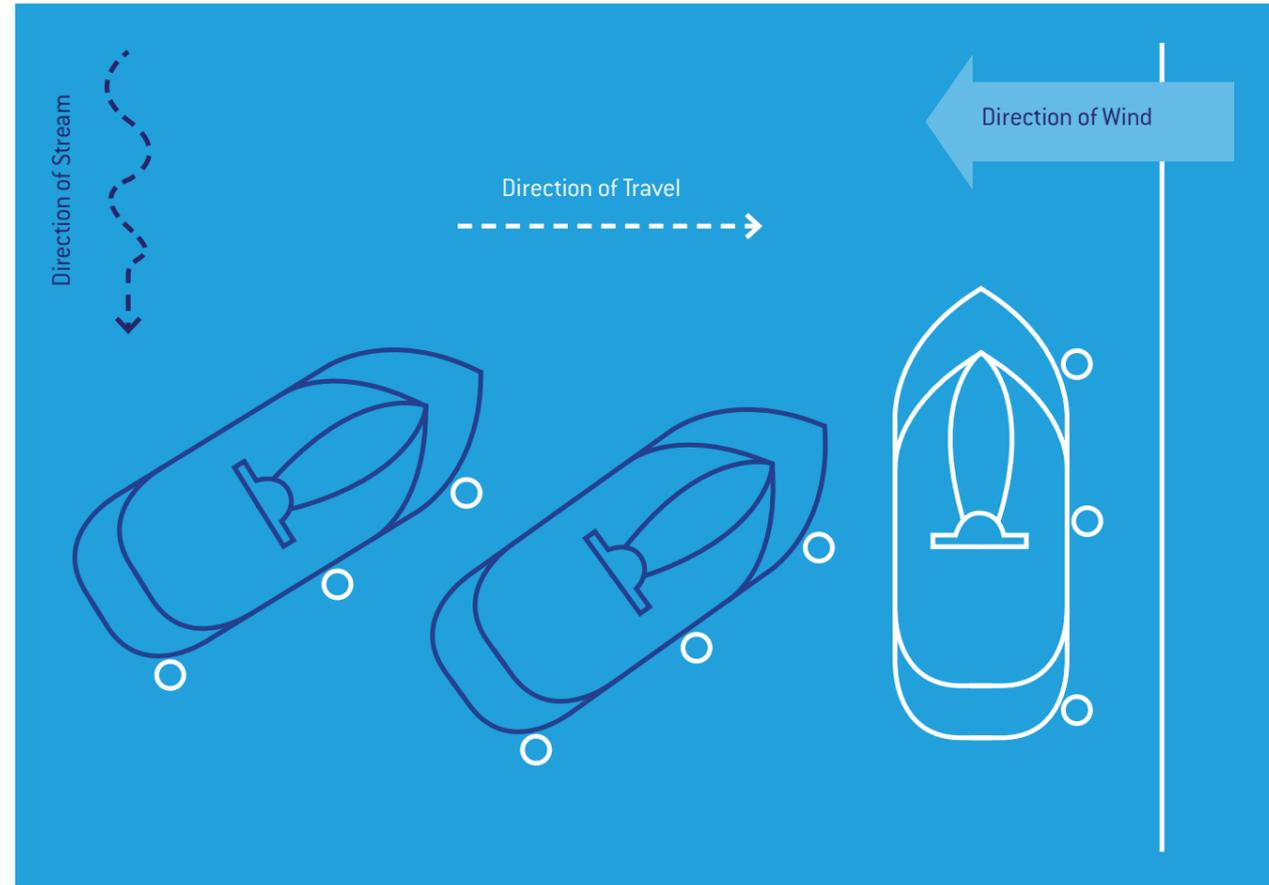
We have already touched on this in the head to tide manoeuvre, this term is used to describe the way in which a ski can be made to drift sideways across the water with little or no forwards momentum. It is achieved by holding the ski against the wind or tide and applying small amounts of power with the steering set to achieve the angle of attack necessary to create the effect. This is a great manoeuvre to practice to understand the effects of both the handlebars and forwards and reverse thrust.



# Water awareness skills on land and water

## Wind off

This is a more difficult manoeuvre and requires a different approach, firstly identify the direction of the tide and point the boat into the tide, next increase the angle of attack to the pontoon, sometimes this can mean you are pointing at right angles to the pontoon, as you approach the pontoon secure the bow with a mooring line, then turn the handlebars to the left and engage reverse thrust this will swing the stern of the ski into the pontoon. Be careful not to use too much power.



# Water awareness skills on land and water

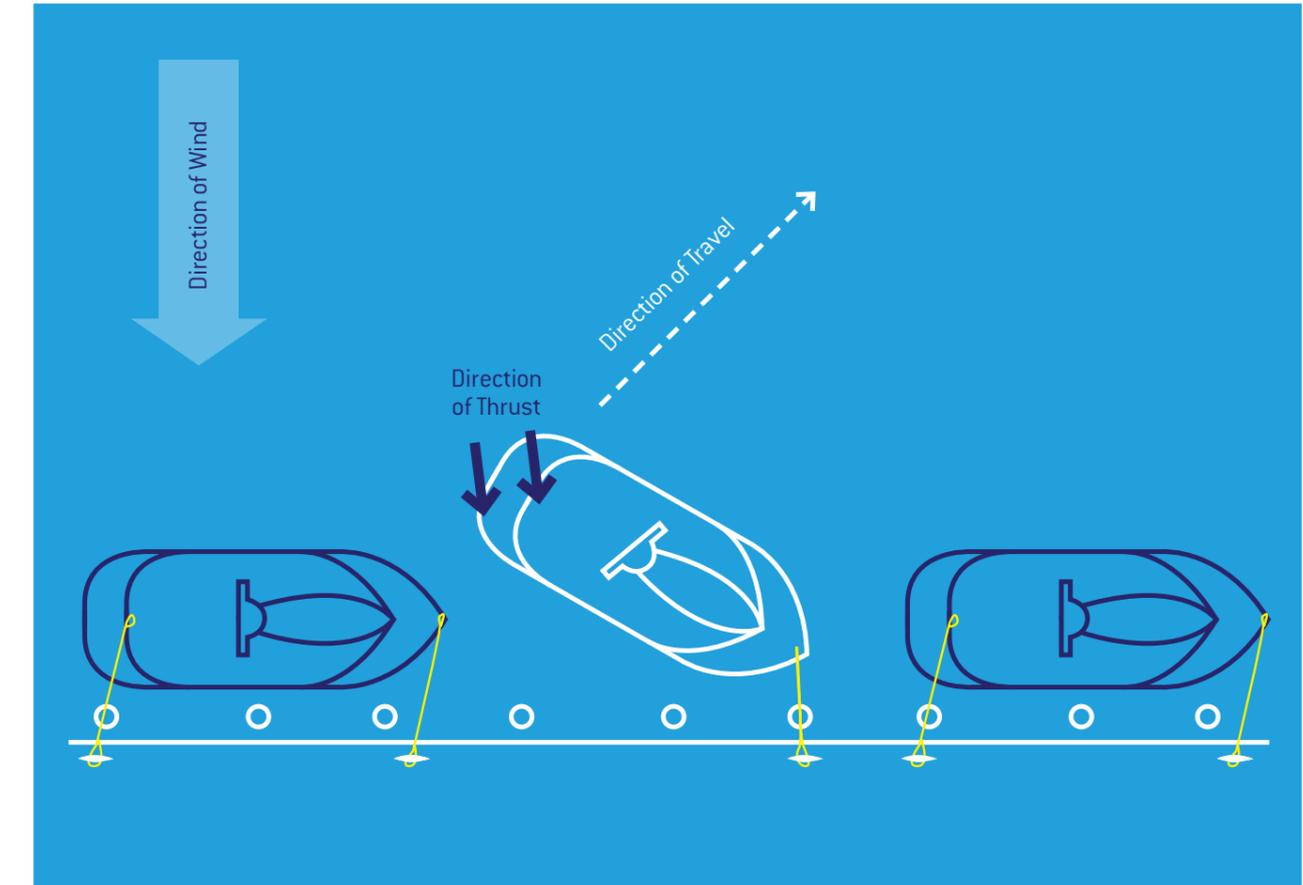
## Turning in a restricted area

This manoeuvre requires careful hand and eye coordination remember where the pivot points are and don't engage forwards or rear thrust until the handlebars are pointing in the direction you want to go. Small applied amounts of power are ideal which will result in the ski turning on its axis with minimum forwards or backwards momentum.

## Leaving a mooring (moored on starboard)

When tide and wind conditions do not affect the ski it is possible to simply drive off the pontoon. If this is done using forward thrust take care not to side swipe the pontoon with the stern of the machine as you leave. If you turn the handlebars too much to the left the ski will hit the berth.

It is often better to reverse off a mooring as this method avoids the danger above. To execute this manoeuvre turn the handlebars to helm towards the berth to the right and apply a very small amount of reverse thrust, just enough to start the stern of the ski to swing away from the berth. As you clear the pontoon straighten up and depart into tide or wind.



# Water awareness skills on land and water

## On water driving, head to sea, beam on and following sea.

### Head to sea

Riding directly into the sea means that the ski will be attacking the seas head on, this will result in a rough bouncy ride and getting the speed set right in this situation is very important, too much speed and you will take off and the ski can become very unstable, too little speed and the nose of the ski will dive into each wave and almost bring you to a stop. Your experience levels and physical ability will dictate how you ride in these conditions. As you get more experienced you will adjust the speed constantly to suit the wave height and patterns, in some cases where waves are close together you can jump between each wave crest and thereby maintain a high speed. This is much more difficult if the distance between the wave crests is large. Start carefully and develop your skills over time.

### Beam on Sea

This is when the seas are coming from either side and you are driving in between the crests, this can be really good fun as you are not jumping from crest to crest as above. Because you are not jumping you can maintain a much higher speed and not so much physical ability is required.

### Following Sea

As the name suggests this is when you are running with the waves and travelling in the same direction. Following seas can be more dangerous than head seas and the reason for this is if you misjudge the height and strength of a large wave you will jump of one wave and heavily crash into the back of the next wave in front of you, this can result in you being catapulted over the handle bars into the sea. Again experience and physical ability are the key to safe driving in these conditions.

It is important to consider the direction and strength of the waves when planning a day out. Avoid travelling long distances first thing in the day with a comfortable following sea only the find the wind has increased in the afternoon and now the waves are much larger and you have got to head directly into them for the whole journey back. Safe passage planning and understanding the effect of wind, tides will be covered in the weather and tides section. In all of the above conditions a rider may have to adjust their riding position, in a head to sea situation it could be extremely uncomfortable to remain seated so a semi standing position would be adopted and the shocks of landing can then be partly absorbed through the legs. This however is extremely tiring and you need to be fit to ride for extended periods in this position.

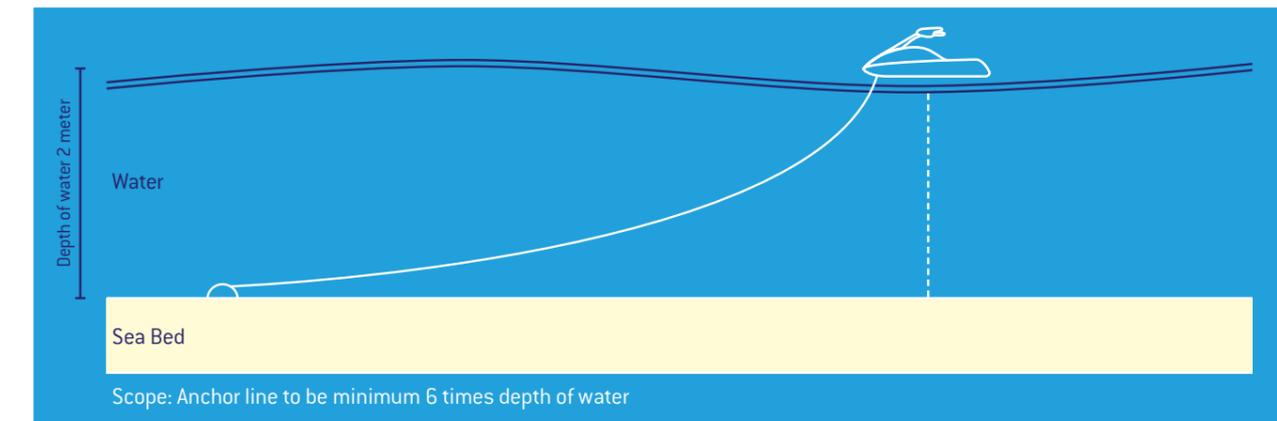


# Water awareness skills on land and water

## Anchoring

Anchoring is a very simple exercise providing some basic principles are applied, most anchors are fold up grappling style anchors which are both easy to stow and light weight. Choose your anchorage bearing in mind that you don't want to be anchoring on a rocky bottom as the anchor will just drag and the boat is likely to float up out at sea! Best holding ground is sand or mud, you can check this out prior to departure by a simple look at your navigation chart. The chart will also give you the minimum depth of water so don't forget to allow for the rise of the tide if applicable and determine the depth of water you are likely to have when you arrive.

The general rule is that you would use 6X maximum depth of water to determine the amount of line to use. Now that you are ready to anchor drive into the wind and bring the boat to a stop and drop your anchor, carefully engage reverse drive and pay out the anchor line until it is fully deployed. Tie the anchor line off securely with a round turn and two half hitches. Spend a few moments to check that the anchor has secured and that the boat is not dragging.



Anchoring is both a very useful practical way of securing your boat for a short stay and also can be a lot of fun; some typical examples of when you might anchor are given below.

### Some anchoring do's!

- Anchoring for a short stay off a slipway whilst you secure your trailer following launching
- Anchoring for a short stay whilst you collect your trailer for recovery
- Anchoring for lunch, or off beach for a swim.
- Anchoring due to a mechanical problem

### Some anchoring don'ts!

- Don't anchor on a rocky or weedy bottom
- Don't anchor in rough conditions unless it is an emergency
- Don't anchor off a rocky beach with a strong on shore wind
- Don't leave your ski unattended for long periods of time

# Water awareness skills on land and water



## How to change positions on a ski

If you are riding with a passenger and you want to swap positions the best way to do this is for the driver to move off the jockey seat and move slowly backwards down the side of the ski whilst at the same time the passenger moves forwards on the opposite side of the ski. This ensures that a neutral balance is maintained and the ski does not capsize. Don't forget to swap over the kill cord at the same time. Pay particular care in rough conditions.



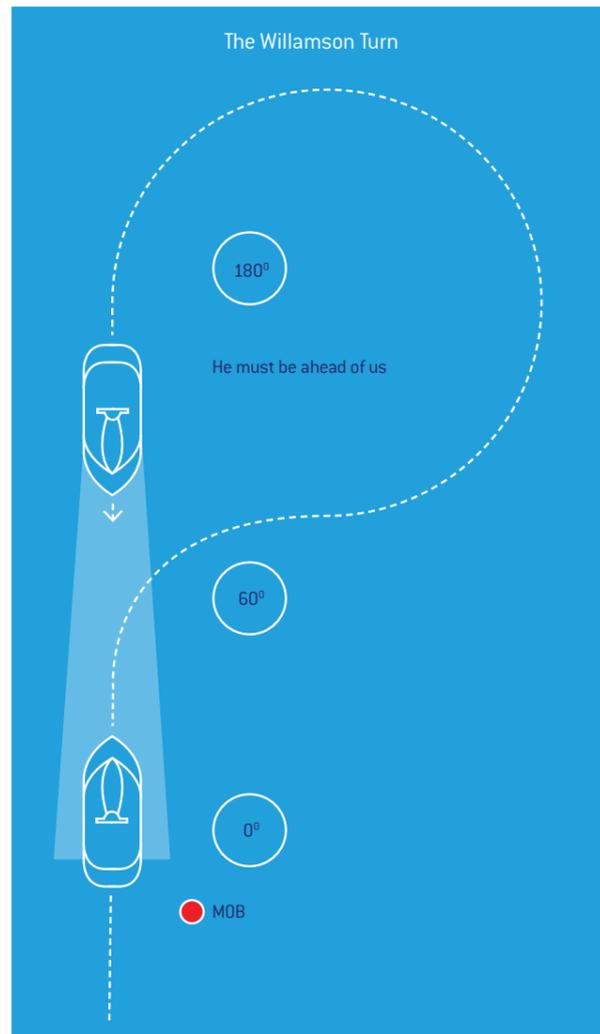
## Man Overboard Recovery

Riding with a passenger can be a lot of fun but the driver must be aware that for the passenger it is much more difficult to hold on! A passenger should always hold on to the driver, just like on a motorcycle, this way the driver always knows that the passenger is still there!

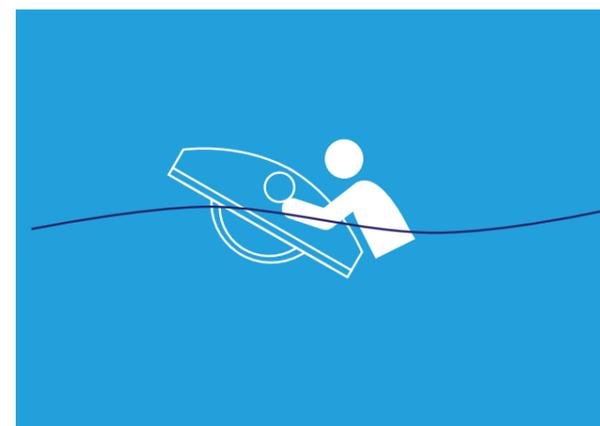
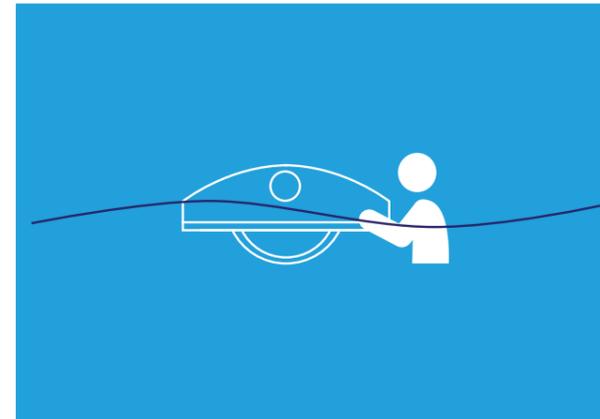
If the passenger falls off slow down, maintain visual contact throughout and return to the MOB, the best way to do this is to go downwind of the MOB and return head to wind as this gives you best control of the ski.

As you get closer, switch off the engine and allow the MOB to re board from the stern of the ski, making sure that you help to maintain neutral balance. If conditions are rough you could also use the rescue throwing line, throw the line to the MOB and once they have it you can help by pulling them to the ski.

If the MOB has suffered an injury you may have to call the emergency services for assistance. If the MOB is unconscious you MUST call the emergency services immediately whilst at the same time rendering what assistance you can. Make sure they are breathing, their airway is clear and that their face is clear of the water. In this situation you have a possible life threatening situation which requires a Mayday call or if no VHF an emergency 999 or equivalent.



# Water awareness skills on land and water



## Capsize Procedures

All riders of skis must fully understand how to deal with a capsize, modern Skis are designed to cope with this situation however as a rider you must take sensible precautions and in the event of a capsize follow a set procedure.

1. Always make sure that you and your passenger are wearing a life jacket or buoyancy aid, this must be fitted properly and in good condition. [See section on Personal Equipment Life Vest].
2. Once a capsize occurs and you are in the water, check that your passenger is OK, next make sure the engine is not running. The kill cord should have ensured this.
3. Keep hold of the ski at all times or immediately swim back to it.
4. Check the direction of rotation of the ski, this varies between different models and a label on the stern will always show the correct way to rotate.
5. Swim to the side of the machine that you intend to rotate towards you, put your knee on the rubbing strake and catch hold of the grill under the impeller.
6. Pull the ski towards you using your weight to help it rotate.
7. When the ski is upright, re board in the usual way from the stern.
8. Once righted the petrol in the fuel system will then return to its normal state and after a few moments you should re connect your kill cord and start the engine.



## Visual Distress Signals

If you have capsized and are now in Distress you can signal to others that you need assistance by slowly raising and lowering your arms. This is not the best way of indicating Distress as Flares, VHF Radio or mobile phone are much better but if none of those are available this method is a recognised Distress signal.

In all UIM and National Racing it is the responsibility of the Rescue services to provide the required assistance to any casualties in the water and all competitors must observe the rules and regulations as described by the race organisers and the Officer of the Day. More details on this will be covered in the Advanced section of this manual.

# Basic Navigation

## Basic Navigation

In this section we look at how to avoid collisions by understanding the International Rules of the Road, how to recognise ships we have to give way to and how to read and understand the Buoyage system. We will also consider the effect of tides and tidal streams as well as looking at weather and how to avoid getting caught out in rough conditions.

## Collision avoidance Rules of the Road

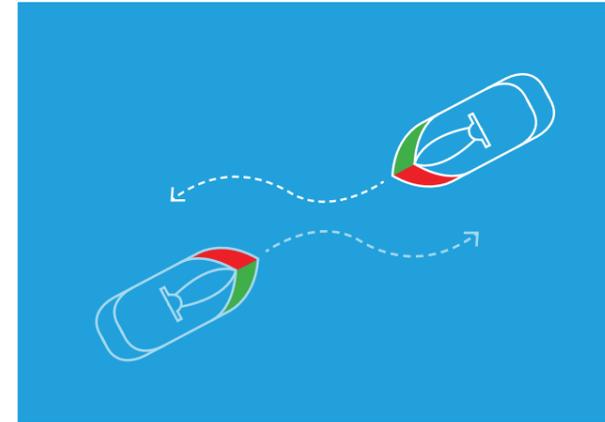
Just like travelling on the road safely driving at sea is controlled by a number of simple rules. If you know and understand these rules you will avoid problems, if you ignore them you could have a serious collision for which you may be held responsible and subsequently prosecuted.

