

LP PNEUMATIC FENDERS



Dunlop GRG design, develop and manufacture a large range of fabricated, rubber coated textile products, for many applications.

From our facility in Manchester, UK we are involved from the design stage with full project management capability to ensure our performance and products meet the expectations of our clients projects needs.

For over 40 years Dunlop GRG has produced high quality products for the armed forces worldwide. Our materials operate in many tough conditions and applications which have also allowed us to develop our products for very demanding commercial opportunities around the world. We now supply to a wide range of markets which include Defence, Maritime, Petrochemical, Power industry, Agricultural, Security and Offshore industries. Our high quality service is backed up by our expertise in the area of flexible Engineering and the ability to consistently produce to the highest standard demanded by present day markets.

In 2005 Dunlop GRG became part of the Trelleborg group, operating within the Coated Systems Division.





Trelleborg

The Trelleborg company was founded in 1905 and has since developed into a leading supplier of engineered polymer products growing from a small group of Swedish companies to the global group of today. Trelleborg's leading positions are based on advanced polymer technology and in-depth applications know-how.

The group has around 24,000 employees in 40 countries, the head office being located in Trelleborg, Sweden. The Trelleborg group offers technological solutions that meet three principal customer needs to Damp, Seal and Protect. These functions have various areas of use in many industries worldwide. Trelleborg's customer groups are to be found primarily within the aerospace, agricultural, automotive, infrastructure/construction, transportation equipment, oil/gas and other industries. The Group has five main divisions, Trelleborg Coated Systems, Trelleborg Industrial Solutions, Trelleborg Offshore & Construction, Trelleborg Sealing Solutions and Trelleborg Wheel Systems.

Trelleborg offer specialised engineering solutions for infrastructure construction projects such as fender systems for harbour, tunnel seals, dredging systems, acoustic and vibration-damping solutions for railways, bridges and buildings, niche products for offshore oil and gas extraction and other specialty products. Within the Trelleborg group, Dunlop GRG have extensive design and development expertise including finite element modeling of elastomeric composites and structures.





Low Pressure Fenders

The Dunlop GRG Low Pressure (LP) Pneumatic Fender has evolved from the clients' need to avoid high developed pressure upon the hull structure of vessels during berthing, whilst effectively absorbing the kinetic energy of the moving vessel during the berthing operation.

Because the contact surface of an LP Fender is large, the maximum specific reaction is considerably lower than any other fender system, including solid rubber, foam filled and high pressure pneumatic fenders. This makes Dunlop GRG LP Fenders ideal for use with thin-hulled or weakened vessels. Unlike fender systems which rely on the deformation of rubber and can give performance variations due to age, speed of contact and temperature, LP Fenders simply rely on the compression of air, with variations due to temperature and initial inflation pressure being very slight. The low pressure also makes repairs and maintenance easier to carry out.

Dunlop GRG has been supplying LP Pneumatic Fenders to the maritime industry for over 30 years. The wide range of sizes available covers most berthing solutions that users are likely to encounter, however Dunlop GRG fenders can be tailor made to meet any specific requirement.

When deflated they can be rolled into small packages which greatly reduces the cost and time of getting them from one location to another, giving a much greater flexibility of use. The large contact area spreads the berthing force over a large area so there is a very low load reaction per unit area.

No special davits are needed with Dunlop LP Fenders and they are easily handled with ordinary ships' mechanical handling gear. High energy absorbing capacity coupled with ease of handling enables ships of even the largest tonnage to be safely fendered in various conditions and berthing operations.

Not being encumbered by external fittings, the units can be towed in the inflated state and attachments suitable for towing and mooring can be provided at each end of the fender, in addition there are girthing ropes fitted for ease of handling.





Quality Materials

Each fender is issued with a unique serial number so all materials, manufacturing and test records are fully traceable. Factory acceptance testing and final product inspection of Dunlop GRG Low Pressure Fenders are based on tests and inspections procedures indicated in table 1.

