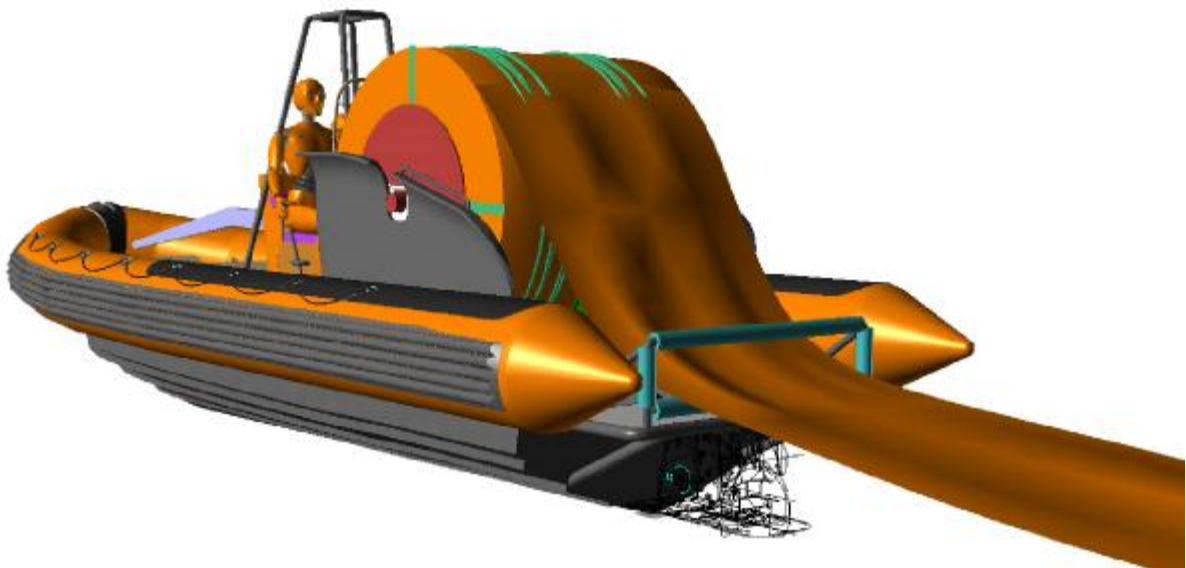


Technical Specifications

FAST CONTAINMENT BOAT





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1. - General boat description.

The boat is specifically designed to enable a rapid intervention in the prevention or combating pollution at sea or inland waters caused by oil spills or chemical products.

This is particularly ideal for oil platforms, refineries, ports, loading and unloading stations, treatment plants, and any facilities, which operate in open sea in general, or, in the coast or, all works related to the use of all type of products capable of causing polluting discharges at water surface.

Main functions of the boat:

- Rapid response boat with single release point.
- Equipped with spill control measures.
- Equipped with spill collection measures.

Field of performance:

- As a precautionary measure related to the maintenance, repair or installation/boat inspection tasks for those boats which operate with products, which have a high risk of polluting.
- As a preventative measure before shipping operations and loading or discharging of pollutants.
- As a preventive measure against the risk of potential discharges produced as a result of maritime accidents, drift boats, sinking, etc., for those boats, which carry waterborne contaminants.
- As a measure to control spills or leakage caused in all types of water produced either due to the facilities or the boats.
- As a measure for the collection and drainage of all types of waste produced due to a polluting discharge at surface level in the water.

2. – System's Advantages.

- Environmental:

- § Prevention of potential pollutant discharges.
- § Control and containment of spills, which have already occurred.
- § Collection of spills produced in the sea.

- Economical:

- § Speed in the response, avoiding the risk of irrigation or the expansion of polluting discharges at sea.
- § Stand-alone system that does not require deployment of any additional resource.
- § The cost will only be reduced in relation with an equipped boat.
- § It avoids costly measures, which would apply if a pollutant discharge were to occur.
- § Low maintenance costs.
- § Significantly reduces the cost of insurance premiums for the risk of discharged pollutants.

- Operational:

- § The system is of simple implementation and use.
- § Little space is required for stowage.
- § It only requires two people for the use and operation of this system.
- § Fully self-ruling.

3. - Main boat features.

The boat has a length between 7 and 9 meters and built in semi-rigid fibreglass or aluminium with a Polyurethane or Neoprene float, which assists the navigation in turbulent waters.

This type of boat model is designed for intensive and professional use, that supports a high load capacity, with a deep V hull which allows navigation in very adverse sea conditions, constantly maintaining the boats stability and capacity to develop high speed, capable of installing maximum power between 300hp and 500hp and are compatible with normal road transport.

One of its features is its internal freeboard that provides additional security to its occupants, providing in the bow, a high strut navigation aid with high waves and a generously sized float made out of polyurethane that makes this model more suitable for intensive and professional use.

