BUOYS & BARRIERS BROCHURE

SHIBATAFENDERTEAM

on the safe side

INTRODUCTION

The ShibataFenderTeam Group is the leading international fender manufacturer with 50+ years of group experience in fender production, +120,000 fenders in service, and 90+ years of experience in the production of rubber products.

Shibata Industrial, headquartered in Japan, is responsible for rubber production and R&D, generating a revenue of about 120 million USD with +360 employees in Japan.

ShibataFenderTeam, headquartered in Germany, handles design, manufacturing (steel, foam, PE) and international sales, generating a revenue of about 60 million USD with their +80 employees around the world. The SFT Group offers consulting, engineering, manufacturing, after sales service and testing.

Our regional offices in the US, Malaysia, Spain and The Netherlands facilitate the local contact to customers. They are supported by a large network of well-established local representatives on six continents. Direct contact between all our employees and partners plays a vital role in our group's development.

Providing safety equipment, the SFT Group has a strong focus on manufacturing all major components inhouse, ensuring highest quality and reliability at our own production facilities in Europe and Asia. Our experience has earned us a reputation as the dependable partner in the international ports, harbors and waterways market.

The SFT Group offers a comprehensive range of foam filled Ocean Guard Buoys and Ocean Guard Floating Barriers for support, mooring, navigation, demarcation and restricted areas in all marine environments, from inland waterways to offshore applications.

Both, buoys and barriers are fully customized, unsinkable, highly visible and require only low maintenance.

The typical SFT buoy/barriers consists of an inner steel construction embedded in buoyant foam and covered by a urethane skin reinforced with nylon tire cord. The top deck of the buoy can be equipped with simple chain-through or eye connections, up to sophisticated Quick Release Hooks and navigational aids, all according to our customers project requirements.

SFT buoys and barriers are manufactured in our own production plant in Rechlin, Germany. There, we produce foam filled products (Buoys, Foam Fenders, Donut Fenders, Floating Barriers etc.), fabricated steel parts such as Fender Panels, Buoy and Donut Fender hardware and HD-PE Sliding Fenders. The plant also has in-house blasting and painting facilities. Buoy/barrier projects in the Americas are served from a US based production plant.

Customers can choose from versatile buoy/barrier types and sizes, up to a maximum diameter of 4,500 mm, a length of 5,000 mm and a weight per piece of up to 6,000 kg, equivalent to a net buoyancy of up to 45,500 kg.

CONSTRUCTION FEATURES BUOYS

The SFT Group is committed to design and provide buoys that withstand harshest marine environments and are constructed using state of the art materials and latest manufacturing technologies.

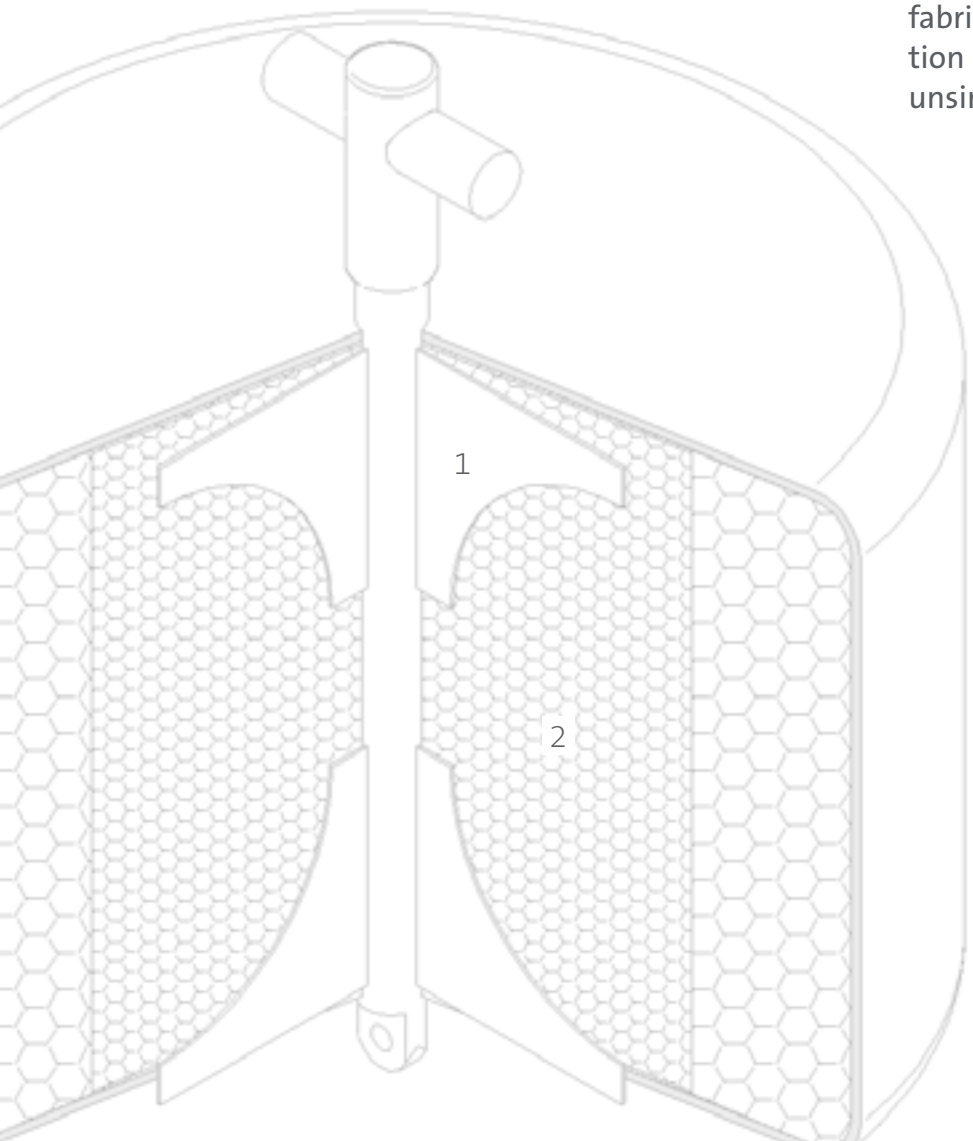
The design of the buoy flotation unit, consists of four different components, which are further described below, starting from the core to the outside of the buoy.

