DONGYANG RUBBER FENDER

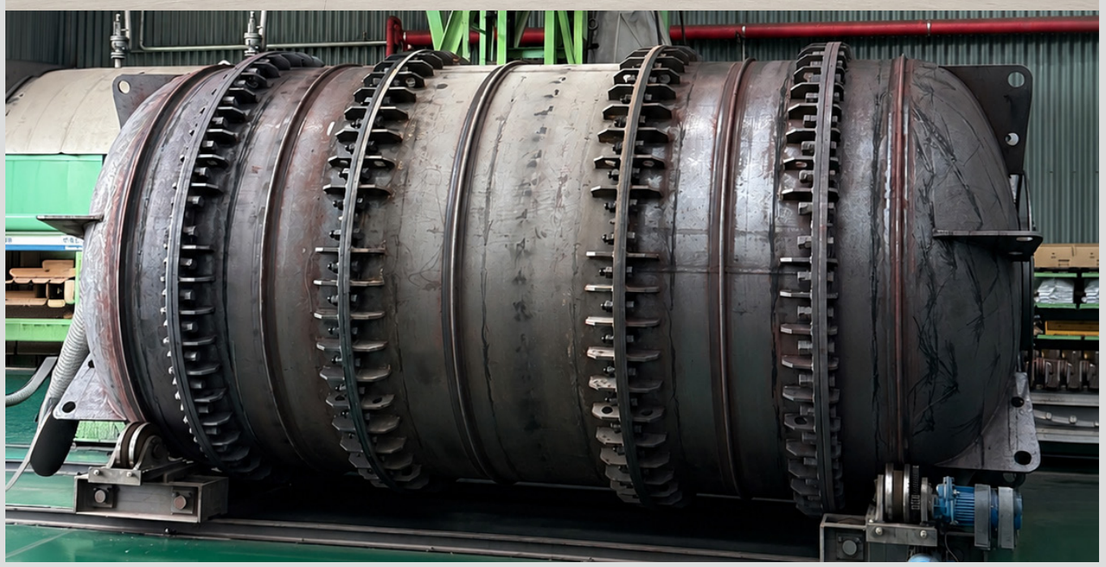
DRF

## ENGINEERING SAFETY FOR EVERY BERTHING

Premium Pneumatic Fender Solutions for the World's Ports.








**DONGYANG CO., LTD.**

**Plant 1** 118, Eogokgongdan 1-gil, Yangsan-si, Gyeongsangnam-do, Korea
**T** +82 55 367 2311 **F** +82 55 367 2316 **E** dycok@dyfender.com **H** www.rubberfender.co.kr

**Plant 2** 139, Eogok-ro, Yangsan-si, Gyeongsangnam-do, Korea
**T** +82 55 781 2311 **F** +82 55 781 2312




DONGYANG RUBBER FENDER

# DONGYANG CO., LTD.

**Since 1998,** Dong Yang Enterprise has specialized in the design, development, and manufacture of high-quality marine rubber fenders for the global maritime industry. With decades of experience, we have earned the trust of customers worldwide by delivering reliable products based on advanced engineering, precision manufacturing, and consistent quality. Our pneumatic rubber fenders are designed to provide high energy absorption while minimizing reaction force, ensuring safe and efficient berthing performance. Manufactured using our **precision mold-based production process** and in compliance with **ISO 17357-1:2014**, every fender is produced with outstanding dimensional accuracy, durability, and long-term reliability.

Dong Yang Enterprise supplies marine fender solutions to ports, shipyards, offshore facilities, and marine infrastructure projects around the world. By combining proven technology, strict quality control, and continuous innovation, we provide products that deliver stable performance throughout their service life while minimizing maintenance requirements. Committed to quality, safety, and customer satisfaction, Dong Yang Enterprise continues to be a trusted partner, providing dependable marine fender solutions for the global maritime industry.

### SINCE 1998
Over 28 years of expertise in pneumatic rubber fender manufacturing.

### ISO 17357-1:2014
Compliant production system ensuring international standards and reliability.

### MOLD-BASED PRODUCTION
Precision-engineered molds ensure consistent quality, uniformity, and long-term durability.

### RELIABLE QUALITY
Strict quality control and continuous improvement deliver superior performance in demanding marine environments.



## PRECISION BEGINS WITH THE MOLD

Precision mold-based manufacturing ensures exceptional quality, outstanding performance, and long-term reliability.





