# Commercial & Rescue

Worldwide leader in the design & manufacture of hovercraft











# **GRIFFONHOVERWORK**



# The home of the hovercraft

Hovercraft are marine vessels which operate by creating a cushion of air between the hull of the vessel and the surface below. They are able to operate over almost any reasonably flat surface including shallow water, ice, vegetation, mud, logs and debris, rapids and flood plains.

We enable our customers to engage in tasks in some of the most diverse and inaccessible areas of the world, from the jungles of South America to the frozen seas of the Baltic and Arctic. Despite our customers' diverse requirements, they all have one thing in common - a need to access areas where conventional marine craft cannot go.

Our hovercraft are in use by those responsible for national security and commercial operations. Current roles include:

- logistical support
- mobile medical clinics
- oil spill response
- passenger operation
- search and rescue
- survey work









### About Us

Griffon Hoverwork is at the forefront of hovercraft development and has been involved in the manufacture and operation of hovercraft since they were first conceived in the 1950's.

We hold current ISO 9001 quality and ISO 18001 safety certification, we build to the latest IMO endorsed codes of practice and our craft are certified by International Association of Classification Societies members.

Our success is based upon our commitment to design and manufacture hovercraft that are adapted to the challenging environment and work requirements that our customers face. We have developed a range of craft that support light, medium and heavy payload needs. All can be customised to meet different mission and environmental conditions.

The people at Griffon Hoverwork have a long history of working in the hovercraft Industry. The founders of the business set up the world's first hovercraft operation, Hovertravel, in collaboration with Sir Christopher Cockerell.

Our mission is to sustain excellence in hovercraft, marine and related innovative technologies.

# **ADVANTAGES**







### Why choose a Hovercraft?

Our hovercraft use commercially available technology are diesel powered and use aluminium as the primary hull structure to make them easy to maintain and repair in the field. Our hovercraft have a range of advantages:

#### Highly Adaptable and Amphibious

They can travel over almost any non-porous surface and operate from any unprepared beach or slipway.

#### High Speed

They are fast compared to conventional marine vessels and capable of travelling up to 45 knots with a full payload.

#### Reliable

Our products are proven over tens of thousands of operating hours worldwide.

### Why Griffon Hoverwork?

Our commitment to a customer is paramount and this applies to the timeliness of our delivery, as well as the quality and performance of our hovercraft. Our product performance is proven through the design process and ultimately via real product testing. We give our customers what they require:

#### Knowledge & Experience

Our team has been involved in the design, development, manufacture and operation of hovercraft for over 50 years. We provide expert advice and support from the outset of a project.

#### **Quality & Performance**

We assure that we will deliver the contracted performance of our craft at full payload.

#### Commitment

We are committed to deliver on time, using lean manufacturing methods.

#### **Cost Effective**

They are considerably cheaper to operate than helicopters.

#### **Easy to Maintain**

Engineers with a good understanding of common user machinery can service and maintain the craft.

#### **Environmentally Friendly**

They make minimal wash or wake, and with no underwater pressure signature or propeller there is no impact on marine life.

#### Training

We offer engineering and pilot training from true professionals, the most experienced in the world.

#### After Sales Support

We offer service and maintenance packages along with support from in-country partners.

#### **Can Be Classified**

Classified by Lloyds Register, DNV-GL, Korean Register, US Coastguard and other classification societies.

# **APPLICATIONS**

#### **Passenger Ferry**

A hover ferry can be operated over shallow water from a beach or slipway. Routes can therefore be established that would otherwise be impassible to displacement craft. This opens up possibilities for direct, fast routes from new locations which customers would find invaluable.

#### Logistical Support & Cargo Carrying

All of the Griffon Hoverwork range can be configured in a full or half well deck format. This allows the craft to carry a range of equipment, from drilling rigs and survey equipment to light vehicles and cranes. The main cabin can be configured for crew or passenger transport.

#### **Detect & Respond**

Hovercraft integration with UAV's enables the user to track, monitor and coordinate response to maritime safety, surveillance and security. (See case study).