FABRICATED STEEL CORE (1)

Ocean Guard Buoy construction starts with a fabricated heavy duty central steel member. The welded structure is designed to provide excellent working load performance and contains load distribution plates that provide the required pull through resistance. Top end and bottom fittings (see page 14) are connected straight to the central steel member.

RIGID CLOSED CELL URETHANE FOAM CORE (2)

The second component of the buoy is a rigid, 100% closed cell urethane foam core. The foam core has excellent buoyancy and compressive strength properties. It is molded directly into the fabricated steel core, which in combination provides a heavy duty and strong, unsinkable core.

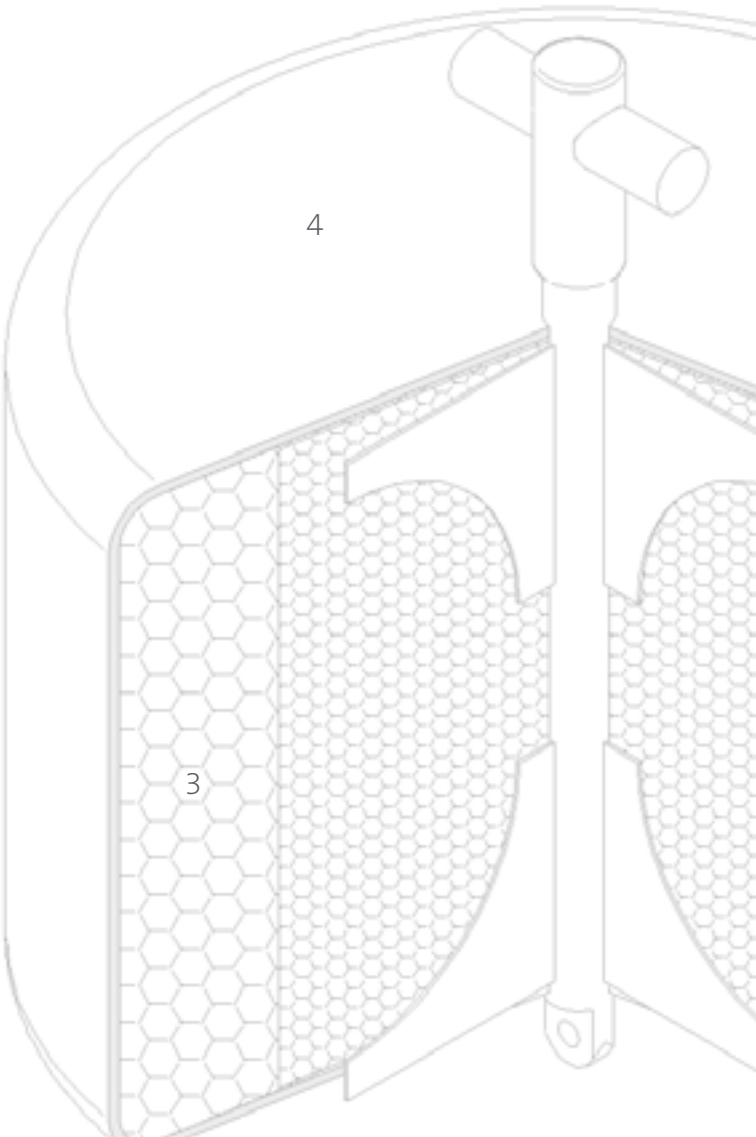


RESILIENT OUTER FOAM SHELL (3)
The third component of the Buoy is purposely added to absorb normal vessel impacts, without damaging both, the buoy or the impacting vessel. The resilient closed cell and cross-linked polyethylene foam is heat laminated and molded onto the rigid foam/steel core resulting in a one piece solid buoy body. The heat lamination process is the same as used in Ocean Guard Fender manufacturing. It creates a thermal bond between the foam layers, which strength is beyond the integral strength of the foam itself and will not delaminate or disintegrate even under the most harsh conditions.

