

## COMPANY PROFILE





# FENDERTeam – ON THE SAFE SIDE

>> FenderTeam is a dedicated team of experts providing the very best in fendering solutions with its headquarters in Germany and local offices in France and the US supported by well established local representatives. **Fenders** – We are specialists in the design, manufacture and sale of fenders and fender systems. **Team** – Our team of partners, employees and reputable and approved suppliers all share one thing in common – the passion for this product and the market. We also consider our clients as an important part of the team. Together we have decades of experience and specialized know-how in this niche market which is highly safety-sensitive to people, ships and port infrastructure. Our expertise and know-how ensures unique fender-engineered solutions, high quality products and fair prices.

## >> DESIGN AND ENGINEERING

Application engineering, detailed design calculations and installation supervision are all available through our exclusive cooperation with the consulting engineering company, Roßburger\*. Consultant Roßburger and his team of engineers have a long track

record in the marine construction industry and share premises with FenderTeam. As a team we are true fender specialists with worldwide references. All FenderTeam products are designed, manufactured and tested in accordance with PIANC 2002, EAU 2004, and DIN 18800.

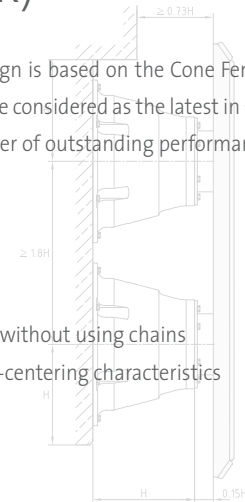
\*E-Mail: [info@rossburger.eu](mailto:info@rossburger.eu)



## SPC-FENDER (SUPER CIRCLE FENDER)

The SPC Fender is the result of continuous product development. This fender design is based on the Cone Fender which was introduced to world-wide markets more than 25 years ago. This type of fender can be considered as the latest in state-of-the-art moulded fender products. Its refined geometry and conical shape result in a number of outstanding performance characteristics which include:

- ▶ Exceptional good energy absorption to reaction force ratio (E / R)
- ▶ Outstanding energy absorption per weight of fender
- ▶ High shear stability which allows the fender to carry even larger panel weights without using chains
- ▶ Very good inherent resistance against shear forces due to its geometry and self-centering characteristics
- ▶ No reduction of energy absorption up to 10° compression angle
- ▶ Internal overload stopper as standard



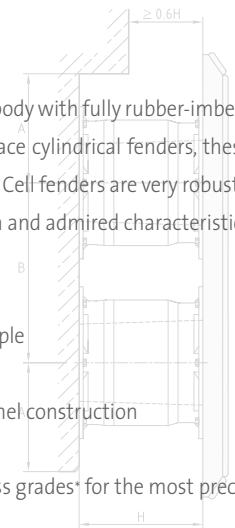
Availability in heights between 300 and 2.000 mm, each in 3 different main hardness grades\* for the most precise fender selection.



## CSS-FENDER (CELL-FENDER)

The CSS fender is a well established fender type. This fender has a hollow cylindrical body with fully rubber-embedded mounting flanges and is designed to deflect in an axial direction. Originally designed to replace cylindrical fenders, these fenders have more than 30 years track record with only some minor improvements over the years. Cell fenders are very robust and have been used for decades in many ports around the world. The CSS-style fender's well-known and admired characteristics include:

- ▶ Good energy absorption to reaction force ratio (E / R)
- ▶ Integrated and fully-embedded fender flanges make assembly & installation simple
- ▶ Good shear force resistance due to the large diameter of the fender flanges
- ▶ Large fender footprint with good force distribution could lead to relative light panel construction



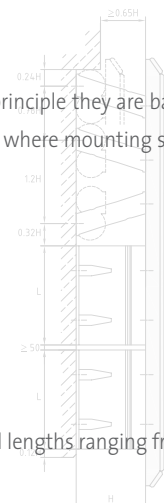
Availability in heights between 400 and 3.000 mm, each in 3 different main hardness grades\* for the most precise fender selection.



## FE-FENDER (ELEMENT FENDER)

Element fenders are fully moulded rubber legs with embedded mounting plates. In principle they are based on V-fenders but separated legs increase fender layout flexibility when installed behind steel panels or where mounting space is restricted. The major characteristics include:

- ▶ Good energy absorption to reaction force ratio (E / R)
- ▶ High energy absorption per weight of rubber
- ▶ Modular and compact design with small footprint
- ▶ Vertically and horizontally mounted elements may be combined in one system



The FE fender element is available in heights between 250 and 2.000 mm, in standard lengths ranging from 500 to 2.000 mm each in 3 main hardness grades\*. This enables the most precise fender selection.