#### Hydrographic & Seismic Survey, Engineering Support

Our hovercraft are used across the globe in an engineering support role, such as dredging, cable and pipe laying in shallow water and marginal terrain. Our craft can be equipped with hydrographic and seismic survey equipment, allowing the operator to carry out studies in inaccessible shallow water.

#### Search and Rescue

In-shore, shallow and tidal areas, mud-flats, sand-banks, frozen seas and lakes are ideal areas for hovercraft. Their ability to perform rescues on tidal mud plains is unique. With our comprehensive search and rescue service, many SAR operators have found the Griffon range to be a vital asset to their operations.

#### **Oil Spill Response**

Griffon Hoverwork craft offer a stable, safe working platform to which all oil spill response equipment can be fitted, stored and safely deployed. The hovercraft's air cushion allows the craft to hover over any spill with limited contact with the oil. Reaching the area at high speed, the threat of further contamination or damage is limited.

#### **Engineering Support**

We are designing new heavy lift hovercraft of 35 tonnes and 150 tonnes payload for operations in support of humanitarian aid, disaster relief and roles in difficult and variable environmental and atmospheric conditions, designed to survive and be sustainable far from their support base.

#### Ice Rescue

Griffon Hoverwork has provided bespoke hovercraft to operate in sub zero temperatures for clients worldwide, offering an ideal solution for ice rescue, at the same time as limiting risk to the rescuer. Hovercraft can travel at speed over ice and snow, thus providing the quickest method to for rescue.

#### **Mobile Medical Clinics**

Hovercraft are the only solution when sending medical clinics and supplies to the most inaccessible corners of the globe. Our hovercraft offer clean, secure and spacious cabins that can be kitted out with the latest medical equipment to suit your requirements.













# SUPPORT & SERVICES



Due to the specialised nature of hovercraft, our dedicated after sales department provides a complete support solution.

#### Warranty & Support

Griffon Hoverwork has a dedicated after sales department which is committed to working closely with our customers to ensure spare parts are available when they are needed. We provide full scalings of depot and on board spares when a craft is ordered to ensure our customers have the items they need in country. We provide a minimum 12 months warranty and work with our customers to sustain their hovercraft through life.

#### Charter

Griffon Hoverwork have many years of experience in supporting hovercraft chartering operations in differing roles around the globe. We have a range of hovercraft available for charter on a weekly, monthly and annual basis. All craft are supplied with all the appropriate safety equipment and are fully coded by the UK Maritime Coastguard Agency. We also provide fully qualified pilots.

#### Servicing & Maintenance

Like all vehicles, hovercraft require regular servicing and maintenance. Our support model is built around enabling our customers and our local product support partners to maintain the craft. Our UK team of support engineers are set up to provide training, engineering advice and management support. We offer a complete maintenance service package as well as a full refit service.

#### Consultancy

Griffon Hoverwork offers a consultancy service on all aspects of hovercraft operation. Our expertise spans route analysis, business planning, terminal design, crew development, engineer training and a broad range of after sales services. We can consult on all aspects of design and research into hover technology, this is demonstrated by our recent contracts with international companies to research new hovercraft designs for cold climates.

# OPERATIONAL TRAINING

All our hovercraft are sold with a level of in-country pilot and crew training. Good pilots reduce wear and tear on the hovercraft which leads to reduced costs. Our training is flexible, customer focused and designed to enable clients to get the very best from their hovercraft. Griffon Hoverwork are authorized to issue Type Rating Certificates – our training meets and exceeds maritime regulations.

#### **Pilot and Crew Training**

High quality pilot training is the key to operating hovercraft safely and effectively. We have put together a comprehensive package of pilot and crew training courses, which can include specialist training such as Sea Survival, First Aid at Sea and a range of Commander's courses, leading to a recognised qualification. All training can be tailored to meet specific local legislation as required.

#### **Engineer and Technician Training**

Hovercraft engineer training is also available in the UK or in-country, whether you have just taken delivery of your new hovercraft or you require refresher training courses for your engineers. Our technical training is designed to take your qualified mechanics through the whole hovercraft to enable them to maintain it effectively, good maintenance means your hovercraft will achieve high availability rates.

