



## STRATEGIC FLOATING SECURITY BARRIERS



The main elements of the **ORCA** Strategic Floating Safety Barriers offered by our company are:

- n-shaped spatial-bearing frame, with stiffer structural elements in the form of struts made of a 10 mm thick strip, guides for fastening floats with the use of reinforcements and transom plates for fastening sections of floating barriers to each other,
- two floats made of thick-walled impact-resistant and wear-resistant polyethylene with maximum resistance to ultraviolet exposure,
- a set of power clamps for fastening floats,
- a set of vertical racks attached to the spatial frame structure using bolted connections,
- a set of cables and ropes that provide additional holding force for effective counteraction to boats and speedboats,
- a surface and underwater mesh barrier that ensures and enhances the effectiveness of counteraction to penetration beyond the perimeter of floating safety barriers by small vessels and boats,
- on the vertical surface racks of the barrier is placed a flashing alarm system to ensure navigation safety, as well as reflective marker surfaces.



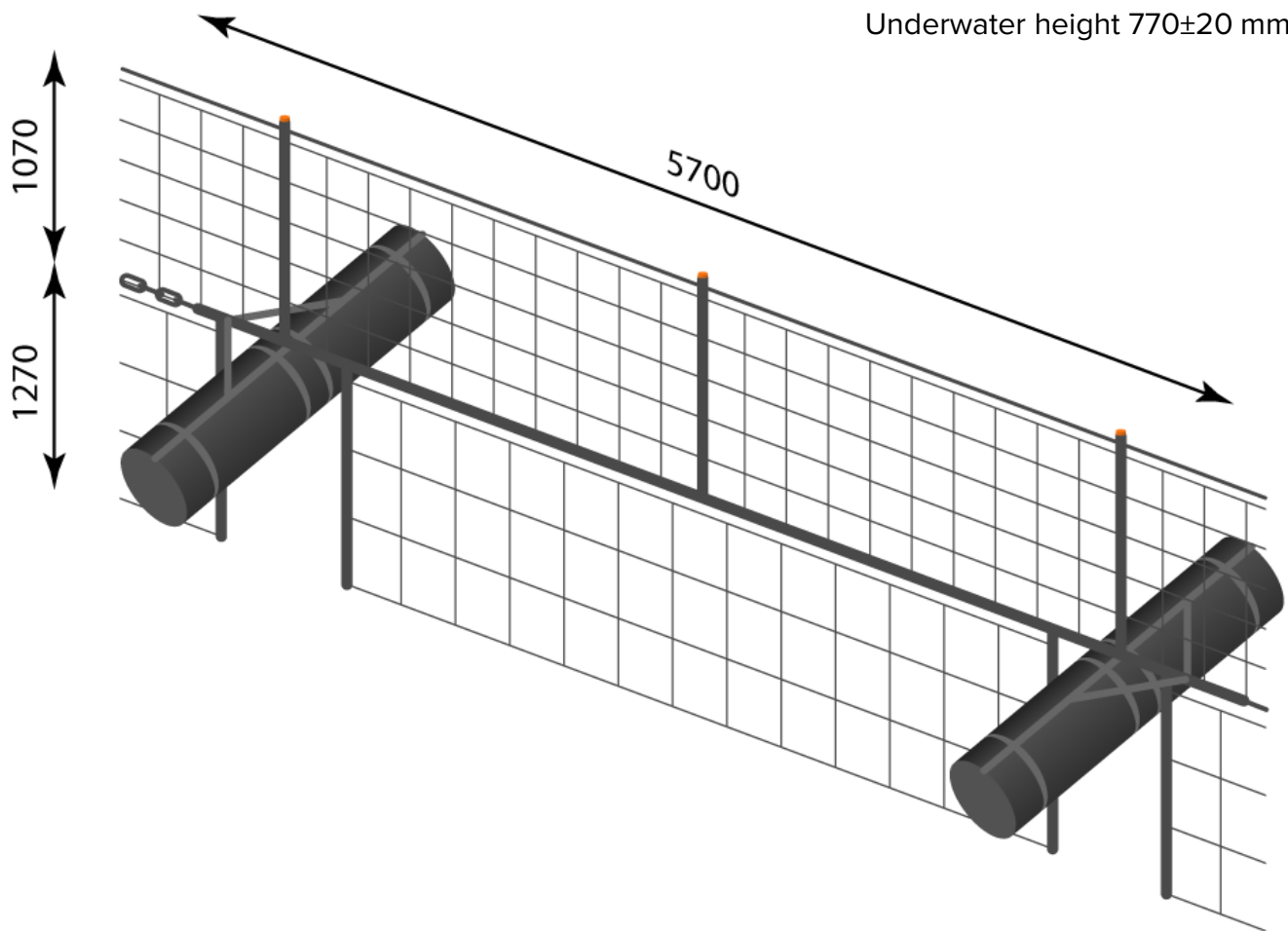


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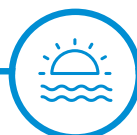
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A security alarm system is located on the vertical above-water posts of the barrier, implemented through the use of tachometric sensors (load sensors or mooring system tension) or inductive sensors.

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



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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 pipe and transverse beams. The frame nodes carrying bending loads are reinforced with rigid kerchiefs and spacers between the main pipe and transverse H-shaped beams. The spacers allow transferring 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 tube withstands high torsional and bending loads and ensures strength and uniformity of application of tensile load to the frame of each section of the floating barriers that is part of the assembled full 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.



# 3834

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:

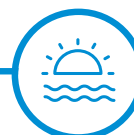
Two floats are fixed to the cross beams, located across the barrier line. This design ensures the strength and surface stability of the floating safety barriers in rough seas and loads from the impact of sudden gusts of wind. The location of the floats in the transverse projection provides minimal resistance to the impact of wave and wind loads, usually directed in the direction from the sea to the shore.

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 barrier 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, which is embedded inside 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 to reduce the horizontal and vertical components of the wave load on the metal structure of the frame and allows 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**.



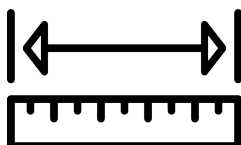


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### Surface and underwater nets:

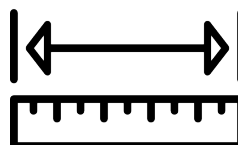
To effectively counteract penetration along the perimeter of the fence, nets are additionally placed on cables and polyamide ropes, providing additional reinforcement of the floating safety barriers.

Surface a net made of rope and metal wire, resistant to impact, 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, m<sup>2</sup> 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 m<sup>2</sup>, 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, m<sup>2</sup> 45  
 Breaking force of the supporting rope, kN 37  
 Energy absorption capacity from impact loads, J 26000  
 Card weight, kg 56.0  
 Weight 1 m<sup>2</sup>, kg 3.5





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### Connection elements:

To connect the sections together, certified links with a safety factor of 4:1 are used, made in accordance with the DSTU EN 1677-4:2017 standard. The quality of the product is confirmed by a quality certificate. To secure the sections together, load chains with a safety factor of 4:1 are used, made in accordance with the DSTU EN 818-2:2017 standard (DIN 5687). The chain is made of heat-hardened alloy steel with an oil blue finish. 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

