



WESTMINSTER
INTERNATIONAL LTD

Excellence through Service
Protecting your world



Marine Barrier

The Marine Barrier has been designed primarily to provide marine defence for the protection of key areas such as:

- ▶ Oil Rig Platforms;
- ▶ Harbours;
- ▶ Naval Bases;
- ▶ Restricted Marine area;
- ▶ Strategic Military installations.

The biggest threat that exists for strategic key marine installations is the inevitable terrorist attack. The damage that would result in the event of a fast marine craft attack packed full of explosives would be vast. The impact of which would be costly to both the economy and the environment.

The Marine Barrier is available to meet almost any defence requirement, and can even be provided to prevent direct high speed ramming from small to medium sized marine craft.



The Marine Barrier Module

Each barrier starts out with individual modules, which are highly engineered polygons made of high-density polyethylene. The unique polygon shape is beneficial not only for wave attenuation but also greatly enhances the modules strength. The polyethylene is treated with UV inhibitors during manufacturing so its life expectancy, even in harsh marine environments with direct sunlight, is 20+ years.



A standard module weighs 36 lbs. empty, and is approx. 30" X 30" and 22" deep. The module can be filled with materials of different densities, such as water or sand, to precisely adjust its buoyancy as well as provide ballast.

The modules can also be "puncture proofed" by filling them with marine buoyant foam. The modules can be produced in any colour, and come standard in white, black, and a highly visible safety orange.

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Module Construction

The Marine Barrier structures can be constructed with embedded stainless steel cable or rods, up to 1 ¼" diameter, inside connecting 2" EPDM rubber cables. These cables or rods can run the entire length of the structure, or be constructed in sections. The sizing and number of cables, the freeboard height of the structure, and the anchoring system all influence the resistance to various threat levels as well as the wave attenuation capabilities.



The stainless steel rods are used when a rigid structure is required, such as for sections or buoys with signage and barriers with rigid fencing.

All metal hardware used is either galvanized or stainless steel (as required). Metal eyes can be placed periodically to allow for lifting, towing etc.

How effective is the Marine Barrier?

The Marine Barrier floating breakwaters are engineered to effectively extract the energy out of the water rather than just deflecting the energy. At the installation at Pier Point Marina on Sodus Bay in Lake Ontario, New York we are showing a transmission coefficient of 0.1 on the expected wave spectrum.



The Marine Barrier was able to dissipate the 4-foot waves that the marina was subject to during highly destructive storms to a mere 6 inches (90% efficient)!

Marine Barrier Configuration

The barriers are currently available in 3 configurations, the Small Craft

Intrusion Barrier, the Vessel Exclusion Barrier and the Enhanced Vessel Exclusion Barrier. The VEB has sufficient strength to withstand 1,000,000 foot pounds of energy over a 1.5 second period, capable of completely stopping 35-foot vessels travelling at 50 miles per hour (43-½ knots) and significantly impeding larger vessels. The barriers can be designed with gates, solar lighting, fencing, razor-wire and more depending on your needs.

Boat stopping dynamics of the Marine Barrier

When a boat hits the barrier, the net that is attached to the floating section separates from its support members (as designed). This process is to maximize energy absorption. The net then begins to pick up tension as it breaks away. The tension is then transferred from the net into the support structure via structural net tie back points. The energy is then transferred from the structural tie backs into the mooring system. The barrier then begins to move in response to the loading, and the boat is brought to a stop.

Note:

The net will have break strength of over 150,000 lbs

The structural tie backs will be spans of Nylon, Kevlar or Spectra line as necessary (break strength of about 200,000lbs) laced through the net every 100ft. These structural tie backs are tied directly into the mooring system for the 100 ft spans

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between moorings. For a larger specified span, the structural tie backs are tied into the barrier structural lines, and energy is transferred into the moorings.

This is the only way to absorb the nearly 1,000,000 ft lb of kinetic energy without designing the equivalent of a floating brick wall.

Options

- ▶ Aluminium Light and Sign Stanchions;
- ▶ Razor Wire;
- ▶ Capturenet;
- ▶ Other Physical deterrents.



Optional Accessories

- ▶ Solar Powered Marine Lights;
- ▶ Solar Light Programmer;
- ▶ Signs.



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