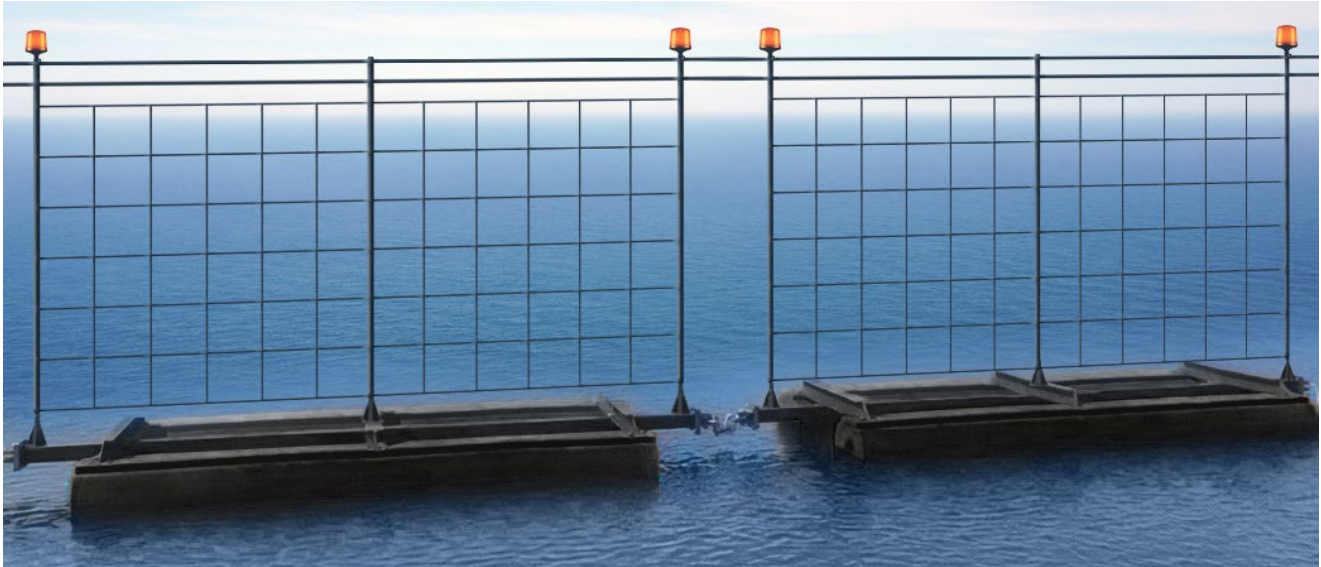




STRATEGIC FLOATING SECURITY BARRIERS



Strategic Floating Security Barriers are a versatile structure designed to protect critical maritime facilities from waterborne attacks. The modules of the structure are identical and interchangeable, which ensures their easy replacement in case of damage or during maintenance.

THE DESIGN OF STRATEGIC FLOATING SAFETY BARRIERS CONSISTS OF:

1. Strong outer frame

Made of H-beams of sizes 10, 12 and 14, which provide high rigidity and resistance to wave loads and sharp wind gusts.

Nodes that accept bending loads are reinforced with stiffeners, and in some cases, with spacers, which provide additional stability at the attachment points.

All connections of frame parts and floats are made using high-strength bolted connections. In metal construction are used corrosion-resistant hardware stainless steel class A2.

The central steel I-beam withstands high torsional and bending loads, ensuring uniform distribution of tensile load along the entire length of the frame of each barrier section.

2. Two floating elements

Attached to both sides of the outer frame, they maintain the buoyancy of the structure and serve as a barrier for marine drones and small craft.





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STRATEGIC FLOATING SECURITY BARRIERS

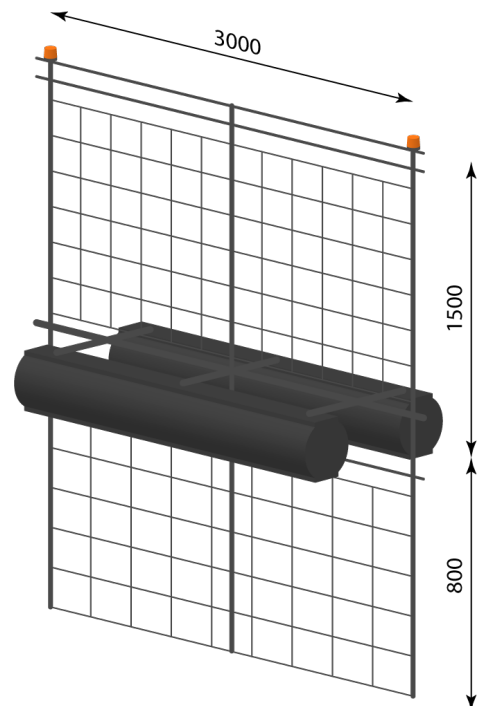
Made of thick-walled, impact-resistant and wear-resistant polyethylene, which has maximum resistance to ultraviolet radiation.

