



STRATEGIC FLOATING SECURITY BARRIERS



The main ones elements **Strategic floating barriers ORCA security** offered ours company, is:

- n-shaped spatial-bearing frame, with stiffer structural elements in the form of struts made of a 10 mm thick strip, guides for attaching floats using reinforcements and transom plates for attaching sections of floating barriers to each other,
- two floats are made of thick-walled, impact-resistant and wear-resistant polyethylene with maximum resistance to ultraviolet radiation,
- set of power clamps for mounting floats,
- a set of vertical posts attached to the spatial frame structure using bolted connections,
- a set of cables and ropes that provide additional holding force to effectively counter boats and speedboats,
- surface and underwater mesh barrier, which ensures and enhances the effectiveness of countering penetration beyond the perimeter of floating safety barriers by small vessels and boats,
- on the vertical above-water pillars of the barrier to ensure navigation safety, as well as reflective marker surfaces.



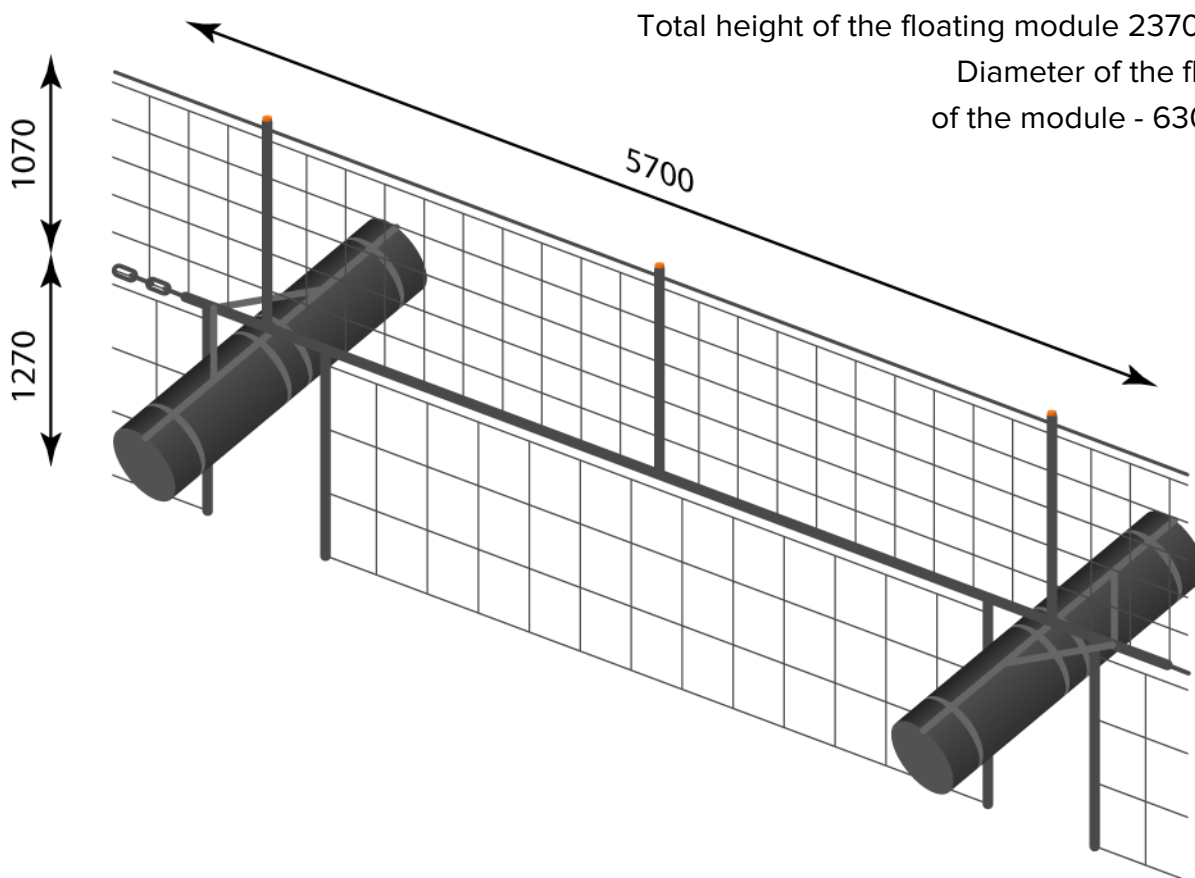


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On the vertical above-water posts of the barrier, implemented through the use of tachometric sensors (load sensors or mooring system tension) or inductive sensors.

Note: The use of a complex of other inductive infrared, photoelectric and radio frequency sensors, capacitive, magnetic, strain gauges or load or tension sensors of the mooring system, as well as narrow-beam microphones is performed by the Customer. This system is developed by the specialized port security service to maintain the confidentiality of information about the system's operation.