REINFORCED ELASTOMERIC SKIN (4)
The final and outer layer is a highly wear and tear resistant, heavy duty thick, nylon-filament reinforced elastomer skin. It is specially formulated to withstand harshest environmental conditions and protects the buoy for years, reduces the maintenance and enables exceptional performance when exposed to the elements. This non-marking outer skin is similar to the skin of our Ocean Guard Fender, resists and is resistant to extreme temperatures, toxic environments, hydrocarbons, sea water, ozone and ultraviolet radiation.

Its reinforcing tire cord filaments are continuously wound in a helix pattern through about 90 % of the skin thickness, and around the integrated fittings, providing increased tensile and tear strength.

MAINTENANCE FREE FITTINGS
SFT offers a comprehensive range of standard fittings which are selected depending on the buoy size and application. Clients have the choice for an integral extension of the central steel member or a bolt-on item connecting to an upper bolt flange. Depending on the selected style/type, the fittings are epoxy coated or hot dip galvanized to provide excellent corrosion protection. Stainless steel hardware is also available for certain styles/types on request.



PERFORMANCE

FEATURES BUOYS

SFT Ocean Guard Buoys/barriers offer a variety of significant advantages, compared to traditional steel buoys. They are generally lighter, and therefore less labor intensive in cases of maintenance or relocation, have almost no corrosion and are less affected by marine growth. This combination of advantages helps streamlining maintenance cost for ports and waterway authorities.

UNSINKABLE CONSTRUCTION

The closed cell foam used to build the core provides a buoy that is unsinkable even if damaged or punctured.

TOP DECK AND BOTTOM FITTINGS

Buoy fittings are available in a variety of styles such as mooring tees, pad eyes, quick release hooks, swivel eyes, bails, forged eyes, hawse pipe with capture plate and all kinds off navigational lights and aids.

IMPACT ABSORBING

The resilient outer foam layer and the nylon reinforced elastomeric skin of the Ocean Guard Buoy are designed to absorb normal vessel impacts without damaging the buoy or the vessel.

NON-MARKING

All Ocean Guard Buoys share a non-marking, heavy duty, thick and reinforced elastomeric skin. It is extremely abrasion resistant and also available in various colors.

CUSTOMIZED DESIGNS

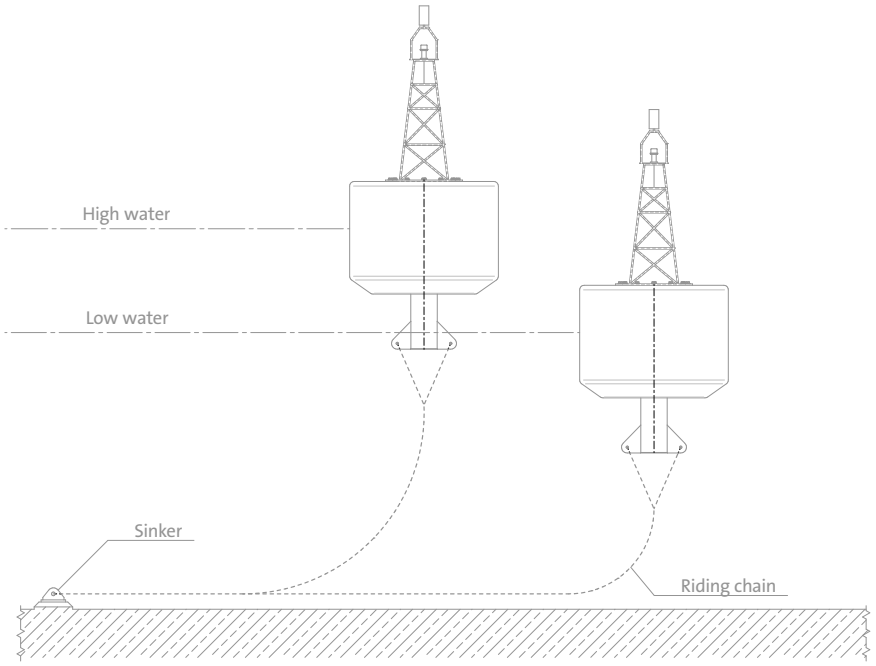
Every project has unique requirements and a dedicated approach to customize the buoy design. Our team of experienced engineers is available to support customers in developing and custom designing any individual project, considering all operational and environmental aspects. Please feel free to consult your nearest SFT office or representative to obtain this free of charge support.