Inside the polyethylene float, reinforcement in the form of a steel channel (No. 8) is used, which evenly distributes the load in the places where the floats are attached to the frame. This reinforcement also reduces horizontal and vertical loads from wave action on the metal structure of the frame, allowing it to withstand variable loads.

The internal volume of the floating elements is filled with polyurethane foam with a density of 30 kg/m^3 with a low water absorption coefficient. Thanks to this, even in the event of mechanical damage to the outer shell of the float, the element retains buoyancy.

The floating elements are made of RX 840 NATURAL polyethylene material for general use in rotational molding processes and are suitable for applications that require a combination of rigidity and impact strength, as well as low deformation and excellent processability.

RX 840 NATURAL is fully thermally and UV-stabilized, ensuring a wide processing range, good color retention and a long service life.





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EACH FLOATING ELEMENT HAS SEVERAL LEVELS OF PROTECTION:

1. Main protection: the floating element itself

- The floating element is reinforced internally with a steel channel (No. 8), which ensures uniform load distribution in the places where the floats are attached to the frame. This reinforcement also reduces horizontal and vertical loads from wave action on the frame's metal structure, allowing it to withstand variable loads and collisions with hostile marine objects.
- The internal volume of the floating elements is filled with polyurethane foam with a density of 30 kg/m^3 with a low water absorption coefficient. Thanks to this, even in the event of mechanical damage to the outer shell of the float, the element retains buoyancy.

2. Additional protection: external frame

The outer frame is made of H-beams of sizes 10, 12 and 14, which provide high rigidity and resistance to wave loads, sharp gusts of wind and collisions with floating vehicles at speeds up to 90 km/h.

3. Maximum efficiency: anti-intrusion elements

- A metal mesh with a cell size of 250×250 mm and two cables (ropes) with a diameter of 20 mm (3/4 inch) are installed on top.
- From below, under the floating elements, a rope with a diameter of 20 mm (3/4 inch) is stretched and a nylon mesh, ___ thick with a cell size of 350×350 mm, is installed along the entire length of the barriers. The height of the mesh is adjustable depending on the depth of the installation site.





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TO CONNECT SECTIONS TO EACH OTHER THESE ARE USED:

1. Certified links with additional ovals A346 (SL - 32)

With a safety factor of 4:1, manufactured in accordance with the DSTU EN 1677-4:2017 standard. The quality of the product is confirmed by a quality certificate.

2. Grade 80 load chains for securing sections together .

With a safety factor of 4:1, manufactured in accordance with the standard DSTU EN 818-2:2017 (DIN 5687). The chain material is thermally hardened alloy steel with an oil phosphate coating. The quality of the product is confirmed by a quality certificate.

3. Rigging brackets for connecting sections and fixing them

G209, G209 Black staples , DIN 82101, G2130 or G2150 omega staples , manufactured in accordance with the DSTU EN 13889:2014 standard, are used.

The quality of the product is confirmed by a quality certificate.

4. Rope clamps

Rope clamps DIN 1142 or DIN 741 are used.

The quality of the product is confirmed by a quality certificate.



Length of floating module 3760mm

The total length of the floating module including connecting devices is 4275mm.