One of the most important things to remember is that it is your responsibility to avoid a collision and you must take whatever measures necessary to do so, you should also remember that the other riders may not know the rules or worse never heard of them so don't take their ability for granted.

The most important rule is to maintain a proper lookout at all times:

- Don't suddenly change course at high speed without looking who may be behind you.
- Don't rely on your mirrors, look behind you
- Anticipate what other people may do on the water
- Always cruise at a safe speed with particular reference to sea conditions, density of traffic and visibility

Let's now look at some of the basic rules and what you should do:



### Head on

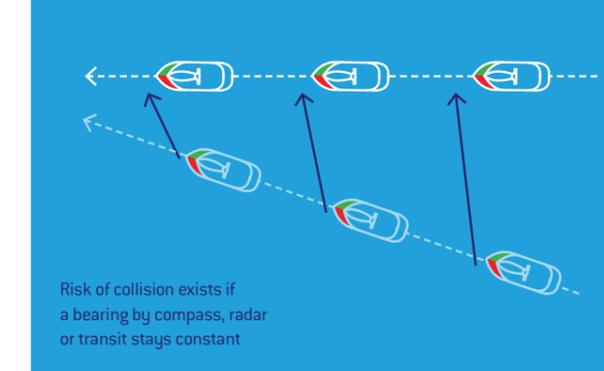
i.e. two craft travelling towards each other

Turn to the right (Starboard) make sure your turn is made early enough so that your intentions are clear to the other vessel. If there is no room to turn slow down or stop.

In this situation both craft alter course to the right (starboard) and pass left to left i.e. port to port. You should avoid crossing ahead of an oncoming boat as it is difficult to estimate their speed.

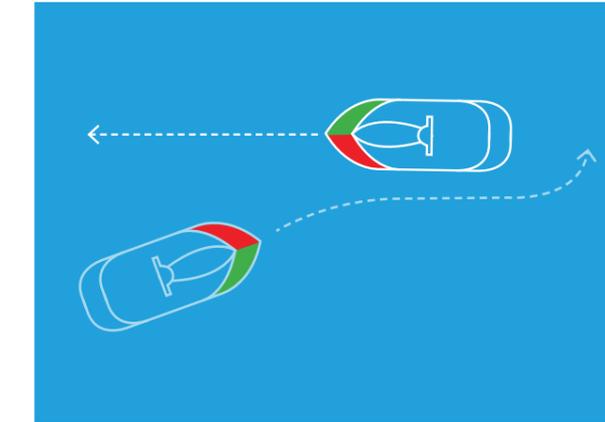
# Basic Navigation

## Risk of Collision

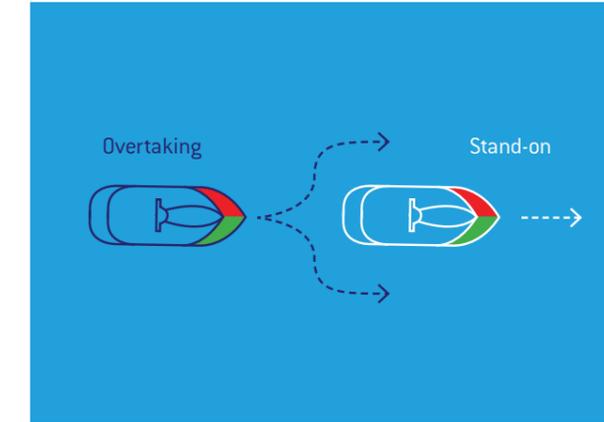


### Crossing other craft

If a danger of collision exists in other words the relative bearing between the two craft remains constant YOU MUST ACT. In this case turn to the right to pass behind the other vessel.



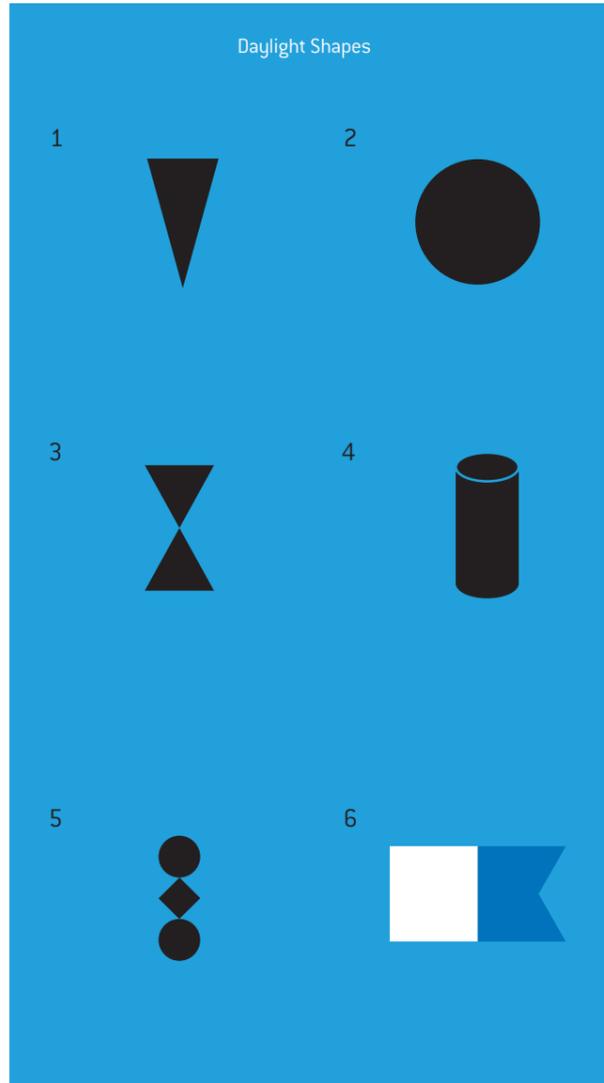
If another vessel is approaching you from your left and the relative bearing is constant that vessel should give way to you and pass behind you. Keep a sharp lookout in this situation and if the other vessel fails to alter course be prepared to take avoiding action, best to turn to the right and pass behind the other vessel.



### Overtaking

If you are overtaking another vessel it is your responsibility to keep clear, you can pass on either side so choose the one that is safest.

# Basic Navigation



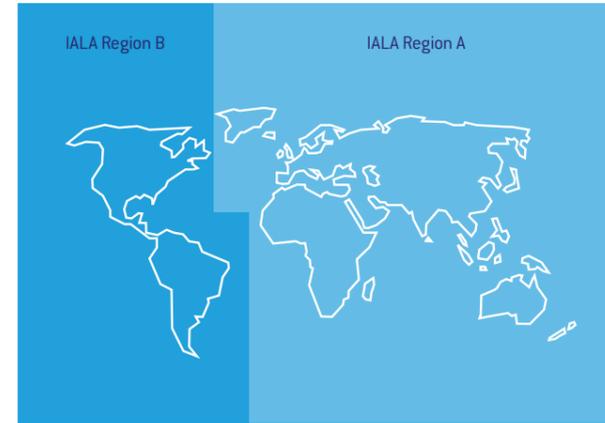
## General Rules

As you are a power driven craft you must keep out of the way of sailing vessels and all vessels which are restricted in their ability to manoeuvre such as: fishing boats, canoes, kayaks, wind surfers and dive boats. There are very detailed rules which describe numerous other types of vessel that you must keep out of the way of and details of these can be found in publications entitled "International Regulations for the Prevention of Collisions at Sea." Pay particular attention to the following signals:

1. Vessel under sail and power
2. Vessel at anchor
3. Vessel engaged in fishing or trawling, also restricted in its ability to manoeuvre
4. Vessel concentrated by it's draught
5. Vessel restricted in it's ability too manoeuvre
6. Vessel engaged in diving operations

In addition to the International Rules of the Road many harbours and Port Authorities impose local regulations so it is important that you research this before you go to a particular location.

When racing in National or International events these are generally held on closed waters and the Racing Rules apply, if however part of the race takes you into open and uncontrolled waters the International Rules for the Prevention of Collisions applies at all times.



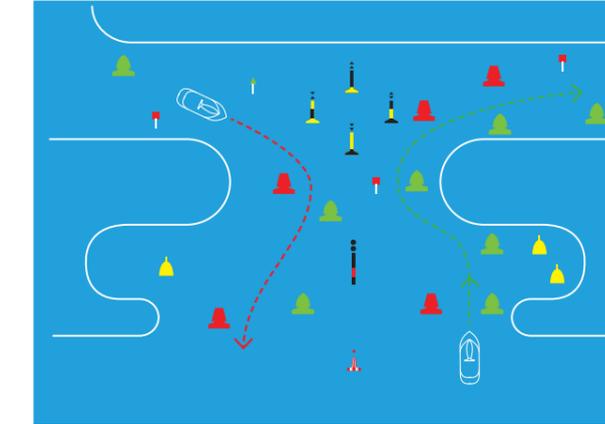
## International Buoyage System

In order to safely navigate at sea and avoid dangers and obstructions a system of Buoyage is used. This falls into two categories. IALA region A and IALA region B. The diagram below shows where the two systems apply.

# Basic Navigation

## IALA Region A

The most important point to remember when using this system is that Port hand buoys are can shaped and Red and when entering a port from seaward they must be left on your left side.



From Sea into port

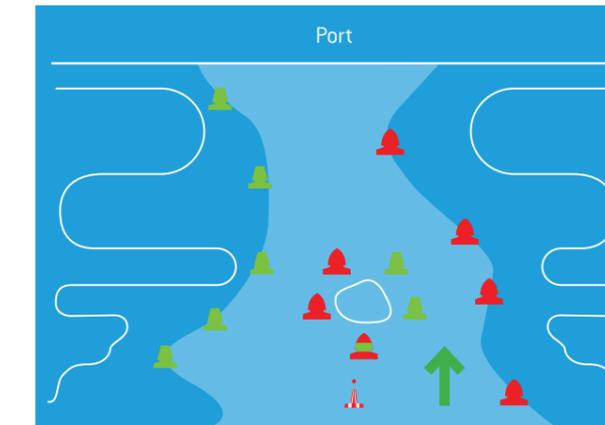


## IALA Region B

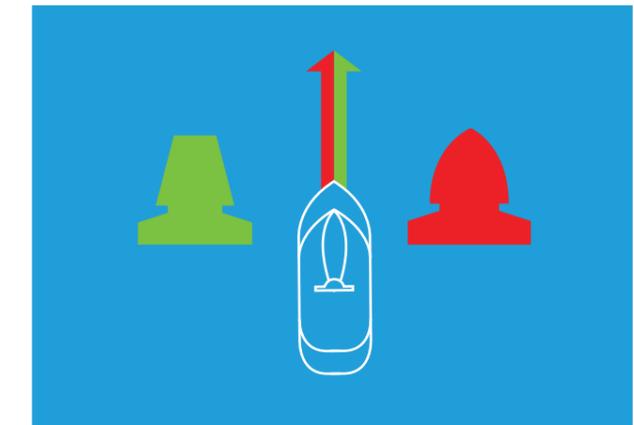
In the IALA B region you must leave the Green Can shaped buoys to Port and the Red Cone shaped buoys to Starboard when entering a port from the sea.

As we can see from the diagrams above the buoys act like road signs and they will guide you into safe water, the Red and Green buoys in both systems are called Lateral Marks.

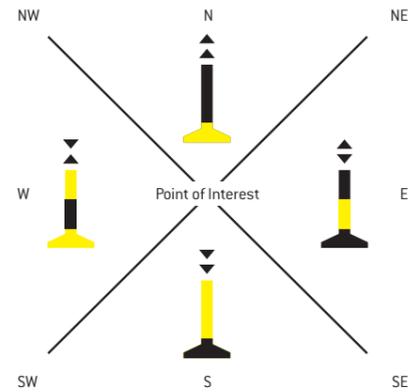
There is one other primary type of navigation mark used in both systems:



From Sea to port

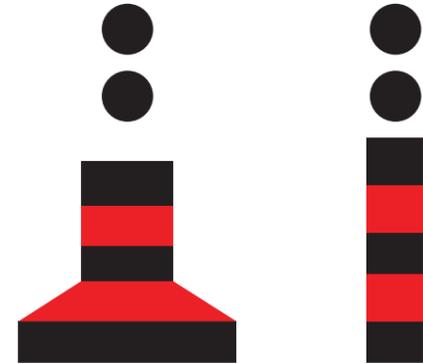


# Basic Navigation



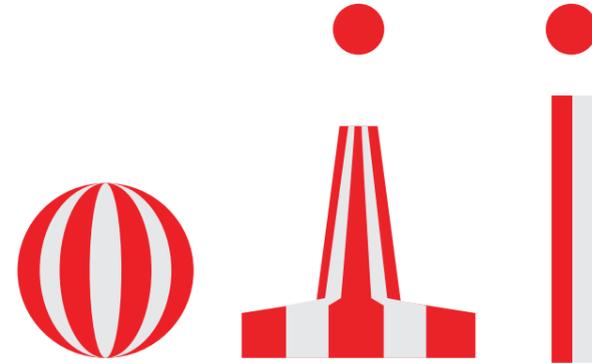
## Cardinal Marks

Each of the Cardinal Marks shown above direct you to the safe water, in other words the Northerly cardinal tells you to pass to the north of it and the Southerly to the South, the East top the East and the West to the west. As you can see each of the buoys has a distinctive yellow and black colour as well as a specific shaped top mark, they also have different light sequences so they can be identified in the dark but that will be further covered in you training modules.



## Isolated Danger Marks

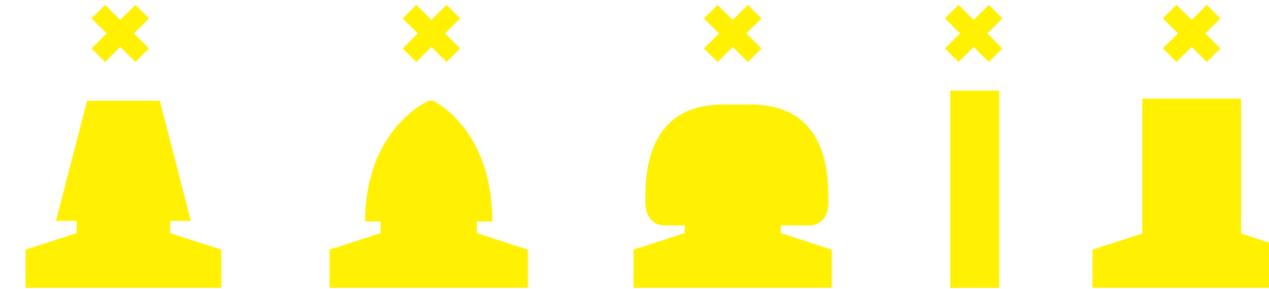
As the name suggests this buoy marks an isolated danger with safe water around it. Check your navigation chart to see the extent of the danger



## Safe Water Mark

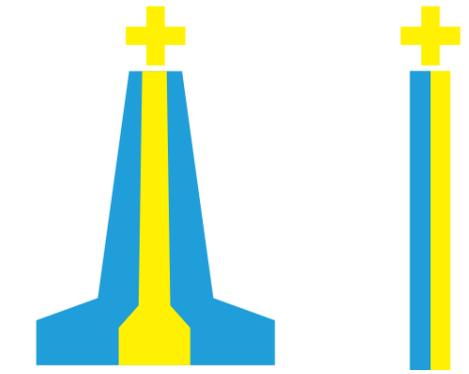
These navigation marks often called land fall buoys indicate safe water and are normally used to mark the start of a channel or port entry.

# Basic Navigation



## Special Marks

These special marks are used for a variety of reasons but frequently mark areas such as swimming water skiing etc. Again check your chart for more information.



## Emergency Wreck Marks

These buoys are used to temporarily mark a wreck, so particular care and attention is required.

As we can see from all of the diagrams above the buoys act like road signs and they will guide you into safe water, but as with all navigation understanding how to use this system must be done in conjunction with reading and understanding a marine navigation chart.

# Tides

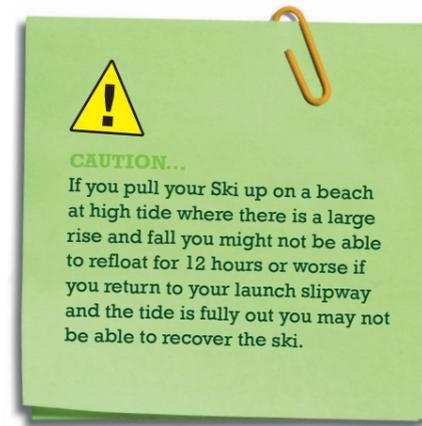
## Tides and tidal streams

Tides and tidal streams are primarily driven by the effect of the gravitational force of the moon and the sun. This force effectively pulls the water in the Oceans from one place to another which in turn causes the rise and fall of the tide. The tide rises and falls once every 12 hours, six hours to come in and six hours to go out. In some places around the world such as the Baltic and the Mediterranean there is very little tidal flow and almost no rise or fall but in other places the rise and fall can be as much as 12m and the tidal flows in some places can exceed 10 knots.

**WHY DO WE NEED TO KNOW THIS, WELL CLEARLY IF YOU PULL YOUR BOAT UP ON A BEACH AT HIGH TIDE WHERE THERE IS A LARGE RISE AND FALL YOU MIGHT NOT BE ABLE TO REFLOAT FOR 12 HOURS OR WORSE IF YOU RETURN TO YOUR LAUNCH SLIPWAY AND THE TIDE IS FULLY OUT YOU MAY NOT BE ABLE TO RECOVER THE BOAT.**

Another important factor regarding tides is that generally where there is a strong tidal stream the sea will be rougher especially if the tide is flowing over an uneven sea bed. This is made considerably worse if a strong wind is blowing against the direction of flow of the tide in which case rough or very rough conditions may be found. It is therefore very important to plan your trip with care taking into account tides and wind conditions.

Tide tables are available for locations all around the world so as part of your pre planning you should always check to see if the tidal heights and flows will affect you. Tide tables can be found in most nautical almanacs as well as most local port, marina and harbour booklets.



# Tides

## Tide tables - A closer look

Daily Layout			
Date	Time	Height	
22	00.36	4.7	High Water
Day MO	07.14	1.6	Low Water
	13.31	4.6	High Water
	19.44	1.7	Low Water

**Range**

The Range of tide is the difference between the Height of a Low Tide and Heights of the subsequent on proceeding High Tide.

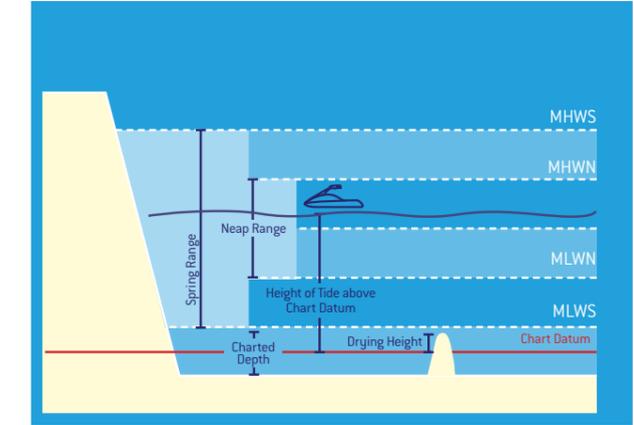
On the afternoon of the 22nd the Height of the High Water is 4.6m, the next Low Water is 1.7m. The range is therefor 2.9m.

Phases of the Moon	
	New Moon
	First Quarter
	Full Moon
	Last Quarter

20	04.34	1.7
	10.53	4.4
SU	17.04	2.0
	23.13	4.7
21	05.55	1.8
	12.43	4.4
MO	18.30	1.9
22	00.36	4.7
	07.14	1.6
TU	13.31	4.6
	19.44	1.7
23	01.52	4.8
	06.26	1.3
WE	14.34	4.8
	20.46	1.4
24	02.54	5.2
	09.18	8.9
TH	15.29	5.2
	21.43	1.0
25	03.50	5.2
	10.51	8.9
FR	16.20	5.2
	22.35	1.0
26	04.42	5.2
	11.01	8.8
SA	17.07	5.3
	21.23	0.8
27	05.30	5.3
	11.47	6.8
SU	17.50	5.4

Neap Tides

Spring Tides



The range of the tide is the difference between the height of high tide and the next low tide and the rate at which this changes can be roughly calculated using the rule of twelfths. As can be seen in the table below the tidal range changes at different rates during the six hour cycle.

## The Rule of Twelfths

Hour	Tidal Range
6	1/12 of tidal range
5	2/12 of tidal range
4	3/12 of tidal range
3	3/12 of tidal range
2	2/12 of tidal range
1	1/12 of tidal range

# Weather

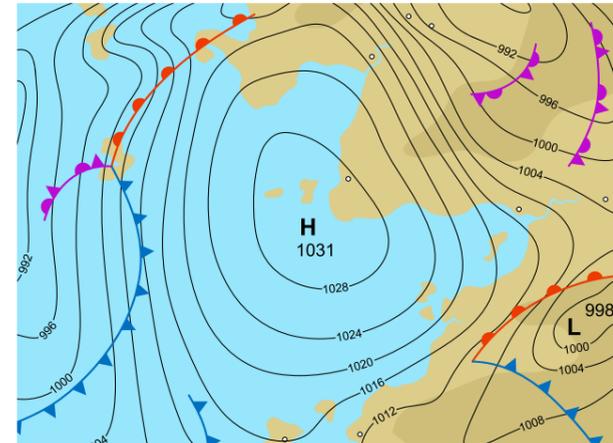
## Weather

As we have previously mentioned it is very important that you understand what the weather is doing as you don't want to be caught out in rough conditions a long way from home. Some simple steps as listed below will help you to avoid this:

1. Check your local weather forecast before you leave, there are numerous ways of doing this from on line, TV, local radio to checking with the harbour master at your local marina.
2. Don't just be concerned about the strength of the wind as it is very important to know its direction. Wind directions are given in the direction from which they are blowing i.e. blowing from the North or South East. Direction is important for as we have already considered if the wind is blowing against a strong tide conditions may be very rough and dangerous.
3. Remember if you are travelling with the wind behind you it may seem very comfortable but if you have to go back against the wind it may be much harder. Stop, turn around and just check to see if you are comfortable with the conditions.
4. The strength of the wind is given by what is known as the Beaufort scale, details of this are explained below. As a rough rule if you multiply the Beaufort number i.e. Force 3 by 5 and then deduct 5 you will get the average wind speed for that Force. It is interesting to note that at almost every level the strength of the wind doubles for every increase in force, in other words the strength of a Force 3 is double the strength of a Force 2. This is very important as often the forecast will say Wind SE Force 2-3 increasing to Force 4 later. You must take this into account when planning your day.