The following elements are included on the boats hull:

- q A self inflatable reel barrier control:
 - q Length of the barrier of up to 500 meters.
 - q Polyurethane or PVC barrier, which is valid for open sea and up to 1,7 meters.
 - q Hydraulic motor for the barriers use and collection.
- q A Skimmer to retrieve the oily residue from the water surface with a maximum flow collection of 20 tons per hour.
- q A davit which allows for the introduction of the skimmer in the spill area and secure it during the collection process and lift it once the process is complete
- q Hydraulic device, which enables the handling of all equipment to be carried out by a single person only.
- q Hoist system for a single release point, which allows for rapid availability of power to be operational from single-point lifting equipment from offshore platforms, boats or helicopters.
- q Storage tanks of under cover domestic waste and potable PVC or Polyurethane floats.

4. – Technical features.

	FCB 750	FCB 900
Total Length	748 cm	885 cm
Interior Length	606 cm	750 cm
Total Breadth	280 cm	290 cm
Interior Breadth	162 cm	170 cm
Maximum Breadth moulded	160 cm	160 cm
Maximum Diameter	59 cm	60 cm
Nº of Compartments	6 + 1	7 + 1
Maximum authorised engine	300 HP	500 HP
Maximum Engine weight	400 Kg	550 Kg
Type of driving force	Jet	Jet
Maximum Nº. of people	5/5	6/6
Aprox. Boat Weight	855 Kg	950 Kg
Class C Maximum Load	3.620 Kg	3.695 Kg
Class B Maximum Load	2.795 Kg	2.945 Kg
Design Category	C/B	C/B
Fuel tank	200 litres	200 litres

Construction details of manufacturer:

- Safe design of all component parts in order to prevent electrical, mechanical and thermal hazards to the personnel: through the use of protection and covers for any control that could be accidentally activated through contact with personnel.
- Designed with ergonomic factors to accommodate people measuring 1,50 m to 1,90 m with equipment. The items of the lifeboat equipment shall be readily accessible for its use and cleaning and maintenance inspection.
- The boat and all its components will be free of local vibrations that could endanger the crew, damage the structure, machinery and systems that interfere with the operation and maintenance of machinery and/or boat systems.
- The materials used in the manufacturing of the boat shall be adequately treated to resist corrosion produced in marine environments, contact with hydrocarbons and UV radiation protection.

5. - Containment Barrier.

The barrier is self-inflatable and expands itself during the time of use through a self-tensile folding mechanism through the use of springs.

The sections are divided into compartments each of 2 meters and they contain waterproof chambers, which in case of damage make it unsinkable.

The **buoyancy** chambers are subject to atmospheric pressure so that it can adapt to wave movement in an optimal manner.

The barrier is deployed hydraulically, but in case of failure it can be deployed manually through its hydraulic brake.

The length, width and weight of the barrier is adapted to the boats destination, as the characteristics of these differ, in case of still waters and open sea.

Barrier characteristics:

- Speed deployment of the barrier: 50 meters per minute.
- Up speed of the barrier: 20 meters per minute.
- Is operated hydraulically or manually in case of failure.
- Self-inflating as it unfolds.
- Its expands during boat navigation
- Measure 0,5 to 1,7 metres in height.
- Weight of 3 to 12 Kg per meter.

Positioning and securing of the boats barrier:

The barrier will be positioned in the boats stern and will be fixed by a vertical or horizontal axis, with a barrier of a maximum capacity of 2000 kg, through a system, whereby if necessary, the prompt loading of a new barrier in order to extend the length of the initial one.

The boat has installed on the structure at the back of the deck a support allowing for the transportation or loading of the barrier and hydraulic deployment and collection thereof.

The barrier will be held to the installation to shorten the controlled discharge area, allowing for the connection of several barrier sections if the discharge extension may require it.

The system allows for the barrier to unfold in a speedy manner and, if necessary, the boat will move in order to collect new barriers for its link with the original, suspended by a davit or directly thrown back into the sea.

6. - Waste collection equipment.

The boat will transport one or various devices, which allow for the spillage collection and is fitted with a pump, which allows for the waste to be sent to the storage tank at the same time.

The storage tank can be located in the installation (port, platform, boat) or in the case of intervention, in open sea, the boat will include a self-floating tank that allow for the storage of spillage and regardless, the boat has two tanks under deck with a limited capacity of 380 litres for limited oil spill circumstances.

For oil platforms the boat will be equipped with a double Skimmer that uses two disk batteries or inserted plates on a perpendicular axis to the water. The discs have the property of repelling the water and adhere hydrocarbons of any nature with a minimum water content (less than 5%), and up to 1.000.000Cst in thickness.

- q Recovery: Up to 16m³/hour. (20 Tm/h) per device.
- q Application: Hydrocarbon recovery of all types of viscosity.
- q Bilge pump built into the frontal area with hydraulic action.

The devices shall be introduced in the spillage area, previously bounded to the barrier by a release system by means of a hydraulic-action davit installed on the boats deck and the device will be secured to the boat or by the davit for the prevention of it being drifted out to sea.