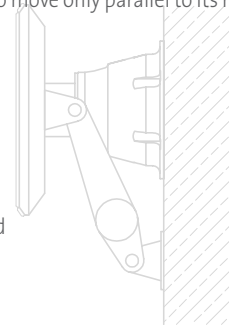
\* Intermediate rubber grades are available upon request



## PM-FENDER (PARALLEL FENDER)

The PM-Fender is an individually designed complete fender system. A turning lever-arm mounted between the structure and the panel restrains the panel movement during the entire fender compression, allowing it to move only parallel to its mounting irrespective of the impact level and angle. The advantages are obvious:

- ▶ The system provides equal energy absorption capacity at any impact level
- ▶ No second contact point between the ship and the fender system can occur
- ▶ Reaction forces could be much lower compared to conventional fender systems
- ▶ Lower reaction forces result in lower hull pressures and lighter structures which can lead to substantial savings in the complete project



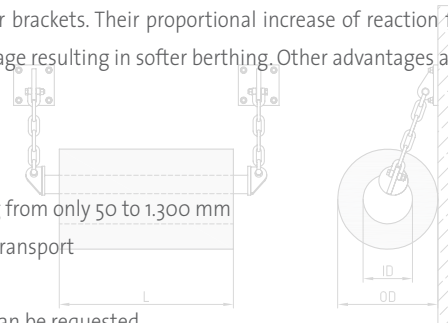
This fender is uniquely designed for each project. FenderTeam would be pleased to receive your design input allowing us to select the correct type, size and overall layout for the PM-fender.



## CYLINDRICAL FENDERS

Cylindrical fenders were the first fender type to be produced with a defined performance. Adequate installation is simply achieved by using chains, bars, ropes or specially designed ladder brackets. Their proportional increase of reaction force and energy absorption all the way to the rated deflection is an advantage resulting in softer berthing. Other advantages are:

- ▶ Very robust and simple fender type
- ▶ Easy to install, allowing multiple usage at different berths
- ▶ Outside diameter up to 2,700 mm and inside diameter ranging from only 50 to 1,300 mm
- ▶ Variable in length up to 20 m, limited mainly by handling and transport



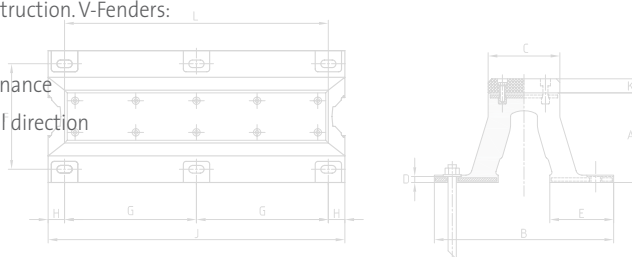
Special dimensions and features such as pre-bending or jointing can be requested.



## V-FENDERS

The V-fender is the most commonly used moulded fender type and is available in 3 different cross sections, SV, SX and SH. The main difference is the width of the front face and resulting surface load. Each type can be equipped with an additional embedded steel plate in the fender head. This allows the installation of a low friction PE-rubbing plate, a steel fender panel or the mounting of the fender unit behind a pile construction. V-Fenders:

- ▶ Are very robust, durable and require low maintenance
- ▶ Provide high shear resistance in the longitudinal direction
- ▶ Are most suitable for Multi-Purpose-Terminals
- ▶ Can be installed both vertically and horizontally



The V-fender is available in standard heights from 250 to 1,000 mm and standard length ranging from 1,000 to 3,500 mm \*\*, each in 3 main different hardness grades.

\* Intermediate rubber grades are available upon request \*\* Special lengths, diameters, fixing arrangements or end-chamfers available upon request

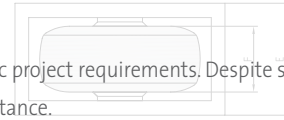


## ROLLER- AND WHEELFENDERS

Roller and Wheel fenders are predominantly installed in the entrance areas of locks, dry docks and other narrow or exposed passages. Roller fenders offer only limited energy absorption and are chosen to smoothly guide passing vessels by means of the rotation of the wheel.