## Beaufort Scale

Beaufort Force	Wind Description	Min kts	Max kts	Min km/h	Max km/h	Sea State	Height of Waves [Meters]
0	Calm	0-1	0-1	0-1	0-1	Mirror Like	-
1	Very Light	4	6	6	11	Ripples on surface	0.1
2	Light Breeze	4	6	6	11	Small wavelets smooth crest	0.2 – 0.3
3	Gentle Breeze	7	10	12	19	Large wavelets breaking crest	0.6 – 1.0
4	Moderate Breeze	11	16	20	28	Large waves begin to form with white crests	1.0 – 1.5
5	Fresh Breeze	17	21	29	38	Moderate waves with many white crests	2.0 – 2.5
6	Strong Breeze	22	27	39	49	Large longer waves with white crests	3.0 – 4.0



# Safety Reminders

## Safety Reminders

As with many other sports the safest way to go to sea is in company with other boats, this is also a lot more fun. A second boat can assist with a tow, or help in a more serious emergency. Let's just remind ourselves of some of the most important things you need to do when going to sea:

- Always use your kill cord
- Always wear a suitable life jacket or buoyancy aid
- Carry a marine VHF Radio or mobile phone
- If you use a VHF make sure you know how to use it and have a licence
- Carry emergency flares and know how to use them
- Don't forget Red flares and Red smoke signals at sea signify DISTRESS
- Carry an anchor



# Advanced Training ...

Candidates attending the Advanced Training course must have first attended the Basic Training course and completed the syllabus to the satisfaction of the instructor.

Direct entry to the Advanced training module may be possible if the applicant can prove passed boating experience. This may require the applicant to take a short assessment examination before being accepted on the course. The Advanced course is designed to provide an introduction into powerboat racing and to teach candidates how to get started in the sport and safely compete at club and national levels.

## Contents

### Introduction

- What is UIM Aquabike Racing 77
- What to expect from this Advanced course 77
- Short resume of key points covered in the Basic Training Course, check ability and competence of those attending 77

### Race Administration and Race Officials

- How to start racing, age limits licences, medicals and Insurance 80
- The role of the racing officials 81
- Race Secretary 81
- The Officer of the Day (OOD) 81
- The Safety Officer (SO) 81
- Technical Inspectors 82
- The Technical Inspection (Tech) 82
- Timekeepers 82
- Commissioners 82

### Race documentation

- General documentation 83
- Race Instructions 83

### Race Numbers

### Drivers Briefing

### 77

77  
77  
77

### 80

80  
81  
81  
81  
81  
82  
82  
82  
82

### 83

83  
83

### 84

### 85

### Personal Safety Equipment

- Protective Helmet 86
- Racing vests and life jackets 87
- Wet Suit 87
- Gloves 88
- Boots 88
- Eye Protection 88
- Body Armour 89
- Maintenance of Personal Equipment 89

### Race Flags

- Safety and Flag Procedures 90
- Green Flag 90
- Yellow Flags 90
- Red Flag 90
- Black Flag 90
- White Flag 90
- Blue Flag 90
- Chequered Flag 90

### General Safety Rules and Race Etiquette

- Problems when Racing 92

### Start Procedures

- General Procedure 93
- General Rule 93
- Start Procedure from Quay or Beach 94
- Jetty Starts 95
- Differences for Beach Starts 96
- Differences for rolling starts 96
- Jump starts 96
- Jump start penalties 96

### 86

86  
87  
88  
88  
88  
89  
89

### 90

90  
90  
90  
90  
90  
90  
90  
90

### 92

92

### 93

93  
93  
94  
95  
96  
96  
96  
96

## The Courses

### The Course Layout

- A typical Aquabike/Jet Ski Race Course
- Race Course marks
- Split Buoys
- Black Penalty Buoys
- Missing Buoys
- Two Hole Shot buoys

### The control tower

### Riding Rules

- Overtaking Rules
- Overtaking and Turn Marks
- Missed Marks and aborting a race
- Blocking or Reckless/Dangerous Riding
- Control of Machine during Race
- Obstruction
- Accidents
- Injured Pilots
- Outside Assistance

### Safety and Support Skis

- On water safety fleet
- Rescue skis
- Marshal skis
- Tow skis

## 97 Racing Lines and Cornering 103

- Racing Lines 103
- High Speed cornering 103
- Runabout skis 103
- Stand up skis 104
- Foot and leg in water technique 104

## 97 Race Duration and Finish Procedure 105

## 99 Practical on water Training 106

## 100

## 102

# Introduction

## What is UIM Aquabike Racing

UIM – ABP Aquabike World Championships  
The Championship

The UIM-ABP Aquabike World Championship is the most acclaimed and prestigious international series promoting personal watercraft in a competitive racing environment, and one of the fastest, most spectacular, demanding and entertaining sports on water.

The championships cover a diversity of competition across three categories, Runabout GP1, Ski GP1 for men and women and Freestyle; Circuit, Parallel Slalom, Endurance, Offshore and Jet Raid combine speed, skill and sheer raw power producing adrenalin-fuelled non-stop action and edge-of-the-seat racing, with the Freestyle category providing improbable feats of artistry and insane aerial acrobatics.

# Introduction



## Competitors

The world championship is open to all comers and under pinned by 'Registered Riders', all of whom must hold a valid National Licence issued by a National Authority recognised by the UIM and a World Super Licence issued through the UIM Secretariat.

To be issued with a World Super Licence a competitor must have competed in four national or international ordinary races.

The minimum age to compete is 15.

## Circuit

For both Runabout GP1 and Ski GP1, circuit racing is fast and furious with competitors racing over a multiple pin course comprising left and right hand turns, an alternate track and penalty buoy.

Starts are either dead-engine or rolling with circuits of circa 29-pin 1500m for Runabout and 27-pin 1300m for Ski.

## Parallel Slalom

Slalom is an explosive and nail-biting event and takes place at selected Grand Prix, with the top eight riders from qualifying in Runabout and Ski and the top four/six in Ski Ladies competing.

The competition is a dead-engine pontoon start run over a parallel two lane 96m, five-pin course and is the best of three runs.

## Offshore

Offshore is arguably the most physically demanding and often described as a bike, body and bone breaker. Held at sea or open water for Runabout bikes, Offshore is the most spectacular racing category with riders challenged by extreme conditions and sky high waves that demands the ultimate in fitness, skill and some luck!. Considered as the toughest races on the planet, where survival against all elements is the priority.

The multi-stage events are raced over distances of a minimum 110km with refuelling stops taking place at the same or different locations.

## Endurance

Held on open water close to shore, the closed-course circuit is between 5km and 20km with a maximum time limit of 60 minutes with start, refuelling and finish taking place at the same location.

## Jet Raid

Similar to Offshore in the challenge the competitors face, the races are multiple stages of a minimum 110km and a total distance of between 250 and 1500km.

# Introduction



## What to expect from this Advanced course

In the Basic Aquabike/Jet Ski Training Course much of the emphasis was placed on introducing the candidate to basic water awareness skills, in this advanced module the emphasis will be to improve your depth of knowledge in all areas but also to introduce you to the skills necessary to safely race at club and national levels. All of the practical on water training will be done using various types of different Skis available to your training centre.

## Short resume of key points covered in the Basic Training Course, check ability and competence of those attending

To demonstrate ability to safely board the ski from a deep water start to connect the kill cord, start the engine and to perform a series of basic handling manoeuvres including mooring alongside, reversing and driving at speed around a preset course.

# Race Administration, Race Officials and Rules

## How to start racing, Age limits licences, Medicals and Insurance

### Minimum age

The minimum age limit for racing is 15 years old; this is determined by the age of the rider on the 31 December of the relevant year.

An exception to this rule may apply to a junior rider competing in the UIM Junior Continental Championships. A special dispensation would have to be granted by the UIM. See UIM rules for details.

### Licences

Like any motor racing sport Aquabike/Jet Ski racing is governed by both National and International Authorities. Aquabike/Jet Ski racing licences are issued by the National Authority of your country however before you can apply for a licence you will need to take a medical examination and a. Aquabike/Jet Ski race training course. The Advanced training course set out in this module will cover all aspects of racing and on satisfactory completion of this course you will be able to apply for a provisional racing licence from your National Authority. This provisional licence will enable you to participate in Club and National events during which your competence to race will be further assessed by the Officer of the Day. Some National Authorities require you to compete in four events (possibly with multiple races) before you can apply for your licence to be upgraded to a full National Licence. This requirement may differ from country to country. A further upgrade to your licence is required if you wish to compete at International Level and you will need to apply to your National Authority for an International Licence.

In order to compete in UIM Aquabike Racing at World and European events you are also required to have a UIM Super licence. This licence requires that you take another comprehensive medical examination; you can apply for this additional licence through your own National Authority. Super Licences can be purchased per event or annual and are class specific. Racing licences are valid for one year and upon each annual renewal you must undertake a further medical examination.

Full details of the UIM Superlicence can be found in the UIM Aquabike Rule Book at [UIMpowerboating.com](http://UIMpowerboating.com)

### Insurance

To race in UIM Aquabike you must have a minimum of 1 million euros Third Party Public liability Insurance required as standard, this is required for European Championships.



# Race Administration, Race Officials and Rules



## The role of the racing officials:

### Race Secretary

The race secretary is likely to be the first contact you have with the organisational team, the role of the race secretary is to record your presence at the meeting and to ensure that you comply with all of the administrative requirements as described in the rules. In addition to this the race secretary will post the results of the races and also issue important race bulletins which you must read. These bulletins may contain very important safety information or time table changes to the event.



### The Officer of the Day (OOD)

The Officer of the Day is the principal official at any race and he/she is responsible for running the event in accordance with the rules of the National Authority and in the case of International races the rules of the UIM. The OOD is a key member of the Race Committee. He/she gives the Drivers' Briefings, ascertains that all safety assets are available, maintains order on the course, and ensures that all activities are conducted in accordance with the Racing Rules. He/she verifies any decisions to stop or curtail the race. He/she analyses the written reports of the Officials and Timekeepers and any other documents that will enable the results to be compiled. The OOD can also apply penalties to competitors if they are found to be in contravention of the rules.



### The Safety Officer (SO)

Is the deputy to the Officer of the Day. He/she coordinates the safety services on shore, on the water. The primary duty of the Safety Officer is to ensure that all safety related activities are coordinated and that an adequate response to any situation is promptly delivered. The Safety Officer must also ensure that event risk assessments are created and planned in advance.

# Race Administration, Race Officials and Rules



## Technical Inspectors

The primary duty of the race technical inspector is to check that skis and equipment comply with current racing rules. Competitors will be required to present their ski and its equipment for scrutineering or Technical Inspection prior to every race. Particular attention will be paid to the condition of all safety equipment, a full inspection of the skis control systems, general seaworthiness and integrity will also be carried out. Competitors should present all of their equipment in an orderly fashion, neatly laid out close to the boat so that these important checks can be made.

## The Technical Inspection (Tech)

As we have already mentioned at every event your ski, its equipment and your personal safety equipment will be checked by the technical Inspectors. You must ensure that this is in good order, fit for purpose and complies with the class rules. Particular attention will be paid to safety equipment; don't forget that if your helmet is damaged or more than two years old it may not pass Tech. Technical Inspections are sometimes required post-race where checks are made for any damage incurred during the race. At some events you may be given a signed card by the Technical Inspector confirming that your ski has passed Tech, you may be required to take this to race administration where you will be given a cleared to launch sticker, check this process at race administration when you sign on to the event.

Some of the most common causes of failing Tech Inspection include:

- A kill cord not operating properly, this item will always be checked
- Loose batteries, often found in the higher classes
- Handlebar grips not secure
- Sharp edges on ski
- Flexible tow loop on bow eye not installed
- Side sponsons are an area in which a machine may fail the Tech inspection, all side sponsons must be in accordance with UIM rules
- No breather pipe fitted to fuel tank
- Air filters not installed and fuel lines not secured with cable ties

Tech inspectors will seal engines by marking head bolts and similar with paint this ensures major repairs cannot be carried out without the knowledge of the Tech Inspectors.

A sticker is often given to the rider once the machine has passed Tech inspection, a sticker may also be given for the helmet.

## Timekeepers

Official timekeepers will record all of the race times and this information will then be posted on the race bulletin board by the race secretary. Don't forget that if you wish to protest the results you must lodge your protest within the time limits described in the rules, this is normally 30 minutes from the time of the official results being posted.

## Commissioners

Usually appointed by the National Authority, their task is to prepare a detailed report on the event so that the performance of the organising club can be evaluated. A Commissioner will sit on the race jury; they can assist the OOD and SO with the running of the event as well as talking to and discussing concerns with competitors. Commissioners are also appointed by the UIM (the International Governing body) at all International events.

# Race documentation

## General Documentation

Before you can go racing you will be required to complete a number of forms which are listed below:

- A completed race entry form together with payment must be sent to the organisers before the event.
- Upon arrival at the race site you will be required to provide your racing licence
- Providing this is in order you will then be required to sign the competitors signing on sheet and to provide contact details of next of kin in the event of an accident. By signing the competitors signing on form you are then bound by the rules of the event, National Authority and or UIM and you must comply with these at all times. Failure to do so may result in disqualification. You are then also covered against Third Party Public Liability claims whilst racing but you should check with the race organisers the extent of this cover as it can vary from country to country. It is worth noting that this cover does NOT cover you for personal accident or damage to your boat whilst racing. You MUST ensure you have this personal cover in place
- Don't forget that Race Instructions will have been sent to you, by the organisers, this contains all the information you require concerning the timetable and running of the event. The OOD will ask you if you have read and understood this important document.

## Racing Instructions

This is an extremely important document which will be sent to you before the event. This provides detailed information concerning the general running of the event and it is a requirement of the racing rules that you read this and fully understand the information given. Pay particular attention to the following areas:

- The racing risk statement and competitors responsibility
- Timetable of events
- Pit areas, parking and special conditions
- Course details, marks of the course, dangers, distances and restrictions at corners
- Any special local restrictions, exclusion zones, noise levels etc
- Contact details of Officials



# Race Numbers

## Race Numbers

For the UIM Aquabike Championships each pilot is designated a Race Number at the beginning of the racing season. A pilot's Race Number remains the same for the entirety of the Championship. As of the first race, a set of self-adhesive numbers and a dossard will be given to each pilot. These must be used as instructed and kept in good condition throughout the season. Race number 1 in each class is reserved to the reigning World Champion. The size of numbers will be 30cm x 30cm. Numbers will be printed black (Arial Black) on white background for all categories. Numbers will be provided by the organiser.

The pilot will stick the numbers on his Aquabike in a visible way at the front of his machine, on the right and on the left hand side. Experience has shown that the pilot should wear a number on his back (as is done in skiing) to be more easily identified by the timer. Only numbers provided by the promoter will be allowed.

For National Racing some National Authorities issue race numbers but check with your own National Authority before racing. International race numbers may not be the same as national race numbers. International race numbers have priority over National race numbers.



# Drivers Briefing

## Drivers Briefing

A drivers briefing is mandatory at all race meetings, sometimes more than one briefing will be given, all competitors must attend these briefings, failure to do so will result in immediate disqualification or a financial penalty as described in Race Instructions. Details of the times of briefings will be given in race instructions. The drivers briefing provides detailed information concerning the race course, the safety cover, the start and finish procedures, what to do in the event of an accident. It is recommended that all competitors take notes of key points of information especially any changes to the course or communication procedures. A detailed weather forecast will also be given by the Safety Officer, this information is very important and can also be used to help competitors decide on boat set up for the race.



# Personal Safety Equipment

## Personal Safety Equipment

Full details of the mandatory equipment you will require for racing is contained in the UIM Aquabike Rule Book. National Authorities may also provide lists of equipment required for National racing which may differ from UIM requirements. Rules are updated annually so make sure you have a current rule book and are familiar with the requirements of the Class that you are racing in. The two most important pieces of equipment you have are your protective helmet and your lifejacket or racing vest, these may just save your life so you must ensure they are in perfect condition and that they provide the best possible fit.



## Protective Helmet

Protective helmets must be worn at all times when you are on the ski and under the direction of the OOD. Helmets must be of Motocross design, have temple protection and a removable visor. It is mandatory to wear a helmet made to a minimum standard to include Snell M2000, or M2005 or Snell SA2000 or SA2005. There is no specific helmet colour required but in order to be seen in the water bright fluorescent colours are used.

**IN ALL UIM RACING EVENTS YOU MUST WEAR A PROTECTIVE HELMET THAT COMPLIES WITH SNELL INTERNATIONAL STANDARDS AS ABOVE. OTHER HELMET STANDARDS ARE NOT PERMITTED.**

A correctly fitting helmet is essential, seek advice from your supplier but be aware that if there is excessive movement in the fit or you can pull your helmet off from behind it is useless. Look after your helmet at all times, it is a vital piece of safety equipment, if you drop your helmet onto a hard surface it is extremely likely that it will be irrevocably damaged.



## Important Notes:

- If you damage your helmet replace it
- If you drop your helmet replace it, damage may have been caused which you cannot see, this could be fatal in the event of an accident
- If your helmet is more than 5 years old replace it
- Never remove any of the fixed part of the inner lining
- Some inner linings can be removed for washing
- It is most important that the helmet fits snugly, if when it is secured you can lift it from the back and it comes off it does not fit correctly so replace it

Full details and specifications regarding protective helmets can be found at [UIMpowerboating.com](http://UIMpowerboating.com)

# Personal Safety Equipment

## Racing vests and life jackets

Racing Vests must be worn at all times when you are on the ski and under the direction of the OOD. The efficiency of a racing vest is the responsibility of the wearer so above all make sure that all straps and zips are done up tightly before racing. Failure to do this could result in the racing vest pulling up over your head which will render it useless. Lacing ties and/or straps shall be adequate and in good condition. All straps shall be at least 40mm wide and have a minimum breaking strain of 500kg.

There must be lifting straps at the front or on the shoulders. Zips are not permitted as the sole means of fastening a racing vest. Where zips are used as an ancillary means of closure they must be in working order. Tears or rips or bad repairs through which buoyancy material may leak out are not permitted. Vests must have a lifting eye or strap attached to the main harness. Vests must not be able to ride up over the wearer's head, and must be secure to the body. The disposition of the solid buoyancy must be such as to ensure that an unconscious person will float face up in the water. The vest must have impact protection material covering the back.

Please contact your National Authority for additional information if you are unsure of the type of product that is acceptable. Full details and specifications regarding racing vests can be found at [UIMpowerboating.com](http://UIMpowerboating.com)



## Wet suit

A good fitting wet suit is essential for comfortable Aquabike/Jet Ski riding; wet suits are available in many different forms, weights (thickness), full suit or shorty and many different colours. The first thing to remember is that a wet suit does not keep you dry, when fitted correctly it will allow water to enter between the wet suit and the skin and your body heat will then warm this layer of water which in turn will keep you warm.

Wet suits are available as a full suit or a shorty covering the torso only; generally speaking the shorty suit is for summer use but clearly the choice of which one is best for you will depend on the location in which you are operating.

You should choose a suit that fits snugly and is approx. 2-3mm thick, the thicker the suit the warmer it will be but a heavy suit will limit your movement which is not good on a Jet Ski.

Wet suits both full and shorty are available for Aquabike/ Jet Ski use; these tend to have more padding so best to research this area thoroughly before purchasing. You should also wear a life jacket or buoyancy aid with your wet suit.

**FOR UIM AQUABIKE RACING IT IS MANDATORY TO USE A FULL WET SUIT.**

# Personal Safety Equipment



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## Gloves

An essential part of your personal equipment, a good pair of neoprene gloves will help you grip the controls and will also prevent blisters. Expect to go through several pairs in the course of a season and always carry a spare pair with you.



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## Boots

This is another essential piece of personal equipment, a good fitting pair of boots with ankle support will provide stability, support and protection when both on and off the ski. Don't forget that wearing boots with a dry suit is more difficult and you will need to fit them whilst wearing the dry suit.



## Eye Protection

This is absolutely essential when riding on a ski, spray and rain hitting the face when travelling fast is extremely uncomfortable and will greatly reduce your ability to see where you are going. The glare from the sun is magnified whilst on the water so strong UV is there even when it is cloudy. Special goggles are available so choose one that suits you also don't forget that if you need to wear glasses the goggles will have to fit over them.

# Personal Safety Equipment

## Body Armour

The wearing of body armour is highly recommended in recreational riding but essential in racing.

Like many modern products this comes in many forms and shapes and is comfortable to wear. Body armour is worn between the wet suit and the life jacket. Don't forget that knee, back and ankle protectors are available and should be worn for your protection.

## Maintenance of your personal equipment

Just like any aspect of water sport maintaining your personal equipment is essential, failure to do so will result in the equipment failing and spoiling your day on the water.

Top tips for your personal kit:

- Rinse off your wet suit, dry suit, gloves, boots, helmet and goggles after every trip out on the water.
- Allow all equipment to drain off especially gloves and boots so make sure they are upside down so the water can drain out
- Store all equipment in a warm dry place, don't throw it into a corner and expect it to work next time out
- Check zips especially on dry suits, running a pencil down a zip will keep it running freely
- When dry treat dry suit cuffs and neck seals with powder to ensure ease of wearing next time out.



# Race Flags

## Safety and Flag Procedures

The use of flags is the primary communication between Pilots and Officials. You must obey the meaning of these at all times; failure to do this will result in disqualification or worse.