Depending on the type of discharge the use of different collection devices; both disk systems, overflow, suction, drum, brush etc., will be employed given that the flow rate, viscosity and sea state condition depend on the use of which type of skimmer for collection is to be applied.

If the pumping of waste occurs at a floating storage tank, the boat will be equipped with tubing that allows for the transfer of the product collected by the skimmer for subsequent transfer to the facility.

In the case of pumping to a fixed storage facility, its is only necessary to proceed to the connection of the skimmer tank hose.

If necessary, the boat may be moved to collect new skimmer units in order to accelerate the collection process.

7. - Operating methodology.

The boat is designed for rapid action, which allows for the containment barrier to be unfolded and if the case were necessary, the collection of produced discharges in the sea.

The order in case of full operation would be:

1. Press release button of alarm: Boat to sea.
2. Switching on of the engine.
3. Hook the barrier to the first point of the barrier installation.
4. Unfolding of the barrier simultaneously whilst navigating.
5. Automatic inflation of the barrier.
6. Tying of the barrier to the second point of the installation.
7. Hose connection from the Skimmer hose to the storage tank.
8. Loosening and securing of the Skimmer in the spilling area.
9. Pumping of the discharge to the tank.
10. Once the process is finished, raise the skimmer.
11. Barrier collection.
12. Rising of the boat.
13. Cleaning of the boat and its materials.

If necessary the boat can travel to an facility or a back-up boat for a collection of additional means both containment and collection allowing for the connection of various barriers, together, covering a larger area of control and also introducing more ways of reducing the time spent collecting it.

However, the system is completely autonomous as it alone, has the necessary means to control and collect the discharge, counting on its own boats with its own structural tanks for waste storage and also counting on floating tanks, for it to later be towed.

Additional means or devices in the case of mayor spills can in turn supplement it, given that its ability to act is designed in such a manner that it can deal with rapid action or a spill prevention.

The operation's estimated time of action until its collection connection, shall not exceed 10 minutes after the boat has been launched to water, so it is an actuation system, that without any doubt, can avoid serious and costly environmental impacts once a spill has extended at sea.

The boat can start its operation from a crane or davit, from land or directly from a boat, and even from a helicopter, we are considering a control system that thanks to its speedy implementation it can carry out an effective action in order to prevent environmental disasters.

8. - Summary of the boats set up:

A. - Up to 9 meters of semi-rigid aluminium or polyester.

B. - Float made out of Polyurethane or Neoprene.

C. – Deck equipped to prevent or control waste:

- Single point release allowing for quick release and lifting of the boat from a davit or helicopter.
- Aft structure for stowing, recharge and deployment of the containment barrier.
- A self-inflating barrier of up to 500 meters.
- A davit for the handling of the spillage collection of the skimmer.
- A skimmer team for the collection of spillages with a capacity of up to 20 tons per hour.
- Two floating tanks to store the discharge with a capacity of 50 cubic meters in the case of there not being no fixed storage tanks.
- Connecting hoses to pump the waste to the tank float.
- Cockpit of the boat.
- Installation for the handling of various hydraulic devices.

D. – Inboard engine with a jet drive between 300 and 500 Hp

E. – Two structural under-deck tanks to store waste.

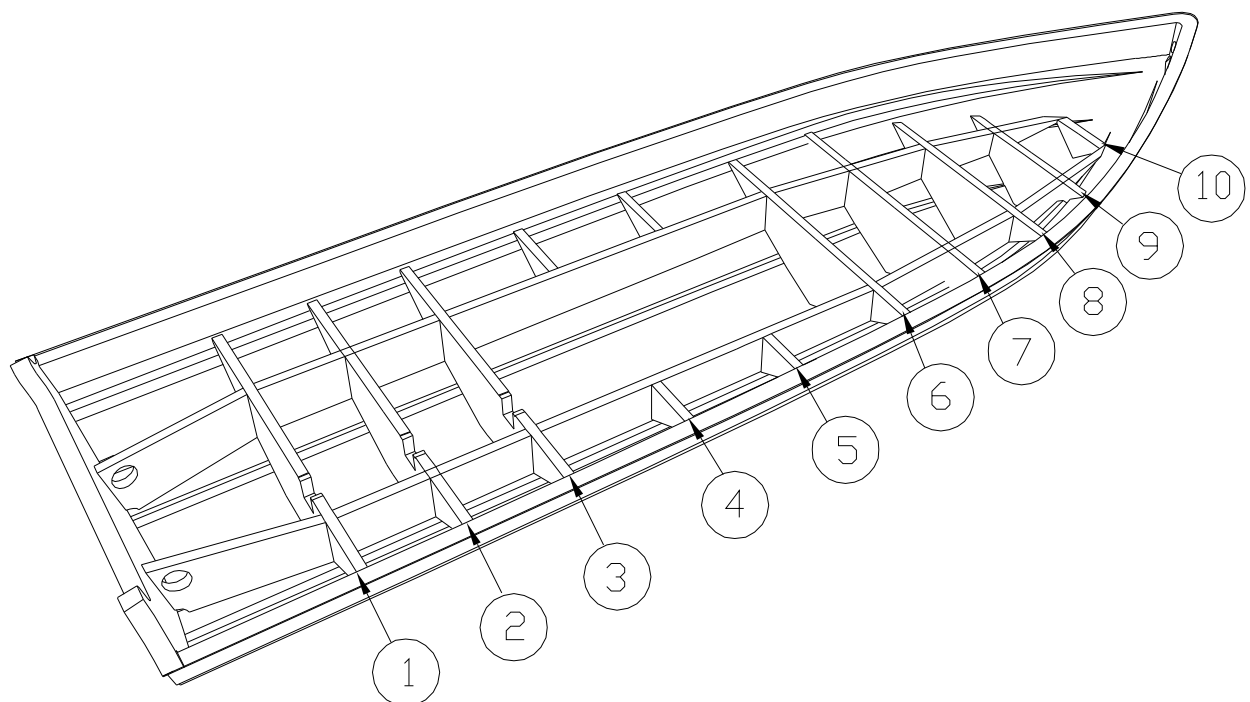
F. – A fuel tank with a 200-litre capacity.