## Outer & Inner Rubber Material Properties

| Test item | Test method | Outer rubber | Inner rubber |
|---|---|---|---|
| **Before ageing** | - | Original | Original |
| Tensile strength | BS ISO 37 | 18 MPa or more | 10 MPa or more |
| Elongation | BS ISO 37 | 400% or more | 400% or more |
| Hardness | ISO 48 | 60 +/- 10 (durometer hardness test type A) | 50 +/- 10 (durometer hardness test type A) |
| **After ageing** | ISO 188 | Air oven ageing. 70°C +/- 1°C. 96 h | Air oven ageing. 70°C +/- 1°C. 96 h |
| Tensile strength | BS ISO 37 | Not less than 80% of the original property | Not less than 80% of the original property |
| Elongation | BS ISO 37 | Not less than 80% of the original property | Not less than 80% of the original property |
| Hardness | ISO 48 | Not to exceed the original property by more than 8 | Not to exceed the original property by more than 8 |
| Tear | BS ISO 34-1 | 400 N/cm or more | No requirement |
| Compression set | ISO 815 | 30% (70°C +/-1°C for 22h) or less | No requirement |
| Static ozone resistance | ISO 1431-1 | No cracks after elongation by 20% and exposure to 50 pphm at 40°C for 96 h | No requirement |

## Hydro Pneumatic Fender

| D X L (mm x mm) | Initial internal pressure (kPa) | Ship radius (mm) | WATER RATIO (%) | Guaranteed energy absorption (kJ) | Reaction force at gea (kN) | Hull pressure at gea (kPa) | Deflection at gea (%) |
|---|---|---|---|---|---|---|---|
| 1,700 × 7,200 | 50 | 4,000 | 70% | 159 | 648 | 131 | 55% |
| | 80 | | | 228 | 873 | 175 | |
| 2,000 × 4,000 | 50 | 4,000 | 65% | 125 | 502 | 122 | 50% |
| | 80 | | | 180 | 679 | 164 | |
| 2,000 × 6,000 | 50 | 4,000 | 70% | 129 | 517 | 125 | 50% |
| | 80 | | | 185 | 700 | 169 | |
| 2,500 × 5,500 | 50 | 4,500 | 65% | 214 | 731 | 129 | 50% |
| | 80 | | | 306 | 984 | 173 | |
| 3,000 × 5,000 | 50 | 4,500 | 65% | 263 | 801 | 124 | 45% |
| | 80 | | | 378 | 1,083 | 168 | |
| 3,300 × 6,500 | 50 | 4,500 | 70% | 292 | 843 | 121 | 40% |
| | 80 | | | 420 | 1,143 | 165 | |
| 3,300 × 10,600 | 50 | 5,000 | 75% | 953 | 2,031 | 135 | 45% |
| | 80 | | | 1,358 | 2,720 | 181 | |
| 4,500 × 9,000 | 50 | 5,000 | 75% | 1,368 | 2,281 | 132 | 50% |
| | 80 | | | 1,957 | 3,067 | 176 | |
| 4,500 × 12,000 | 50 | 6,000 | 75% | 1,879 | 3,039 | 134 | 50% |
| | 80 | | | 2,679 | 4,064 | 180 | |

## PRODUCT CHARACTERISTICS

### Pressure Ratings : 50 kPa

| Pneumatic 50 size (OD × L) (mm) | Internal pressure at 0% deflection (kPa) | Internal pressure at 60% deflection (kPa) | Minimum endurable pressure at 0% deflection (kPa) | Minimum endurable pressure at 60% deflection (kPa) | Safety-valve pressure setting (kPa) | Testing pressure at 0% deflection (kPa) |
|---|---|---|---|---|---|---|
| 500 × 1,000 | 50 | 132 | 300 | 462 | – | 200 |
| 600 × 1,000 | 50 | 126 | 300 | 441 | – | 200 |
| 700 × 1,500 | 50 | 135 | 300 | 473 | – | 200 |
| 1,000 × 1,500 | 50 | 122 | 300 | 427 | – | 200 |
| 1,000 × 2,000 | 50 | 132 | 300 | 462 | – | 200 |
| 1,200 × 2,000 | 50 | 126 | 300 | 441 | – | 200 |
| 1,350 × 2,500 | 50 | 130 | 300 | 455 | – | 200 |
| 1,500 × 3,000 | 50 | 132 | 300 | 462 | – | 200 |
| 1,700 × 3,000 | 50 | 128 | 300 | 448 | – | 200 |
| 2,000 × 3,500 | 50 | 128 | 300 | 448 | – | 200 |
| 2,500 × 4,000 | 50 | 137 | 350 | 480 | 175 | 250 |
| 2,500 × 5,500 | 50 | 148 | 350 | 518 | 175 | 250 |
| 3,300 × 4,500 | 50 | 130 | 350 | 455 | 175 | 250 |
| 3,300 × 6,500 | 50 | 146 | 350 | 511 | 175 | 250 |
| 3,300 × 10,600 | 50 | 158 | 350 | 553 | 175 | 250 |
| 4,500 × 9,000 | 50 | 146 | 350 | 511 | 175 | 250 |
| 4,500 × 12,000 | 50 | 154 | 350 | 539 | 175 | 250 |