Don't forget in UIM Aquabike Racing to keep a careful eye on the control tower for all flag signals.

**Q:** What is used to control races?

**A:** As in motor racing, powerboat races are controlled by flags

## Green Flag (1)

This flag signifies that the course is clear and the race can start or the race is in progress.

## Yellow Flags (2)

Warns of safety hazard on the course. Pilots are allowed to continue racing in a safe manner but must decrease in speed, holding position and no overtaking. A pilot will be disqualified if he continues to race in an unsafe manner i.e. not slowing down or trying to overtake another pilot. Once clear of the flag you may resume racing.

## Red Flags (3)

Red Flags mean race stopped, immediately regardless of position of machines on the course. Pilots are to return to the starting line unless instructed differently at the pilots briefing. In the event of single injury being the reason for the red flag, that pilot could be disqualified from the day events.

## Black Flag (4)

A Black flag is shown to disqualify a rider from that heat. It must be used with a number board indicating the racing number of the competitor who has to stop racing immediately and return to the pits. A Course Marshall on water may also follow rider, sound whistle and point with stick to rider. The pilot must exit the course in accordance with instructions at drivers briefing and as soon as it is safe to do so.

## White Flag (5)

When the white flag is displayed, pilots have entered their last lap. This flag is shown when the lead pilot starts the last lap, when the lead pilot finishes that is the end of the race irrespective of how many laps you have completed. This flag is shown from the race control tower. Sometimes the white flag and chequered flag are shown as crossed flags to indicate 50% of the race is complete.

## Blue Flag (6)

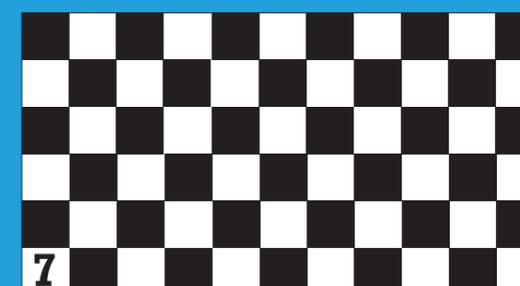
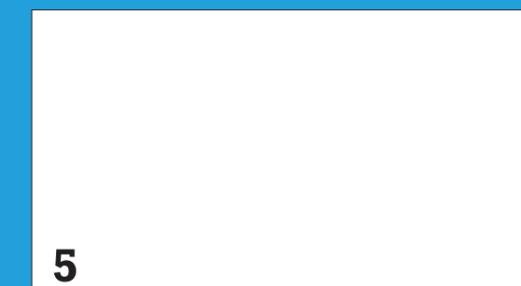
The flag Marshall may shows the blue flag to signal that a pilot is being overtaken and lapped by a faster pilot which is similar to F1 car racing. Alternatively the marshal may blow a whistle and point to the pilot to signal that a faster pilot is approaching from behind.

The slower pilot must make way for the overtaking pilot to pass safely, follow a safe and predictable racing line and allow the faster pilot to overtake as soon as possible. Caution and awareness are essential by both pilots throughout the overtaking manoeuvre. Failure to respect this signal will result in disqualification.

## Chequered Flag (7)

At finish line race finished

# Race Flags



# General Safety Rules and Race Etiquette



## General Safety Rules and Race Etiquette

1. Read and fully understand your Racing Rules, for UIM Aquabike these can be found at [UIMpowerboating.com](http://UIMpowerboating.com)
2. At all race meetings you can only go onto the race course with the approval of the Officer of the Day. If a red flag is displayed in the pits this means the race course is closed. Read your Race Instructions and pay particular attention to this at the Drivers Briefing. During this briefing you will also be told how and where to enter the race course and how to leave it, failure to observe this rules will result in DQ
3. If you ever face a head on collision situation on the race course you MUST ALWAYS TURN TO THE RIGHT.
4. If you spin out during a race you are permitted to turn around and continue the race but you must only do this when it is safe to do so. The pilots on the race course have priority and you must give way to them following a spin.
5. If you travel in the wrong direction on the race course you will be Black flagged and disqualified from the race.
6. If you lose power on the race course and have to retire do so as soon as possible, avoid racing lines and keep out of the way of other skis racing.

## Problems when Racing

As with any motor sport mechanical problems can occur whilst racing, there is normally no warning so be prepared and follow the simple guide lines below:

### Engine failure or lack of power:

- Pull off the race course when safe to do so and raise your hand to signal for assistance

### Steering Failure:

- Immediately let go of the throttle and reduce revs to idle.
- Raise one hand to indicate to other pilots and the race marshals that you have a problem
- Try to steer the ski to a safe part of the course
- If you cannot steer at all come to a stop, remove kill cord and remain on your ski. Raise your hand and call for assistance.
- If you are on the racing line warn other pilots to keep clear.
- A race marshal will come to your assistance and will indicate to other pilots that there is a hazard on the course by waiving the yellow flag

### Throttle Failure:

- Immediately remove the kill cord to stop the engine
- Raise one hand to indicate to other pilots and the race marshals that you have a problem
- Do not attempt to re-start the engine
- A race marshal will come to your assistance and will indicate to other pilots that there is a hazard on the course by waiving the yellow flag

# Start Procedures



## General Procedure

Pilots will know their start time from Race Instructions and they must make sure that they are ready before the start. Pilots will be asked by the pit marshalls to make their way to the slip way/ beach etc. for launching. They will also be asked what position they want to take up on the start line, this will be done in order of priority i.e. fastest rider first

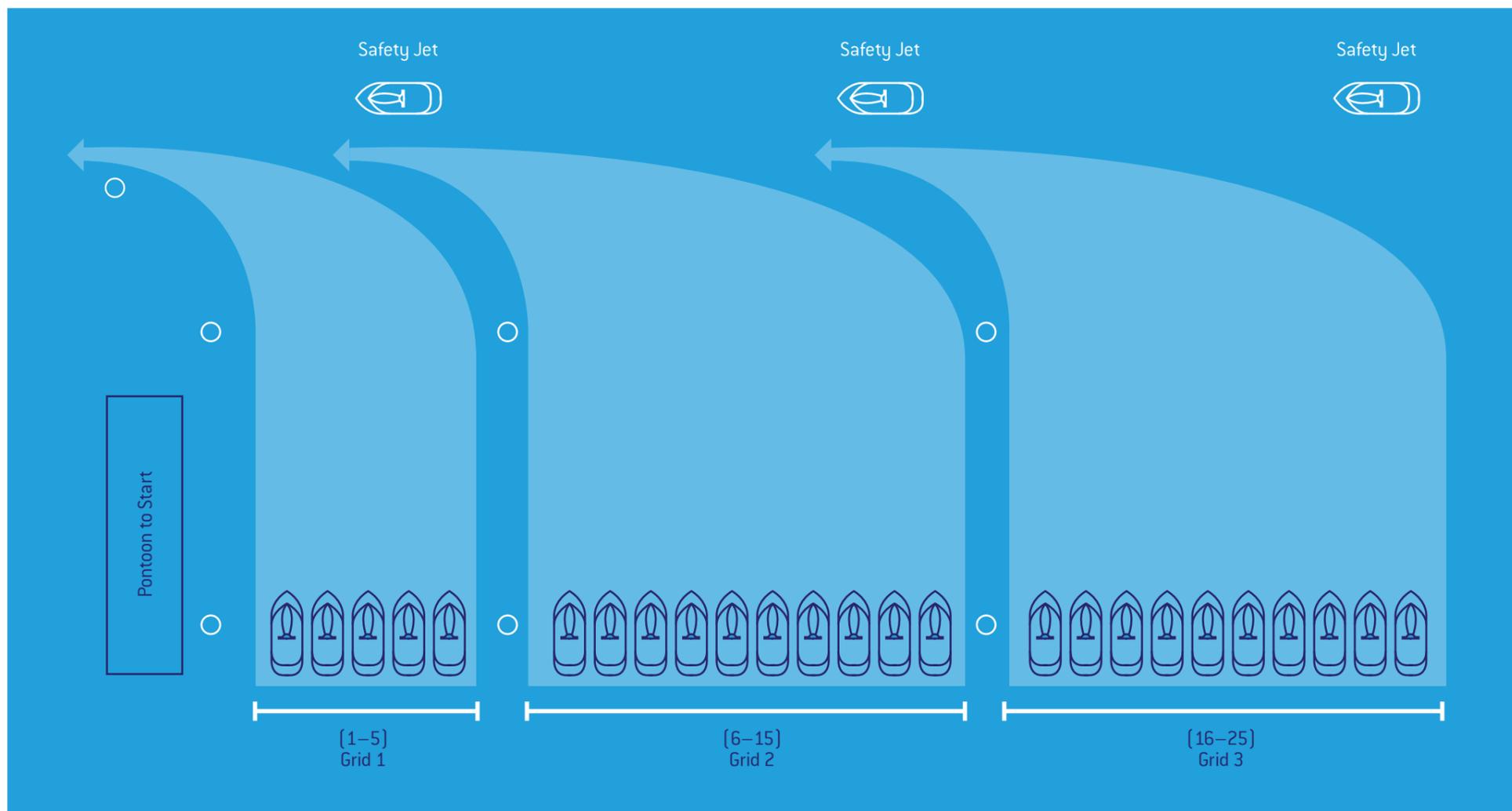
The start will be either a quay, jetty, beach, or a rolling start. Every pilot must be ready for the starting procedure 30 minutes before the scheduled time.

## General Rule

Positions on all start grids are determined by your qualifying time so in essence fastest time equals Pole Position. However pilots can also choose their position on the start grid, the procedure is as follows: the fastest pilot can select pole position or they can choose a position anywhere on the start line that they think might be beneficial to that race. Some pilots may choose not to select a position close to another faster pilot but move further down the grid so that they are close to a slower pilot and can accelerate quickly out of the pack into clear water and thereby gain an early advantage.

# Start Procedures

## Start Procedure from Quay or Beach



# Start Procedures

## Jetty starts

The start marshal will lead all pilots slowly out of the wet pits/beach etc. and will go directly to the start line either the jetty or the beach. Once in position all pilots are under the control of the tower. At this time all signals are given from the control tower. The pit crew are responsible at this time for holding the skis safely in their correct positions, for stand up skis one pit crew member is required and for runabout classes two pit crew members are required. In each case pit crew must wear shirts, shoes, gloves etc.

The start marshal will then drive across the front of the start grid from the slowest end first to indicate that the safety sighting lap is going to commence. The safety marshal will then lead all pilots around the full course to ensure they know the correct direction and also to pass all turn marks on the correct side. This sighting lap is also used as an opportunity to warm up the skis prior to the race. All pilots will then return in their correct starting order to the start jetty or beach. Once they have safely returned all skis must have engines off.

All pilots should then look at the start tower, the start marshal will begin the start sequence by showing a 2 minute start board. This means that all pilots can start their engines, during this period the pit crews have approx. 20 seconds to Blow the skis out.

Blowing Out; This is done by lifting the back of the ski out of the water in order to blow the water out of the water box and to dry out the exhaust, this process generally gives a faster start off the line. There is no need to do this on Four Stroke Skis

If during the 2 minute start sequence a pilot is unable to start their engine or they have a problem they can request a two minute hold to the sequence. Only one two minute hold per pilot will be given after which the start marshal will re commence the sequence again allowing for engines to be blown out. If the pilot is still unable to start the race will start regardless.

A one minute start board, (ready to go), may be displayed and the race will start from 0 to 3 seconds. The race can be started by start lights, Green flag or elastic band or rotating the start board. Once the race has started all pilots must maintain their lane until they have passed the marker buoys placed at 50% of the distance to the first turn mark or hole shot buoy.

Some Race starts may use an elastic band stretched across the start line, this is often red in colour once this line is released the start commences.

In some races the start grid will be divided into two sections, in this case two first turn marks or hole shot turn buoys are deployed. The fastest pilots take up position closest to the pole position end of the line, these pilots must turn around P1 hole shot buoy, the second group of pilots must turn around P2 hole shot turn mark. See diagrams.



# Start Procedures



## Differences for Beach Starts

- For all runabout classes two pit crew are required to hold the skis
- Depth of water for beach between 500mm and 750mm, depth can't be too deep as pit crew have to hold skis and keep them under control.
- Some beach or water starts use a submerged platform for the pit crew to stand on; this is great as no problem with sand getting into the impeller etc.
- Starting Lights some beach or jetty starts may use starting lights; red lights will be turned on 2 minutes before start, when red lights go out race starts, same as F1 cars



## Differences for rolling starts

- Pilots follow start marshal out in pole position or selected order
- A standard sighting lap will follow after which pilots then line up in staggered formation behind the start marshal (see diagram)
- Pilots MUST NOT be in front of transom of either the start marshal or the ski in front of them
- Start marshal will control the start, he will commence his start run and when safe to do so he will raise the green flag this signifies the start of the race.



## Jump Start

The race may be re started if there is a jump start or a crash in the event of a jump start all pilots will return to the Jetty or beach start and line up as before.

## Jump Start Penalties

- Pilots who jump the start may be required to hold their kill cord above their heads and not connected to the machine, all other pilots will have their engines running and the start sequence will be as previously described.
- Alternative penalty: If a rider jumps the start a time penalty will be imposed, this now requires a pilot to drive into the stop go box. The control tower will display yellow and black crossed flags to a rider who is required to take a stop go time penalty

These are two different penalties that have been imposed for Jump Starts but all pilots must check their race instructions to ensure they fully understand penalties applicable to a particular race.

# The Courses

## The Courses

The race Course will be set in an approximate area of 250000m<sup>2</sup> and will be composed of turn mark buoys. The minimum number of turn mark buoys for a world championship circuit race is 25. The minimum number of turn mark buoys for a continental championship circuit race is 20. One or more alternative courses are part of the circuit.

## The Course Layout



- runabout circuit
- ski division circuit
- alternative course

## A typical UIM Aquabike Race course

### Race Course marks

The primary marks of a race courses are as follows

Buoys	Meaning
 	Right Turn Buoys To define Right Turns
	Left Turn Buoys To define Left Turns
	Penalty Buoy Indicating when you miss a course turn mark
	Chequered Buoys To define the finish line
 	Splitter Buoys To indicate where the course splits in two routes
	Separation Buoys Separate skis as they merge back into the main race course.



## Split buoys

These marks identify two possible channels that a pilot can take, the choice of which channel to take is up to the pilot as there are many factors need to be taken into consideration when making this decision.

The colour of these marks will vary from event to event and full details will be given at drivers/pilots briefing. Let's assume blue buoys are used to identify one channel and green buoys the second channel (See diagrams)

When choosing which route to take you need to consider where your nearest competitor is, will choosing one route give you an advantage, is the water calmer on one route as opposed to the second route. One route may be faster but more technical which one suits you best. Split channels also help a rider to overtake another pilot providing the right choice is made

When you complete the split channel you must merge back into the main race track, at this point sausage or demarcation buoys will be laid to keep pilots safe when merging back into the race track. Much care must be taken when carrying out this manoeuvre, be aware of other pilots in the split channels and also pilots on the main race track.

# The Courses

## Black Penalty buoys

Black penalty buoys must be used when you miss a course turn mark; the following rules apply:

Any pilot riding over the course marker buoy will be judged as missing the buoy no matter what side of the Aquabike/Jet Ski. The buoy re-appears. A pilot who misses a buoy on the circuit must take the penalty black buoy in the same Lap. In all cases the pilot must give priority to other pilots on the race course when both taking the Black Penalty Buoy and leaving it to re join the race course. Failure to do this will result in the pilot being penalized for dangerous driving.

In case of missing a buoy and not passing the penalty buoy, the pilot will be penalized in accordance with the rules. If the pilot misses two buoys in the same Lap he can only pass the Black buoy once so will be penalised for missing the second buoy in accordance with the rules. Black penalty buoys are normally laid close to the finish line.

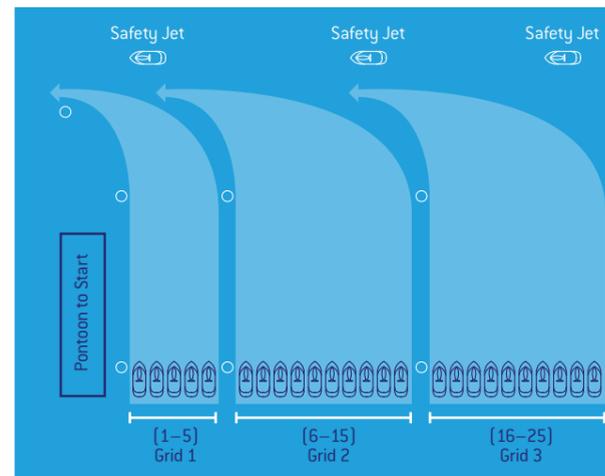
Don't forget that after you have taken your penalty and passed the black buoy you must re-join the race track but be careful as you have no rights and you must yield to other pilots on the track.



## Missing Buoys

In the event that a buoy is missing or is misplaced during a race, the Race Committee will replace it whenever it is possible. If the buoy cannot be replaced, the rider will take the next buoy by the shortest path while ignoring the missing or out of place buoy

If you destroy a turn mark buoy you are required to pay a financial penalty as described in race instructions or at drivers briefing.



## Two Hole Shot Buoys

The hole shot buoy is the first turn mark of the race. In some races where large numbers of pilots are racing two hole shot buoys may be used there will be a separation buoy located between two hole shot buoys. Colours type and location will be described at drivers/pilots briefing.

# The Control Tower

## The Control tower

The Race Control tower will be located close to the start line, this is where the Officer of the Day and the Safety Officer will start and control the race from. All competitors must be very careful to look at the control tower during the race and check for any flag signals.



# Riding Rules



## Overtaking Rules

A pilot overtaking another ski must keep clear however it is the responsibility of both pilots to be aware of each other's position and to avoid a collision.

A pilot must be prepared for another Ski to overtake and must always be aware of other Ski approaching from behind. The overtaking pilot must consider the safest route to pass and must do so without forcing the other pilot to suddenly alter the course.

When the Course Marshall points his arm and finger towards one pilot, this is the signal that one pilot is being overtaken and lapped by another pilot. The slower pilot(s) must make way for the overtaking pilot(s) to ensure safe overtaking (blue flag).

An essential part of overtaking is for each pilot to know who you are overtaking and how experienced that pilot is .

A novice pilot might not have good awareness skills so extra care may be needed, they may not know that you are behind them. Novice pilots do not have specific identification so know who is riding which machine.



## Overtaking and Turn Marks (buoys)

When trying to overtake a ski on the inside of a turn, the pilot must anticipate the possible direction of the ski being overtaken and must take all necessary action to avoid a collision. When passing on the outside again the pilot must anticipate the direction and track being taken by the other ski, don't forget this might vary depending on the experience level of the pilot. You cannot force another ski off the track or force the pilot into a turn mark, this would be dangerous driving and strict penalties apply.

## Missed marks and aborting a race

You are not allowed to travel in the wrong direction on the race course and it is not permitted to return to a race mark under any circumstances, serious penalties will be applied if you do. If you miss a mark you will be required to take a penalty lap as described at drivers briefing. If you have to abort a race follow the instructions given at drivers briefing, this is normally to safely exit the race course and return to the pits.



## Blocking or Reckless/Dangerous Riding

UIM Rules are very strict regarding dangerous driving and all pilots should be aware of the following Rule: The deliberate blocking of a faster machine is cause for disqualification or a one lap penalty at the discretion of the O.O.D. Any reckless/dangerous riding, unnecessary bumping, crowding, chopping, blocking, deliberate striking, breaking a course marker buoy or unsportsmanlike conduct on the course or off may subject the pilot to disqualification and other sanctions and if in the case of a team effort, the complete team may be penalised.

## Control of Machine during Race.

It is forbidden to ride a Ski in a direction opposite to which the event is being run. A pilot who has spun out is permitted to turn the ski around and to continue the event provided such action is taken only when the course is clear and must give the right of way to other pilots on the course. Pilots running in the wrong direction will be black flagged and disqualified.

# Riding Rules



## Obstruction

If for any reason, a pilot is forced to stop on or near the course during a heat, it is the pilot's first duty to remove the ski from the course so not to endanger or obstruct other pilots.



## Accidents

Flipped pilots, if uninjured should clasp hands above head as an "OK" signal. No pilot or representative thereof shall hold any other pilot or representative liable for any personal injuries or damage resulting from an accident or racing occurring in a sanctioned race.

## Injured Pilots

An injured or otherwise incapacitated pilot shall be prohibited from racing unless, in the O.O.D's judgement following an examination by qualified medical personnel, the pilot is determined not to be a danger to himself or any other competitor. It is up to the decision of the O.O.D. to decide if a damaged Jet Bike is safe to continue in the competition.



## Outside Assistance

If a pilot falls off his ski the safety Marshals can assist the pilot to get back to the machine and the pilot can continue the race without any penalty. If a pilot is towed off the race track by the marshals they will not be allowed to re-enter the race.

# Safety and Support Skis



## On water safety fleet

The on water safety fleet is usually made up of a number of different skis with different roles which are explained in more detail below. The Safety Officer and the Officer of the Day coordinate the actions of these safety skis in order to provide the safety cover for the event.

## Rescue Ski

The role of the safety rescue ski is to provide fast response to any racing incident on the water, safety rescue skis tow special spinal boards to enable them to transport a casualty quickly and safely back to the shore. In UIM Aquabike races the medics and paramedics are located on the shore at an agreed safety extraction point. The required numbers of safety rescue skis is agreed between the Safety Officer and the OOD; these numbers will vary depending on the lengths of the race courses and the local conditions at the venue. All safety rescue riders are equipped with VHF radio. If an incident occurs on the racing line the race may be red flagged but not necessarily, this is at the discretion of the OOD.



