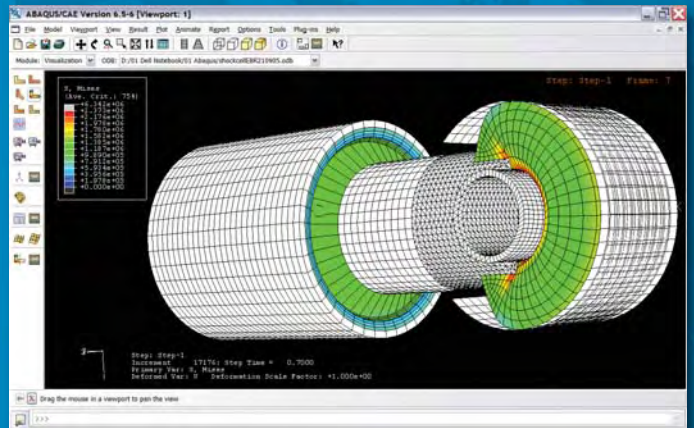
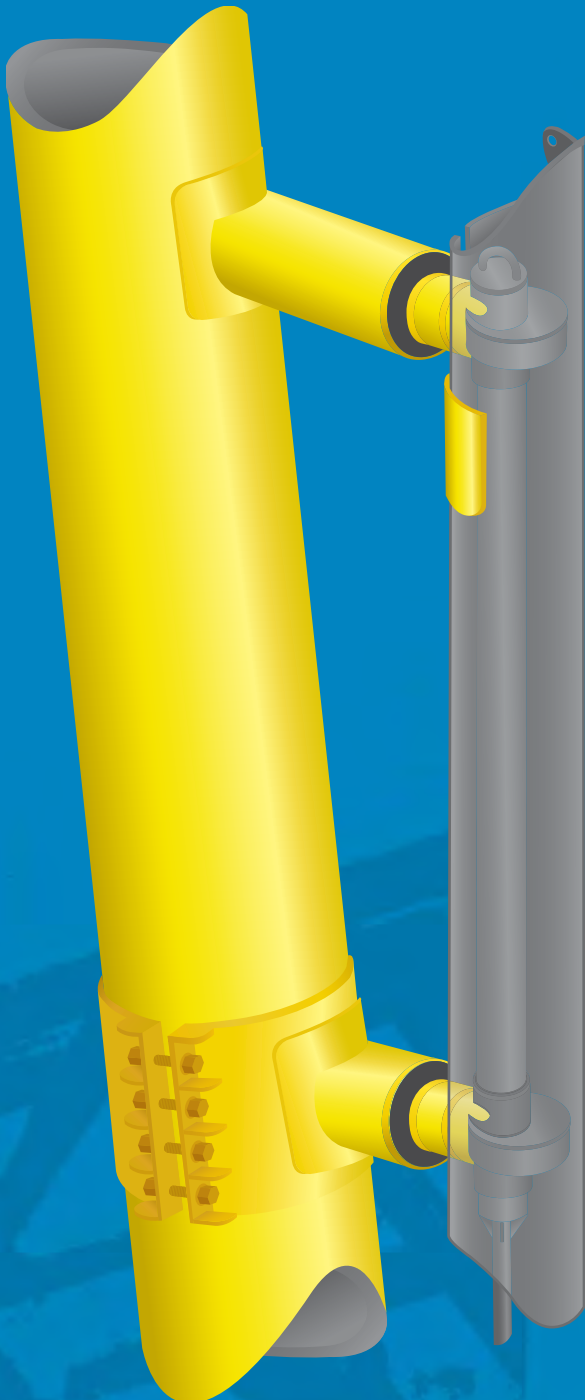


Trelleborg Offshore Products

Boat Landing and Fendering Systems



Boat Landing

Eccentric Bumper Ring



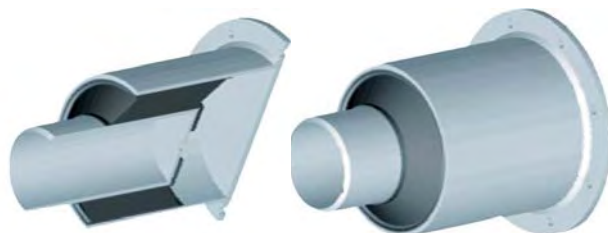
Boat Landing Systems by Trelleborg provide a cost effective and reliable protection for offshore platforms. Building on our experience in manufacturing specialized rubber products for the marine industry, the Boat Landing Systems can withstand the most hostile climates and operate in even the most severe weather.