- Length of floating module 5950±50mm
- Diameter of the float part of the module - 630±10mm
- Height of the above-water part 1600±20 mm
- Underwater height 770±20 mm
- Total height of the floating module 2370±20mm
- Diameter of the float part of the module - 630±10mm





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DESCRIPTION OF THE ELEMENTS OF THE FLOATING SAFETY BARRIER MODULE

Frame:

The space-bearing frame is made in the form of an H- shaped supporting structure made of a supporting central thick-walled profile pipe 120x120x6 and transverse beams made of an I- beam N-shaped beam of size 12. The frame nodes carrying bending loads are reinforced with rigid kerchiefs and spacers between the main pipe and transverse H-shaped beams. The spacers are made of a 120x60x4 profile pipe. The spacers allow you to transfer the load of the float resistance that occurs when transporting ORCA floating safety barriers by ship to the central thick-walled pipe.

The supporting central profile pipe is thick-walled 120x120x6, withstands high torsional and bending loads and ensures strength and uniformity of the application of tensile load to the frame of each section of the floating barriers that is part of the assembled structure over the entire length.

In the manufacture of the supporting parts of the metal structure of the frame of each section of the floating safety barriers, high-strength welded joints with reinforcing kerchiefs and plates were used. When performing these works, the quality control of the execution of welding seams will be carried out, and when preparing for welding individual nodes together, the quality control of the preparation of parts for welding (edge processing, maintaining the necessary welding gaps, etc.) will be carried out. All welding works undergo quality control checks to the extent necessary for their execution. All products obtained using welding work are manufactured in strict accordance with the requirements of the standard for the quality of welded products in full compliance with EN ISO 3834.





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Floats:

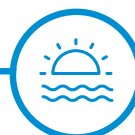
Two floats are fixed to the cross beams, located across the barrier line. This design ensures the strength and surface stability of the floating safety barriers in rough seas and loads from the impact of sudden gusts of wind. The location of the floats in the transverse projection provides minimal resistance to the impact of wave and wind loads, usually directed in the direction from the sea to the shore. The floats are made of polyethylene PE 100 pipe with an outer diameter of 630 mm and a thickness of 24.1 mm (SDR 26). For additional reliability, the filler (core) of the finished float is made of low-density foam with a low water absorption coefficient, which makes the ORCA floating safety barriers unsinkable.

The float of the floating barriers retains buoyancy even if the outer shell of the float is mechanically damaged. In some cases, it is possible to additionally use reinforcement in the form of a steel channel (No. 8-12), which is laid in the middle of the polyethylene float. In this case, the above-mentioned channel ensures uniform load distribution in the places of attachment of the float to the supporting frame of the floating barrier section. The use of reinforcement in the form of a channel allows you to reduce the horizontal and vertical components of the wave load on the metal structure of the frame and allows you to withstand alternating loads.

All connections of the frame and floats are made using bolted connections of increased hardness (strength) and (or) for ease of maintenance, parts of the frame's metal structure can be made of metal products made of corrosion-resistant A2 stainless steel.

Surface and underwater nets:

To effectively counteract penetration along the perimeter of the fence, nets are additionally placed on cables and polyamide ropes, providing additional reinforcement of the floating safety barriers.





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Surface a net made of rope and metal wire, impact-resistant, 1.07 m high with the following characteristics:

Surface grid:

Rope diameter, mm 8.0
 Wire diameter, mm 2.2
 Mesh size, mm 250x250 + 60x80
 Card size, mm 1200x4000
 Map area, m² 4.8
 Breaking force of the supporting rope, kN 37
 Energy absorption capacity from impact loads, J 26000
 Card weight, kg 56.0
 Weight 1 m², kg 3.5

Underwater net:

Rope diameter, mm 8.0
 Wire diameter, mm 2.2
 Mesh size, mm 300x300
 Map size, mm 10000 x4500
 Map area, m² 45
 Breaking force of the supporting rope, kN 37
 Energy absorption capacity from impact loads, J 26000
 Card weight, kg 56.0
 Weight 1 m², kg 3.5

Connection elements:

To connect the sections together, certified links with additional ovals A346 (SL-32) with a safety factor of 4:1, made in accordance with the DSTU EN 1677-4:2017 standard, are used. The quality of the product is confirmed by a quality certificate. To secure the sections together, cargo chains of class 8 (Grade 80) with a safety factor of 4:1, made in accordance with the DSTU EN 818-2:2017 standard (DIN 5687) are used. The chain is made of heat-hardened alloy steel with a "blueing in oil" coating. The quality of the product is confirmed by a quality certificate.





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As quick-release For connecting sections together and fixing them, G209 and G209 Black rigging clips, omega-shaped rigging clips are used. DIN 82101, G2130, or G2150 rigging shackles are manufactured in accordance with DSTU EN 13889:20. The quality of the product is confirmed by a quality certificate.

DIN 1142 or DIN 741 rope clamps are used. The quality of the product is confirmed by a quality certificate.