## Marshal skis

The role of the marshal ski is to control the race course on the water, some marshal skis will be tasked with preventing spectator boats from entering the race area or crossing the course. Other marshal skis will be used to control the pilots, they will indicate to the pilot that they are required to take a penalty lap or in the case of being overtaken by a faster pilot they will sound whistle and point to the pilot to warn them that they are about to be overtaken. The pilot being overtaken must allow the faster pilot to pass safely. All pilots must fully understand and know the signals that the marshal ski riders will use.



## Tow Skis

All competitors' skis and safety and support skis are fitted with a towing hoop on the bow eye, this is used to tow broken down skis off the race track.

# Racing Lines and Cornering

## Racing lines

In all racing it is extremely important to take the fastest possible racing line around the course so that you keep up your average speed. Carefully check the design of the course before you go out on the water, note the best possible route, aim to apex the turn and power out. Take advantage of the practice session before the race to fully familiarize yourself with the race course.

The key to fast cornering is to smoothly execute the turn so that you can maintain the maximum power possible. Learn to anticipate the racing lines that your fellow competitors may take; you may be able to take advantage of their driving style and gain valuable positions by their mistakes. Remember that your ski will be at its fastest when you are correctly balanced, and travelling flat, speed will be lost by cornering too tightly or especially when airborne.

During any race it may be necessary to drive defensively to protect your position, this may require you to follow a different racing line so you will need to balance possible loss of speed against protecting your position, this comes with experience and is part of what will be taught during the Competition module of this course. You cannot however block another pilot so you need to fully understand the UIM Aquabike rules governing blocking.



## High Speed cornering Runabout ski

As you approach the turn ease the power off, this will have the effect of dropping the bow, at the same time aggressively lower your body into the turn whilst at the same time bracing and squeezing your legs into the consol. The pilot must adopt the locked in position in other words, knees squeezing into the consol, feet firmly placed on the floor of the machine. If you have trim control trim down for the turn and then trim up for the straight.

In the lower classes other than GP1 it can also help to lean into the turn. In GP1 a very high degree of fitness is required and pilots will use all of their strength to drive the machine around the corner.



## High Speed cornering Stand up ski

In order to ride a stand up ski well you must be prepared to put in hours of practice and be in good physical condition.

The most important points to master are:

1. To find the best riding position by developing good weight distribution whilst at the same time ensuring that you have enough weight on the deck of the ski to avoid you being thrown off.
2. To find the best possible position to ensure a low centre of gravity.

The ideal position is very similar to that of riding a motorcycle as you approach a left hand turn you move your left leg forwards and lean in to the turn, as you approach a right hand turn move your right leg forward and lean in to the turn, this is essential in order to safely execute the turn. In each of these turns your weight should be as low as possible.

# Racing Lines and Cornering

## Foot or Leg in water Technique.

This technique can be used in both tight and wide turns however it is best used in calm water. By placing your foot or leg in the water you change the pivot point of the machine and thereby increase the turning moment. This can speed up the process of going through the turn but it takes a lot of practice, good balance and excellent physical condition.

The process of executing a left turn would be as follows:

1. As you approach the turn you move your left leg forwards as usual and lean into the turn, your right foot must be firmly planted on the machine.
2. Bend your legs, lower your foot into the water slightly aft so that you can lower your body weight easier.
3. As you complete the turn return to your normal riding position, accelerate to straighten the machine and prepare for the next turn.

We will look at issues resulting from spinning out, stuffing and airborne effects more in the Competition module.



# Race durations and Finish procedure

## Race durations and Finish procedure

The Duration of a typical race, not Endurance is:

- Stand up 15 min plus one lap
- Run about 20 min plus one lap

Endurance Racing, this type of racing follows the same rules but the races are normally longer and they have less turn marks. Typical race time 40 min so much more stamina is required to compete in this type of racing.

The OOD will brief the finishing procedure at drivers briefing, you should pay particular attention to this as failure to comply may result in disqualification. It is worth noting that finish procedures may differ from venue to venue. Once the chequered flag has been displayed pilots will cross the finish line, raise their hand and slow down but not too quickly and make their way back to the pits. Be aware that other pilots may be travelling fast just behind you so avoid stopping quickly.



# Practical on Water Training

## Practical on water training

The following practical exercises will be covered in this Advanced module. In each of these exercises you will be required to demonstrate good Ski handling, safe cornering and maintaining your racing lines. During these exercises your performance may be timed and filmed for discussing after the session.

- Driving at speed round the race course
- Cornering at speed
- Overtaking and responsibilities
- Practice jetty starts
- Racing lines
- Understanding flag signals
- Communications with Pit Crews

One of the key aspects of on water race training is to assess your ability and race awareness skills and to be aware of what other Skis in the race are doing and how you should avoid them. You will also be assessed on your riding technique, your knowledge of the rules and your general ability to ride safely as well as your ability to understand communications from Pit Crews.



# Advanced Training

CERTIFICATE OF COMPLETION



This is to certify that

.....  
Has completed the Advanced Training course of the UIM Propstars Youth Development programme

PROPSTARS ASSESSOR





# Competition Training ...

Candidates attending the Competition Training must have satisfactorily completed the Advanced training module. Direct entry to the Competition training module may be possible if the candidate has past racing experience. This may require the applicant to take a short assessment examination before being accepted on the course.

On satisfactory completion of this course the candidate will be eligible to apply for a Provisional Jet Bike Racing licence from their National Authority and to race in the Class in which they have been trained

## Key Points

### Theory revision

To include the following key topics:

- An understanding of how to start racing, licences, medicals and required paperwork
- The roles and responsibilities of the race officials
- What is covered in race instructions
- To identify the principal safety equipment required
- What information is given at driver briefing
- How to prepare for technical inspection
- Race Flag meanings
- How to start a race from a jetty start
- Overtaking and collision avoidance procedures
- To identify the roles of the on water safety fleet

### Practical re assessment

Following the revision of theory all candidates will be required to drive a training ski around a course and to carry out a series of basic manoeuvres. The ability of all trainees will be assessed prior to being accepted on the competition course. Particular attention will be given to the following:

- Mooring alongside and general handling ability
- Driving at speed around the race course, control of the ski and water awareness skills
- Understanding racing lines and cornering in both left and right hand turns

### Summary of what will be covered in this Competition Training course

The course will consist of a combination of theory and practical on water training however the emphasis will focus on training the candidate to race safely and competitively at National and International levels.

**DON'T FORGET: YOU CANT WIN THEM ALL NO ONE WINS THEM ALL**

# Contents

<b>Introduction</b>	<b>111</b>	<b>Impellers</b>	<b>126</b>
<b>UIM Racing Categories</b>	<b>112</b>	<ul style="list-style-type: none"><li>• A quick guide to impellers 126</li><li>• Impellers 126</li><li>• Impeller and the Jet Pump 127</li><li>• Impeller terminology 128</li></ul>	
<b>UIM –ABP Aquabike World Championships</b>	<b>113</b>	<b>Side Sponsons</b>	<b>130</b>
<ul style="list-style-type: none"><li>• The Championship 113</li><li>• Competitors 114</li><li>• Circuit 114</li><li>• Parallel Slalom 114</li><li>• Offshore 115</li><li>• Endurance 115</li></ul>		<b>On the race Circuit</b>	<b>131</b>
<b>UIM World Ranking</b>	<b>116</b>	<ul style="list-style-type: none"><li>• Racing to win 131</li><li>• Racing lines 131</li><li>• Cornering left and right hand turns 132</li><li>• Foot or leg in the water technique 133</li><li>• High Speed Turns 133</li><li>• Airborne – taking off waves 134</li><li>• Stuffing 135</li><li>• Hooking 136</li><li>• Chine walking 136</li><li>• Capsize Procedures 137</li><li>• Avoiding Collisions. Proactive not reactive riding 138</li><li>• What to do if you are involved in a collision 138</li></ul>	
<b>Choosing the right machine and the right class</b>	<b>117</b>	<b>Finishing the Race</b>	<b>139</b>
<ul style="list-style-type: none"><li>• Sit Down skis also known as Runabout 118</li><li>• Stand Up Skis 119</li><li>• Freestyle Skis 120</li><li>• Budget 121</li><li>• Physical fitness 121</li><li>• National Competition 122</li></ul>		<ul style="list-style-type: none"><li>• Finishing a race and signing off 139</li><li>• The Protest Procedure 139</li><li>• Practical on water training 139</li></ul>	
<b>Racing Preparation</b>	<b>123</b>		
<ul style="list-style-type: none"><li>• Racing Preparation 123</li><li>• Top Tips for Race Preparation 123</li><li>• Know your class rules 123</li><li>• Race Instructions and course details 123</li><li>• Tools spares and equipment 124</li><li>• Introduction to the Race Circuit 124</li></ul>			

# Introduction



## Introduction

Before we start to look in detail at this Competition module let's have a look at what is available to you. As we have mentioned it's probably best to start your racing career at club or National Level as this is where you will learn your race craft skills. Listed below are the UIM Categories available which many different National Authorities follow.

Ladies only classes exist in Ski GP1 and Ski GP2 these are both high end classes, it might be better to choose a lower class with mixed competitors as again this will help you to perfect and develop your race craft skills.

# UIM Racing Categories

## UIM Racing Categories

Categories	Name	2 Strokes	4 Strokes	Turbo	Power	Comments
Ski Future Electric	SFE					Age 5-7
Ski Juniors	GP 200		Max 200cc		Max 16hp	Age 8-10
Ski Juniors	GP 3.1	Max 800cc			Max 85hp	Age 8-9
Ski Juniors	GP 3.2	Max 800cc			Max 85hp	Age 10-12
Ski Juniors	GP 3.3	Max 800cc			Max 85hp	Age 13-15
Ski Juniors	GP 3	Max 800cc			Max 85hp	
Ski Division	GP 3	Max 800cc				
Ski Division	GP 2	Max 850cc	Max 1602cc	Max 750cc		Turbo
Ski Division	GP 1	Max 1300	Max 1602cc	Max 1000cc		
Runabout	GP 4		Max 950cc		Max 90hp	
Runabout	GP 3	Max 1300cc	Max 2000cc		Max 200hp	
Runabout	GP 2	Max 2600cc	Max 2600cc			Supercharged
Runabout	GP 1	Max 2600cc	Max 2600cc			
Freestyle	Free					

So once you have learnt you're racing skills at club and National level it's time to move on to the UIM –ABP Aquabike World Championships.

This is world class racing where you will meet and challenge the best of the best. This top class World Series stages events all over the world so for more information on this go to [Aquabike.net](http://Aquabike.net)

# UIM – ABP Aquabike World Championships

## The Championship

The UIM-ABP Aquabike World Championship is the most acclaimed and prestigious international series promoting personal watercraft in a competitive racing environment, and one of the fastest, most spectacular, demanding and entertaining sports on water.

The Championships is now in its 23rd season since being sanctioned in 1995 by the Monaco-based Union Internationale Motonautique (U.I.M.) the World Governing Body for Powerboating.

In 2011 Aquabike Promotion (ABP) was appointed by the U.I.M. as worldwide promoter. During its tenure it has raised the profile, expanded the geographic boundaries and increased competitor numbers.

The championships now cover a diversity of competition across a wide range of classes and disciplines. The UIM Aquabike Championships highlights the skill and sheer raw power of adrenalin- fuelled non- stop action and edge of seat racing with the Freestyle category providing improbable feats of artistry and insane ariel acrobatics.



# UIM – ABP Aquabike World Championships



## Competitors

The world championship is open to all comers and underpinned by 'Registered Riders', all of whom must hold a valid National Licence issued by a National Authority recognised by the UIM and a World Super Licence issued through the UIM Secretariat.

To be issued with a World Super Licence a competitor must have competed in four national or international ordinary races.

The minimum age to compete is 15.  
All competitors are bound by the rules as published.

## Circuit

For both Runabout GP1 and Ski GP1, circuit racing is fast and furious with competitors racing over a multiple pin course comprising left and right hand turns, an alternate track and penalty buoy.

Starts are either dead-engine or rolling with circuits of circa 29-pin 1500m for Runabout and 27-pin 1300m for Ski.

Main Course - Red buoy: left-hand turn. White or Yellow buoy: right-hand turn. Black buoy: penalty turn. Chequered buoys: finish line.

Alternate course: Yellow, blue, green buoys as specified in the briefing. (If a rider choosing alternate course A invades course B or does not respect the exit demarcation buoy he/she will be disqualified.)

## Parallel Slalom

Slalom is an explosive and nail-biting event and takes place at selected Grand Prix, with the top eight riders from qualifying in Runabout and Ski and the top four/six in Ski Ladies competing.

The competition is a dead-engine pontoon start run over a parallel two lane 96m, five-pin course and is the best of three runs.

# UIM – ABP Aquabike World Championships



## Offshore

Offshore is arguably the most physically demanding and often described as a bike, body and bone breaker.

Held at sea or open water for Runabout bikes, Offshore is the most spectacular racing category with riders challenged by extreme conditions and sky high waves that demands the ultimate in fitness, skill and some luck!.

Considered as the toughest races on the planet, where survival against all elements is the priority.

The multi-stage events are raced over distances of a minimum 110km with refuelling stops taking place at the same or different locations.

## Endurance

Held on open water close to shore, the closed-course circuit is between 5km and 20km with a maximum time limit of 60 minutes with start, refuelling and finish taking place at the same location.

Resistance and strength are the main themes of Endurance racing. They can be easily integrated with local festivals and celebrations. A great opportunity to host a small event or even various events within a major event.

# UIM World Ranking

## UIM World Ranking

As with all top class sports the UIM- ABP Aquabike World Championships run a World Ranking and World Standings programme, full details of the current World Champions and their current standings can be found at [Aquabike.net](http://Aquabike.net).

So now that we have got you interested let's have a look at how you get into this vibrant and exciting sport.

# Choosing the right machine and the right class

## Ski Runabout or Freestyle

You need to decide right from the start what sort of racing or activity you want to get into, you have the primary classes of Ski, Runabout and also the wild world of Freestyle. Let's just remind ourselves of some of the rules in the disciplines:

- When riding a Stand up machine you cannot kneel during racing see UIM Rules
- When riding a runabout you can stand or sit without penalty
- Duration of a typical race, not offshore endurance:
- Stand up 15 min plus one lap
- Runabout 20 min plus one lap
- Freestyle limited rules apply as per UIM Rule book but lots of practice time required

Both Offshore and Endurance Racing are tough and physical as you face a constant battle with the waves to stay on the ski and to keep ahead of the competition. so much more stamina is required to compete in this type of racing.

# Choosing the right machine and the right class

## Sit Down Skis also known as Runabout

These skis come in a variety of formats; they are predominately two seater. Sit down or runabout skis are now available with engines from 60hp to over 300hp. The lower end machines although fitted with less power are extremely light and therefore are very sporty and it is likely that this is the type of machine that you will start your training on.

The high end machines with 200+ HP are heavier and therefore more stable in rough conditions, they also incorporate a range of sophisticated electronics designed to help you manage the machine.

The UIM Racing Classes in the Runabout category are: Runabout GP4 is the entry level class through GP3 and GP2 to GP1 being the unlimited top end class. Full details of these UIM Classes can be found in the UIM Aquabike Rule book at [UIMpowerboating.com](http://UIMpowerboating.com)

# Choosing the right machine and the right class

## Stand Up Skis

Stand up machines are used in racing and in order to ride one well you must be in good physical shape and it is essential that you develop a good riding technique.

The UIM Racing Classes in this category are: GP3 is the entry level class through GP2 to GP1 being the unlimited top end class. Full details of these UIM Classes can be found in the UIM Aquabike Rule book at [UIMpowerboating.com](http://UIMpowerboating.com)

# Choosing the right machine and the right class



## Freestyle Skis

All skis used in UIM Pro Freestyle are purely bespoke and highly customised; they incorporate specialist hulls, pumps and engines. The hulls are much shorter than the standard stand up ski; they are also much lighter and are often made in light weight carbon fibre.

The shape of a Freestyle ski is also completely different; the underwater bow section is curved upwards to assist in creating jumps and providing lift. More detail on this category is included at the back of this manual in the Freestyle section. All rules governing UIM Freestyle can also be found at [UIMpowerboating.com](http://UIMpowerboating.com)

# Choosing the right machine and the right class

## Budget

This is the number one consideration, in both Stand up and Runabout classes GP4 is the cheapest and GP1 the most expensive. Freestyle is also very expensive as most of the machines used are custom made and bespoke to suit the owner's style of riding.

The Runabout entry level class is GP4, riders in this class at present predominately use the Seadoo Spark, this is a relatively cheap 90hp machine but other manufacturers are bringing new machines to this entry level class. This class is active nationally as well as internationally

## Physical fitness

How fit are you? Riding these machines at any level requires high levels of personal fitness. So how fit do you need to be, that's simple you need to be fit enough to ride as hard on the last lap of the course as you did on the first lap.

Before you start racing you must prepare yourself for the physical challenges that you will face, most top competitive riders will follow a strict training programme and you should be prepared to train a minimum of three times a week ensuring that you achieve 20-30 minutes of hard physical exercise during each session.

If possible use a personal trainer as they will be able to structure your training programme to suit your individual needs. Clearly a Freestyle rider will have different criteria to a GP1 Runabout rider.

You need to consider the following points when measuring your fitness levels:

- Body weight
- Strength
- Stamina
- Flexibility
- Mobility
- Agility

Being fit alone won't win races but it will give you more confidence and confidence will help you to win.

Some further useful points to consider are given below:

- Machines in the GP4 Classes are much easier to control than those used in GP1 or GP2. A GP1 machine has five times more power than those used in GP4
- Small fit athletic riders might choose a stand up machine as a preference as opposed to a GP 1 Runabout ski which requires raw power and muscle to control.
- As a rider you need to be able to give your top performance throughout the race, from start to finish.

# Choosing the right machine and the right class

## National Competition

Try to select a Class which is active in your country, this is important as by competing in National races on a regular basis you will start to perfect your race craft skills.

Don't forget that good race craft takes time and skill to develop, choose a machine that suits your budget and your ability.



# Racing Preparation

## Racing Preparation

Good preparation for a race starts months before the event, you should make sure that the ski and its equipment are all in top condition and well prepared for the race.

Ensure that your personal protective clothing, protective helmet and racing vest all fit comfortably.

Know how much fuel your ski uses in different conditions, calculate the minimum fuel load you require for the race but don't forget to allow a small margin for unforeseen circumstances such as race delays or changing conditions.

## Top Tips for Race Preparation:

- Study the Advance Instructions and Race Instructions before the event.
- Carefully study the course details, know the layout of the course for your next event and look for any possible areas of advantage.
- When you go out on the practice session learn the course, check where the water might be rougher or smoother, look for good overtaking opportunities.
- Check the split courses, see which one you prefer, is one faster than the other or more technically difficult to complete.
- Determine your best racing lines, use physical objects on the shore to help you maintain the best possible lines.
- Study the local weather conditions in advance of the event, know what wind and sea conditions you might have on race day, be prepared.
- Know your own weaknesses and try to correct them by practice.
- Try to use the best fuel available to you, high octane 100+ will burn cleaner than lower octanes and is much better for your engine.
- Adjust the angle of the handle bars on your machine to suit your riding position, also adjust the angle of the throttle lever and trim lever if you have one.
- A comfortable riding position is a faster ski.

## Know your class rules

The UIM Aquabike Racing Rules can be found on line at [UIMpowerboating.com](http://UIMpowerboating.com) go to Documents – Rule Books – UIM Aquabike Rules.

If you are racing nationally make sure you have a copy of your National Rules from your own National Authority as these may be different from the UIM Aquabike Rules.

Don't forget that rules change each year so make sure you are up to date with any changes, there may also be local changes to rules relating to safety and you will be advised of these at the drivers briefing. These notifications will also be posted on the race notice board by the Race Secretary.

## Race Instructions and course details

This is a very important document and you must read it carefully before each race, all the details of your courses will be provided as well as a full race timetable and other important safety information.

Don't forget that Race Instructions vary from race to race and venue to venue so don't just read one at the start of the season and forget the rest.

# Racing Preparation

## Tools spares and equipment

You can never have too many tools so make sure that you are well prepared before the start of each racing season.

Listed below are some of the spares you should carry:

- A full set of good quality tools is essential
- Spare engines are allowed (see any penalties in UIM rule book)
- Spare battery, or make sure that you can charge your battery at an event
- Spark plugs, water repellent such as WD40, spare HT leads, electrical test meter
- Spare cables for throttle control and trim, these can fail due to problems with salt water
- Four stroke engines will have belts so spares needed.
- Two stroke engines do not have belts so no spares required
- Spare fuel filters
- Spare carburettor, needles and reed valves
- Electric coils
- Electronic spark boost called capacitor discharge ignition system
- General Cable ties, jubilee hose clips, spare coolant hoses.

Don't forget that strict technical rules govern the sport so always check with the UIM Rule book that changes or modifications are allowed and always consult with your UIM Technical Inspector when at the race site.

# Racing Preparation

## Introduction to the Race Circuit

All racing venues are different and the course designs will vary from venue to venue, it is extremely important to fully familiarize yourself with the course before racing; this is best done in the mandatory practice sessions before the race. Pay particular attention to the wind direction and where you might experience wind eddies and rough water as these can dramatically affect the performance of the ski in a race.



# Impellers

## A quick guide to Impellers

Choosing the correct impeller is one of the most important aspects of correctly setting up a competitive ski. In this section we try to simplify some of the technical terminology, we look how the jet pump and the impeller work and what you need to know to get the best performance from your ski.



## Impellers

The diameter of the impeller is determined by the diameter of the housing. The capacity of the pump is also determined by the cc of the engine. Generally a slightly smaller pump is ideal for racing as it will initially spin quicker, pick up and acceleration will be better however as with all racing this is a carefully judged balance. Too small and you will be too slow too large and you will be poor on acceleration.

Impellers can be made from Aluminium, Stainless steel and Titanium, Titanium impellers are probably the best as they are light and extremely tough. Be careful to study the UIM rules to ensure that you comply and do not fit an impeller that is illegal for racing in your class.

