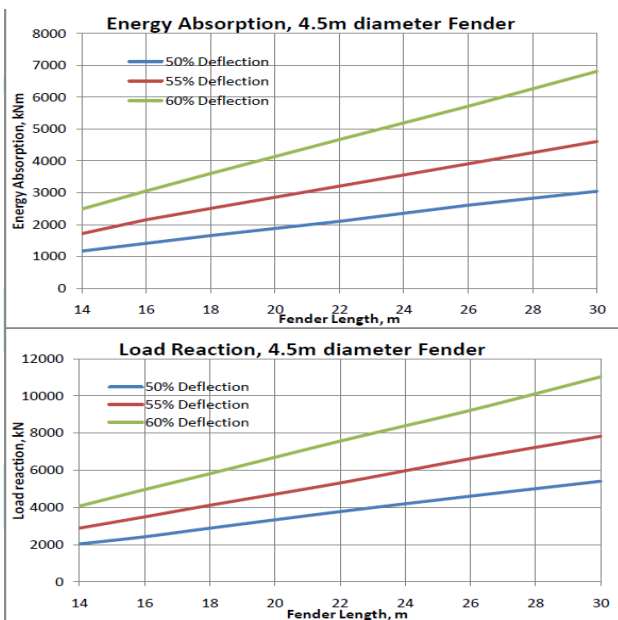


Low Pressure Pneumatic Fenders

Trelleborg's division, Dunlop GRG are manufacturers of Low Pressure (LP) Fenders an ideal product to use in situations where there is need to avoid high specific pressures upon the hull structures of vessels, whilst still effectively absorbing the kinetic energy.

Dunlop GRG developments.

Lightweight, the LP Fenders can be deployed quickly by road, sea and air into areas where emergency Fendering is required, STS operations being a key area to exploit this feature.



The LP Fender

The LP Fenders cover diameters of 1.0 m to 4.5 m, the lengths of the fenders being made in accordance with the requirements of the specific application. Designs of LP fenders can be made to provide the same performance as a HP Fender unit.

Dunlop GRG LP Fenders operate at a nominal pressure of 70 m bar (1 psi). Any convenient air supply, compressor or blower, can be used to inflate the LP Fender. This LP type of Fendering offers energy

absorption over a large area whilst reducing to a minimum the disadvantage of point loading. The yielding nature of the LP Fender usually renders unnecessary the need to equip the unit with external reinforcement and protection. This feature is especially

valuable when LP fenders are used during STS operations, the significantly reduction of metal fittings on the contact surfaces precludes the risk of fire through sparking. The LP Fender at 4.5Ø x 22 M long weighs in at just over 2000kg, a HP unit offering the equivalent Energy Absorbed (EA) is sized at 4.5Ø x 9 M long, with chain and tyre assembly this unit is over 9000 kg.

Advantages of the LP Fenders are compact storage, ease of deployment, simple and minimal maintenance requirements.

High EA capacity coupled with ease of handling enables ships of even the largest tonnage to be safely fendered in most weather conditions and during various berthing operations.

Operations

Our products continue to be used world-wide, the UK and US Navy use our LP Fenders as do commercial companies such as Svitzer and Fuji Trading. The LP Fenders have been used in many applications including Ship to Ship Transfer, Offshore Mooring, Jetty Mooring, Naval Applications, Salvage & Cargo recovery and emergency floatation.



Low Pressure Pneumatic Fenders

The maximum specific load reaction pressure that can be developed from a LP Fender is 11 Tonnes Square metre; in practice this value is seldom approached.

Unlike some forms of pneumatic fender Dunlop GRG LP Fenders are available in standard sizes and can also be manufactured to virtually any size required.

The LP Fenders are comparatively lightweight and can be folded to be easily stored and transported into its launch position.

Design Principles

The whole concept of low pressure Fendering has evolved from the need to avoid high specific pressure on the hull structures. This is an important feature when operating with damaged or weakened hulls. Manufacturing methods, testing procedures and records follow well established rules taking into account BS 6349 part 4 and ISO 17357, to ensure the equipment is robust and more than fit for the application it was designed for.

The Ship to Ship Transfer Guide (Liquefied Gases) Second edition 1995 states "The low pressure pneumatic type have been found useful for emergency situations where ease of transport is a first priority" The Ship to Ship transfer guide, Petroleum Fourth Edition 2005, advises " A new International Standard (ISO 17357) now specifies the material, performance and dimensions of floating pneumatic fenders which are intended to be used for the berthing and mooring of a ship to another ship or berthing structure" and also "it is strongly recommended that any pneumatic fenders used in STS transfer operations comply with this standard or equivalent"

With interest in LP Fenders from a high profile LNG company it was decided to further test the LP Fender to ensure the product met with the International Standards now being quoted in the STS Guides. BSI was approached and through them a draft copy of a Low Pressure testing standard was provided to the ISO Standards Committee.

This Draft Standard followed very closely the testing procedures required for HP Fenders outlined in ISO 17357.

The only modification made being in the testing methods of the base materials, due to the significant differences in wall thickness between the HP & LP Fenders units.

The draft standard has been discussed at an ISO Standards Committee meeting further comment is expected on either a change to ISO 17357 to include the LP Fender testing requirements, or possibly a new International Standard is required for a LP Fender.

Dunlop GRG LP Fender Testing

The Trelleborg Group manufacture HP Fenders, testing in accordance with ISO 17357. Based in Asia their help ensured our draft standard and testing methods were as close to the ISO standard as was possible.

Testing of materials and scale models started earlier this year. Dunlop GRG employing American Bureau of Shipping (ABS) as their qualifying authority.

Parallel compression, angular compression (5° & 7°) tests together with durability tests have all showed a LP Fender product which can successfully operate to meet the demands of an STS operation.

To date 90% of the Draft testing is complete with all results meeting the requirements laid down in the draft standard.



Dunlop GRG have always have followed stringent construction methods and now have the benefit of support from the Trelleborg Group. Our materials technology and the products can only improve as we now develop our LP Fender product to meet with the needs of our many clients.

www.trelleborg.com/dunlopgrg