Wheel fenders provide a defined energy absorption capacity in addition to guiding the vessel. Combinations of two or more roller or wheel fenders are possible.

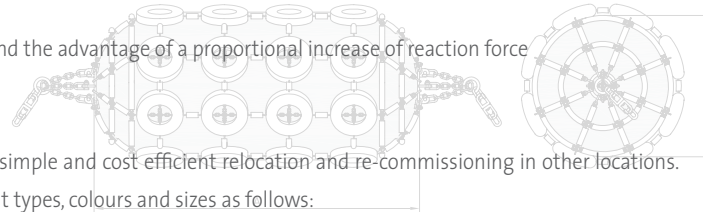


Selection of the appropriate type, size and casing is dependent on the specific project requirements. Despite standard tyre and roller dimensions, each fender is a tailored system. Please contact us for assistance.

## PNEUMATIC FLOATING FENDERS

Pneumatic floating fenders are a proven alternative to fixed fenders and are preferably used:

- ▶ In ports with extreme tidal variations
- ▶ For ship-to-ship lightering operations
- ▶ For all Navy vessels due to low hull pressure and the advantage of a proportional increase of reaction force and energy absorption



The fenders can easily be deflated which allows simple and cost efficient relocation and re-commissioning in other locations. We supply pneumatic floating fenders in different types, colours and sizes as follows:

- ▶ 2 different inside pressure levels to cover a wide performance range
- ▶ Standard colours grey and black
- ▶ Optional chain/tyre net for heavy duty applications
- ▶ Diameters ranging from 300 mm to 4.500 mm and length ranging from 500 mm to 10.500 mm
- ▶ Special hydro-pneumatic version for submarines



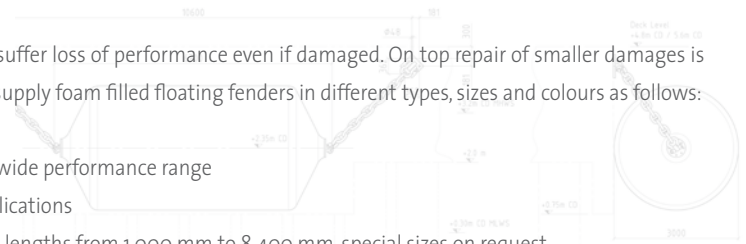
## FOAM FILLED FLOATING FENDERS

Foam filled floating fenders are used as alternative solution to both fixed fenders and pneumatic fenders. Main applications are:

- ▶ Heavy duty ship-to-ship lightering operations
- ▶ All Navy vessel berths and cruise terminals due to low hull pressure, non-marking Polyurethane skin and the advantage of a proportional increase of reaction force and energy absorption

The fenders are extremely robust and do not suffer loss of performance even if damaged. On top repair of smaller damages is relatively simple and can be done on site. We supply foam filled floating fenders in different types, sizes and colours as follows:

- ▶ Different foam hardness grades to cover a wide performance range
- ▶ Optional chain/tyre net for heavy duty applications
- ▶ Diameters from 300 mm to 4.500 mm and lengths from 1.000 mm to 8.400 mm, special sizes on request
- ▶ Individual skin colours are available upon request, standard colours are black and orange



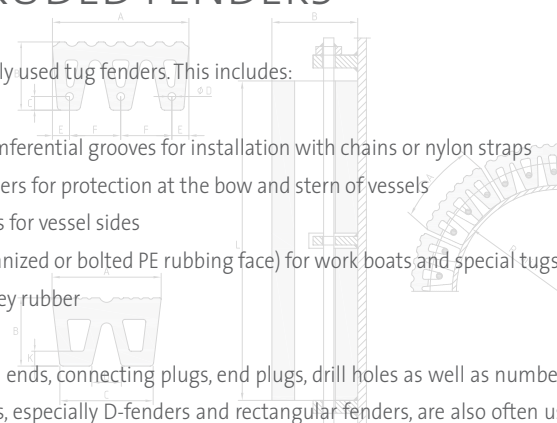


## TUG FENDERS AND EXTRUDED FENDERS

FenderTeam is able to offer a complete range of commonly used tug fenders. This includes:

- ▶ Cylindrical bow and stern gunwale fenders with circumferential grooves for installation with chains or nylon straps
- ▶ W-fenders, M-fenders, block fenders and key-hole fenders for protection at the bow and stern of vessels
- ▶ Wing-type fenders, D-Fenders and Rectangular fenders for vessel sides
- ▶ Composite fenders (moulded rubber fender with vulcanized or bolted PE rubbing face) for work boats and special tugs
- ▶ For Navy applications also available in non marking grey rubber

A complete “ready to install” fender kit including tapered ends, connecting plugs, end plugs, drill holes as well as numbered stern and bow fender sets are available. Tug boat fenders, especially D-fenders and rectangular fenders, are also often used for other applications or structures.