#### **Train Your Trainer**

Once your pilots have gained sufficient experience, we can train your personnel to become trainers themselves. Your trainers must re-qualify every 3 years to retain their ability to issue qualification certificates.

#### **Specialist Training**

Griffon Hoverwork offers a range of specialist rescue training courses, to operators who have completed the pilot courses and gained sufficient experience for hovercraft operations. The courses are bespoke to your requirements and could include disciplines such as first aid, a commanders course, search and rescue navigation, and also covers differing rescue techniques on terrains such as shallow water, mud and ice.

#### **Operational Training**

We can also help to provide further operational training with our UK users in the emergency services or commercial ferry operations. Our pilots can stay with your team during mentoring periods to ensure you achieve the full benefit of your team and craft.







# TECHNOLOGY

At Griffon Hoverwork we are dedicated to developing new technologies and improved manufacturing techniques.

#### **Meeting High Standards**

Our hovercraft meet exacting engineering standards and are regularly classified by Lloyds Register, amongst other classification societies. Our processes and quality management system is certified to ISO 9001 we are continually developing our approach to provide products with even higher standards of robustness, reliability and performance.

#### **Innovation, Research & Development**

Our innovation is informed by customer feedback and through our engineering change process. Use of advanced electronic systems, enhanced cushion efficiency, improved transmission systems and faster build marine structures are now being fed into our new product development programme. At the heart of this is a desire to develop products that our customers need.

#### Performance

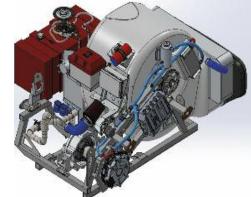
We take great pride in meeting and exceeding the performance criteria that are agreed with our customers at the outset of a project. We know the performance criteria we specify can be achieved and can prove this both theoretically and from real life application, proven over tens of thousands of operating hours.

#### **Hover Solutions**

At Griffon Hoverwork we design and build bespoke air cushion solutions, tailored to address our customer's specific needs. We can provide alternatives for those wishing to transport heavier loads and listen to the needs of our customers to ensure we can offer a range of services to meet any requirement.









# DESIGN ENGINEERING

#### Offering new and patented technologies

#### **Aluminium Bonding**

Griffon have pioneered and patented the design and manufacture of bonded aluminium structures as an alternative to traditionally welded structures, achieving a standard which is approved for manufacture and use in the marine environment and many other uses.

After extensive testing we have developed the capability to chemically bond large aluminium structures. This process allows us to retain its strength, achieve tighter tolerances, provide cost savings and greater dimensional control.

#### **Electric Drive**

Griffon have developed and patented a new flexible high powered, light-weight electric drive system, offering an environmentally friendly solution and operational cost savings. The system can be installed in new builds or retrofitted to provide sub-IMO boats with loiter/slow speed capability either using small diesel engines and/or batteries to reduce environmental impact, fuel consumption, layout constraints and maintenance.

The electrical system is fitted to operating marine vessels in Class and could provide the solution to many hybrid/electric propulsion initiatives for workboats, pilot boats, wind farm support vessels, super yachts and high-speed tenders.











## PROJECT ENGINEERING



Based on our proven expertise in lightweight marine vehicles, we have developed unique engineering and manufacturing capabilities to support our hovercraft and marine products. We have developed an end to end service delivering and supporting complete or part engineering projects, within our own facilities, at customers' sites, or even in the most extreme environments globally.

With first class skills in boat building, marine and electrical engineering, our in-house design team are experts at developing lightweight structures, mechanical and electrical systems and outfit solutions all to comply to the highest of standards.

Our low volume lean manufacturing techniques are all controlled by our project management processes to ensure that we deliver on time for our customers.

Our ISO 9001 and BH OHSAS 18001 accreditation gives assurance to the quality and safety of our work.

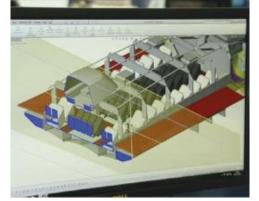
At Griffon we offer new and existing customers our focus on quality and innovation at a price which remains competitive and adds value. Our dedicated factory facilities are geared to providing a modern, efficient and productive manufacturing environment for our range of premier commercial and military vessels.