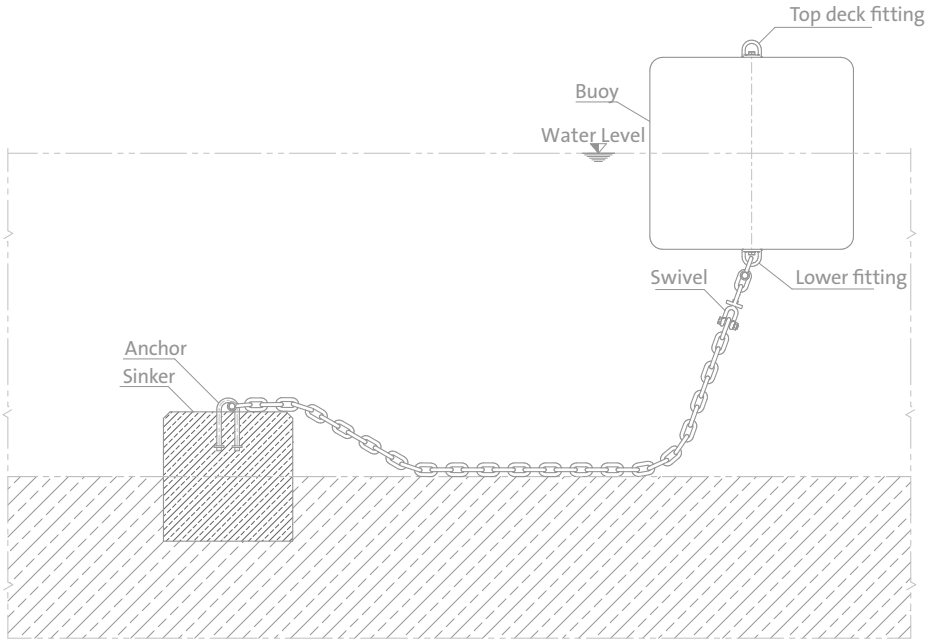
ENVIRONMENT

The buoy skin is free of solvents, not painted and therefore does not discharge any chemical residue into the water.

TYPICAL BUOY LAYOUT

Buoys are always customized to meet the requirements of the specific project. Below you can see an example of a typical mooring buoy with sinker at different water levels. Each individual project requires different characteristics. Therefore, the appropriate buoy type and accessories are selected jointly by our technical specialists and the customer to perfectly meet the specific application.





MOORING BUOYS

Buoy Type	Buoyancy Net in kg	Working Load in tons	Diameter in m	Height Buoy Body in m	Height Overall in m	Buoy Weight in kg
MB 25	2,500	45	1.9	1.1	1.8	698
MB 35	3,500	68	2.1	1.2	1.9	868
MB 50	5,000	68	2.4	1.4	2.2	1,202
MB 70	7,000	91	2.6	1.5	2.4	1,570
MB 90	9,000	91	2.8	1.7	2.7	1,929
MB 115	11,500	91	3.1	1.8	2.8	2,263
MB 135	13,500	136	3.2	1.9	2.9	2,669
MB 160	16,000	136	3.4	2.0	3.1	2,982
MB 185	18,500	136	3.6	2.1	3.2	3,288
MB 225	22,500	136	3.8	2.2	3.3	3,762
MB 250	25,000	136	3.9	2.3	3.4	4,052
MB 275	27,500	136	4.1	2.4	3.5	4,337
MB 340	34,000	136	4.3	2.6	3.6	5,063
MB 455	45,500	136	4.4	3.3	4.6	6,076

Actual values for above sizes may vary +/- 15 % due to variations in materials and tolerances.

PENDANT BUOYS

Buoy Type	Buoyancy Net in kg	Working Load in tons	Diameter in m	Buoy Length in m	Height Overall in m	Buoy Weight in kg
PB 25	2,500	68	1.4	2.1	2.2	583
PB 50	5,000	68	1.7	2.6	2.5	898
PB 75	7,500	68	1.9	2.9	2.7	1,185
PB 100	10,000	68	2.1	3.2	3.1	1,550
PB 150	15,000	68	2.4	3.6	3.4	2,070
PB 200	20,000	91	2.7	4.0	3.7	2,669
PB 250	25,000	91	2.9	4.3	3.9	3,203
PB 300	30,000	91	3.0	4.5	4.1	3,678
PB 350	35,000	114	3.2	4.8	4.3	4,142
PB 400	40,000	114	3.3	5.0	4.5	4,893

Actual values for above sizes may vary +/- 15 % due to variations in materials and tolerances.

CYLINDRICAL BUOYS

Buoy Type	Buoyancy Net in kg	Working Load in tons	Diameter in m	Height Buoy Body in m	Height Overall in m	Buoy Weight in kg
CB 5	50	2.3	0.4	0.6	0.8	37
CB 10	100	2.3	0.5	0.8	0.9	47
CB 15	150	2.3	0.5	0.9	1.0	57
CB 25	250	3.4	0.6	1.0	1.3	73
CB 45	450	4.5	0.7	1.3	1.5	112
CB 70	700	4.5	0.8	1.4	1.7	161
CB 100	1,000	9.1	0.9	1.6	1.9	198
CB 115	1,150	9.1	1.0	1.7	2.0	255
CB 140	1,400	9.1	1.0	1.8	2.1	284
CB 180	1,800	18.0	1.1	2.0	2.5	384
CB 230	2,300	18.0	1.2	2.1	2.6	435
CB 275	2,750	18.0	1.3	2.3	2.8	483

Actual values for above sizes may vary +/- 15 % due to variations in materials and tolerances.