It is durable, easy to install and requires no maintenance. Every unit is load tested prior to delivery and the customer can choose from a complete range of sizes to suit their needs. Our Shock Cells and Eccentric Bumper Rings are proven in absorbing and safely deflecting almost all axial and lateral loads so that you can have peace of mind that your platform will always be protected.

How it works

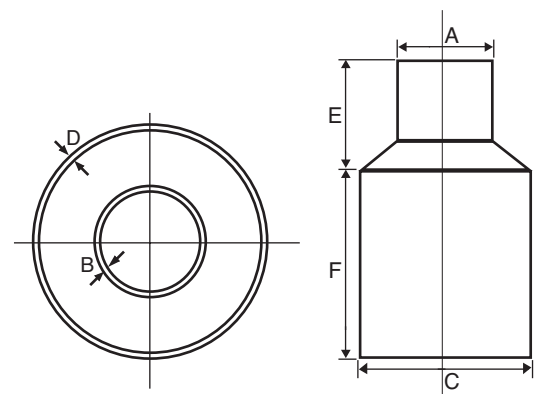
The Boat Landing System consists primarily of the Shock Cells, Eccentric Bumper Rings (EBR) and a steel contact surface. On impact by a berthing vessel, the steel surface transfers the load to the EBRs and the Shock Cells. Kinetic energy is absorbed and dissipated as heat and a smaller reaction force against the vessel by the rubber as it undergoes shear and tension. The load is therefore reduced and the vessel can berth without damaging the platform structure. The strong bonding achieved between the rubber and the steel during the manufacturing process ensures that this arrangement will safely dissipate and reduce the external load without damaging the platform.

We essentially utilize rubber's unique ability in deflecting normal and lateral impact to withstand the design stresses that is imposed on a platform during barge and vessel operations. Rubber, with its internal damping effect, can resist high overloads without damage.



Shock Cell

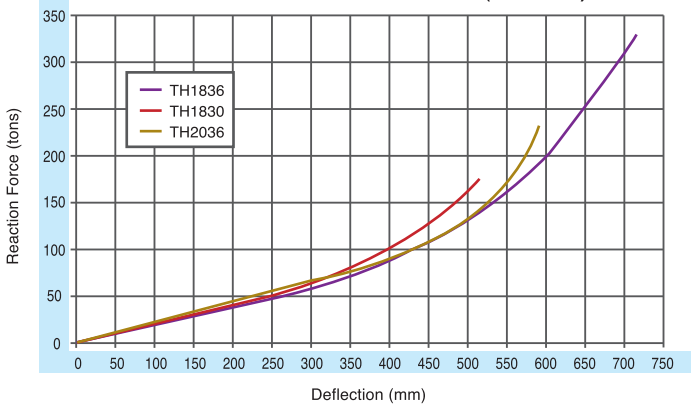
Shock Cell Specifications (All dimensions in mm)						
Type	A	B	C	D	E	F
TH1424	356	19	610	17	216	435
TH1630	406	26	762	19	406	679
TH1830	457	19	762	19	406	610
TH1636	406	26	914	25	610	800
TH1836	457	24	914	25	610	746
TH2036	508	21	914	25	610	660