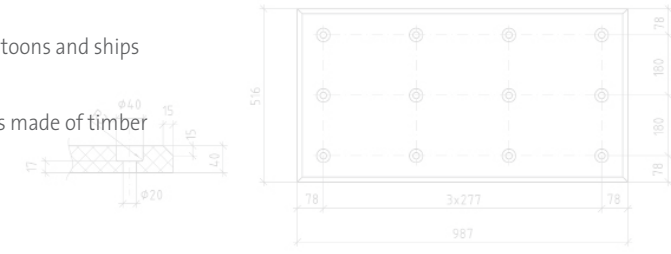
## PE-SLIDING PLATES AND FENDERS

Sliding and wear materials made of Polyethylene are used in many applications in the marine environment such as:

- ▶ Sliding fenders on marine structures, pontoons and ships
- ▶ Front face for fender panels
- ▶ Replacement of timber piles and dolphins made of timber

The following material grades are available:

- ▶ UHMW-PE 1000 FQ, mainly used as low friction and rubbing pad for fender panels
- ▶ HD-PE sliding fenders, predominantly used to replace wooden beams
- ▶ Plastic piles and beams with both glass fibre or steel rebar embedded to replace timber piles



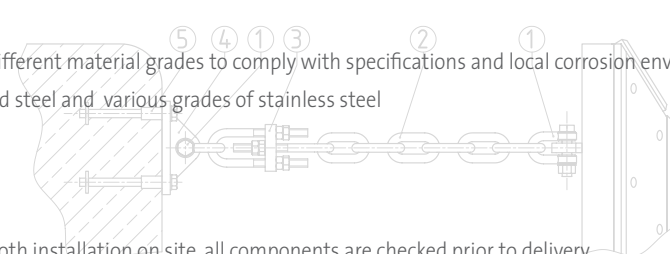
Technical information and details are available upon request.

## ACCESSORIES AND FIXINGS

High quality accessories and fixings to assemble and install fenders are a vital part of each fender solution. Supplies include:

- ▶ Cast-in and resin anchors in different material grades to comply with specifications and local corrosion environments
- ▶ Bolts, nuts and washers in mild steel and various grades of stainless steel
- ▶ Chains and shackles
- ▶ Tensioners and chain anchors

To ensure a trouble free and smooth installation on site, all components are checked prior to delivery.



## >> SALES AND PRODUCTION

A modern fender system consists of many different components and materials. These items are purchased worldwide through approved and reputable suppliers. All manufacturing is done strictly in accordance with FenderTeam specifications, drawings and calculations. Furthermore, our partners in the supply chain are continuously being urged to enhance and develop their products.

**Rubber Fenders**—The heart of a fender system is the energy absorbing rubber unit. FenderTeam has entered into an exclusivity agreement with the highly-regarded Japanese company, Shibata, for the manufacture of this most important item in a fender system. Located in Kobe, Japan, the family-owned company, Shibata Industrial, was founded in 1923 and has produced rubber fenders for more than 50 years.

The name Shibata has a global reputation for highest product quality, durability and reliability. In modern factories within and also outside of Japan, Shibata manufactures a complete range of moulded rubber fenders. Shibata is certified according to ISO 9001 and 14001. Fender testing follows the recommendations of PIANC and the PIANC TYPE APPROVAL CERTIFICATE is also available.

**Steel Panels and Accessories** — Steel fender panels are preferably designed as a closed box and have a protective coating applied strictly in accordance with ISO EN 12944-5 C5M. Both the fabrication of the steel fender panel and the application of the coating system are carried out in Germany. Our two standard colours are RAL 2009 orange or RAL 7011 grey. Alternative coating systems and colours are available on request. The steel fender panels and fixing accessories are manufactured only after detailed calculations have been made and working drawings prepared.

All fabrication work, quality control and related documentation are exclusively performed by qualified and skilled employees. Test certificates associated with welding and materials are available to our customers upon request. All the required standard components such as anchors, shackles, chains and bolts are sourced from specialized wholesalers.

