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# ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION



# ISO RECOMMENDATION
# R 38

## SHIPBUILDING DETAILS FOR SEA NAVIGATION

## BOLLARDS (VERTICAL TYPE) WITH AND WITHOUT LUGS

1st EDITION



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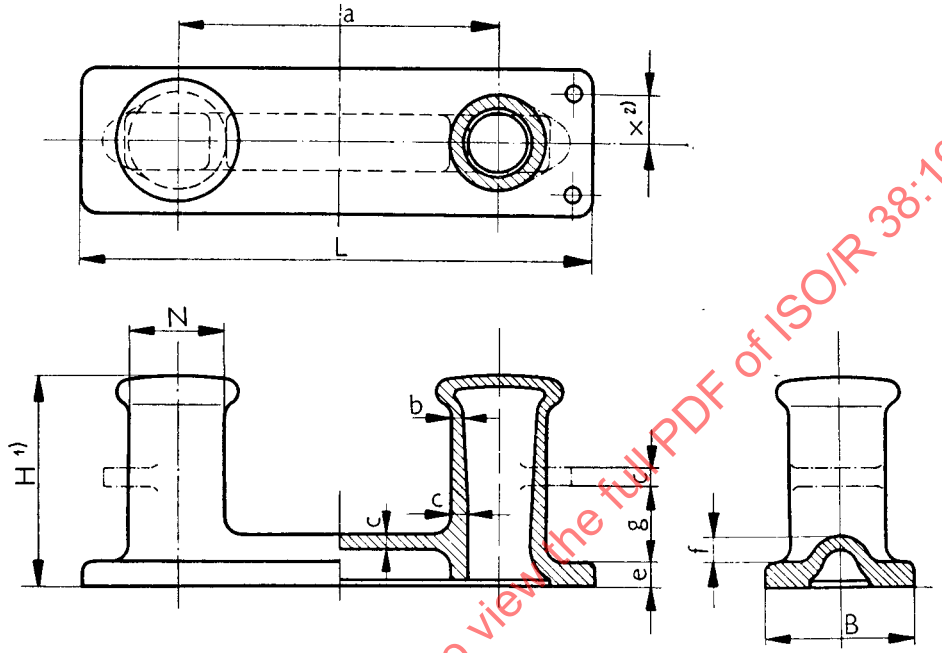
# SHIPBUILDING DETAILS FOR SEA NAVIGATION

# BOLLARDS (VERTICAL TYPE) WITH AND WITHOUT LUGS




*N* = nominal size of bollard = diameter of barrel.
*b* = thickness of barrel at top.
*c* = thickness of barrel at bottom, thickness of lug and longitudinal rib.
*n* = number of bolts or rivets.
*d* = diameter of bolts or rivets.
*P* = maximum admissible breaking load of the corresponding rope.



NOTES

If material other than cast iron [3]) is used, the thicknesses should be changed accordingly.

The dimensions in feet and inches are considered as the equivalents of the corresponding dimensions in millimetres.

Bollards are designated by their nominal sizes expressed either in millimetres or in inches.

Examples: *250 mm bollard* or *10 inch bollard.*

The illustrations do not define the construction.

The construction with lugs is indicated by thin long chain lines.