G. – Engine room with hydraulic action devices of the equipment.

9. - Structural parts of the boat.

9.1- Description of the hull, keel and qualities

- It has a deep V hull and a good brace to ensure stable navigation in the worst conditions.
- Hull manufactured according to ISO12215 standard in fibreglass reinforced plastic (FRP) laminated with fire retardant Vinylester resins and gel-coat ISO / NPG
- Internal hull structure consists of self-extinguishing Polyurethane transverse rib plates with a closed cell and with a 35 kg/m² density and 50mm thickness, laminated with fibreglass and isophthalic resin, forming a high strength structure monoblock.
- The gaps in the structure are foamed with polyurethane foam with a closed cell and with a 35kg/m² density giving the entire boat extra unsinkability capacity, soundproofing and absorbing the majority of the vibrations that usually occur during navigation.
- Reinforced transom with a 40mm Okume and two laminated polyurethane straps to reinforce the mirror and bear the barrier weight.



9.2- Float

The boat has a polyurethane float installed with a diameter measuring approximately 60cm with two independent chambers and over-pressure valves in each of the chambers, linking its parts through automatic heat soldering processes, which guarantee a perfect sealing for all its compartments.

The float gives the boat a greater stability, floatability and manoeuvrability in the case of strong waves allowing for a better operation function in the barrier extension and waste collection, as well as speeding up the entire operation.

Although the fabric can be made out of PVC or Neoprene, the polyurethane technical specifications make it ideal to work with hydrocarbons.

The float has internal bulkheads made out of polyurethane fabric, which divide the floats in independent chambers; each float chamber in turn has an inflation valve with an anti-return system and an overpressure valve that regulates the excesses of pressure.

9.3- Single release point

The boat has a unique release point on the steering console placing an eyebolt on a metallic structure that allows its release from a fixed point ensuring the boats total equipped stability and with the crew on board during the release operation.

In the same manner, the boat has 4 aft steel eyebolts (2 indoor and 2 outdoor) where the outdoor ones are allocated for the towing of other boats or from the floating tanks and the indoor ones for the lifting of the boat by means of slings (with the help of 2 other internal lugs, located on the bow of the boat) as a preventive measure.

The bow of that boat feature a U-shaped lug made out of steel 316 for towing and anchoring functions, reinforced through the internal part of the hull with a steel plate and self-locking nuts and two interior bow lifting lugs.

These lugs are designed for the lifting system through slings with 4 arms for it's lifting in a safe manner for all the boats crew and equipment, allowing for the boat to be hoisted with a firm stability.

The system enables the boat to operate at sea, just a few seconds after a prevention process or spill control has commenced.

9.4- Fixing the structure of the barrier

The boat features, on its stern, a fixed structure that allows the anchoring of the containment barrier, the deployment and collection of the barrier and the replacement by a new load, if it should be required, a greater length due to the discharge volume.

The structure will have security measures which cover the entire crew, preventing the barrier from accidentally accessing the cockpit area.

It is a model with a fixed cover, which has 16 fixation points and consists of bolts with locking nuts that can withstand a weight of 2.000 Kg which allows for the securing, extension and retraction of the containment barrier.

It will have a device, which allows for correct barrier positioning and a hydraulic brake, which prevents an accidental deployment of the barrier or it folding too quickly.

The structure allows for the installation of all types of barriers limiting the weight to 2, 0 tons and the width to 1, 7 meters.

The structure allows for a fast barrier replacement either from a davit or a crane located on land, from another boat, from a helicopter or from a sea platform with a simple replacement of a barrier wrapped around a metal axis that adapts to the structure.

9.5- Internal waste deposits.

The boat has two tanks of 190 litres each in aluminium quality 5083 and with CE standard.