A good rule to remember is that as you lower the pitch of the impeller your RPM will increase and conversely as you increase the pitch so your RPM will decrease. In order to be competitive in all racing you need your engine to run at the upper end of the RPM band.

It is impossible to make a single recommendation of a particular impeller as different skis, pumps and engines require different impellers. Probably the best advice is to start with a standard impeller recommended by the manufacturer, remember that your engine should reach its maximum revolutions or close to it in all conditions in order to deliver maximum power and thereby top speed.

# Impellers

## Impeller and the Jet Pump

To fully understand how impellers work, we must examine the jet-pump, because the impeller by itself will only scatter water, and is highly inefficient. A ducted propeller (shrouded) produces greater efficiency than its open counter-part. The reason is simple. The duct controls water and forces it backwards as opposed to a propeller which allows water (or air) to slip outwards.

Impellers (and jet-pumps) work on the principal of positive and negative pressure, or the push/pull concept. As a blade rotates, it pushes water back (and outwards due to centrifugal force). At the same time, water must rush in to fill the space left behind the blade. This results in a pressure differential between the two sides of the blade: a positive pressure, or pushing effect on the blade face and a negative pressure, or pulling effect, on the blade back. This action, of course, occurs on all the blades around the full circle of rotation. The impeller hub design is also very important, larger at flow exit than entry as this feature also increases the pressure and power transmitted to the water.

Thrust is created by water being drawn into the impeller and accelerated out the back. However, due to the spiralling effect (vortex) of water leaving the trailing edge of the blade it must pass through stators (straightening vanes) to straighten its trajectory. Stators also increase velocity by "catapulting" water, similar to the way a "kick" works on the trailing edge of a blade. To further enhance velocity, water passes through the venturi before finally exiting the pump as thrust. The venturi works on the principle that a restriction or reduction in line size will cause water to accelerate if the same volume is to be realized at the other end of the restriction/reduction. This is where you get the "jet" in pumps. The relationship between the impeller

and pump exit nozzle diameter is also critical to the performance of the ski.

Traditionally, most impellers are designed to give the best overall performance and efficiency for the range of pumps that the impeller applies to, and provide you with both bottom-end and top speed without having to compromise. This may be OK for recreational use but if you are going to be successful in racing you will have to work your impeller to suit your ski, the engine and your driving style.

The only way to check what is the right impeller for you is by hours and hours of testing, below are some of the key points to remember when testing:

- Record everything you do for future reference.
- Check RPM on each run
- Check speed on each run
- Make your test runs in two directions in order to eliminate or reduce the effect of wind or tide.
- Only ever make one change at a time, and record every change you make.
- Make sure all impellers used are in top condition, that the leading edges are sharp and the body of the propeller is highly polished.
- Carry the same fuel load throughout your testing

# Impellers

## Impeller terminology



### Straight Pitch

This is the distance that the impeller would move in one revolution, if it were moving through a soft solid. An impeller acts like a screw cutting through water as it turns. The amount of distance that an impeller can cut through in one full revolution is known as the pitch of the impeller. Pitch is usually marked in inches. This is the theoretical pitch. (Impellers are not as efficient as marked) By altering 1" of pitch we could expect a change of approximately 200 RPM.

A pitch designation for a variable or progressive pitch impeller typically could be shown as 14/18; this indicates that this impeller is variable pitch. The pitch angle varies from the leading edge to the trailing edge. The two numbers indicate the degrees of pitch of each blade in relation to an imaginary line perpendicular to the axis of the impeller. Special measuring sleeves are available to check the pitch of your impeller both at the leading and trailing edges.

### Over-Lapping Blades

Over-lapping blades give an increased blade area to accelerate water while increasing vacuum, critical to bringing more water up into the gullet and thus producing more thrust. Without overlapping blades, the impeller may not create the vacuum necessary to keep the ski travelling at high speed mph glued to the water. Vacuum is the most essential ingredient in jet-pump performance and Jet Ski handling.

### Variable Pitch

Smaller pitch gives greater acceleration, but reduces top speed. Larger pitch decreases acceleration, but increases top speed. By combining smaller pitch at the leading edge and transitioning to a larger pitch at the trailing edge,

you effectively get the best of both worlds. But variable pitch has limitations when coupled with over-lapping blades! There comes a point where the leading edge of the blade begins shutting off area to the blade behind it. This becomes more pronounced in a helicoil design.

Variable pitch technology allows the impeller to grab a given mass of water per blade at a given pitch angle (the lower pitch number) and transition it into a more aggressive pitch (the larger number). This concept works much like a catapult. At the same time, a smaller pitched leading edge reduces laminar separation due to a lower pitch angle. Laminar separation results in cavitation, or the separation of air from water. A larger pitched leading edge can grab too much water, thus over-loading the engine and reducing acceleration. If the leading edge angle is too aggressive it creates a paddle effect that "slaps" water as opposed to transitioning the water along the blade.

If you examine a variable pitch impeller from the side, you will see the pitch angle of the blade is constant where it is attached to the hub, but the outer edges of the blade are not. This is where the term VARIABLE comes from. The reason this system works is because it connects three basic principles. Acceleration, Centrifugal Force and Velocity. As water enters the leading edge of the blade, it is ACCELERATED. During transition to the trailing edge, the constant chord of the blade near the hub and the increasing size of the hub, work with CENTRIFUGAL FORCE to push (and pull) water toward the outside edge of the blade. This results in a collective action that increases the VELOCITY of the water exiting the blade. Although water is not compressible, this system somewhat emulates compression.

### Diameter

This is the width of the circle made by the impeller as it rotates.

### Stainless steel, Aluminium or Titanium

Aluminium impellers are not suitable for competitive racing, Stainless steel is 5 times stronger than aluminium, and can be made with thinner blades to improve efficiency. Can be repaired easily although generally more expensive than Aluminium. Good efficiency due to less flexing. Titanium impellers are stronger than stainless steel, can be made thinner are excellent for racing but are much more expensive.

# Impellers



### Narrow Hubs

A narrow hub allows more water through and gives more blade area for acceleration. This design also reduces blow-out at the leading edge of the hub.

### Rake

The impeller rake is the blade angle from 90 degrees of the impellers centre. Impellers have varying angles of rake which are consistent with manufacturer designs for efficiency and speeds.

### Cupping/Kicks

When the trailing edge of the blade is formed cast with an edge curl it is said to have a cup. Once water begins acceleration from the leading edge to the trailing edge, it can be catapulted (nominally) to increase velocity. There comes a point of diminishing returns on this as well, i.e., reduced RPM, cavitation, etc.



### Rotation

The direction in which the impeller turns

### Ventilation

Impeller ventilation is caused by air from the surface being drawn into the rotating impeller blades. This results in the impeller slipping more than usual due to the reduced water load on the blades. The obvious symptoms of this are a sudden increase in engine RPM as well as a possible loss of speed. This commonly occurs when trying to turn the ski at high planning speeds.

In racing conditions this can also occur when following another ski too closely. The small bubbles in the water created by the leading ski can cause ventilation of the propeller of the following ski, with a subsequent loss of speed.

### Cavitation

Impeller cavitation is less obvious than ventilation, but can be far more damaging. When the impeller blade passes through the water at an increasing speed, the pressure that holds the water to the sides of the blades is lowered. If the water is sufficiently warm, and depending on the speed of the boat, formation of water vapour (boiling) can occur. These bubbles that are produced then immediately collapse, releasing energy that can cause a cavitation burn on the impeller blades. In the worst case a complete loss of grip will be experienced. Stainless steel impellers due to their superior strength can withstand cavitation damage better than aluminium and can also be produced with thinner blades to reduce the occurrence of cavitation. If an impeller has suffered cavitation burn you will notice that the blades are dull, no longer highly polished and that a film of chalky deposit will appear on the surface of the impeller.

# Side Sponsons

## Side Sponsons

Side sponsons provide stability especially in cornering, sponsons can be modified providing they are in accordance with UIM rules. Unduly thin sponsons can break and cause the ski to spin out of control.

Stand up skis do not have side sponsons fitted as standard but in order to race riders fit both front and rear sponsons, the rear sponsons provide lateral stability in cornering and the front sponsons provide added stability in a straight line.

Side sponsons are fitted as standard to runabout classes.



# On the race Circuit

## Racing to win

- Know your limits, Identify your best possible place in the race, target your nearest competitor and try to win
- When racing in offshore in rough conditions preserve both your machine and yourself, to win you have to finish.
- Visibility whilst racing is often extremely limited, know who you are racing against, get to know their style as much of the control whilst racing is by instinct
- Try not to use full power at all times and especially when jumping waves, take the power off every time you jump if you don't you may very well damage your engine and yourself
- Make sure that you get as much cool air into the engine as possible, strict rules govern air intakes so make sure you comply to class rules
- If you are racing in GP2 use special racing sponsons, this will improve your competitiveness.
- Avoid any debris on the race course, picking up debris in the impeller such as weed, rope and especially plastic is one of the main reasons of failure.
- One of the most important factors is to be reliable, get consistent results and this can produce a winning formula.
- Always think about your next event, how well prepared are you, do you have enough spares etc.

**YOU CAN'T WIN THEM ALL NO ONE WINS THEM ALL**



## Racing lines

In all racing it is extremely important to take the fastest possible racing line around the course in order to maintain a high average speed. Carefully check the design of the course before you go out on the water, note the best possible route which sometimes may include taking a single sweep around two marks. Take advantage of the practice session before the race to fully familiarize yourself with the race course.

The key to fast cornering is to smoothly execute the turn so that you can maintain the maximum power possible. Some course designs require you to "pin turn" at the mark, this is a different technique but can be extremely effective if executed well. Learn to anticipate the racing lines that your fellow competitors may take; you may be able to take advantage of their driving style and gain valuable positions by their mistakes. Remember that your ski will be at its fastest when you are correctly trimmed, and travelling flat, speed will be lost by cornering too tightly or especially when airborne. During any race it may be necessary to



drive defensively to protect your position, this may require you to follow a different racing line so you will need to balance possible loss of speed against protecting your position, this comes with experience and is part of what will be taught in this Competition module



**REMEMBER ...**  
You can't win all the races!  
No one wins them all!

# On the race Circuit

## Cornering left and right hand turns

### Runabout ski

It is essential to adopt the locked in position, a customised racing seat should help you to achieve this. In the locked in position your legs should be gripping the consol, your feet planted firmly on the deck and you should have no weight on your arms. You should also adopt a light touch on the handlebars when steering.

As you approach the turn ease the power off, this will have the effect of dropping the bow, at the same time aggressively lower your body into the turn whilst at the same time bracing and squeezing your legs into the consol. The rider must adopt the locked in position in other words, knees squeezing into the console, feet firmly placed on the floor of the machine. If you have trim control trim down for the turn and then trim up for the straight.

In some of the lower classes like GP4 it is essential to keep the ski flat whilst cornering, you should use your weight to achieve this by moving from side to side and front to back. In some corners it may be necessary to lean out from the turn in order to keep the ski flat.

In GP1 a very high degree of fitness is required and riders will use all of their strength to drive the machine around the corner.



### Stand up ski

In order to competitively ride a stand up ski well you must be prepared to put in hours of practice and be in good physical condition. You must change leg positions as you approach a corner, for a left turn move your left leg forwards and lean into the corner, for a right turn move your right leg forwards and lean into the turn.

The most important points to master are:

- To find the best riding position by developing good weight distribution whilst at the same time ensuring that you have enough weight on the deck of the ski to avoid you being thrown off.
- To find the best possible position to ensure a low centre of gravity.



The ideal position is very similar to that of riding a motorcycle as you approach a left hand turn you move your left leg forwards and lean in to the turn, as you approach a right hand turn move your right leg forward and lean in to the turn, this is essential in order to safely execute the turn. In each of these turns your weight should be as low as possible.

# On the race Circuit

## Foot or Leg in the water Technique

This technique can be used in both tight and wide turns however it is best used in calm water. By placing your foot or leg in the water you change the pivot point of the machine and thereby increase the turning moment. This can speed up the process of going through the turn but it takes a lot of practice, good balance and excellent physical condition.

The process of executing a left turn would be as follows:

- As you approach the turn you move your left leg forwards as usual and lean into the turn, your right foot must be firmly planted on the machine.
- Bend your legs; lower your foot into the water slightly aft so that you can lower your body weight easier.
- As you complete the turn return to your normal riding position, accelerate to straighten the machine and prepare for the next turn.

The normal straight line standing position would be with one leg behind the other this gives stability when riding, Feet must be firmly planted on the deck for maximum stability.



## High Speed Turn

For a high speed turn power on before you reach the turn, decrease power as you approach turn increase power once the nose of the machine passes the turn, so it is power on, power off, power on very little adjustment in between. A properly executed high speed turn should be completely safe however if this manoeuvre is conducted irresponsibly there is a high risk that you will be thrown off the ski Cavitation or ventilation will occur in tight high speed turns and often in choppy water in a straight line. When cavitation or ventilation occur you will hear and feel the impeller spinning, most of the time you will have to drive through it as taking the power off can result in loss of directional control.



The following points must be considered before carrying out this manoeuvre:

- Avoid turning sharply over confused water or washes from other boats
- Check that your turn will not conflict with other craft and does not take you into danger and complies with racing rules
- Be aware that you may have to reduce speed to take the turn
- If the impeller starts to cavitate either reduce the sharpness of the turn or reduce speed or both.
- Do not take all power off
- Once the turn has been completed it will be safe to apply more power

# On the race Circuit

## Airborne – taking off waves

Skis can take off and become airborne as a result of launching off big waves, this is something the rider must be aware of and they should learn how to read the water ahead to minimize the times the ski is in the air. When airborne you lose speed and have no control.

Circuit racing boats can fly in windy conditions and sometimes do a full 360 flip as a result of their aero dynamic design but this does not apply to Skis, the only reason a Ski will fly is as a result of taking off waves at high speed. For this reason skis must be correctly balanced with neutral balance.

When you take off or land make sure the handle bars are pointing forwards in a straight line otherwise you will hook violently and possibly spin out of control. Also make sure that you have your weight over the handle bars and absorb the shock of landing with your legs. Avoid landing stern first as this is likely to pith you off the ski backwards.

All riders need to understand how to deal with a ski in the air and especially when it lands, remember the following tips:

- Immediately reduce power to prevent damage to engine
- Try to ensure the handle bars are pointing in a straight line prior to jumping as this will help to prevent the ski from falling off on one side
- If the ski is balanced and trimmed correctly it will land squarely, if not it may well land heavily on one side. This needs to be avoided as damage to the ski can be caused and possible injury to the rider.
- Don't forget that as soon as a ski becomes airborne you have no control, no steering, no forward drive and no cooling to the engine and a loss of speed
- Landing stern first can result in the rider being thrown off backwards. Landing bow first but not stuffing can be dangerous as it is possible the ski will hook, this is similar to a spin where the ski ends up at 90° to its direction of travel. This problem is covered in more detail under hooking below
- In choppy conditions try to run at 98% of speed to reduce the time in the air.

# On the race Circuit

## Stuffing

This is the term used when a ski jumps off a wave and then falls into the back of the next wave ahead, this can be dangerous as the sudden de acceleration can cause the rider to be thrown off the ski. A ski can also stuff by catching the transom of the ski on a wave which in turn causes the bow of the ski to trip and then fall into the back of the next wave ahead. Move body weight backwards especially in a stand up machine in order to get the nose of the machine up. Most important read the water and anticipate the waves and the action of the ski.



# On the race Circuit



## Hooking

The rear of the ski can break free especially in tight corners, the rider must get the weight forwards and over the handlebars and as soon as possible to apply more power to regain directional control, this comes with practice and making mistakes so training is vital.

Hooking a ski is sometimes likened to spinning in a car. A hook is caused when the centre of gravity of the ski moves forwards usually caused by the actions of the waves and the speed of the ski which causes the back end of the ski to break free of the water and for the ski to spin sideways. This is particularly dangerous in racing conditions or when travelling close to other skis.

## Chine Walking

The chine of a hull is where the bottom joins the side. Chine walk is a violent, often rapid, side to side oscillation when the ski literally bounces from one chine to the other. To reduce the possibility of chine walking the ski must be set up with neutral trim so balanced left and right. Moving body weight to counteract chine walking may help, small power corrections may also help BUT never take the power off particularly in a stand up ski as you will crash.

- Small corrections left and right
- Small corrections of power
- Each under or overcorrection requires a larger correction to compensate and, if that correction is too much or too little, the oscillation increases.
- NEVER fully power off
- Regain balance

# On the race Circuit

## Capsize Procedures

All riders of skis must fully understand how to deal with a capsize, modern Skis are designed to cope with this situation however as a rider you must take sensible precautions and in the event of a capsize follow a set procedure. When racing it is vital that a ski that capsizes is righted as soon as possible, racing skis do not have additional buoyancy as this is a weight as an issue, if the ski is not righted quickly there is a strong possibility that it will sink.

If you capsize during a race the first thing you must do is to raise your left arm above your head to indicate to the safety marshals that you are OK.

## Outside Assistance

A rider who has fallen off their machine will if needed be assisted by the safety Marshals and taken back to their machine, the rider may then continue the race without incurring any penalties. If however a rider has to be towed off the race course they will not be allowed to continue in the race.



## Rider Beware!

Correct capsize rotation to be followed in accordance with manufactures instructions.

- Keep hold of the ski at all times or immediately swim back to it.
- Check the direction of rotation of the ski, this varies between different models and a label on the stern will always show the correct way to rotate.
- Swim to the side of the machine that you intend to rotate towards you, put your knee on the rubbing strake and catch hold of the grill under the impeller.
- Pull the ski towards you using your weight to help it rotate.
- When the ski is upright, re board in the usual way from the stern.
- Once righted the petrol in the fuel system will then return to its normal state and after a few moments you should re connect your kill cord and start the engine.



## Rescue Ski

The role of the safety rescue ski is to provide fast response to any racing incident on the water, safety rescue skis tow special spinal boards to enable them to transport a casualty quickly and safely back to the shore. Rescue skis will be positioned around the race course so as to provide maximum safety cover to all sections of the course. A safety plan will be agreed in advance with the Safety Officer and the OOD and the Rescue Skis will follow this plan. In UIM Aquabike races the medics and paramedics are located on the shore at an agreed safety extraction point. The required numbers of safety rescue skis is agreed between the Safety Officer and the OOD; these numbers will vary depending on the lengths of the race courses and the local conditions at the venue. All safety rescue riders are equipped with VHF radio. If an incident occurs on the racing line the race may be red flagged but not necessarily, this is at the discretion of the OOD.

# On the race Circuit



## Avoiding Collisions. Proactive not reactive riding

In order to win races you must first finish so avoiding collisions is an essential part of your race planning strategy. Proactive driving is a skill which enables you to anticipate the actions of your fellow competitors and take the appropriate action, frequently these decisions are made in an instant and the good driver will react instinctively to situations on the race course.

### Overtaking Rules

A rider overtaking another ski must keep clear however it is the responsibility of both riders to be aware of each other's position and to avoid a collision. A rider must be prepared for another Ski to overtake and must always be aware of other Ski approaching from behind. The overtaking pilot must consider the safest route to pass and must do so without forcing the other pilot to suddenly alter the course. When the Course Marshall points his arm and finger towards one pilot, this is the signal that one pilot is being overtaken and lapped by another pilot. The slower pilot(s) must make way for the overtaking pilot(s) to ensure safe overtaking (blue flag).

An essential part of overtaking is for each pilot to know who you are overtaking, how experienced is the rider, a new rider might not have good awareness skills so extra care may be needed. A novice rider might not know that you are there, novice riders do not carry specific identification so know who is riding which machine.

## What to do if you are involved in an accident on the water

The first thing to do is to check for any injuries and immediately decide if assistance is required. If assistance is required attract the attention of the rescue skis and marshals on the course. If you are in the water try and get back to the ski and await recovery by the rescue services, At all races there will be comprehensive safety and medical cover and the response time to all incidents is usually very quick, the OOD may Red Flag the race however this is at the discretion of the OOD. If you are injured follow the instructions of the paramedics and allow them to do their job. It is normal at racing events for a rider to be recovered on a spinal board and transported to the shore prior to being examined by the race doctor/paramedic. Conform to the instructions of the rescue officials at all times. If you are injured and are taken to hospital the medical officer/OOD will revoke your licence in which case you will have to be declared fit to race by a qualified doctor prior to racing at the next event.

# Finishing the race



## Finishing a race and signing off

The finish of a race is shown to the driver by waving a black and white chequered flag. A driver who finishes a race must withdraw from the course without hindering the skis that are still racing.

The OOD will brief the finishing procedure at drivers briefing, you should pay particular attention to this as failure to comply may result in disqualification. It is worth noting that finish procedures may differ from venue to venue. Make sure you follow the procedure as briefed by the OOD; you don't want to win the race only to be disqualified at the finish.

At many racing events competitors are required to sign off at the end of racing, make sure you know the rules and follow the instructions in race instructions or those given at drivers briefing.

## The protest procedure

All teams and riders are entitled to protest the results or penalties given if they feel there is sufficient justification. If you are lodging a protest you must inform the OOD first, if you are protesting the results this must be done within the time limits set by the class rules, usually 30 minutes from time of the results being posted. All protests must be in writing and accompanied by the protest fee (details of this will be found in race instructions) Protests against eligibility can only be lodged prior to the drivers briefing or up to that point in the drivers briefing where the OOD asks if there are any such protests. The protest will be heard by the appointed Race Jury and they are required to strictly follow the procedure set out in the rule book. At International events the Jury must follow the procedure as described in the UIM Offshore Rule Book. If you are unhappy with the result of the protest you may appeal to either your National Authority in the case of National races or to the UIM for all International races.

Full details of the UIM protest procedures for Aquabike racing can be found at [UIMpowerboating.com](http://UIMpowerboating.com), go to the rules section for Aquabike.

## Practical on water training;

The following practical exercises will be covered in this Competition module. In each of these exercises you will be required to demonstrate good handling of the ski, safe cornering and maintaining your racing lines. During these exercises your performance may be timed and filmed for discussing after the session.