### **Polyethylene Frontal Pads and Fender Piles**

**(UHMW-PE / HMW-PE / HD-PE)** — Most modern fender systems include UHMW-PE (ultra-high molecular weight Polyethylene) pads to enhance the life of the steel fender panel coating, minimise wear and reduce friction forces. The material properties of Polyethylene are ideally suited for this application. At the lower end of the market, HD-PE (high density Polyethylene) sliding fenders offer a number of significant advantages compared to timber beams.

PE- fender piles can be supplied either with or without glass fibre rebar or steel rebar. These piles can be used in many dolphin and pile constructions to replace traditional tropical hardwood. Approved and mostly German-based companies are the suppliers of our Polyethylene products. These products are manufactured strictly to our standards and specifications.

**Installation** — Important conditions for a smooth and on-time fender installation on site require all components to be not only supplied in correct quality and quantity but also to match each other properly. We check this prior to delivery and provide our customers with detailed installation instructions.

# SALES AND SERVICE

>> Being office-based in Germany, France and the US we coordinate the sales and engineering activities in close cooperation with our local representatives. Our aim is to answer all enquiries concerning the project both competently and timely. Take our word — we look forward to receiving your enquiries.

### **FENDERTEAM — GERMANY**

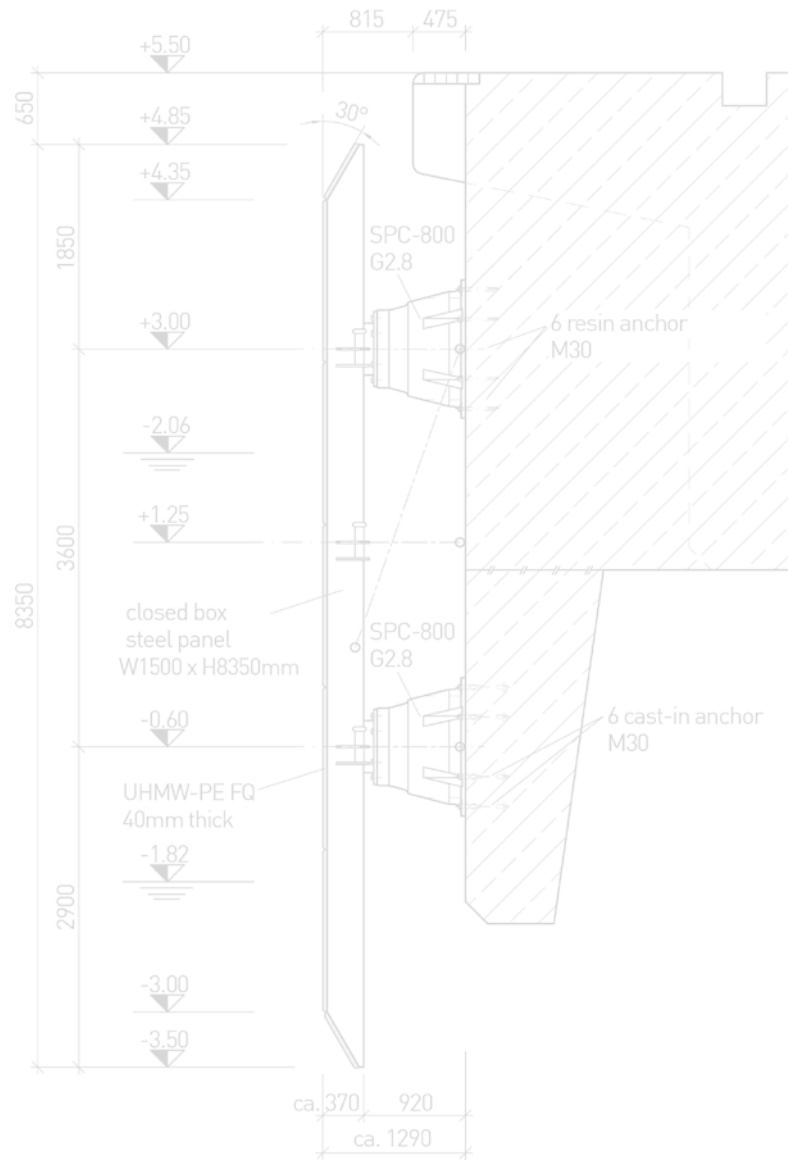
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