The tanks are installed below deck to obtain the maximum use of the deck, protected by a sealed lid in order to prevent water leaks and with parallel positions along the hull to stabilize the boats weight.

The waste tanks sit on a polyurethane pole in order to absorb vibrations and are firmly fixed to the boats hull through mechanical means, which allows for the tanks to be removed for subsequent cleaning.

The deposits have a limited capacity, which allows them to operate only in the case of few spills.

9.6- Floating tanks

In situations where it is impossible to directly pump the waste to the fixed storage tank, or that the internal tank capacity is not sufficient, the boat has two floating self storage waste tanks with a capacity of 25 m³ each ready for its connection to the hose connected to the skimmer.

The tanks will be able to be directly towed by the boat once the collection process to the mainland or to a fixed installation deposit has finished.

9.7- Skimmer davit or crane

The boat positions in its bow, a davit, which allows for the skimmers release, positioning and securing within the waste collection area for its subsequent boat lifting to be carried out once the waste collection is finished.

The davit will be fixed to the hull by means of a steel plate and will be of a swing arm, in order for it to allow for skimmer positioning overcoming the containment barrier within the spillage area.

It will equally allow for the securing of the skimmer in order for it to avoid drifting into the target area, and will also operate in case of replacement of the containment barrier to remove the reel shaft to be replaced.

In the case that the use of floating storage is required, the davit will allow for its handling from the boat in order to place it into the water. The davit will also be activated through hydraulic means.



10. - Accessories

10.1- Pilot console and equipment management

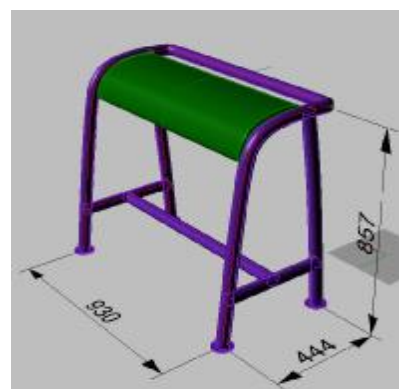
Black fibreglass console, with the capacity to shelter 2 people, it has methacrylate windshields of 44cm in height with windshield wipers and 2 watertight hatches with gates, an upper and a lower.

It has a stainless steel fitting of INOX 316, to provide passengers with a side and upper grip.

The console includes the entire boat administration, radar with a LCD 6" screen, a magnetic compass, a GPS and its aerial, rev counter, temperature and oil level warning indicator, a VHF with its aerial and loudspeaker, the corresponding switches for the entire light and acoustic indicator, a battery charge indicator and a switch which turns of the batteries power, a switch for the indicator for the fuel level, a switch for automatic bilge pump with three positions, a manual electrical projector (waterproof, floatable and with a wide span) with its fixation system which can be plugged into a 12 V plug and, a man over board device.

10.2- Hip seat

The two seater hip seat is made out of INOX 316 with upholstered padding for two people; it has a grip bar in the rear part for the other crew members. It has four legs to allow for a firm anchorage to deck and it is possible to adapt a chest in the lower part for storage of auxiliary material.



10.3- Motorization

The boat is equipped with an inboard diesel engine with a powered jet of up to 500 HP.

The engine provides the necessary power for the hydraulic operation of all the equipment, both the barrier extension and traction, pumping the skimmer and the davit performance.

Full-load speed: 28kn, which is enough for the containment operation.
Speed without collection equipment: 40kn

10.4- Steering system

The boat has an Ultraflex hydraulic steering pump and it also has an under-deck cable for the assembly of the hydraulic hoses, which have INOX connections, and in this manner it prevents the assembly of cables and pipes on the deck.

The console has an ergonomically designed steering wheel, and it is also slip resistant and robust in order for it to support the driver's maneuvers.

10.5- Fuel tank capacity

The boat has a 200 litre standard fuel tank, made out of Steel quality 5083 with CE approval. The tank is installed under deck in order for it to obtain and guarantee the deck's maximum use; they are protected by a lid and are sealed in order to avoid any water leaks to the tanks and it is located under the bow in order to stabilise the boats weight.

In the case of water inflows, the tanks are connected through the bottom part of the hull with the sterns cesspit in order for it to allow a correct automatic drainage towards the water pump.

Inside, the deposit has bulkheads to minimize the fuel movement inside the deposit from the wave movements, therefore controlling the fuel movements in the inside of the deposit. The fuel tank is seated on polyurethane rollers to absorb vibrations, and firmly fixed to the boats hull through mechanical means which allow removing the tank if necessary, and firmly holding the deposit.

10.6- Batteries and electrical systems

The entire electrical system will be capable of functioning simultaneously with any other electrical system without causing interference to any other electrical equipment or to the magnetic compass.

It has a distribution system of 12 V DC to be used to power the engine start and the service loads of the boat, including the following:

- * Interior and exterior navigation lighting,
- * Electrical equipment
- * Instrumentation
- * Water pumps

The interconnected batteries have a four position switch, mounted in the water tight hatch of the console in order to prevent accidental operations.