- Driving at speed round the race course
- Cornering at speed
- Practice jetty starts
- Racing lines
- Overtaking and Overlaps
- Overtaking and blocking manoeuvres

As part of your assessment by the instructor all candidates will be required to drive around the race course in a time not exceeding 110% of the Racing Instructor.

One of the key aspects of on water race training is to assess your ability and race awareness skills and to be aware of what other skis in the race are doing and how you should avoid them. You will also be assessed on your knowledge of the overtaking and overlap rules throughout this activity.

Throughout these practical exercises your performance will be timed and monitored and guidance given to improve your lap times and competition driving techniques.



# Competition Training

CERTIFICATE OF COMPLETION



This is to certify that

.....  
Has completed the Competition Training course of the UIM Propstars Youth Development programme

PROPSTARS ASSESSOR



# Slalom and parallel slalom

Slalom and Parallel Slalom racing provide an added spectacle at many Aquabike/Jet Ski events. Slalom racing is open to all classes in both Stand up and Runabout disciplines.



# Contents

## Slalom and Parallel Slalom

- Types of Racing
- Parallel Slalom Racing
- The order of the competition
- Course Details
- Start Procedure (Parallel Slalom)
- Slalom Racing
- Start procedure (Single Slalom Racing)
- Top Tips for both Slalom and Parallel Slalom Racing
- General Notes

143

143  
144  
144  
144  
145  
146  
146  
146  
146



# Slalom and Parallel Slalom



## Types of Racing

There are two different types of Slalom Racing:

- One rider at a time on a set course racing against the clock. This is single Slalom racing
- Two riders on two courses racing against each other, this is Parallel Slalom racing.
- In each of the two types it is a simple knockout competition. Full details of the rules can be found in the UIM Aquabike rule book at [UIMpowerboating.com](http://UIMpowerboating.com)
- These exciting competitions are often run at night in a spectacular setting.
- Single Slalom racing is often run at National events.

# Slalom and Parallel Slalom



## Parallel Slalom Racing

Parallel Slalom is featured in the UIM-ABP World Championships and is an explosive and nail-biting event which takes place at selected Grand Prix.

- The top eight riders from qualifying in Runabout and Ski and the top four/six in Ski Ladies competing are eligible to participate.
- The competition is a dead-engine pontoon start run over a parallel two lane 96m, five-pin course and is the best of three runs.



## The order of the competition is

- Ski division, first race
- Runabout, second race
- Ski division and Runabout last race



## Course Details

A typical Parallel Slalom course will be laid out as the diagram below

There are no set colours for the turn buoys, full details of the course will be given at the drivers briefing. As two courses are laid sometimes one side may be faster than the other so riders get the chance to ride each side of the course. Three runs are allowed in an overall knockout competition.

The last turn mark can be taken on either side the rider chooses. The rider will determine the best side for him taking into account sea conditions, angle of turn, light and confidence of the rider.

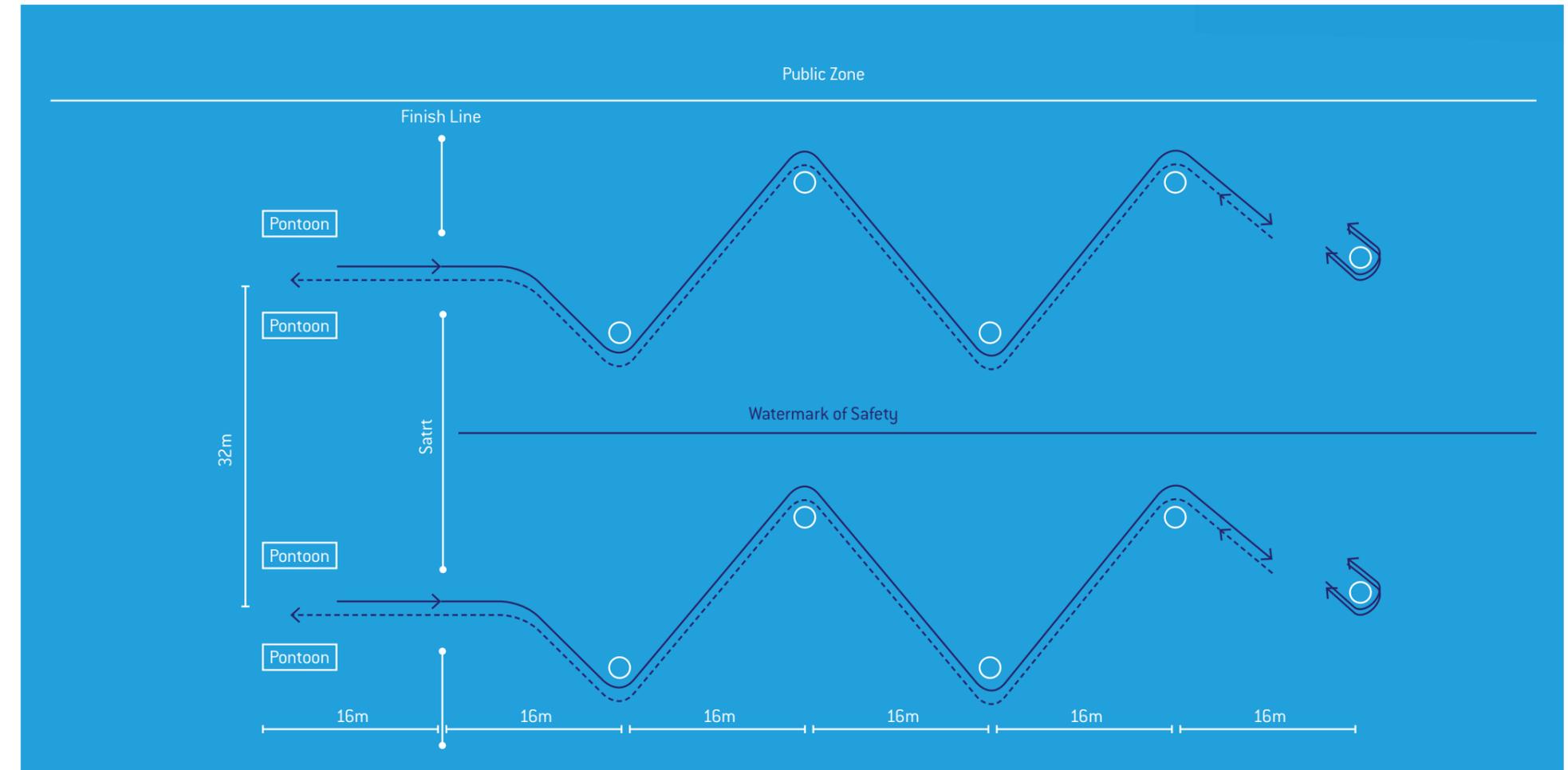
# Slalom and Parallel Slalom



**REMEMBER...**  
Don't forget that the last turn mark can be taken on either side.

## Start Procedure (Parallel Slalom)

Starts will be from a pontoon and controlled by the tower as for standard racing



# Slalom and Parallel Slalom



## Slalom Racing

As previously mentioned this is one rider at a time racing against the clock.

## Start procedure (Single Slalom Racing)

This will be either a pontoon start controlled from the tower as per normal or a flying start. If a flying start procedure is used full details will be given at drivers briefing. Timing will start when the nose of the ski crosses the start line and finishes when the nose of the ski crosses the finishing line.

## Top tips for both Slalom and Parallel Slalom Racing

- The top competing riders will use full power to maximum effect throughout their run.
- Power will be applied full on then off for the turn then full on and then off for the next turn and so on throughout the course.
- Critical to the success of this will be maintaining an extremely accurate racing line
- Maintaining a smooth flowing line at all times is vital
- Reading the water conditions correctly
- The use of goggles at night is often a problem due to light refraction

## General Notes

There are no beach starts in this discipline and no sighting laps. As with all types of racing practice is essential, especially developing the skill to be able to apply maximum bursts of power for as long as possible prior to safely taking the turn. Good technique here will be a winning formula.

# Freestyle

UIM Aquabike Freestyle is similar to other motocross freestyle events except it takes place on water. Freestyle is a showcase of skill and ability in controlling a stand up ski.

Freestyle is anything that requires skill that is not part of regular riding. When Freestyle started it was predominately based around on water tricks such as submarining, this was because the early machines were not powerful enough to deliver the modern Aerial tricks.

# Contents

## Freestyle

• Freestyle	149
• Definition	149
• How to get into Freestyle	150
• Two distinct types of Freestyle	151
• Points Scoring	151
• Jury	152
• Start and Finish Procedures	152
• Freestyle Machines	153
• Personal Equipment	154
• Physical training	154
• Training to be a freestyle rider	154

# Freestyle

## Definition

This category is more of a competition than a race. Riders are given a duration of 3 minutes to perform a rehearsed routine, one at a time. The tricks are evaluated by a team of five expert judges. The evaluation criteria are: quality, quantity, mistakes, quantity of tricks performed with one leg or one hand, and variety. The most common tricks are Backflip, Barrel Roll, 360, Superman and Submarine.



# Freestyle

## How to get into Freestyle

Freestyle is a way of life, it will require a major time commitment by you in order to train for and perfect championship winning tricks and above all you must be extremely fit. Listed below are some points that you should take into consideration

- You must have previous riding experience on a stand up machine
- Start with a regular stand up machine
- It is very very difficult to get on a standard stand up machine and attempt tricks or figures without some kind of instruction
- Starting in Freestyle is the most difficult phase of training you must be ready to crash, crash and crash some more.
- Understanding how to do the tricks and the physics that make them possible is initially very difficult to gain
- An instructor will help you at this critical phase and he/she will help to unlock the secrets to performing at first basic tricks such as submarining and then moving on to the more complex Aerial tricks
- Each Freestyle trick holds complex keys to successful performance, you must unlock these before you become successful
- Finding a Freestyle Instructor can be difficult, some of the international Freestyle riders may be able to help but if they are competing internationally their time may be restricted.
- If you purchase Freestyle Ski from a supplier they may be able to help put you in contact with an Instructor
- Videos on the internet are available and watching these may help
- Google Aquabike Freestyle Instructors. Jet Ski Freestyle Instructors etc.



# Freestyle

## Two distinct types of Freestyle

- Old school on or below water tricks/figures
- New School Aerial tricks/figures

## Points Scoring

Current UIM scoring of Freestyle tricks/figures is based upon 2 points for a successful on or below water trick and 4 points for new school Aerial tricks. There are no requirements within the rules for the rider to perform both types so Freestyle Aerial new school is now the favoured option.



# Freestyle

## Jury

The jury will be composed of minimum 5 members and 1 timing officer. The points will be allocated according to the following system:

- A total of 115 points are available to each rider:
  - 30 points maximum will be allocated for the total number of figures executed
  - 1 point per figure successfully executed
  - 50 points maximum will be allocated on the variety of figures according to the following:
    - Aerials: 4 points for every different figure executed
    - On Water: 2 points for every different figure executed.
  - 5 points maximum will be allocated for figures where extremities (no hands etc.) are released. 1 point per figure
  - 1 point will be deducted for each minor fall or body contact with the water which is not considered to be part of the figure
  - 30 points will be allocated by the Judges on the quality of execution, the pilots imagination, the use of the water plan and the sequence between the figures. Every Judge will dispose of 10 points maximum; the highest and lowest scores will be eliminated.
  - In case a figure is not finished, or if the pilot falls into the water not holding his Aquabike there will be no allocation of points.
  - The judges may unanimously decide to allocate 10 extra points to the freestyler that is performing new freestyle or a particularly spectacular show.
  - In Case of Equality the score given by the judges will determine the positions.



## Start and Finish Procedures

The start sequence commences by the blowing of a horn and the showing of the green flag. The pilot indicates to the Jury that he/she is ready to start their exhibition by raising an arm, the timing officer starts the sequence from the start of the first figure. A brief sounding of the horn and a green/red flag will indicate to the pilot that 30 seconds remain until the finish.

The end will be indicated by a long sounding of the horn and the presentation of the red flag. A tolerance of 3 seconds is given.



# Freestyle

## Freestyle Machines

### General

Freestyle activities started as a result of racing riders finishing racing and then wanting to show what they could do with their machines. To start with existing racing machines were used but these were too slow and heavy to perform many tricks. The first successful ski used for Freestyle was the Yamaha Super Jet, this has now been superseded with specialist customized machines but this ski is still used in racing today.

UIM only have one Freestyle Class: Pro Freestyle, like all other classes in the UIM full details of the rules and regulations governing this discipline can be found in the UIM Aquabike Rule Book at [UIMpowerboating.com](http://UIMpowerboating.com)

Local National Authorities in different countries also run Freestyle events and some local National rules may apply UIM Freestyle is always held in conjunction with a racing event.

### Customised Freestyle Skis

All skis used in UIM Pro Freestyle are purely bespoke and highly customized; they incorporate specialist hulls, pumps and engines. More details are given below on the extent of this customization below:

- Hulls are much shorter than the standard stand up ski; they are also much lighter and are often made in light weight carbon.
- The shape of a Freestyle ski is also completely different; the underwater bow section is curved upwards to assist in creating jumps and providing lift.
- The construction and design of the deck is not really relevant but again the deck will be constructed in lightweight materials such as carbon.
- The water intake on the underside of the hull will be much larger than a standard machine; this allows large amounts of water to be sucked in by the pump and thereby to deliver maximum thrust.
- The water pumps are much larger than standard, they are designed to deliver the maximum capacity that the engine can handle, this ensures that maximum power and thrust is delivered.
- The trim control on Freestyle machines is reversed thereby giving the rider the ability to aim the jet upwards to propel the ski into the air and then perform a series of Aerial tricks
- Very small fuel tanks are used, only sufficient fuel is carried in order to get to the competition site and perform the tricks for the three minute duration
- The key to a successful design is for the engine to deliver maximum thrust for a split second and to propel the machine and rider as far as possible into the air.
- Power to weight ratio is therefore crucial.
- Don't forget the weight of the rider is part of this successful formula.

### Customised Freestyle engines

Engines in this discipline typically deliver 250hp plus, engines are purpose built and include large pistons, no charging capacity, the engines are designed to deliver maximum thrust for a split second.

- No Limitation on engine size but most International competitors opt for a 1200 cc capacity engine
- Engines can be blue printed, ported, and modified in any way
- The use of titanium pumps is common as they are very strong and very light

# Freestyle

## Personal Equipment

Only a life vest is mandatory in International competition however the use of a wet suit full or shorty, gloves and shoes is highly recommended.

## Physical training

It is essential that a Freestyle rider is fit however the best way to achieve this is by regular practice and riding the ski. Before you start you must prepare yourself for the physical challenges that you will face, most top competitive riders will follow a strict training programme and you should be prepared to train a minimum of three times a week ensuring that you achieve 20-30 minutes of hard physical exercise during each session. If possible use a personal trainer as they will be able to structure your training programme to suit your individual needs. Clearly a Freestyle rider will have different criteria to a GP1 Runabout rider.

You need to consider the following points when measuring your fitness levels:

- Body weight
- Strength
- Stamina
- Flexibility
- Mobility
- Agility

Being fit alone won't win competitions but it will give you more confidence and confidence will help you to win.

## Training to be a Freestyle Rider

During the course of your training you will experience bruising, scraping and other such injuries, be prepared and protect yourself. Failure to take these common sense precautions could result in serious injury.

It is highly recommended that you use the following safety equipment when training:

1. Suitable life vest
2. Suitable helmet
3. Knee pads
4. Shin Pads
5. General body armour

# Environmental

# Contents

## Propstarts and the Environment

• The UIM Environmental Code	157
• The key areas of responsibility	157
• General Principles Definition	157
• Noise	158
• The UIM recommends	158
• Fuel	158
• Protection of Ground Water	158
• Environmental Mat	159
• Action to be taken by drivers / participants	159
• Requirements to encourage environmental behaviour by the spectators	159
• Here are some suggestions	159
• A Summary of Key Points to follow	160

157

157

157

158

158

158

158

159

159

159

159

160

# Propstars and the Environment

## The UIM Environmental Code

The UIM place great importance on ensuring that a strict code of conduct is followed at all race meetings with regard to the environment. Through the UIM Propstars programme we will seek to educate competitors and officials in order to establish the highest environmental standards and levels of consciousness during the organisation of all powerboat events. The UIM Environmental Code must be adopted and followed and the education of both new competitors and officials is of the utmost importance.

## The key areas of responsibility

1. To raise awareness on the effects of racing and to consider how to reduce the impact
2. To promote environmental responsibility with both competitors and race officials

## General Principles Definition

3. Powerboat activities fall into three main categories: competition, recreation and transport.
4. Competitive powerboat racing events are a major constituent of the international and national sporting calendars, attracting an increasing audience and producing significant economic effects. It is a sport which, like most other sports, and human activities in general, creates an impact on the environment.
5. Power boating activities in general, as a means of transport or for recreation, continues to increase, and therefore must also be looked at from an environmental point of view. The UIM will do its best to transfer best practices from competitive power boating to these other areas.
6. The UIM considers it to be of major importance to develop a coherent environmental policy, taking into account the legislative and regulatory requirements of each country.
7. The UIM will seek to establish at all times the highest environmental standards during the organization of powerboat events at all levels and will promote environmental consciousness among all powerboat racers. The UIM will do so in close co-operation with the National Authorities and all involved stakeholders.
8. The UIM environment policy, as defined in the UIM Environmental Code, is based on mutual respect of the needs of the environment and of reasonable practices of powerboat sports and powerboat driving in general.
9. The UIM seeks close co-operation with international authorities and organizations in order to ensure that there are sufficient facilities for powerboat activities in environmentally acceptable conditions and encourages its member nations to do so at national, regional and local level.
10. All national federations affiliated to the UIM shall do their best efforts in order to give proper prominence to environmental matters and to the principles of the UIM Environmental Code. Full details of the UIM Environmental Code can be found at [UIMpowerboating.com](http://UIMpowerboating.com)

# Propstars and the Environment

## Noise

Concerns regarding noise at powerboat events are not limited to the machines themselves. In addition to the expected engine noise, organizers and environmental stewards must be aware of the magnitude of sound from public address systems, crowds and other sources associated with an event. Minimizing excessive noise associated with powerboat activity and taking public reaction to noise in consideration is the responsibility of all concerned: drivers, clubs, organizers and officials.

## The UIM recommends

- To avoid all unnecessary running of engines.
- To reduce as much as possible the sound levels in all disciplines and ensure that all applicable regulations are strictly respected.
- The UIM shall always promote research on the question of sound level in relation to powerboat sports.
- The UIM will aim to set regulations stipulating the maximum permitted noise levels for each class.
- Noise levels should be set for the different classes in cooperation with the different commissions. When the limit has been set the regulations shall be monitored and sanctioned strictly

## Fuel

It is recommended that regular unleaded fuel, available at the service stations, or other cleaner fuels provided by the organizers, without additives, except oil for two stroke engines, is used. The use of alternative energies such as bio fuels, hydrogen or electricity, as long as they are not more noxious for the environment, must be encouraged for all disciplines in conformity with the relevant technical regulations. For the purposes of protecting the environment, provisions regarding fuel storage mentioned in the relevant rules must be respected.

## Protection of Ground Water

- Measures must be taken to prevent leaks of fuel, oil, cleaning, degreasing, cooling and brake fluids, etc. into the ground and water or vapour into the air.
- Containers/facilities to recover rubbish, oils, chemicals, detergents, etc. must be provided.
- The use of an environmental mat, (or other effective device) protecting the ground and water, is compulsory to be used where servicing of machines is permitted by the organizer, amongst others in the paddock and repair areas. Any infraction of this rule will be reported to the OOD who will fine the driver/pilot responsible a maximum of USD \_\_\_\_\_000 or any other amount mentioned in the regulation or appendix of the discipline.
- Provision must be made for the treatment of spillage and the disposal of contaminated material by the organizers.
- It is strictly forbidden to empty onto the ground and water waste fluids from vehicles or boats located in the drivers' paddock and the campsite. Waste water may only be disposed of at the circuit a proper facility to this effect. Any infraction to this rule will be reported to the OOD who will fine the driver/pilot responsible a maximum of USD 500. Other sanctions may be pronounced by the OOD or the UIM Commissioner.
- Do not leave on the spot sustainable evidence of any event, club or boating activity.

# Propstars and the Environment

## Environmental Mat

The Environmental Mat is compulsory for all disciplines. It must be composed of an absorbent part and an impermeable part. Its use will be compulsory everywhere where work on powerboats is allowed by the organizers.

## Action to be taken by drivers / participants

- Each driver is responsible for the waste generated by his team during the event.
- Where organizers provide the necessary containers for waste they must be used as directed.
- Waste must be retained by the team until the approved facilities provided by organizers can be used.
- Where refuelling or servicing of a powerboat is being undertaken at events, driver/participants must provide and use an environment mat to protect the ground and water. This environmental mat must also be compulsory when an electrical generator or any other device with a thermal engine is used by the driver/pilot or the team. These mats must be removed by the driver/pilots/competitors after use.
- Any infringement by the participant or driver/pilot (who is responsible for his team) of the UIM regulations can result in a fine, disqualification from the event or suspension, and may also result in the participant or driver/pilot being liable for any costs of rectification.

## Requirements to encourage environmental behaviour by the spectators

Visitors to a powerboat circuit, track, event or gathering can play an important role in keeping the environment clean and undamaged.

## Here are some suggestions

- In co-operation with the local authorities, select the routes to and from circuits, tracks, etc., which will cause as little annoyance as possible for the surrounding areas.
- Provide clear signs to circuits, tracks and venues.
- Avoid parking on vulnerable places (verges, green lanes).
- Avoid parking in long grass.
- Promote the use of public transportation in publications and promotional releases i.e. web or other forums.
- Avoid too high concentrations of people in order to preserve vulnerable places i.e. wildlife and bird reservation.
- Provide sufficient sanitary facilities and safe cleaning and deposit systems.
- Inform the spectators about responsible behaviour on the site.
- Specify in contracts with catering firms a requirement to sell drinks and food packaged in recyclable, reusable or biodegradable material, and to provide and maintain sufficient waste containers. Promote cooperation with caterers that have high standards on ethical and ecological food.
- Manage the events in such a way that only footsteps remain on the soil.