The design of fastening individual nodes to each other provides for the use of elastic inserts or zero-gap connections, and this solution is built into the design between adjacent blocks of each barrier section.

For maximum efficiency, the design of our ORCA floating safety barriers has at least 3 rows of cables (preferably ropes) with a diameter of at least 20 mm (3/4 inch).

Intrusion protection:

For the purpose of additional navigation safety in the port area, a flashing signaling system and reflective marker surfaces of the elements are used on the vertical posts of the floating barrier structure. - gray, sand -brown or brown for metal structures. High contrast visibility on the surface due to the use of bright shades of color, the use of reflective marks on the external surfaces, high specific buoyancy of the floats provides visibility (surveillance) with maximum visibility of the above-water part of the barrier.

Note: The number of rows of cables (ropes) that change in the protective boom fence, shore anchors, underwater anchorages and mooring systems are discussed with the Customer and are carried out in strict confidentiality.

Flashing beacon light

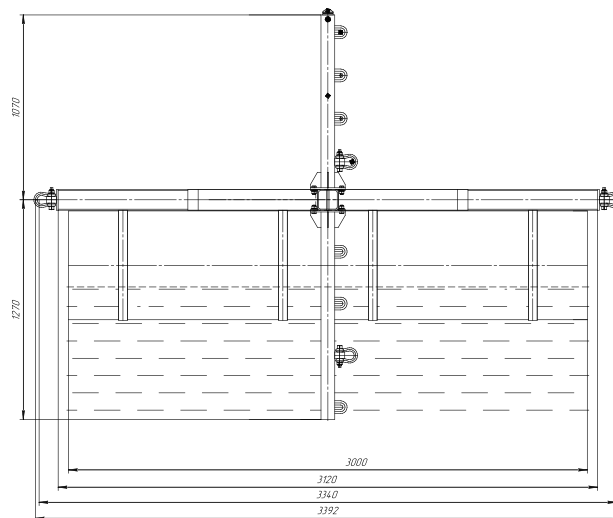
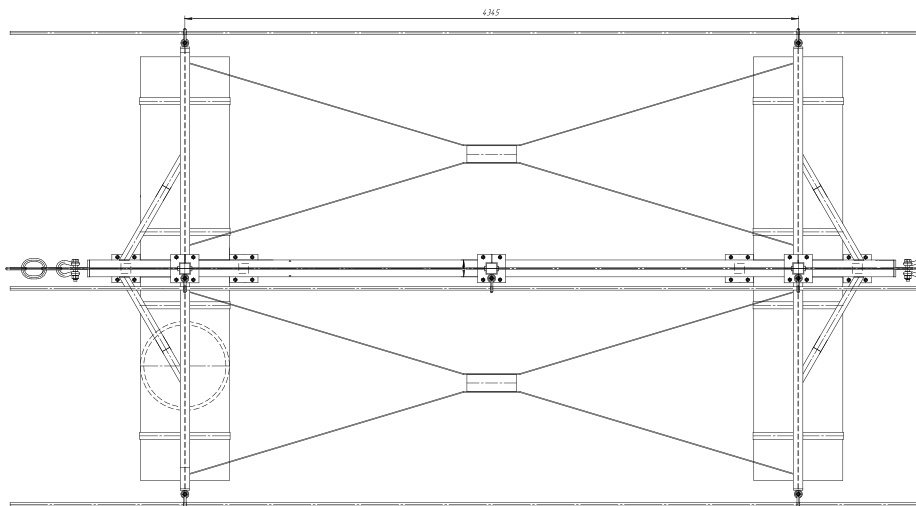
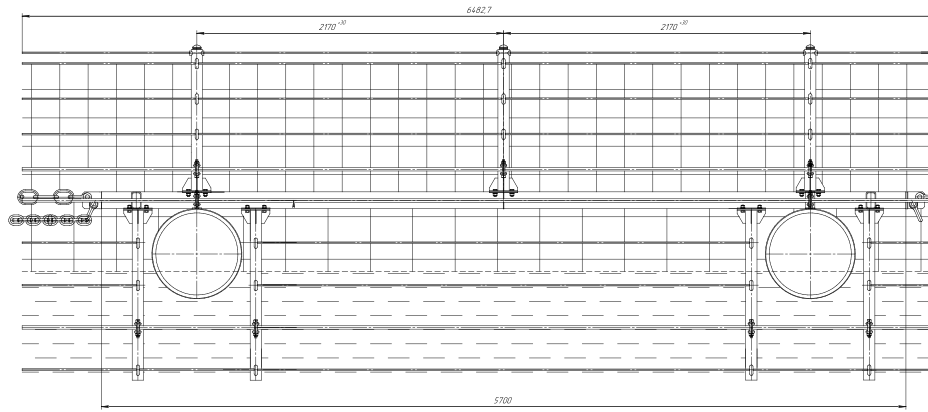
Alarm and security cable





ECONAD

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