The sealed batteries are placed in the watertight hatch. It has a battery selector switch suitable for maritime environments allowing for the use either battery for emergency starts, if necessary; in a normal operation, one of the batteries will be dedicated to the starting of the engines and the other to the boats equipment and accessories and in the case of emergency the boat can start by switching the two batteries.

11.- The boats finishing touches

11.1- Exterior handles

The boats provide exterior handgrips reinforced with PU in order to help when exiting the water, mooring and boat transportation.

11.2- Material reinforcement on the float

The top area of the float is reinforced by a Polyurethane material, protecting the top area given that this is the area which most suffers.

11.3- Protective Strip

The outer part of the float is protected by a double protection strip made out of polyurethane with a breadth of 150 mm, offering the float a maximum protection in the case of collisions or impacts with other boats and, in turn, protects the containment barrier during the waste collection operation in its contact with the boat.

11.4- Rope

It has interior and exterior ropes conducted with a polyamide of 14 mm and in turn are joined to the float in the floats welded rings.

11.5- Rings with rope

The float has INOX rings for the fixation of a rope serving as a float for the crew and allows for the skimmer and the floating storage to be secured once they are operating in the water.

11.6- Bow reinforcement

The float has a double rope lead made out of PVC which protects the float from the contact with the anchor rope and from the abrasion produced in mooring manoeuvres or disembarking.

11.7- Bollard and bow handle

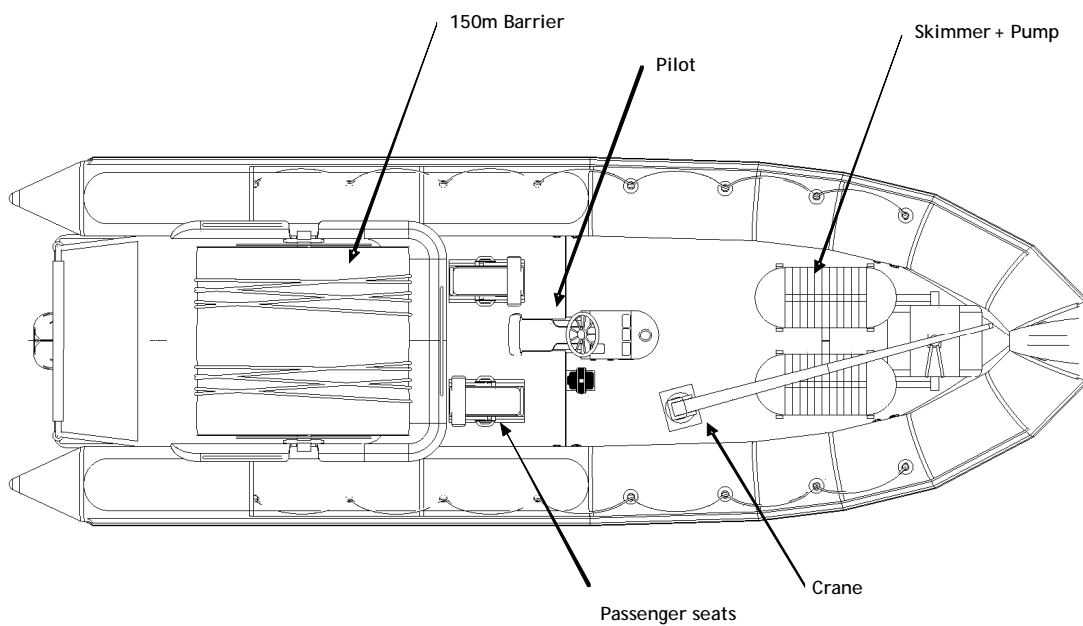
The float features a bollard on the bow with washer prfv of Inox 316 to guide the mooring line and as a support for the disembarking by the crew via the boat's bow; this piece incorporates two small mooring cleats.

The steel bow handle has a gripping width of 130mm and is adhered to the float using the same fabric for its foundation.