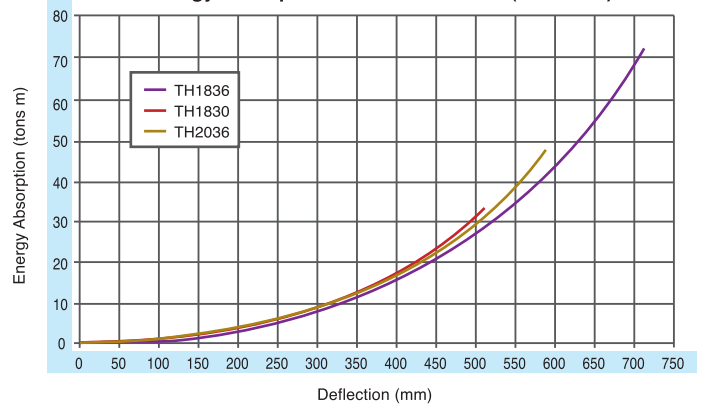
All dimensions act as a guide only. Please refer to us for details.

Boat Landing

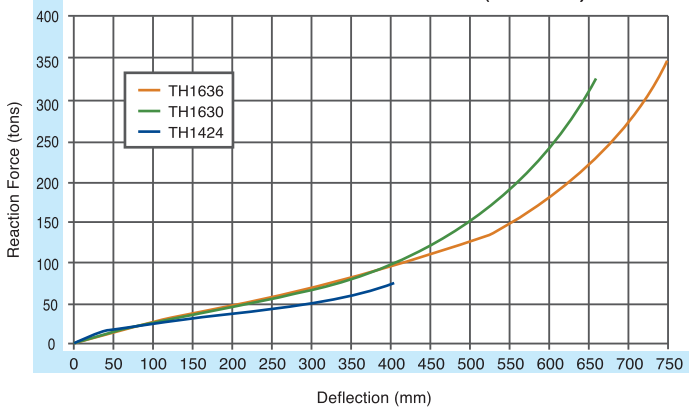
Reaction Force versus Deflection (with EBR)



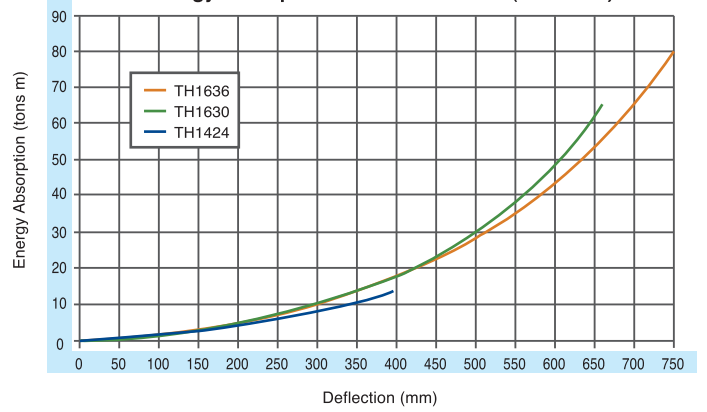
Energy Absorption versus Deflection (with EBR)



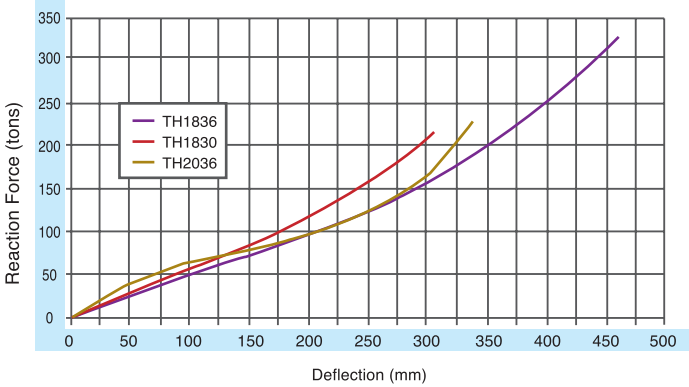
Reaction Force versus Deflection (with EBR)