## Dimensions in millimetres

| N | L | B | H [1] min. | a | b [3] min. | c [3] min. | e = f min. | g | P | n [4] | d Bolts | d Rivets |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | mm | mm | mm | mm | mm | mm | mm | mm | tonnes | | mm | mm |
| **75** | 500 | 145 | 170 | 275 | 13 | 20 | 25 | 60 | 3.5 | 6 | 12 | 13 |
| **100** | 600 | 170 | 220 | 350 | 15 | 22 | 30 | 80 | 5.0 | 6 | 16 | 16 |
| **125** | 700 | 200 | 275 | 430 | 17 | 25 | 35 | 100 | 8.0 | 6 | 20 | 19 |
| **150** | 800 | 230 | 330 | 500 | 19 | 27 | 40 | 115 | 12.0 | 6 | 22 | 22 |
| **175** | 900 | 270 | 375 | 550 | 21 | 30 | 45 | 130 | 16.0 | 6 | 22 | 22 |
| **200** | 1000 | 300 | 420 | 600 | 23 | 32 | 50 | 140 | 20.0 | 8 | 22 | 22 |
| **225** | 1100 | 330 | 465 | 680 | 24 | 34 | 55 | 155 | 25.0 | 8 | 27 | 25 |
| **250** | 1200 | 360 | 510 | 750 | 26 | 36 | 60 | 165 | 28.0 | 8 | 27 | 25 |
| **300** | 1450 | 430 | 590 | 900 | 29 | 40 | 60 | 180 | 40.0 | 8 | 33 | 34 |
| **350** | 1650 | 500 | 665 | 1000 | 31 | 42 | 65 | 200 | 55.0 | 10 | 33 | 34 |
| **400** | 1850 | 560 | 735 | 1100 | 33 | 46 | 65 | 215 | 65.0 | 10 | 36 | — |
| **450** | 2050 | 630 | 790 | 1200 | 34 | 49 | 70 | 235 | 90.0 | 10 | 39 | — |
| **500** | 2250 | 700 | 840 | 1300 | 35 | 50 | 70 | 235 | 115.0 | 12 | 39 | — |
| **560** | 2400 | 770 | 885 | 1400 | 35 | 50 | 75 | 240 | 140.0 | 12 | 45 | — |
| **630** | 2750 | 900 | 955 | 1600 | 35 | 50 | 75 | 250 | 220.0 | 14 | 48 | — |
| **700** | 2900 | 970 | 1000 | 1700 | 35 | 50 | 80 | 250 | 260.0 | 14 | 52 | — |