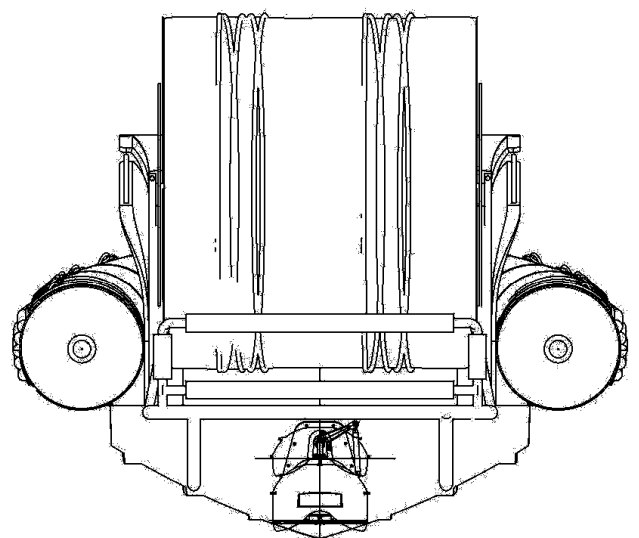
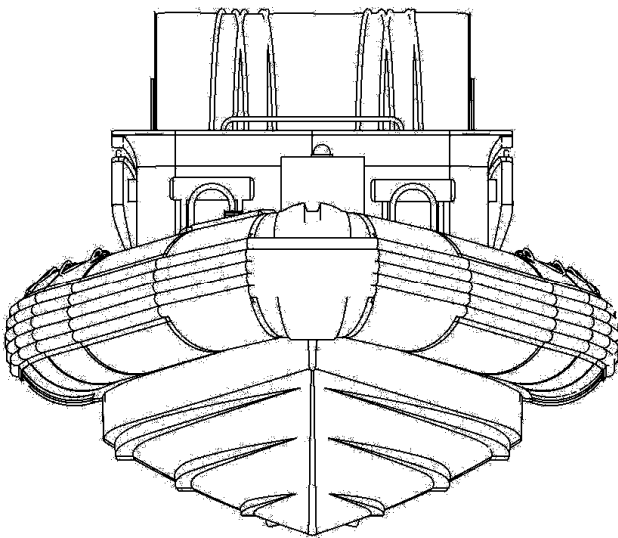
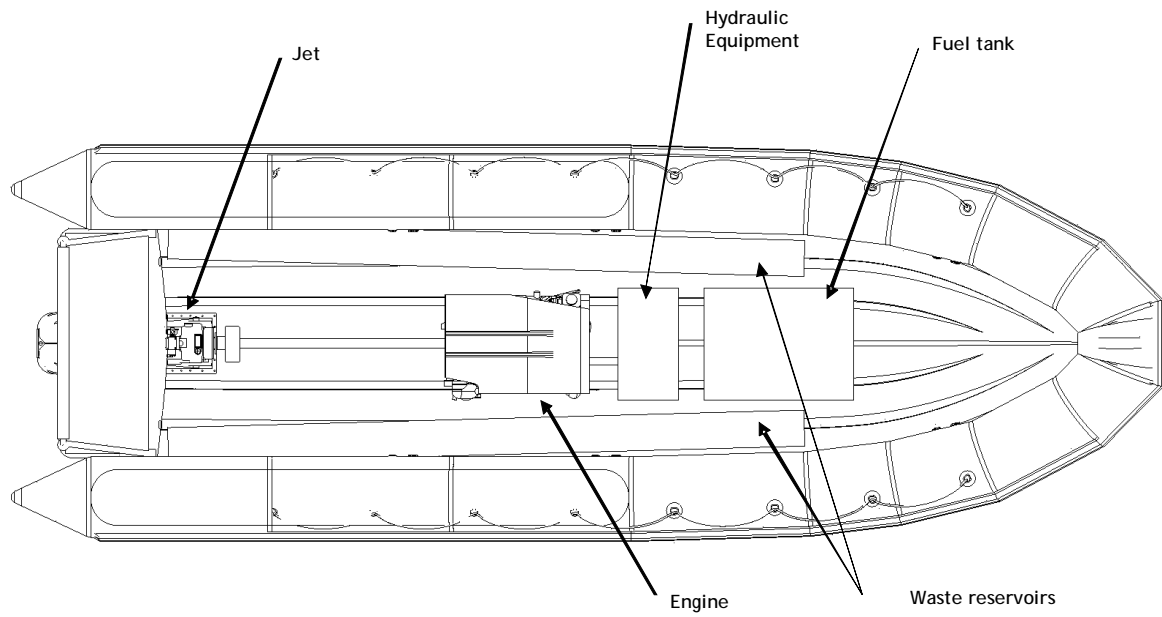
The handle is designed to enable secure floating storage tanks avoiding interference with the waste collection operation and avoiding it coming into contact with the containment barrier.