#### **Electrical**

Based on our proven expertise in lightweight marine vehicles we offer expertise in engine and transmission installation, belt driven transmissions, CANBus electrical testing and installation, diesel electric drives, integrated displays, linear actuation systems, switchboards and electrical enclosure building all to comply with rigorous safety and environmental standards.









# CASE STUDY FOR OIL SPILL CONTAINMENT AND CLEAN UP

Hovercraft have some unique properties that make them ideal for mobility and deployment in oil spill situations:

#### **Assessment Team**

Offering a large and stable platform, the hovercraft can act as a base from which to sustain survey operations using UAVs to find, assess and categorise the extent of oil spills in shallow water, beaches and location that are difficult to reach by conventional resources. The information collected allows the accurate and rapid deployment of the response team.

#### **Mitigation Properties**

Griffon pioneered the High Speed Craft Code for hovercraft as the design standard. Hovercraft are build certified by Lloyds Register of London and other Flag State authorities and are annually inspected by compliance surveyors to the standard of quality and safety required by the IMO through the national government agencies, which includes the Maritime and Coast Guard Agency in the UK who are the world's most experienced.

#### Containment

Hovercraft can carry and deploy booms to contain the oil spill, either deploying them at sea or on the beach to prevent wind and tidal, and of course the waves and wake from other ships breaking up and spreading the oil contamination further.



#### Collection

Hovercraft can be used for the collection and removal of oil spill and pollution. Because of their very low ground pressure (less than a human foot or vehicle tyre) they do not churn the surface and mix in the oil causing greater volumes of contamination to be removed. Instead, dense volumes can be lifted clear from the shallow and often environmentally sensitive areas and taken away for disposal or recycling.

#### Treatment

A modern technique for neutralising oil spills on shore is to use biological and microbial organisms which eat the pollution and convert it back to biomass. For the technique to work the shore needs to be supplied with pumps, tubes, oxygen or air, microbial agents and treatment teams. Hovercraft can often reach these areas where other vehicle, foot or boat deployments cannot gain access.







# SMALL CRAFT AND MEDIUM LIFT RANGE



### Griffon 380TD

The Griffon 38oTD is capable of carrying 5 people or a payload of 380kgs (837lbs). It is remarkably easy to operate, largely due to the ability to control lift and thrust independently, unlike most other small craft.

The 38oTD is a simple vehicle which has no side slip control (bow thrusters or skirt shift), an open loop skirt, inflatable cylindrical side bodies to provide buoyancy and reduce under hull pressure and an effective work surface from which to access items in the water.

Manufactured from a combination of aluminium and composite (FRP) materials, the 38oTD is ideally suited to inshore transportation in areas such as mud flats, swamps, ice and in the event of flooding. With the optional hover-on hover-off road trailer, one person can guickly and easily transport and operate this unique vessel virtually anywhere and provide emergency response over wider terrains.



#### Specification

Specification	
Length (m) Hovering	6.8
Beam (m) Hovering	3.8
Height (m) Hovering	2.9
Minimum Crew	1
Passengers (No Statutory Co	mpliance) 3-4
Passengers (Statutory Comp	liant) 3-4
Max payload (tonnes)	0.38
Standard Endurance (hours at most economical sp	<b>peed)</b> 4
Speed at full payload	28
Engine Type	1 x VW/ 1 x B&S
Power per engine (kw)	62/24
Obstacle clearance	0.36
Max wave height	0.5
Hull material	marine grade aluminium



### Griffon 995ED

The 995ED is the next generation of hovercraft, utilizing the latest high tech systems with key breakthroughs of diesel electric propulsion, adhesive bonded aluminium hull, modularised design, drop-stitch sidebodies, mixed flow fans and azimuthing propeller ducts.

The 995ED offers improved seakeeping ability, better manoeuvrability and greater control, making it the ideal rescue craft. The wide inflatable side decks offer an improved working area and can be deflated for transportation by road trailer. Powered by two diesel engines to electric drive modules the 995ED has additional reliability and lower noise levels. The modules can be quickly and easily removed for off craft maintenance. The large and accessible main cabin has outfit options for many different roles such as search & rescue, surveying or passenger ferry, with the optional configuration of accommodating up to two stretchers.