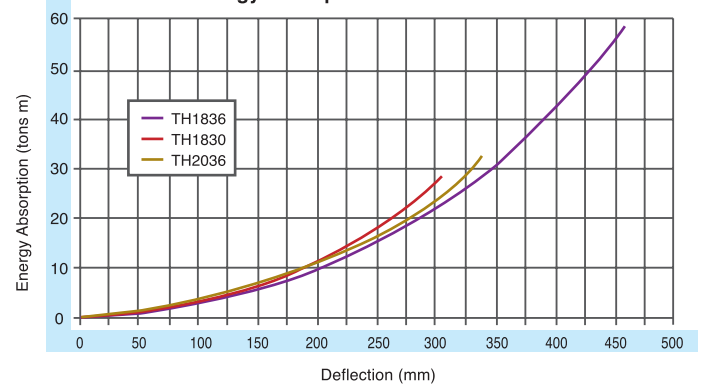
Energy Absorption versus Deflection (with EBR)



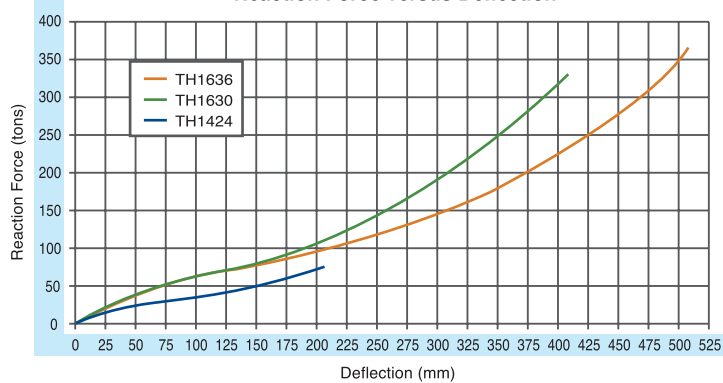
Reaction Force versus Deflection



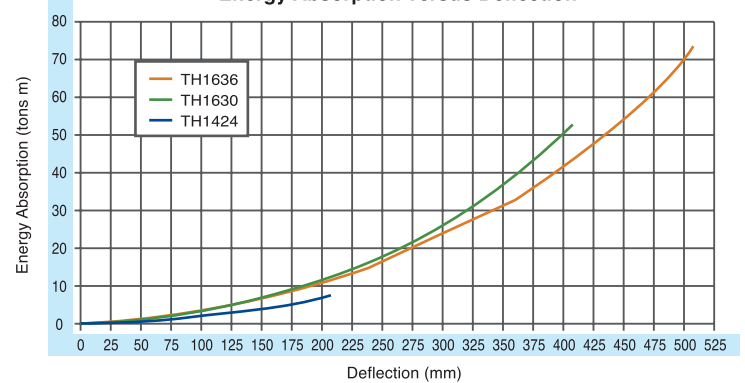
Energy Absorption versus Deflection



Reaction Force versus Deflection