### Pressure Ratings : 80 kPa

| Pneumatic 80 size (OD × L) (mm) | Internal pressure at 0% deflection (kPa) | Internal pressure at 60% deflection (kPa) | Minimum endurable pressure at 0% deflection (kPa) | Minimum endurable pressure at 60% deflection (kPa) | Safety-valve pressure setting (kPa) | Testing pressure at 0% deflection (kPa) |
|---|---|---|---|---|---|---|
| 500 × 1,000 | 80 | 174 | 480 | 609 | – | 250 |
| 600 × 1,000 | 80 | 166 | 480 | 581 | – | 250 |
| 700 × 1,500 | 80 | 177 | 480 | 620 | – | 250 |
| 1,000 × 1,500 | 80 | 160 | 480 | 560 | – | 250 |
| 1,000 × 2,000 | 80 | 174 | 480 | 609 | – | 250 |
| 1,200 × 2,000 | 80 | 166 | 480 | 581 | – | 250 |
| 1,350 × 2,500 | 80 | 170 | 480 | 595 | – | 250 |
| 1,500 × 3,000 | 80 | 174 | 480 | 609 | – | 250 |
| 1,700 × 3,000 | 80 | 168 | 480 | 588 | – | 250 |
| 2,000 × 3,500 | 80 | 168 | 480 | 588 | – | 250 |
| 2,500 × 4,000 | 80 | 180 | 560 | 630 | 230 | 300 |
| 2,500 × 5,500 | 80 | 195 | 560 | 683 | 230 | 300 |
| 3,300 × 4,500 | 80 | 171 | 560 | 599 | 230 | 300 |
| 3,300 × 6,500 | 80 | 191 | 560 | 669 | 230 | 300 |
| 3,300 × 10,600 | 80 | 208 | 560 | 728 | 230 | 300 |
| 4,500 × 9,000 | 80 | 192 | 560 | 672 | 230 | 300 |
| 4,500 × 12,000 | 80 | 202 | 560 | 707 | 230 | 300 |





## PERFORMANCE DATE

### Pneumatic 50 Fender Size & Performance Requirements

| Nominal size (D × L) (mm) | Initial internal pressure (kPa) | Guaranteed energy absorption (GEA) minimum value at deflection 60 ± 5% (kJ) | Reaction force at GEA deflection (R) tolerance ±10 % (kN) | Hull pressure (Internal pressure) at GEA deflection (P) reference value (kPa) |
|---|---|---|---|---|
| 500 × 1,000 | 50 | 6 | 64 | 132 |
| 600 × 1,000 | 50 | 8 | 74 | 126 |
| 700 × 1,500 | 50 | 17 | 137 | 135 |
| 1,000 × 1,500 | 50 | 32 | 182 | 122 |
| 1,000 × 2,000 | 50 | 45 | 257 | 132 |
| 1,200 × 2,000 | 50 | 63 | 297 | 126 |
| 1,350 × 2,500 | 50 | 102 | 427 | 130 |
| 1,500 × 3,000 | 50 | 153 | 579 | 132 |
| 1,700 × 3,000 | 50 | 191 | 639 | 128 |
| 2,000 × 3,500 | 50 | 308 | 875 | 128 |
| 2,500 × 4,000 | 50 | 663 | 1,381 | 137 |
| 2,500 × 5,500 | 50 | 943 | 2,019 | 148 |
| 3,300 × 4,500 | 50 | 1,175 | 1,884 | 130 |
| 3,300 × 6,500 | 50 | 1,814 | 3,015 | 146 |
| 3,300 × 10,600 | 50 | 3,067 | 5,257 | 158 |
| 4,500 × 9,000 | 50 | 4,752 | 5,747 | 146 |
| 4,500 × 12,000 | 50 | 6,473 | 7,984 | 154 |