Length (m) Hovering	8.6
Beam (m) Hovering	5.2
Height (m) Hovering	3
Minimum Crew	1
Passengers (No Statutory Co	ompliance) 7-8
Passengers (Statutory Com	pliant) 7-8
Max payload (tonnes)	0.95
Standard Endurance 4 (hours at most economical speed)	
Speed at full payload	30
Engine Type	2 x Ford Tiger
Power per engine (kw)	85kw
Obstacle clearance	0.5
Max wave height	0.75
Hull material	marine grade aluminium



### Griffon 2000TD

The 2000TD is the longest running model in the Griffon Hoverwork range. Continuous development over more than 20 years has resulted in the most proven, versatile, single-engined fully amphibious hovercraft, offering a payload of up to 2000kg or up to 16 passengers.

A turbo-charged diesel engine, variable pitch propeller and advanced skirt design, delivers a fast, safe performance over a wide variety of terrains and conditions.

The marine grade aluminium hull and advanced composite mouldings guarantee strength, reliability and longevity. The cabin design is fully configurable for seating and cargo, allowing the craft to fulfil a wide variety of roles. Detachable side decks enable the craft to be reduced in width for transportation by road, in a standard 4oft shipping container, on a flat bed truck or in a C130 transport aircraft.



#### **Specification**

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Length (m) Hovering	12.7
Beam (m) Hovering	6.2
Height (m) Hovering	4.1
Minimum Crew	2
Passengers (No Statutory Co	ompliance) 14
Passengers (Statutory Comp	bliant) 8-15
Max payload (tonnes)	2
Standard Endurance (hours at most economical s	<b>peed)</b> 7
Speed at full payload	34
Engine Type	1 x Deutz
Power per engine (kw)	325
Obstacle clearance	0.73
Max wave height	1
Hull material	marine grade aluminium



### Griffon 2450TD

The 2450TD is developed from the 2400TD model, the longest model in the range. The 2450TD is a fast, versatile and robust single-engine amphibious hovercraft.

A choice of cabin superstructures allows the craft to fulfil a wide variety of roles, making it ideal for rescue and commercial applications.

The electronically-injected diesel engine, delivers a fast, safe performance over a wide variety of terrains and conditions. The marine grade aluminium hull and advanced composite mouldings guarantee strength, reliability and longevity.



Length (m) Hovering	15.2
Beam (m) Hovering	6.9
Height (m) Hovering	4.3
Minimum Crew	2
Passengers (No Statutory Co	ompliance) 16
Passengers (Statutory Comp	oliant) 8-15
Max payload (tonnes)	2.4
Standard Endurance (hours at most economical s	<b>peed)</b> 7
Speed at full payload	35
Engine Type	Deutz
Power per engine (kw)	430kw
Obstacle clearance	0.7
Max wave height	1.2
Hull material	marine grade aluminium

# MEDIUM LIFT AND BHT RANGE



### **Griffon 8000TD**

The Griffon 8000TD is a well proven design and is the most popular medium lift hovercraft. Capable of speeds in excess of 50 knots (58 mph or 93 kph) This craft cruises at a speed of 40+ knots with a full payload in zero wind, zero wave('o/o') conditions.

The 8000TD is powered by two water-cooled diesel engines, with an excellent power to weight ratio for a diesel engine. With its two 596Kw (800hp) engines, it offers more power to operators. Depending upon configuration, the 8000TD carries a 8-10 tonnes payload.

This high speed amphibious craft can carry 56 passengers in air line-type seats plus equipment. The 8000TD can also be equipped with a bow ramp and carry small conventional or tracked vehicles, or a combination of people and cargo/freight. It is also used in an aircraft crash rescue role and can be equipped with fire fighting and medical aid capabilities.