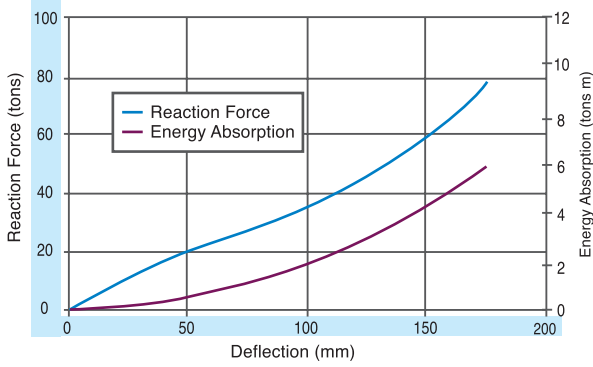


Energy Absorption versus Deflection

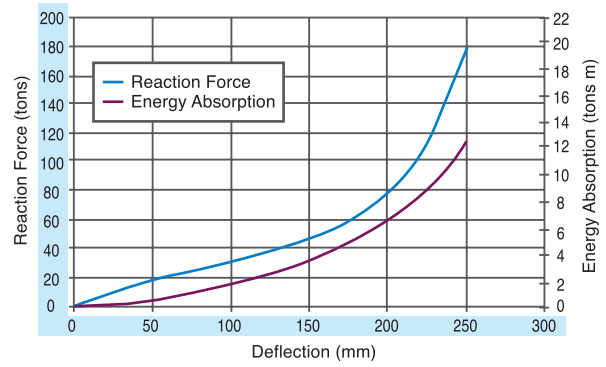


Boat Landing

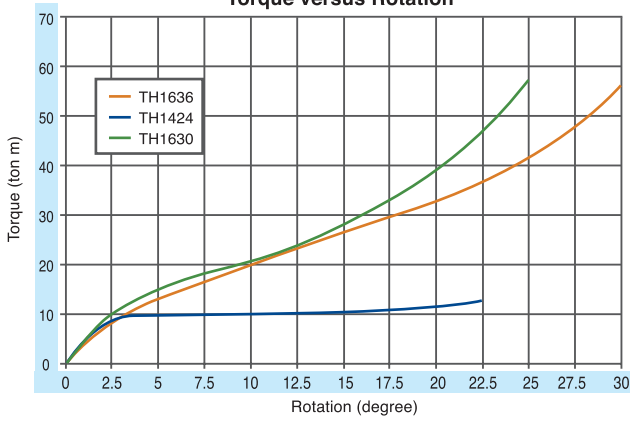
45 DEGREE COMPRESSION PERFORMANCE FOR EBR



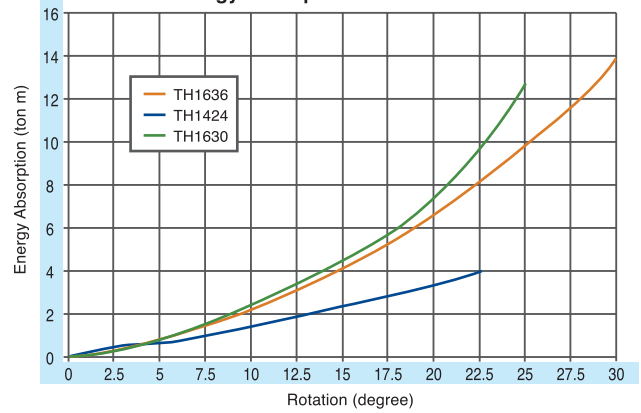
90 DEGREE COMPRESSION PERFORMANCE FOR EBR