At present the scope of specification ISO 17357:2002 is limited to the design of high pressure floating pneumatic fenders. This standard as well as existing Dunlop GRG LP Fender testing procedures have been used as guidelines for the establishment of a low pressure fender test schedule. This ensures, that the Dunlop GRG LP Fender testing is comparable to the test requirements of high pressure fenders and so meets the same high quality standards.

All these testing procedures are documented with full traceability and all records are stored for at least 5 years. All Longitudinal seams are physically tested for tensile break, while all other seams follow very tight procedures to ensure compliance with our requirements.

Table 1

Test	Standard	Description	Remarks
Material Testing	Various International Standards	Properties of the rubber coating compound	Hardness/tensile/elongation before aging to be tested on every batch. Static Ozone Ageing, type approval for any new formulations
		Properties of the coated textile	Abrasion resistance/breaking and tear strength/surface coat adhesion to be tested on every product lot.
Dimensional Inspection	Based on ISO17357 requirements	Length +10% - 5% Diameter +15% - 5%	Dimensional inspection to be carried out at the working pressure
Air Leakage		Pressure drop and soapy water test carried out at the working pressure	All fenders to be tested for each and every order
Hydrostatic Test			The frequency of the test shall be 1 in 20 fenders for each size



Specifications

The current range of Dunlop GRG LP Pneumatic Fenders cover diameters from 1.0m to 4.5m, the length of the fenders are made in accordance with the specific applications. Normally the shortest practical length is 2 ½ times the diameter, whilst the maximum length can be up to 25 meters long.

Operating at a nominal inflation pressure of 70m bar (1 psi), this type of low pressure fendering offers energy absorption over a large surface area which reduces to a minimum the disadvantages of point loading. The yielding nature of the Dunlop LP Fender usually renders unnecessary the need to equip the unit with external re-enforcement and protection. This feature is especially valuable when fenders are used for STS operations off tankers as the absence of metal fittings on the contact surfaces precludes the risk of fire through sparking.

Inflation is simply achieved from any convenient source of Low Pressure High Volume air blowing supply system. Dunlop can supply appropriate inflation units and necessary connections.



Accessories

- Blower Unit
- Medium duty delivery & suction hose
- Inflation adaptor
- Transportation / Storage case
- Repair kits
- Pressure Gauge assembly
- Lifting slings
- Cargo Nets



Quality and Maintenance

The Quality Management System of Dunlop GRG is fully approved, in accordance with BS EN ISO 9001:2008 accredited by LRQA certificate no. LRQ0870728 and is applicable for the design, manufacture and refurbishment of flexible rubber fabricated products. All Dunlop GRG LP Fenders are constructed from polychloroprene rubber coated nylon fabric. Individual sections are sewn together using special purpose built industrial machinery. The seams are then encapsulated in further layers of vulcanised polychloroprene rubber.

The Dunlop GRG LP Fender is tested using the methods of High Pressure Fender standard ISO17357. Dunlop GRG is currently liaising with the ISO committee making amendments to this international standard to include the LP Fenders. Dunlop GRG has presented our full testing procedures to ISO and it is currently our belief ISO will publish a new issue of the ISO17357 standard in 2013/14.

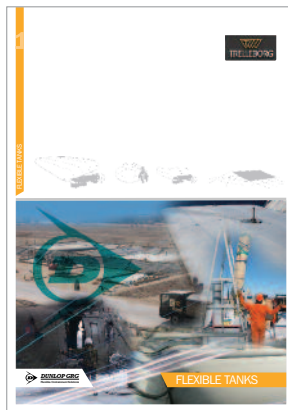
As part of the Trelleborg Group, Dunlop GRG is fully committed to the highest standards of quality and environmental performance. The group adopts best practice from around the world and commits to the implementation on all of its sites. Our business is committed to providing high quality products which are appropriate for our customers' needs and satisfy their expectations in terms of functionality and value. We are also committed to attaining the Environmental Standard ISO 14001.

All Dunlop GRG products come with a 12 month / 1 year warranty; extended warranty packages are available by request. We also offer a full inspection, cleaning (internal/external) and refurbishment service.

**In accordance with our established policy of constant improvement, we reserve the right to amend these specifications at any time without notice. Photographs shown may feature non-standard equipment.*



The Dunlop GRG Range



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