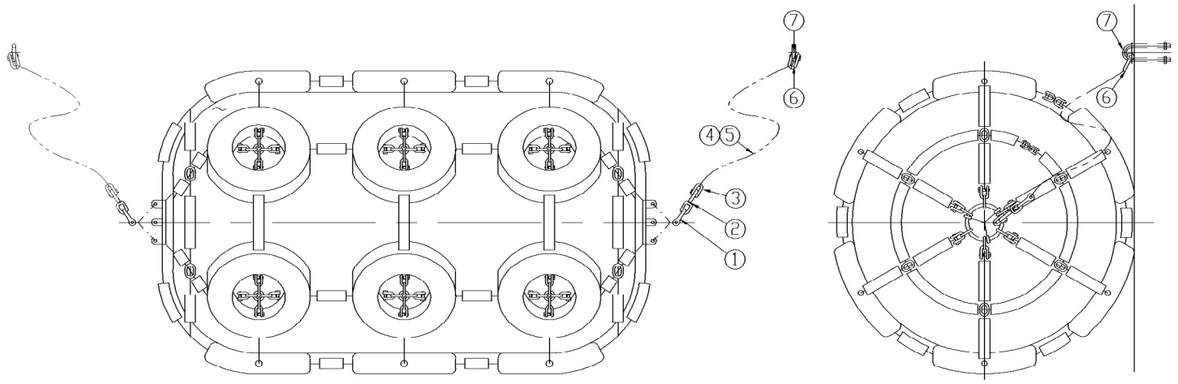
### Pneumatic 80 Fender Size & Performance Requirements

| D × L (mm) | Initial internal pressure (kPa) | Guaranteed energy absorption (GEA) minimum value at deflection 60 ± 5 % (kJ) | Reaction force at GEA deflection (R) tolerance ±10 % (kN) | Hull pressure (Internal pressure) at GEA deflection (P) reference value (kPa) |
|---|---|---|---|---|
| 500 × 1,000 | 80 | 8 | 85 | 174 |
| 600 × 1,000 | 80 | 11 | 98 | 166 |
| 700 × 1,500 | 80 | 24 | 180 | 177 |
| 1,000 × 1,500 | 80 | 45 | 239 | 160 |
| 1,000 × 2,000 | 80 | 63 | 338 | 174 |
| 1,200 × 2,000 | 80 | 88 | 390 | 166 |
| 1,350 × 2,500 | 80 | 142 | 561 | 170 |
| 1,500 × 3,000 | 80 | 214 | 761 | 174 |
| 1,700 × 3,000 | 80 | 267 | 840 | 168 |
| 2,000 × 3,500 | 80 | 430 | 1,150 | 168 |
| 2,500 × 4,000 | 80 | 925 | 1,815 | 180 |
| 2,500 × 5,500 | 80 | 1,317 | 2,653 | 195 |
| 3,300 × 4,500 | 80 | 1,640 | 2,476 | 171 |
| 3,300 × 6,500 | 80 | 2,532 | 3,961 | 191 |
| 3,300 × 10,600 | 80 | 4,281 | 6,907 | 208 |
| 4,500 × 9,000 | 80 | 6,633 | 7,551 | 192 |
| 4,500 × 12,000 | 80 | 9,037 | 10,490 | 202 |