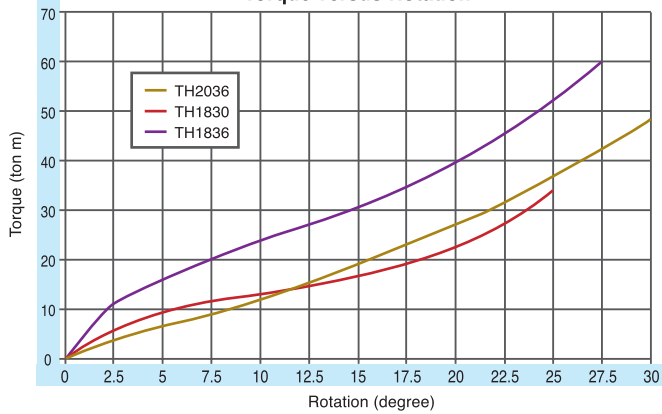
Torque versus Rotation



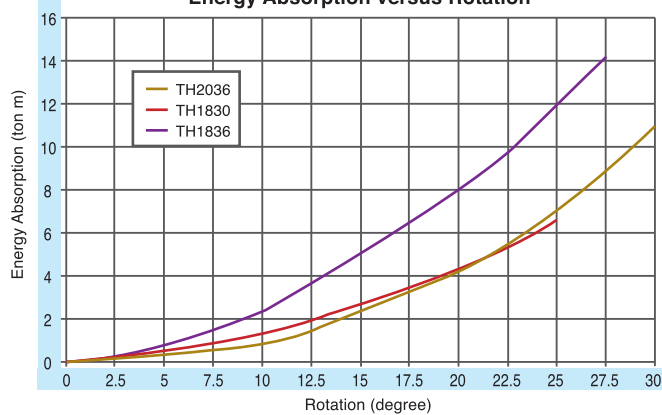
Energy Absorption versus Rotation



Torque versus Rotation



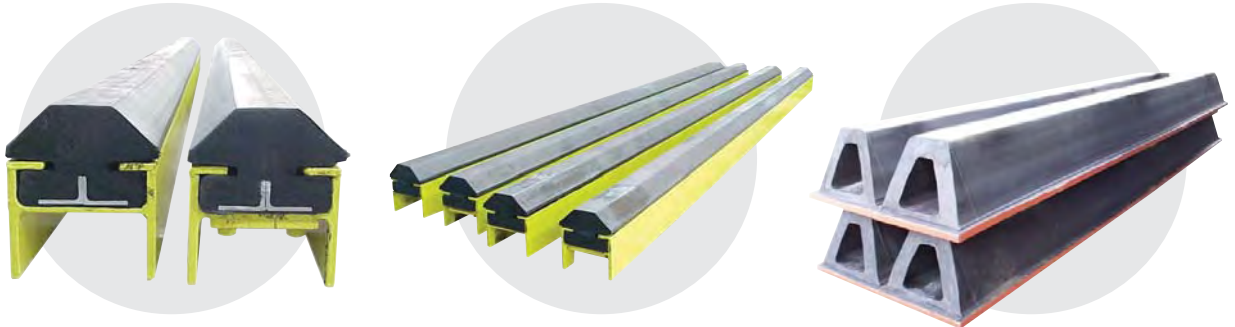
Energy Absorption versus Rotation



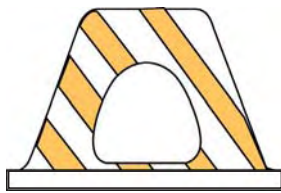
Rubstrips

We also manufacture rubstrips of several different profiles. Our profiles can be solid or hollow and come with many fitting options to the jacket leg/structure.

Our rubstrips are made of high quality rubber that provide the necessary protection to offshore structures while ensuring that the vessel is not damaged. It consists of a simple but robust design that is free from maintenance and have excellent weather resistance. Please contact us for more details.



General Profiles



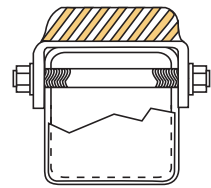
TH-RS-100



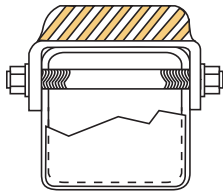
TH-RS-200



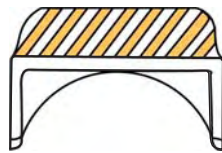
TH-RS-300



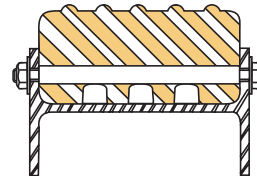
TH-RS-400



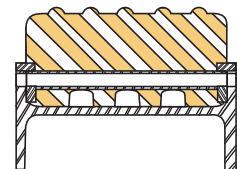
TH-RS-400



TH-RS-700

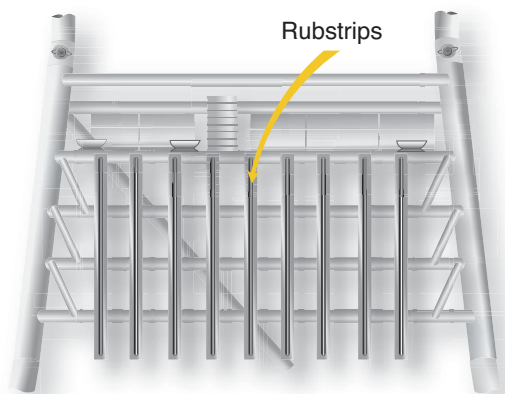


TH-RS-BB1



TH-RS-BB2

Model	Rubber Size	Overall Size
TH-RS-100	305mm(W) x 229mm(H)	356mm(W) x 248mm(H)
TH-RS-200	216mm(W) x 143mm(H)	216mm(W) x 255mm(H)
TH-RS-300	203mm(W) x 154mm(H)	254mm(W) x 173mm(H)
TH-RS-400	229mm(W) x 57mm(H)	229mm(W) x 130mm(H)
TH-RS-700	229mm(W) x 57mm(H)	229mm(W) x 159mm(H)
TH-RS-BB1	276mm(W) x 136mm(H)	305mm(W) x 355mm(H)
TH-RS-BB2	276mm(W) x 136mm(H)	305mm(W) x 355mm(H)