SUPPORT BUOYS

Buoy Type	Buoyancy Net in kg	Working Load in tons	Diameter in m	Height Overall in m	Buoy Weight in kg
SB 25	250	10	0.7	1.0	78
SB 50	500	10	0.9	1.2	128
SB 75	750	10	1.0	1.3	157
SB 100	1,000	18	1.1	1.4	185
SB 125	1,250	18	1.2	1.6	244
SB 150	1,500	18	1.3	1.7	270
SB 175	1,750	18	1.4	1.9	338
SB 200	2,000	18	1.4	2.0	363
SB 250	2,500	18	1.6	2.1	412
SB 300	3,000	20	1.6	2.1	460
SB 350	3,500	20	1.7	2.2	507
SB 400	4,000	20	1.8	2.3	553
SB 450	4,500	20	1.8	2.4	599
SB 500	5,000	20	1.9	2.4	644
SB 600	6,000	20	2.0	2.6	815
SB 700	7,000	20	2.1	2.7	903

Actual values for above sizes may vary +/- 15 % due to variations in materials and tolerances.

CHAIN THROUGH BUOYS

Buoy Type	Buoyancy Net in kg	Diameter in m	Length Buoy in m	Length Overall in m	Through Pipe Diameter in mm	Buoy Weight in kg
CTB 100	1,000	1.1	1.7	2.1	330	570
CTB 150	1,500	1.3	1.7	2.1	330	610
CTB 200	2,000	1.4	1.9	2.4	330	675
CTB 225	2,250	1.5	2.0	2.4	381	777
CTB 275	2,750	1.6	2.1	2.6	381	840
CTB 350	3,500	1.6	2.9	3.4	432	1,060
CTB 400	4,000	1.7	2.6	3.1	432	1,159
CTB 450	4,500	1.8	2.6	3.1	483	1,395
CTB 550	5,000	1.8	3.2	3.7	483	1,560

Actual values for above sizes may vary +/- 15 % due to variations in materials and tolerances.

UNIVERSAL BUOYS

Buoy Type	Net Buoyancy (Min) in kg	Buoy Diameter in m	Height Overall in m	Buoy Body Height in m	Buoy Weight in kg
UB 1500	680	1.3	1.3	0.8	322
UB 2000	970	1.3	1.7	1.0	363
UB 2500	1,134	1.5	1.5	0.9	313
UB 3000	1,361	1.5	1.7	1.0	421
UB 4000	1,814	1.8	1.7	1.0	675
UB 5000	2,268	1.8	1.8	1.1	712

Actual values for above sizes may vary +/- 15 % due to variations in materials and tolerances.

NAVIGATIONAL & MARKER BUOYS

Buoy Type	Net Buoyancy in kg	Diameter in m	Buoy Body Height in m	Buoy Weight in kg
NAV 100	100	0.8	0.5	200
NAV 200	200	1.0	0.6	239
NAV 500	500	1.2	0.7	366
NAV 750	750	1.4	0.8	443
NAV 1000	1,000	1.5	0.9	554
NAV 3000	3,000	2.0	1.2	1,031
NAV 5000	5,000	2.4	1.4	1,577
NAV 7500	7,500	2.7	1.6	2,146
NAV 10000	10,000	3.0	1.8	2,592

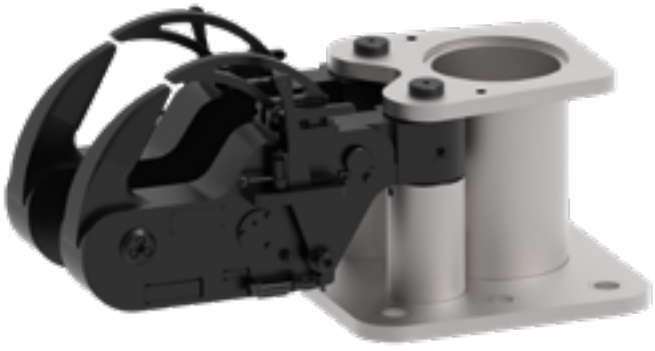
Actual values for above sizes may vary +/- 15 % due to variations in materials and tolerances.

TOP DECK FITTINGS

Pendant Hook

SFT buoys are available with a variety of top deck fittings to provide safe and reliable mooring operation. The most appropriate top deck fitting depends on the final application of the buoy or barrier. Below are three common top deck fittings, a pendant hook, a single hook and a quick release hook. SFT offers a wide selection of different top and bottom deck fittings. Please contact your local SFT office for detailed information.

Single Hook



Quick Release Hook

BUOY QUESTIONNAIRE

Accurate project information is needed to propose the most suitable buoy.

Please use the table below to describe the operating requirements and need buoy type with as much detail as possible.