# Propstars and the Environment

## A Summary of Key Points to follow

Description	Comments
UIM Environmental Code Knowledge and usage	Where to find details of the code and how to apply it to local events, races, competitors and officials
Environment, emissions and sustainability	To ensure that the impact on the environment is minimal with particular regard to emissions and sustainability
Eco-friendly accommodation available?	To promote the use of eco-friendly accommodation, responsibility of officials organising the event
Environmental information for spectators	Information on environmental control measures to be made available to the public
Cleaning up race site before the race	Responsibility of all, this is something that will appeal to juniors and participating schools
Instructions for participant about environmental protection	Competitors and Officials to be educated within the UIM Propstars programme on the importance of environmental protection
Recycling stations in pits and for spectators	These to be made available at all Powerboat Racing events
Loud speakers positions and directions to minimize noise	To educate competitors and officials on their responsibilities to ensure noise pollution is minimised
Person(s) who take care about collecting waste at the time of the event	To train and nominate appointed officials responsible for these actions.
Environmental instructions at drivers briefing	To train UIM Officials with Propstars to promote an environmental understanding at all powerboat racing events.
Check of using mats under engines and refuelling areas	To educate Officials and Competitors to appreciate the importance of these actions
Cleaning instructions and restrictions of boats	To educate Officials and Competitors to appreciate the importance of these actions and in particular the use of bio degradable products
Noise measurement equipment? Find correct place for measurements	To educate Officials and Competitors to appreciate the importance of these actions
Measuring noise of boats	To increase the general knowledge of awareness regarding noise pollution. To help us to return to a venue in the future
Fuelling in the authorized zone	To minimise environmental impact and to increase safety
Monitoring of smoke / pollution	To minimise environmental impact and to increase safety

# Instructors Notes

# Contents

<b>Basic Training Module</b>	<b>164</b>
<b>Advanced Training Module</b>	<b>170</b>
<b>Competition Training Module</b>	<b>176</b>
<b>Additional Training Modules</b>	<b>181</b>
• Freestyle and Slalom	181
• Environmental	182



# Basic Training Module

## Suggested 4 day training course

### Day One Basic

09.00 – 09.30

**Meet and Greet:** Initial meet and greet, provide an overview of the UIM Propstars Training programme including the three levels, Basic, Advanced and Competition and to set out the goals and objectives of each section.

09.30 – 10.00

**Getting Interactive:** what experience, enthusiasm and drive do the trainees have and how do they see themselves involved in the programme

10.00 – 10.15

**The Basic Training Programme:**

Present an overview of this module

10.15 – 10.30

**The Skis**

- Stand up
- Sit Down (Runabout)
- Freestyle.

10.30 – 10.45

**Pause for tea/coffee break**

10.45 – 12.30

**The Jet Pump, Engines, Control systems and Maintenance.**

- The Jet pump
- The scoop and ride plate
- Engines used
- Engine operation
- The operation of the reverse bucket
- Kill Cords
- Control gauges
- Engine and general maintenance

12.30 – 13.00

**Personal Safety Equipment, to include:**

- Life vest/Buoyancy aid
- Wet suit/Dry suit
- Gloves, boots and whistle
- Goggles
- Maintenance of personal equipment.

13.00 – 14.00

**Lunch**

14.00 – 17.00

**Water awareness skills**

**Practical on water training to include:**

- Safety Briefing on how to get out on the water: to include on water and on land risks, use of life jackets and all other safety equipment
- Handlebar controls, steering, forwards, effect of the reverse bucket, throttle, reverse brake
- Getting underway (Stand up and sit down differences)
- How to moor a ski
- How to leave a berth
- How to approach a berth
- Turning in a restricted area
- The effect of jet thrust, forwards and reverse

17.00 – 17.15

**End of day de brief and tasks for the next day**

The trainees will be asked to each prepare a different presentation for the following day; the topics will be selected by the Instructor and will include how the Aquabike/Jet Ski works, safety, mooring, basic controls and handling of the ski

**End Day One Basic**

### Equipment required

**Day One Basic module**

1. Classroom facility
2. A copy of the Propstars Aquabike/Jet Ski Training manual for each trainee, plus note books and pencils etc.
3. White board
4. Tables, chairs etc.
5. At least one training ski
6. Mooring ropes
7. Practice ropes
8. At least four small floating buoys with ground tackle
9. A suitable jetty or pontoon for practice mooring and approach
10. One life jacket for each trainee
11. Tea, coffee, refreshments and suitable toilet facilities ashore



# Basic Training Module

## Suggested 4 day training course

### Day Two Basic

09.00 – 10.00

Presentations by trainees

10.00 – 10.30

Trailing

- To include trailer maintenance
- Securing a ski to the trailer
- Slipway launching
- Departing a slipway launching site
- Slipway recovery
- Beach launching (where possible)

10.30 – 10.45

Coffee Tea etc.

10.45 – 11.45

On Board Safety Equipment

- Flare Pack
- Tow Line
- Fire Extinguisher
- Waterproof Torch
- Knife
- First Aid Kit
- Anchor and Line
- Food and Drink
- Tool kit and spares
- Documentation
- Spare Kill cord
- Folding paddle

11.45 – 13.00

Rope work, an interactive session: to include how to tie a round turn and two half hitches, a bowline, a clove hitch and a sheet bend. This also to include when to use the different knots.

13.00 – 14.00

Lunch

13.00 – 15.00

Practical on water training to include

- Mooring wind on
- Mooring wind off
- Ferry Glide Technique
- Leaving a mooring
- Leaving a restricted mooring

15.00 – 15.15

Coffee/Tea

15.15 – 17.00

Introduction to Driving round a Slalom Course

- Technique
- Control
- Speed
- Timing

17.00 – 17.15

End of day de brief and tasks for next day

The trainees will be asked to each prepare a different presentation for the following day; the topics will be selected by the Instructor and will include trailing and launching, safety, rope work and mooring in a restricted area and driving round a Slalom course.

End Day Two Basic

### Equipment required

Day Two Basic module

1. Classroom facility
2. Min 2 training skis would be ideal
3. A ski on a road trailer with securing straps etc.
4. A suitable slipway for launching
5. Mooring ropes and tow ropes and suitable fenders
6. Practice ropes
7. At least six small floating buoys with ground tackle
8. A suitable jetty or pontoon
9. One life jacket for each trainee
10. Tea, coffee, refreshments and suitable toilet facilities ashore

# Basic Training Module

## Suggested 4 day training course

### Day Three Basic

09.00 – 10.30

Presentations by trainees

10.30 – 10.45

Coffee Tea etc.

11.00 – 11.30

To consider Man Overboard Recovery.

- Head to Sea
- Beam on to Sea

11.30 – 11.45

Towing a Ski (In class and on water training pm)

11.45 – 13.00

Basic Navigation

- Collision Avoidance Rules
- Buoyage System (Choose system relevant to location)
- Basic Pilotage
- Tides and Tidal Streams

13.00 – 14.00

Lunch

14.00 – 14.15

Anchoring

14.15 – 14.30

Capsize Procedures

14.30 – 17.00

Practical on water training to include

- Fun ski handling: Lay salmon course, manoeuvring around a salmon course, control of ski, balance, smooth lines accurate use of throttle.
- Interactive Rule of the Road session on water using two or more training skis. To include the boats driving around in different directions and following the collision avoidance rules.
- Towing
- Anchoring
- Capsize Procedure (when possible)
- Man Overboard recovery

17.00 – 17.15

End of Day de brief and allocate tasks for the next day

The trainees will be asked to each prepare a different presentation for the following day, the topics will be selected by the Instructor and will include, collision avoidance rules, Tides and tidal streams, The Buoyage system, man overboard recovery, anchoring, towing, capsize procedures.

End of Day Three Basic

### Equipment required

Day Three Basic module

1. Classroom facility
2. Two or more training skis
3. Minimum 12 small floating buoys with ground tackle
4. Minimum two life rings or horseshoe belts for MOB recovery
5. Mooring ropes and tow ropes and suitable fenders
6. Practice ropes
7. A suitable jetty or pontoon
8. One life jacket for each trainee
9. Tea, coffee, refreshments and suitable toilet facilities ashore



# Basic Training Module

Suggested 4 day training course

## Day Four Basic

09.00 – 10.00

Presentations by Trainees

09.00 – 10.00

Weather

- Wind, waves and tides
- The Beaufort wind scale

10.00 – 10.45

General Revision of key topics

10.45 – 11.00

Coffee Tea etc.

11.00 – 13.00

Assessment Presentations by Trainees

- Each Trainee to give a 30 minute presentation using the training manual

13.00 – 14.00

Lunch

14.00 – 17.00

On water training Assessments to include

- Confidence on water
- Control of ski
- Use of controls
- Accurate driving around a Slalom course
- Mooring to pontoon
- Ferry glide technique
- Turning in a restricted area
- Reverse through Slalom course

17.00 – 17.30

Final De Brief, award of Certificates and Introduction to Advanced Training Module

End of Day Four Basic

### Equipment required

Day Four Basic module

1. Classroom facility
2. Min 2 training skis would be ideal
3. A ski on a road trailer with securing straps etc.
4. A suitable slipway for launching
5. Mooring ropes and tow ropes and suitable fenders
6. Practice ropes
7. At least six small floating buoys with ground tackle
8. A suitable jetty or pontoon
9. One life jacket for each trainee
10. Tea, coffee, refreshments and suitable toilet facilities ashore
11. Basic Certificates



# Basic Training

## CERTIFICATE OF COMPLETION



This is to certify that

.....  
Has completed the Basic Training course of the UIM Propstars Youth Development programme

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# Advanced Training Module

## Suggested 3 day training course

### Day One Advanced

09.00 – 09.15

Provide an overview of the Advanced Training Module, set out goals and objectives etc. Short resume of key points covered in the Basic Training Course, Check ability and competence of those attending.

09.15 – 09.30

What is UIM Aquabike Racing

09.30 – 10.30

Race Administration, Race Officials

- How to start Racing
- The role of the Officials
- Race Secretary
- The Officer of the Day
- The Safety Officer
- Technical Inspectors
- The Technical Inspection
- Time Keepers
- Commissioners

10.30 – 10.45

Coffee and Tea etc

10.45 – 11.15

Race Documentation and Briefings

- General Documentation
- Race numbers
- Advance and Race Instructions
- Drivers Briefing

11.15 – 11.30

Personal Safety Equipment

- Protective Helmet
- Racing Vest/Life Jacket
- Wet Suit
- Gloves
- Boots
- Body Armour
- Maintenance of personal equipment

11.30 – 12.00

Race Flags and Safety Procedures

- Green Flag
- Yellow Flag
- Red Flag
- Black Flag
- White Flag
- Blue Flag

12.00 – 13.00

General Safety and Race Etiquette

- Problems when Racing
- Engine Failure or lack of power
- Steering failure
- Throttle failure

13.00 – 14.00

Lunch

14.00 – 15.00

Start Procedures

- General Procedure
- General Rules
- Jetty Starts
- Differences for Beach Starts
- Differences for rolling starts
- Jump starts
- Jump start penalties

# Advanced Training Module

## Suggested 3 day training course

15.00 – 17.00

Practical on water training

- Start procedures
- Race control by flags
- Introduction to a full race Slalom course, practice driving at speed.

The trainees will be asked to each prepare a different presentation for the following day; the topics will be selected by the Instructor and will include, Race Administration, Drivers Briefing, Personal Safety equipment, Race Flags, Start Procedures and Race Etiquette.

End of Day One Advanced

### Equipment required

Day One Advanced module

1. Classroom facility
2. Race flags to include: Red, Yellow Black, White, Green, Blue and Chequered Flag,
3. 4 Training skis (numbers to be agreed in advance of training course)
4. Minimum 25 small floating buoys with ground tackle
5. Racing vests, helmets, goggles, boots and gloves for each trainee

Colour of racing turn mark buoys	Meaning
White or Yellow	Leave to the right
Red	Leave to the left
Black or as advised at Drivers Briefing	Penalty
Chequered	Finish line
Green/Blue as described in Race Instructions	Split channel buoys



# Advanced Training Module

Suggested 3 day training course

## Day Two Advanced

09.00 – 10.00

Presentations by trainees

10.00 – 10.30

The Courses

- A typical Aquabike/Jet Ski Race Course
- Race Course Marks
- Split Buoys
- Penalty Buoys

10.30 – 10.45

Coffee Tea etc.

- Missing Buoys
- Two Hole Shot Buoys
- The Control Tower

11.00 – 11.45

Riding Rules

- Overtaking
- Overtaking and Turn Marks
- Missed Marks and aborting the race
- Blocking or Reckless/Dangerous driving
- Control of machine during race
- Obstructions
- Accidents
- Injured pilots
- Outside Assistance

11.45 – 12.15

Racing Lines and Cornering

- Racing Lines
- High Speed cornering
- Differences for Stand up and Runabout Skis
- Foot and leg in water technique

12.15 – 13.00

Prepare Slalom Course, Skis and equipment

- Prepare full Slalom Course for practical training
- Preparation of skis and personal equipment for on water time trials.
- Practice driving on full Slalom Course

13.00 – 14.00

Lunch

14.00 – 15.00

Safety and Support Skis

- On water safety fleet
- Rescue Skis
- Marshal Skis
- Tow Skis

15.00 – 17.00

Practical on water training, Racing Lines and cornering

- Practice driving on Slalom Course
- Individual Time trials around practice course
- Time trials controlled by flags
- Start and stop procedures

# Advanced Training Module

Suggested 3 day training course

17.00 – 17.30 Practical on water training de brief

- Technique
- Fastest Rider
- Race Flags:

End of Day de brief and allocate tasks for the next day.

The trainees will be asked to each prepare a different presentation for the following day; these presentations will form part of their final Assessments for the Advanced Training Module.

End of Day Two Advanced

## Equipment required

Day Two Advanced module

1. Classroom facility
2. Race flags to include: Red, Yellow Black, White, Green, Blue and Chequered Flag,
3. 4 Training skis (numbers to be agreed in advance of training course)
4. Minimum 25 small floating buoys with ground tackle
5. Racing vests, helmets, goggles, boots and gloves for each trainee

Colour of racing turn mark buoys	Meaning
White or Yellow	Leave to the right
Red	Leave to the left
Black or as advised at Drivers Briefing	Penalty
Chequered	Finish line
Green/Blue as described in Race Instructions	Split channel buoys



# Advanced Training Module

Suggested 3 day training course

## Day Three Advanced

09.00 – 10.30

Final Advanced Assessment Presentations by trainees

10.30 – 10.45

Coffee Tea etc.

10.45 – 12.00

Final Assessment Presentations by Trainees

12.00 – 13.00

Prepare Practice training course, free practice

- Lay all training course buoys
- Free practice under control of tower

13.00 – 14.00

Lunch

14.00 – 15.00

Free Practice under control of tower

15.00 – 17.00

Time trials and Final on water training Assessments

- Race Starts
- High Speed cornering
- Overtaking
- Race Etiquette

17.00 – 17.15

End of Day de brief including race de brief,

17.15 – 17.30

Presentations of Advanced Certificates.

End of Day Three Advanced

### Equipment required

Day Three Advanced module

1. Classroom facility
2. Race flags to include: Red, Yellow Black, White, Green, Blue and Chequered Flag,
3. 4 Training skis (numbers to be agreed in advance of training course)
4. Minimum 25 small floating buoys with ground tackle
5. Racing vests, helmets, goggles, boots and gloves for each trainee
6. Advanced Certificates



# Advanced Training

## CERTIFICATE OF COMPLETION



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# Competition Training Module

## Suggested 2 day training course

### Day One Competition

09.00 – 09.30

**The Competition Module:** Provide an overview of the Competition Training Module, set out goals and objectives etc. Short resume of key points covered in the Advanced Training Course, Check ability and competence of those attending

09.30 – 09.45

**UIM Racing Categories**

09.45 – 10.00

**UIM Aquabike World and Continental Championships**

- World Ranking

10.00 – 10.30

**Choosing the right machine and the right class**

- Stand up
- Runabout
- Freestyle
- Budget
- Physical fitness
- National Competition.

10.30 – 10.45

Coffee Tea etc.

10.45 – 11.15

**Racing Preparation**

- Know your class Rules
- Race Instructions and course details
- Tools, spares and equipment
- Introduction to the Race Circuit

11.15 – 11.45

**Impellers and side sponsons**

- A quick guide to Impellers
- Impellers and the Jet Pump
- Impeller terminology
- Side sponsons

11.45 – 13.00

**Practice driving around the Race Course**

- Start procedures
- Cornering
- Understanding race flags

13.00 – 14.00

Lunch

14.00 – 15.00

**On the Race Circuit**

- Racing to win
- Racing Lines
- Cornering left and right turns
- High Speed turns
- Airborne
- Stuffing
- Hooking
- Chine walking
- Capsizing
- Avoiding collisions
- What to do if you are involved in a collision

15.00 – 15.30

**Finishing the Race**

- Finishing the race and leaving the race course
- The Protest Procedure

# Competition Training Module

## Suggested 2 day training course

15.00 – 17.00

**Practical on water training, Racing Lines and cornering**

- Practice driving on Slalom Course
- Individual Time trials around practice course
- Time trials controlled by flags
- Start and stop procedures

17.00 – 17.15

**End of Day de brief and allocate tasks for the next day.**

The trainees will be asked to each prepare a different presentation for the following day; the topics will be selected by the instructor and will include race preparation, Impellers, high speed cornering, airborne, stuffing, hooking, chine walking and avoiding collisions.

**End of Day One Competition**

### Equipment required

**Day Two Advanced module**

1. Classroom facility
2. Race flags to include: Red, Yellow Black, White, Green, Blue and Chequered Flag,
3. 4 Training skis (numbers to be agreed in advance of training course)
4. Minimum 25 small floating buoys with ground tackle
5. Racing vests, helmets, goggles, boots and gloves for each trainee

Colour of racing turn mark buoys	Meaning
White or Yellow	Leave to the right
Red	Leave to the left
Black or as advised at Drivers Briefing	Penalty
Chequered	Finish line
Green/Blue as described in Race Instructions	Split channel buoys



# Competition Training Module

## Suggested 2 day training course

### Day Two Competition

09.00 – 10.30  
Final Competition Assessment Presentations by trainees

10.30 – 10.45  
Coffee Tea etc.

10.45 – 12.00  
Final Competition Assessment Presentations by Trainees

12.00 – 13.00  
Prepare Practice training course, free practice

- Lay all training course buoys
- Free practice under control of tower

13.00 – 14.00  
Lunch

14.00 – 15.00  
Free Practice under control of tower

15.00 – 17.00  
Time trials and Final on water Competition training Assessments

- Race Starts
- High Speed cornering
- Overtaking
- Race Etiquette

17.00 – 17.15  
End of Day de brief including race de brief,

17.15 – 17.30  
Presentations of Competition Certificates.

End of Day Two Competition

### Equipment required

#### Day Two Advanced module

1. Classroom facility
2. Race flags to include: Red, Yellow Black, White, Green, Blue and Chequered Flag,
3. 4 Training skis (numbers to be agreed in advance of training course)
4. Minimum 25 small floating buoys with ground tackle
5. Racing vests, helmets, goggles, boots and gloves for each trainee
6. Competition Certificates

Colour of racing turn mark buoys	Meaning
White or Yellow	Leave to the right
Red	Leave to the left
Black or as advised at Drivers Briefing	Penalty
Chequered	Finish line
Green/Blue as described in Race Instructions	Split channel buoys



# Competition Training

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# Additional Training Modules

## Freestyle and Slalom

### Freestyle and Slalom

These additional Training modules require additional time to be built into the teaching programme. It is suggested that for the Freestyle and Slalom Modules one additional day be allocated. The following content must be covered in each section in this training module.

#### Freestyle

- Introduction
- Definition
- How to get into Freestyle
- Two distinct types of Freestyle
- Old School
- New School
- Points scoring
- Jury
- Start Procedure
- Freestyle Machines
- General
- Customised Freestyle Skis
- Customised Freestyle engines:
- Personal Equipment
- Physical Training
- Training to be a Freestyle Rider

#### Slalom and Parallel Slalom

- Introduction
- Types of Racing
- Parallel Slalom
- Definition
- The order of Competition
- Course Details
- Start Procedure
- Slalom Racing
- Definition
- Start Procedure
- Top tips for both Slalom and Parallel Slalom Racing
- General Notes

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# Additional Training Modules

## Environmental

### Environmental

The Environmental training module is extremely important and must be included in every training session. It is left to the discretion of the Instructor how to incorporate this module, it can be included as you progress through each module of the training programme but this requires the Instructor to have a very good understanding of the points set out below. Alternatively it is suggested that half a day is allocated to cover the key points below.

It is also suggested that a practical application of this topic could be included in the training process, make sure that you leave the training site as you found it or better encourage the trainees to participate in a local clean-up of the surrounding environment.

#### Propstars and the Environment.

- Introduction
- The UIM Environmental Code:
- The key areas of responsibility:
- General Principles Definition
- Noise
- Fuel
- Protection of Ground Water
- Environmental Mat
- Action to be taken by drivers / participants
- Requirements to encourage environmental behaviour by the spectators

### Acknowledgements

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**Dream ...**

**Train ...**

**Race ...**

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**The UIM is recognised as the sole competent authority in Powerboating including Aquabike/ Jet Ski by the International Olympic Committee**

Union Internationale Motonautique  
1, av des Castelans  
98000 Monaco  
Tel: +377 92 05 25 22 Fax: +377 92 05 04 60

Email: [uim@uimpowerboating.com](mailto:uim@uimpowerboating.com)  
[www.uimpowerboating.com](http://www.uimpowerboating.com)