12. - Boat designs

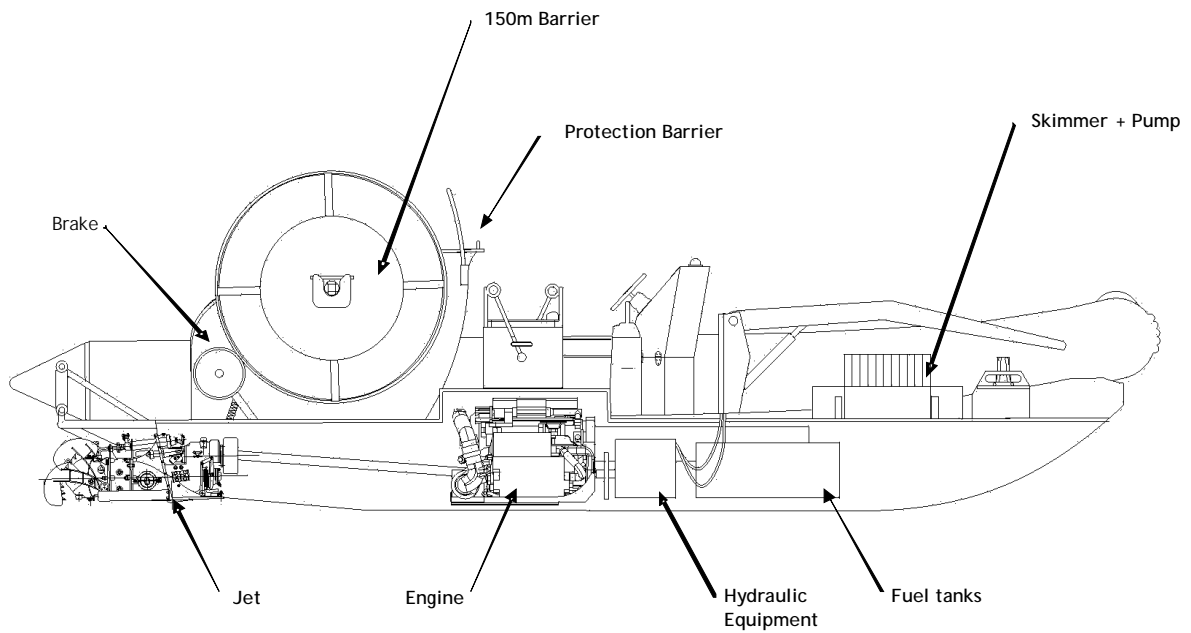
GENERAL NATURE



- **Containment Barrier**
- **Three seats for the crew**
- **Steering console**
- **Davit**
- **A double skimmer set for the collection**



GENERAL NATURE



SIDE VIEW

- **Containment Barrier**
- **Barrier Protection**
- **Engine and Jet**
- **Hydraulic equipment**
- **Fuel tank**

13. - Operational Performance:

A. – Boat Intervention, dropped into the water by using a fixed point release



B. - Containment barrier deployment



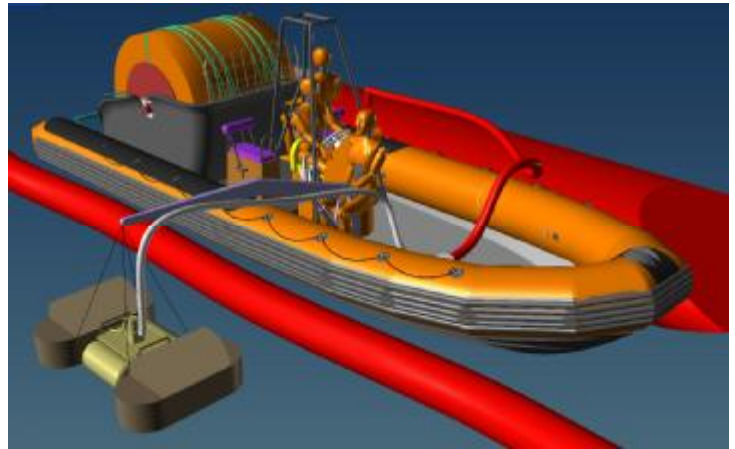
C. - Barrier Attachment



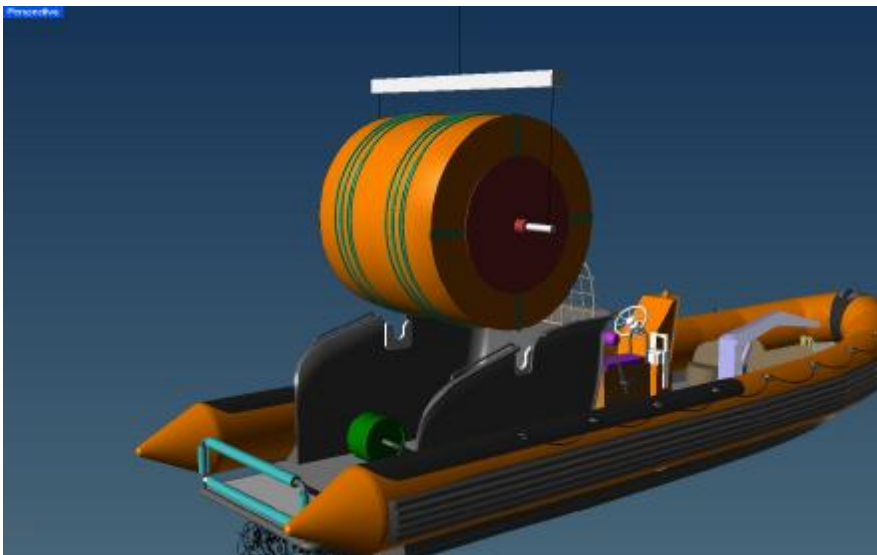
D. - Release of the Skimmer in the spillage area



E. - Pumping of the waste to internal, floating or fixed tank.



F. - Barrier recharge, if necessary



G. - Skimmer and barrier collection once the operation has finished.