## FENDER FIXING ACCESSORIES

### 50 kPa

| SIZE | TYPE | ① SHACKLE (INCH) | ② SWIVEL (INCH) | ③ SHACKLE (INCH) | ④ GUY ROPE (INCH) | ⑤ GUY CHAIN (INCH) | ⑥ SHACKLE (INCH) | ⑦ U-ANCHOR (INCH) | TIRE |
|---|---|---|---|---|---|---|---|---|---|
| Φ800 × 1,500L | CHAIN NET | BB 7/8 | 22 | SB 7/8 | 16 | 16(L) | SB 7/8 | 25 | 550 |
| Φ1,000 × 1,500L | CHAIN NET | BB 7/8 | 22 | SB 7/8 | 16 | 19(L) | SB 7/8 | 25 | 550 |
| Φ1,000 × 2,000L | CHAIN NET | BB 7/8 | 22 | SB 7/8 | 16 | 19(L) | SB 7/8 | 25 | 550 |
| Φ1,200 × 2,000L | CHAIN NET | BB 7/8 | 22 | SB 7/8 | 16 | 19(L) | SB 7/8 | 25 | 550 |
| Φ1,350 × 2,500L | CHAIN NET | BB 1 | 25 | SB 1 | 16 | 19(L) | SB 1 | 28 | 630 |
| Φ1,500 × 3,000L | CHAIN NET | BB 1 | 25 | SB 1 | 16 | 19(L) | SB 1 | 28 | 630 |
| Φ1,700 × 3,000L | CHAIN NET | BB 1 | 25 | SB 1 | 16 | 19(L) | SB 1 | 32 | 630 |
| Φ2,000 × 3,000L | CHAIN NET | BB 1 | 25 | SB 1 | 20 | 22 | SB 1 | 32 | 800 |
| Φ2,000 × 3,500L | CHAIN NET | BB 1 | 25 | SB 1 | 20 | 22 | SB 1 | 32 | 800 |
| Φ2,500 × 4,000L | CHAIN NET | BB 1 1/8 | 32 | SB 1 1/8 | 24 | 25 | SB 1 1/8 | 38 | 800 |
| Φ2,500 × 5,500L | CHAIN NET | BB 1 1/8 | 32 | SB 1 1/8 | 24 | 25 | SB 1 1/8 | 38 | 800 |
| Φ3,000 × 5,000L | CHAIN NET | BB 1 1/2 | 38(D) | SB 1 1/4 | 30 | 30 | SB 1 1/4 | 44 | 800 |
| Φ3,300 × 4,500L | CHAIN NET | BB 1 1/2 | 38(D) | SB 1 3/8 | 32 | 32 | SB 1 3/8 | 55 | 1,100 |
| Φ3,300 × 6,500L | CHAIN NET | BB 1 1/2 | 38(D) | SB 1 3/8 | 32 | 32 | SB 1 3/8 | 55 | 1,100 |
| Φ3,300 × 10,600L | CHAIN NET | BB 1 1/2 | 38(D) | SB 1 3/8 | 32 | 32 | SB 1 3/8 | 55 | 1,100 |
| Φ4,500 × 7,000L | CHAIN NET | SB 1 3/4 | 45 | SB 1 3/4 | 46 | 42 | SB 1 3/4 | 60 | 1,100 |
| Φ4,500 × 9,000L | CHAIN NET | SB 1 3/4 | 45 | SB 1 3/4 | 46 | 42 | SB 1 3/4 | 60 | 1,100 |








## INSTALLATION DIMENSIONS

### Chain-Tire Net Fenders

| FENDER SIZE D × L (mm) | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1,000 × 1,500 | 975 | 950 | 1,350 | 200 | 375 | 2,000 |
| 1,000 × 2,000 | 1,025 | 950 | 1,350 | 210 | 400 | 2,600 |
| 1,200 × 2,000 | 1,200 | 1,140 | 1,620 | 220 | 430 | 2,600 |
| 1,500 × 2,500 | 1,525 | 1,420 | 2,050 | 250 | 525 | 3,250 |
| 1,700 × 3,000 | 1,755 | 1,610 | 2,290 | 280 | 570 | 3,900 |
| 2,000 × 3,500 | 2,050 | 1,900 | 2,700 | 300 | 650 | 4,500 |
| 2,500 × 4,000 | 2,490 | 2,380 | 3,380 | 450 | 890 | 5,200 |
| 2,500 × 5,500 | 2,570 | 2,380 | 3,380 | 400 | 845 | 7,150 |
| 3,300 × 4,500 | 3,350 | 3,140 | 4,460 | 520 | 1,075 | 5,850 |
| 3,300 × 6,500 | 3,380 | 3,140 | 4,460 | 500 | 1,080 | 8,500 |
| 3,300 × 10,600 | 4,000 | 3,140 | 4,460 | 480 | 1,035 | 13,780 |
| 4,500 × 9,000 | 4,710 | 4,270 | 6,180 | 800 | 1,470 | 12,000 |
| 4,500 × 12,000 | 4,730 | 4,270 | 6,180 | 770 | 1,440 | 15,600 |