Project Details

Project Name

Location

Consultant

Project Status

SFT Reference

☐ Preliminary

☐ Detail Design

☐ Tender

Contractor

Name

Position

Telephone

E-Mail

Operational Details

Vessel Types

Vessel Sizes

Location ☐ Exposed ☐ Sheltered

Installation ☐ Temporary ☐ Permanent

Water Depth

Tidal Level (H.WL)

Tidal Level (L.WL)

☐ Salt Water ☐ Sweet Water

Bottom Material ☐ Mud ☐ Sand ☐ Rock

Operating Temperature Min Max

BUOY QUESTIONNAIRE

Buoy Details

Net Buoyancy Min _____ Max _____ **Freeboard** Min _____ Max _____

Pull-through Capacity _____ Working Load _____

Buoy End Fittings

	Forged Swivel Eye	Fabricated Swivel Eye	Padeye	Quick Release Hook	Bail Eye	Crucifix	Hawse Pipe	Hawse Pipe with Capture Plate	Lights (Type)
Top									
Bottom									

Buoy Type

☐ Mooring Buoy

☐ Pendant Buoy

☐ Cylindrical Buoy

☐ Support Buoy

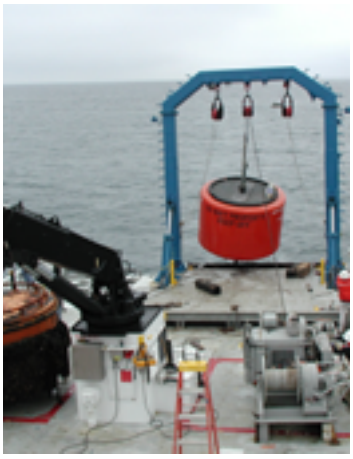
☐ Chain-Through Buoy

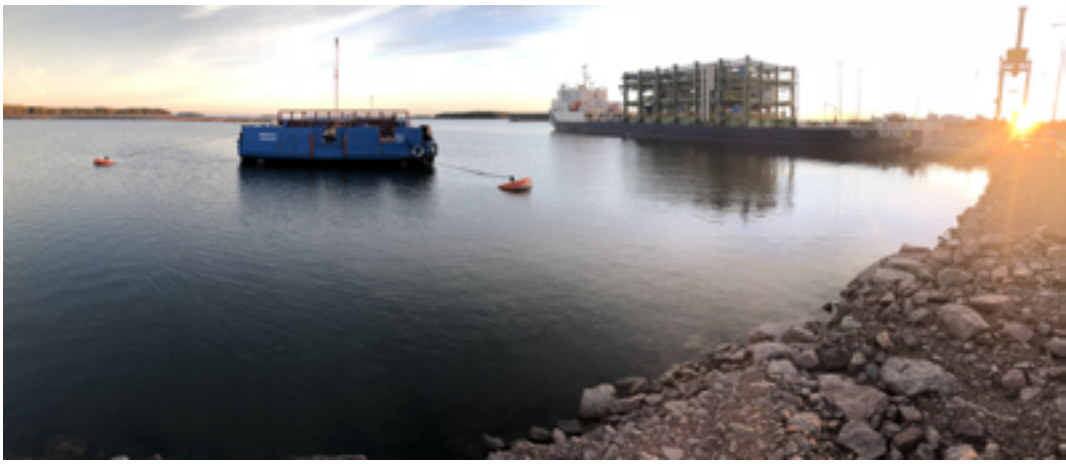
☐ Universal Buoy

☐ Marker Buoy

☐ Navigational Buoy

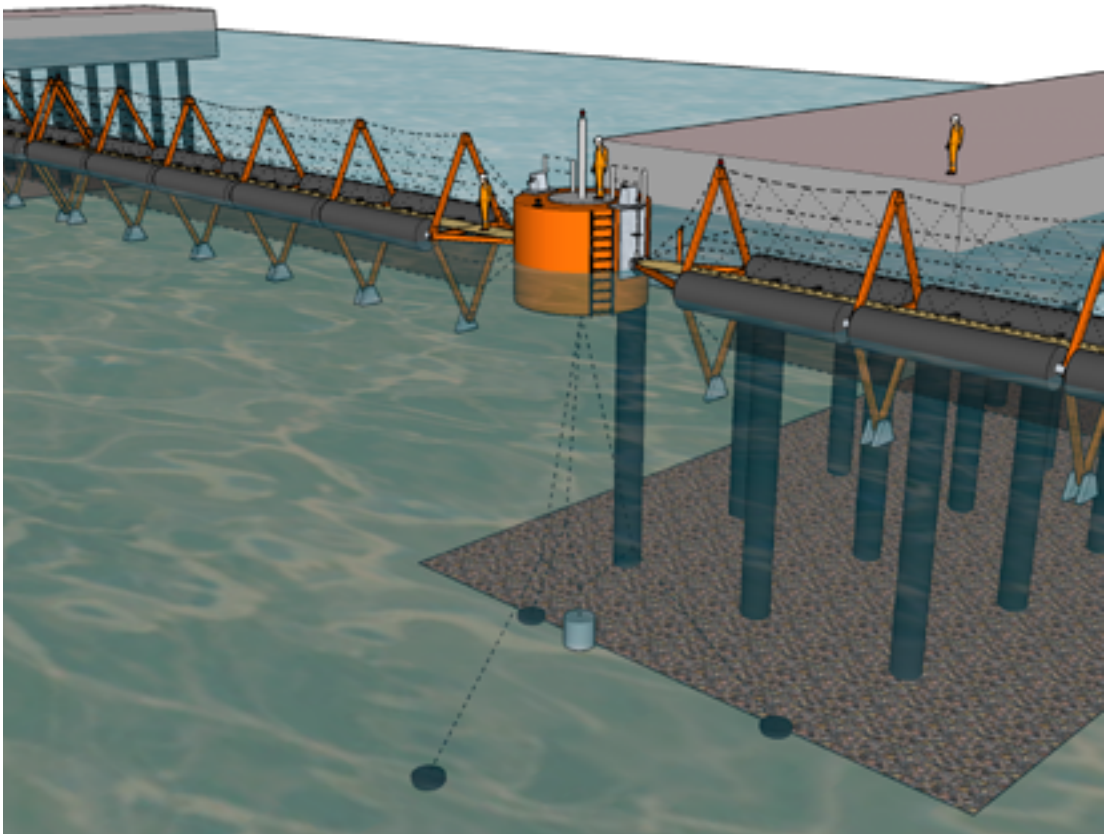
MANUFACTURING IMPRESSIONS





PROVEN APPLICATIONS

FLOATING BARRIERS



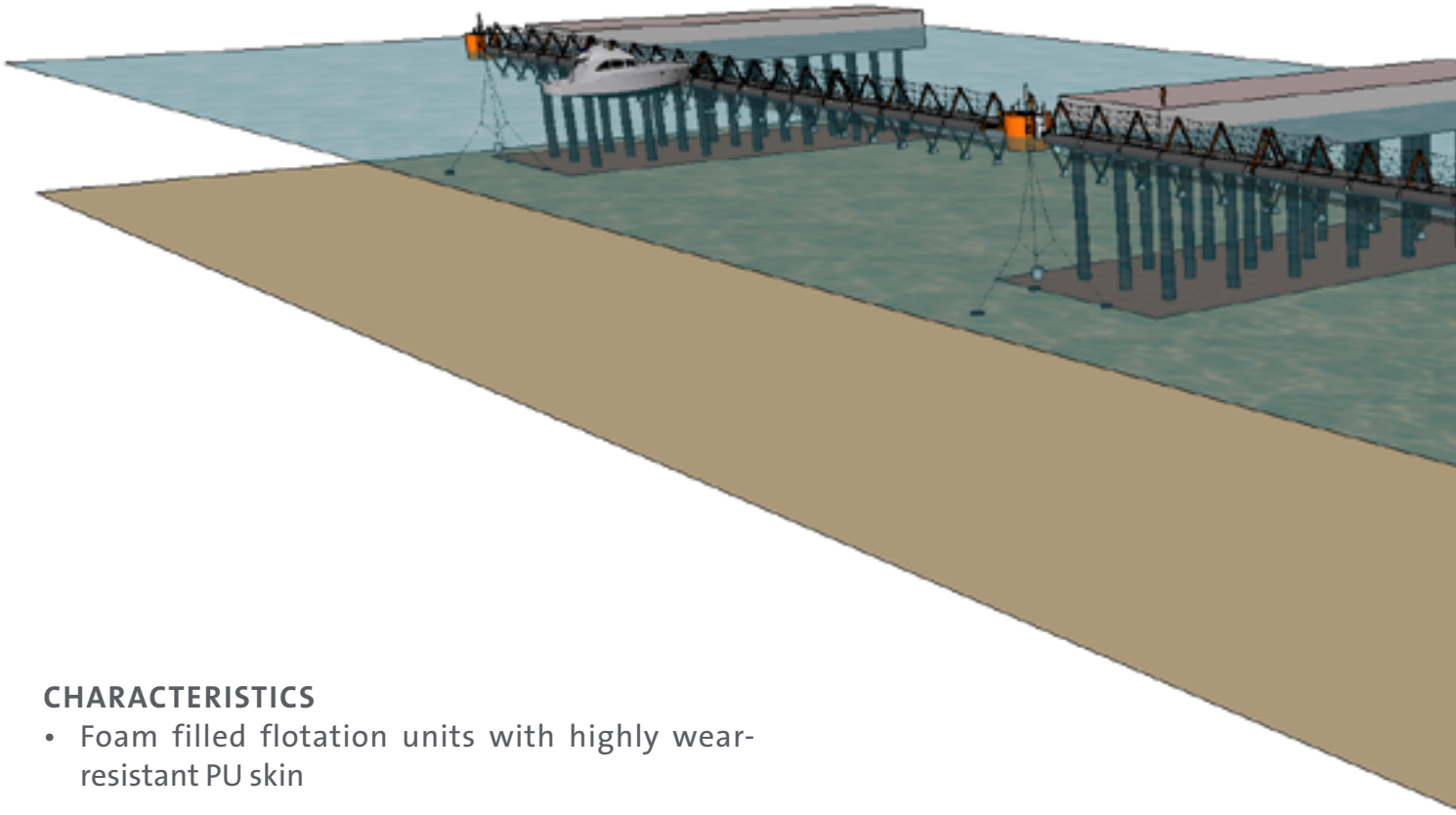
Typical Security Barrier Design/Layout

SFT Ocean Guard Floating Barriers are bespoke barrier systems for support, mooring, navigation, demarcation and restricted areas in all marine environments, from inland waterways to offshore applications.

