

**Approval Date: 20 May 1998****Reviewed on : 23 October 2007****Version: 1****Purpose**

The FRP (Fibre Reinforced Plastic) catamaran will be used to execute hydrological measurements in rivers, canals and reservoirs. Many of the measurements will be made in very shallow water.

**Conditions & Requirements**

- The FRP catamaran shall be of such a design that it operates reliably and safely under the prevailing environmental and hydraulic conditions.
- The boat shall be capable to operate in shallow water where repeatedly the hull may impact with rock or sediment.
- All materials on the boat exterior and on wet spots inside the boat shall be non-corrosive.
- The boat shall be very sturdy, unsinkable and shall have an adequate stability.
- The boat shall be easy to operate and maintain.
- The boat shall have an expected technical lifetime of not less than 10 years.
- The boat and the outboard engines shall be capable to operate for at least 6 months without any major servicing.
- The boat shall have floatation chambers filled with closed cell foam.
- The boat shall be provided with appropriate fenders.
- The boat shall have a cabin to accommodate equipment and staff.
- At port and starboard site the cabin shall have sitting benches with an in-built store cum board provided underneath.
- The cabin shall have windows and a lockable door.
- An opening of at least 3 x 3 m<sup>2</sup> should be provided on deck to carry out hydrological measurements.
- Access openings are to be provided in each compartment by flush manholes.
- The rear deck shall be provided with an awning.
- The boat shall be supplied with the accessories as needed for effective deployment.
- The boat shall be fitted with two outboard engines (see 10.036).
- The outboard engines shall be operated by a remote control system, located at the stern side bulkhead of the cabin.
- The control system shall have a starting switch, gear switch and a throttle system for each engine and a steering wheel and emergency stop switch for simultaneous operation of the engines.
- The control system shall match the outboard engines.
- Guard-rail and stanchions with detachable chain will be rigged out around the deck-opening. Suitable guard-rails shall also be provided around the deck.
- Bollards and fairleads are to be provided on the deck for mooring purpose.
- An overhead beam and a winch will be suitably positioned to lower and hoist the measuring equipment.
- A maintenance manual, related to the type and model of the FRP catamaran, shall be part of the delivery.

## Specifications

### 1. Boat

<b>length</b>	approx. 8 m
<b>width</b>	approx. 3.75 m
<b>draft</b>	approx. 0.5 m
<b>free board</b>	approx. 0.7 m
<b>bottom shape</b>	catamaran
<b>propulsion</b>	2 Nos. of 30 kW (40 HP) outboard engines
<b>carrying capacity</b>	2000 kg
<b>required speed</b>	5 m/s

### 2. Cabin

<b>length</b>	approx. 3 m
<b>height</b>	ample sitting height
<b>door</b>	lockable
<b>door width</b>	>0.8 m
<b>windows</b>	glass, possibility to open, closed water tight

### 3. Boat outfit

<b>anchor</b>	matching boat, fitted with 5 chain and rope for water depth of 20 m and current velocity of 5 m/s
<b>echo-sounder</b>	indicator type, fitted in the boat
<b>compass</b>	magnetic type, fitted in the boat
<b>fenders</b>	4 of Coir type
<b>paddles</b>	4 for rowing
<b>life-jacket</b>	for each person on board, also for guests
<b>life-buoy</b>	8 pieces with at least 50 m line, readily available on board
<b>fire extinguisher</b>	>5 kg

The fire extinguisher shall be readily accessible in the motor compartment (if any) and in the cabin

## Remarks

For the installation of winches, fitting of survey echo-sounder transducers etc. some local reinforcements and/or supports may be required. Arrangements shall exist for mounting the boat outfit (Bracket) and for dropping of the anchor to keep the boat stationary, during flow measurements. These can only be specified after selection of the survey instruments and other relevant equipment.

Arrangements shall be made for safe working on the boat.

For Indian bidders, the Registrar of Shipping, Mumbai, shall approve the design and drawing. For international bidders the design and drawing shall be approved by a national agency in their country authorised for the purpose and acceptable to the purchaser.

## Option

Optionally, the boat may be fitted with an instrument-well for acoustical and other transducers. Basically, there are two ways to install acoustical transducers, such as echo-sounder and ADCP, on a boat, viz.:

#### 1. Transducers attached to a bracket at the boat exterior

This method can be used virtually on any available boat. However, the bracket and transducer are relatively vulnerable and may generate considerable drag. Further, being at a distance from the boat's centre, external transducers experience all the pitch and roll

movements.

2. Transducers in a well inside the boat

Transducers in the well are in direct contact with the water and can execute the acoustic measurements but are not exposed to the flow of water, hence much more protected. In particular in case the well is constructed in or close to the boat's centre, then the transducer will experience little effect of pitch and roll movements. This increases accuracy and data quality. The well has to be tailor made and adds to the boat cost. Being inside the boat and for safety reasons it should be of a sound construction.

To construct a well, a FRP pipe with ID of about 0.4 m could be installed in the centre of the boat. The well top should be at about board level. The well bottom should be soundly fixed to the boat bottom. It shall be possible to close the top of the well.

The location and exact size of the well will be specified after selection of the measuring equipment.

The purchaser may execute his judicious discretion in the choice of configuration and options.

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