## Dimensions in feet and inches

| N | L | B | H [1] min. | a | b [3] min. | c [3] min. | e = f min. | g | P | n [4] | d Bolts | d Rivets |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| in | ft in | ft in | ft in | ft in | in | in | in | in | tonnes | | in | in |
| **3** | 1 $7\frac{5}{8}$ | $5\frac{3}{4}$ | $6\frac{3}{4}$ | $10\frac{7}{8}$ | $\frac{1}{2}$ | $\frac{3}{4}$ | 1 | $2\frac{3}{8}$ | 3.5 | 6 | $\frac{1}{2}$ | $\frac{1}{2}$ |
| **4** | 1 $11\frac{5}{8}$ | $6\frac{3}{4}$ | $8\frac{5}{8}$ | 1 $1\frac{3}{4}$ | $\frac{9}{16}$ | $\frac{7}{8}$ | $1\frac{3}{16}$ | $3\frac{1}{8}$ | 5.0 | 6 | $\frac{5}{8}$ | $\frac{5}{8}$ |
| **5** | 2 $3\frac{1}{2}$ | $7\frac{7}{8}$ | $10\frac{7}{8}$ | 1 $4\frac{7}{8}$ | $\frac{11}{16}$ | 1 | $1\frac{3}{8}$ | $3\frac{15}{16}$ | 8.0 | 6 | $\frac{3}{4}$ | $\frac{3}{4}$ |
| **6** | 2 $7\frac{1}{2}$ | 9 | 1 1 | 1 $7\frac{5}{8}$ | $\frac{3}{4}$ | $1\frac{1}{16}$ | $1\frac{9}{16}$ | $4\frac{1}{2}$ | 12.0 | 6 | $\frac{7}{8}$ | $\frac{7}{8}$ |
| **7** | 2 $11\frac{3}{8}$ | $10\frac{5}{8}$ | 1 $2\frac{3}{4}$ | 1 $9\frac{5}{8}$ | $\frac{13}{16}$ | $1\frac{3}{16}$ | $1\frac{3}{4}$ | $5\frac{1}{8}$ | 16.0 | 6 | $\frac{7}{8}$ | $\frac{7}{8}$ |
| **8** | 3 $3\frac{3}{8}$ | $11\frac{3}{4}$ | 1 $4\frac{1}{2}$ | 1 $11\frac{5}{8}$ | $\frac{7}{8}$ | $1\frac{1}{4}$ | $1\frac{15}{16}$ | $5\frac{1}{2}$ | 20.0 | 8 | $\frac{7}{8}$ | $\frac{7}{8}$ |
| **9** | 3 $7\frac{1}{4}$ | 1 1 | 1 $6\frac{1}{4}$ | 2 $2\frac{3}{4}$ | $\frac{15}{16}$ | $1\frac{5}{16}$ | $2\frac{3}{16}$ | $6\frac{1}{8}$ | 25.0 | 8 | 1 | 1 |
| **10** | 3 $11\frac{1}{4}$ | 1 $2\frac{1}{8}$ | 1 $8\frac{1}{8}$ | 2 $5\frac{1}{2}$ | 1 | $1\frac{7}{16}$ | $2\frac{3}{8}$ | $6\frac{1}{2}$ | 28.0 | 8 | 1 | 1 |
| **12** | 4 $9\frac{1}{8}$ | 1 $4\frac{7}{8}$ | 1 $10\frac{1}{8}$ | 2 $11\frac{3}{8}$ | $1\frac{1}{8}$ | $1\frac{9}{16}$ | $2\frac{3}{8}$ | $7\frac{1}{8}$ | 40.0 | 8 | $1\frac{1}{4}$ | $1\frac{1}{4}$ |
| **14** | 5 5 | 1 $7\frac{5}{8}$ | 2 $2\frac{1}{8}$ | 3 $3\frac{3}{8}$ | $1\frac{3}{16}$ | $1\frac{5}{8}$ | $2\frac{9}{16}$ | $7\frac{7}{8}$ | 55.0 | 10 | $1\frac{1}{4}$ | $1\frac{1}{4}$ |
| **16** | 6 $\frac{7}{8}$ | 1 10 | 2 5 | 3 $7\frac{1}{4}$ | $1\frac{5}{16}$ | $1\frac{3}{4}$ | $2\frac{9}{16}$ | $8\frac{1}{2}$ | 65.0 | 10 | $1\frac{3}{8}$ | — |
| **18** | 6 $8\frac{3}{4}$ | 2 $\frac{3}{4}$ | 2 $7\frac{1}{8}$ | 3 $11\frac{1}{4}$ | $1\frac{5}{16}$ | $1\frac{15}{16}$ | $2\frac{3}{4}$ | $9\frac{1}{4}$ | 90.0 | 10 | $1\frac{1}{2}$ | — |
| **20** | 7 $4\frac{5}{8}$ | 2 $3\frac{1}{2}$ | 2 $9\frac{1}{8}$ | 4 $3\frac{1}{8}$ | $1\frac{3}{8}$ | $1\frac{15}{16}$ | $2\frac{3}{4}$ | $9\frac{1}{4}$ | 115.0 | 12 | $1\frac{1}{2}$ | — |
| **22** | 7 $10\frac{1}{2}$ | 2 $6\frac{3}{8}$ | 2 $10\frac{7}{8}$ | 4 $7\frac{1}{8}$ | $1\frac{3}{8}$ | $1\frac{15}{16}$ | $2\frac{15}{16}$ | $9\frac{1}{2}$ | 140.0 | 12 | $1\frac{3}{4}$ | — |
| **25** | 9 $\frac{1}{4}$ | 2 $11\frac{3}{8}$ | 3 $1\frac{5}{8}$ | 5 3 | $1\frac{3}{8}$ | $1\frac{15}{16}$ | $2\frac{15}{16}$ | $9\frac{7}{8}$ | 220.0 | 14 | $1\frac{7}{8}$ | — |
| **28** | 9 $6\frac{1}{2}$ | 3 $2\frac{1}{4}$ | 3 $3\frac{3}{8}$ | 5 $6\frac{7}{8}$ | $1\frac{3}{8}$ | $1\frac{15}{16}$ | $3\frac{1}{8}$ | $9\frac{7}{8}$ | 260.0 | 14 | 2 | — |

[1]) The height $H$ may exceed the values in the table by 50 mm maximum.
[2]) The centre-lines of the bolt holes on each side should be fixed in relation to the longitudinal axis of the bollard.
[3]) The thicknesses refer to bollards of cast iron with a tensile strength of at least 22 kgf/mm² or 31290 lb/in².
[4]) The required spacing of the holes must be specified on special order.