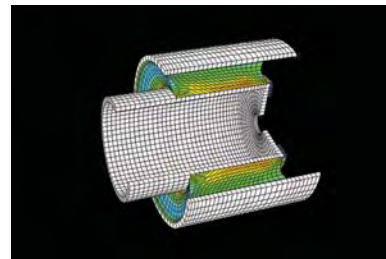
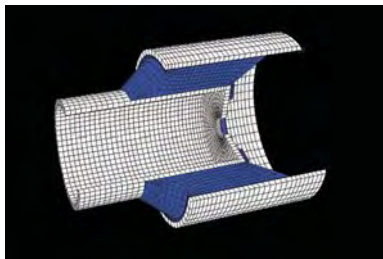
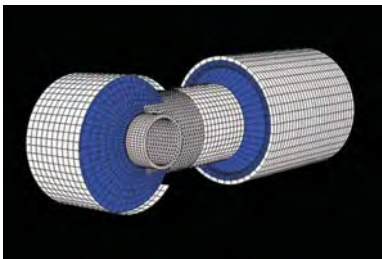


Models and sizes are for reference only.
Rubber & plate size can vary according to customer's specification.

Boat Landing

Project Reference List

ExxonMobil EAST AREA	Arch Fender & Frame
BTE SAUDI ARAMCO	Shock Cell
Petronas ABU-A	Rubstrips
Amerada Hess UJUNG PANGKAH	Rubstrips
ConocoPhillips KERISI	Shock Cell, EBR & Rubstrips
Premier Oil WEST LOBE	Rubstrips
Murphy Oil WEST PATRICIA WPPA & 1A	Fenders
PTTEP ERAWAN FIELD TTP	Shock Cell & EBR
BG & Clough PANNA FIELD	Shock Cell, EBR & Rubstrips
Petronas Vietnam RUBY B	Rubstrips
TOTAL Myanmar WP3 FIELD	Shock Cell & EBR
JVPC C1, CLPP & S1 FIELD	Shock Cell, EBR & Rubstrips
Clough HAZIRA DEVELOPMENT	Shock Cell, EBR & Rubstrips
Sandra SOUTH PARS 4 & 5	Shock Cell & EBR
I.O.E.C SOUTH PARS 1 & 2	Shock Cell & EBR
McDermott Dubai AMOCO P15/18	Shock Cell & EBR
IHC Gusto UNOCAL L11-B	Shock Cell & EBR
Heerema MOBIL P-6B & C	Shock Cell & EBR
Grootint CONOCO L16	Shock Cell & EBR



Research & Development

At Trelleborg, we continue to further refine and improve our product line through R & D activities utilizing the latest tools like FEA modelling (shown above), rapid prototyping/testing and a more selective mixture of raw materials that combine to give our customers products that perform at the highest standard. These initiatives ultimately translate to cost savings that will be passed on to our customers. We are able to offer the fastest and most cost competitive customization to meet every offshore fendering requirement. Contact us to learn more about what we can offer in terms of product improvements/ customizations.

Physical Properties of Rubber

Property	Test Standard	Specification
Tensile Strength (MPa)	ASTM D412	18 min
Elongation @ Break	ASTM D412	450 min
Tear Resistance (kN/m)	ASTM D624 (B)	80 min
Compression Set (%)	ASTM D395 (B)	25 max
Ozone Resistance	ASTM D1149	No cracks



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Certificate No. 190037



Certificate No. 403030