### **Specification**

Length (m) Hovering	22.52
Beam (m) Hovering	11
Height (m) Hovering	5.5
Minimum Crew	2
Passengers (No Statutory Co	mpliance) 56
Passengers (Statutory Compl	iant) 42
Max payload (tonnes)	8
Standard Endurance (hours at most economical sp	10 eed)
Speed at full payload	40
Engine Type	2 x IVECO
Power per engine (kw)	735
Obstacle clearance	1.25
Max wave height	1.8
Hull material	marine grade aluminium



### **Griffon 8100TD**

Capable of travelling at high speeds over a variety of surfaces, the 8100TD is favoured as a logistic or amphibious operational support craft. It can also be configured for passenger ferry services.

At 22.5m by 11m the Griffon 8100TD is a fully amphibious hovercraft capable of carrying up to a maximum of 75 passengers plus two crew. This craft can accommodate a light vehicle or a 20 foot ISO container as part of its 12 tonne payload.

Its unique design permits many possible superstructure options with the same standard hull and machinery installation. The craft is powered by two water-cooled Iveco diesel engines and has a hull constructed of marine grade aluminium.

The craft has demountable side decks, of aluminium alloy construction, which enable it to be reduced in width for transportation by sea if required.



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Length (m) Hovering	22.52
Beam (m) Hovering	11
Height (m) Hovering	5.9
Minimum Crew	2
Passengers (No Statutory Co	ompliance) 75
Passengers (Statutory Comp	oliant) 56
Max payload (tonnes)	10
Standard Endurance (hours at most economical s	10 10
Speed at full payload	40
Engine Type	2 x IVECO
Power per engine (kw)	735
Obstacle clearance	1.25
Max wave height	1.8
Hull material	marine grade aluminium



### Griffon 12000TD

The 12000TD is the most technically advanced and modern hovercraft available today, offering better fuel efficiency, low emissions and significantly less noise.

Designed and built in a modular method the 12000TD offers a highly configurable internal main cabin layout with large windows to provide a pleasant customer experience. The centrally mounted wheelhouse gives 360 visibility for pilots.

The craft is powered by two engines, this innovative drive system means the 12000TD is the only hovercraft to comply with the current MARPOL regulations for the shipping industry.

Maintenance costs are reduced through extensive use of highly reliable components and real-time data is provided to the maintenance team through a continuous on-board condition monitoring system.



#### **Specification**

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Length (m) Hovering	23.7
Beam (m) Hovering	12.8
Height (m) Hovering	7
Minimum Crew	2
Passengers (No Statutory Co	mpliance) 80
Passengers (Statutory Comp	liant) 80
Max payload (tonnes)	12
Standard Endurance (hours at most economical speed) 5	
Speed at full payload	45
Engine Type	2 x MAN
Power per engine (kw)	793kw
Obstacle clearance	1.5
Max wave height	2.5
Hull material	marine grade aluminium



### **BHT Configuration**

The BHT series craft are highly versatile air cushioned vehicles (ACV) able to work in a wide variety of operational roles. They operate in inshore waters with sea states having significant wave heights of up to 2 metres.

Designed to handle a high level of usage on daily scheduled operations, the British Hovercraft Technology (BHT) range of craft carry passengers and cargo with a combined weight of up to 22.5 tonnes. The structural design is highly robust with an aluminium transverse rib construction similar to that used in aircraft wings. Side decks are fixed and can be fitted with added cargo carrying pods.

The craft are powered by 4 engines, 2 providing lift and 2 providing thrust, offering both high levels of power and some redundancy in the event of an emergency. They are fitted with bow thrusters to provide control in yaw, which is considered highly beneficial when manoeuvring a large craft in tight spaces.



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Length (m) Hovering	29.3 - 33.7
Beam (m) Hovering	15
Height (m) Hovering	10.7
Minimum Crew	2
Passengers (No Statutory Co	mpliance) 180
Passengers (Statutory Comp	liant) 180
Max payload (tonnes)	18-21
Standard Endurance 6 (hours at most economical speed)	
Speed at full payload	45
Engine Type	4 x MTU
Power per engine (kw)	895/597
Obstacle clearance	1.8
Max wave height	3.3
Hull material	marine grade aluminium

# GRIFFONHOVERWORK



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