Floating barriers don't come in a standard range as each project is unique and requires a customized design. However, our experienced team of engineers offers free of charge in-house design service to match project related needs.

The flotation units of our Ocean Guard Floating Barriers utilize the proven Ocean Guard Foam Filled Fender technology with all it superior features.

Typical layout in a port



CHARACTERISTICS

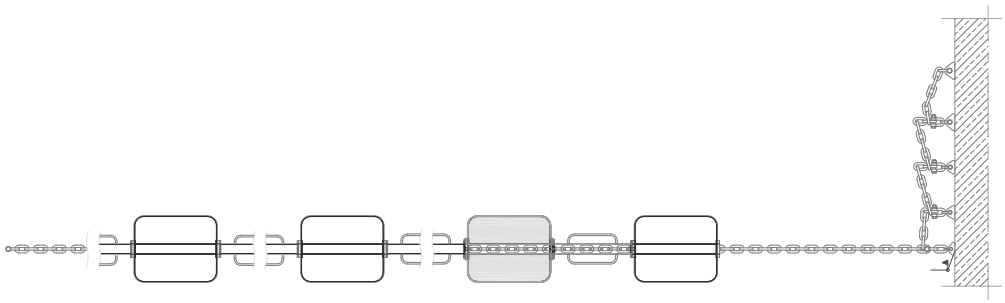
- Foam filled flotation units with highly wear-resistant PU skin
- Modular design that allows easy resizing, adaption, transportation as well as relocation
- Low maintenance and long life construction
- Tailored in size, length, color, strength, floating level, visibility
- High visibility
- Can be designed to specific breaking force
- Can be deployed with anchoring buoys
- Easy to assemble and install

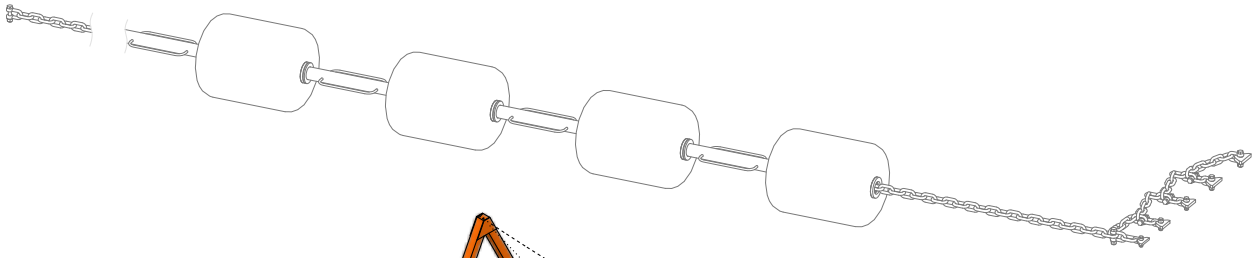
APPLICATIONS

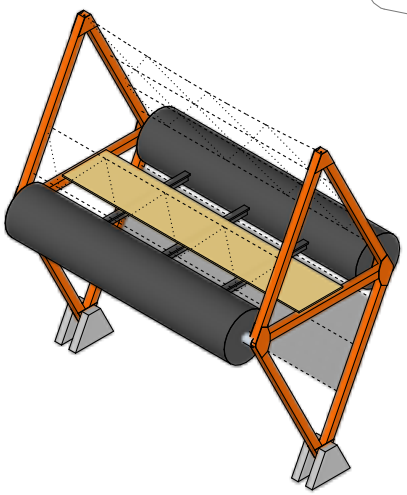
- Protect weirs, dams or structures against ships
- Act as demarcation barriers
- Physically restrict entry into sensitive areas in ports or waterways
- Protect vessels and their surroundings against unauthorized approach

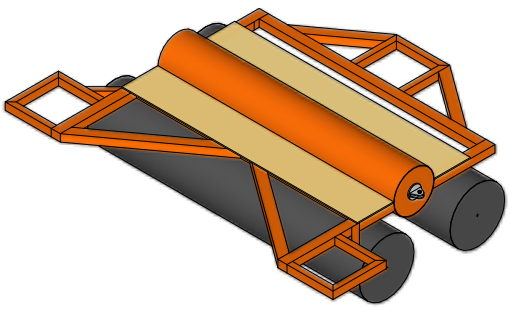
PROVEN APPLICATIONS

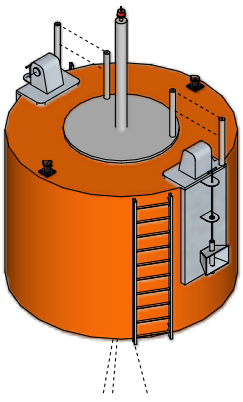
FLOATING BARRIERS











OUR OFFICES.

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