Underwater height 800mm

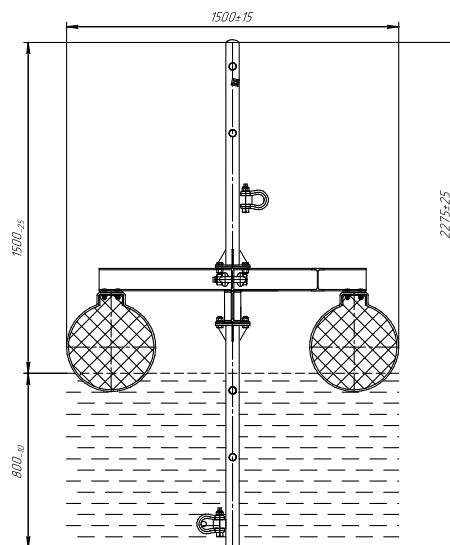
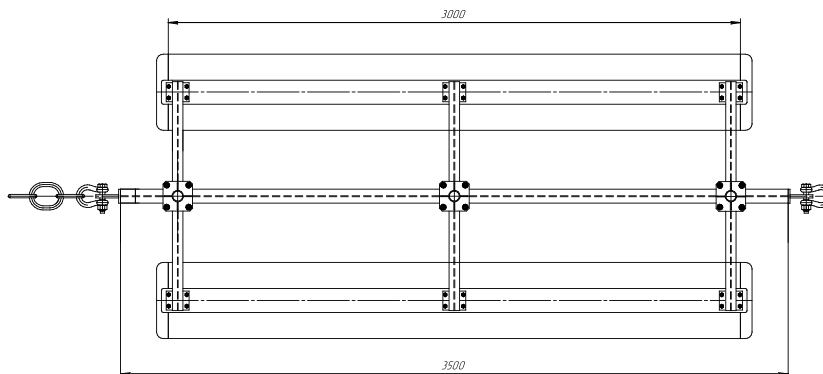
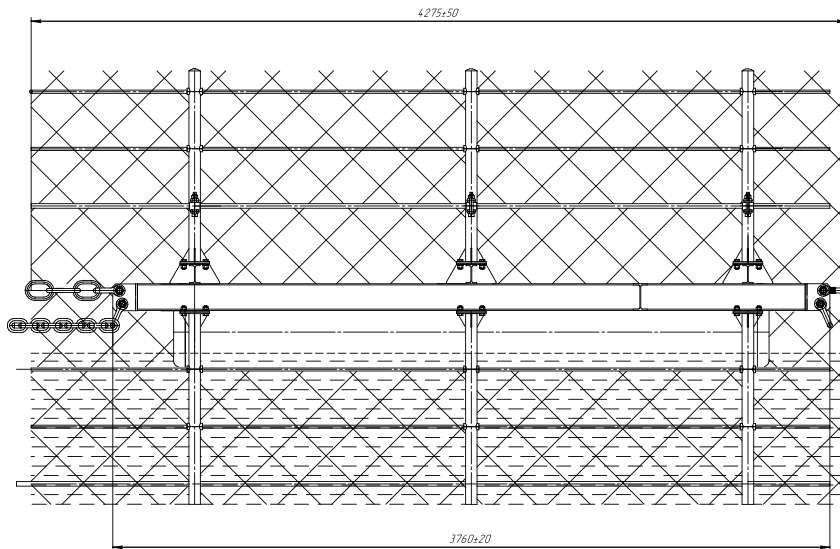
Total height of floating floating module 2275mm



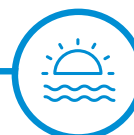


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The diameter of the float part of the module is 400mm.
Height of the above-water part 1500mm

Surface net made of rope and impact-resistant metal wire, 1m high with the following characteristics:

Rope diameter, mm 8.0

Wire diameter, mm 2.2

Cell 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 made of rope and impact-resistant metal wire, 1m high with the following characteristics:

Rope diameter, mm 8.0

Wire diameter, mm 2.2

Cell 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

The barrier withstands a pulling force of 45 tons





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The alarm and lighting system is triggered in the event of an unexpected (unauthorized) intrusion and activates a visual and audible alarm.

Floating elements color - black

The equipment can withstand wind gusts of up to 30 m/s and wave heights of up to 2.5 m.

Towing speed 2-4 knots.

Temperature conditions - from 30 C to + 60 C

The equipment is operational around the clock, year-round.

Each barrier section included in the assembled structure is manufactured by the supplier as a technological solution for strategic floating protective barriers in accordance with ISO 9001:2018 and ISO 9001:2015 standards.

In addition, all products manufactured using welding are manufactured in strict accordance with the requirements of the quality standard for the production of welded products in accordance with EN ISO 3834.

All connecting elements are manufactured in accordance with the standards DSTU EN 1677-4:2017 and DSTU EN 13889:2014.

The technical solution for ensuring the safety of marine facilities in the form of strategic floating protective barriers is supplied with an operating manual and a maintenance and repair manual.

