## Why should you care? Pumps alone cannot save you!!

Stopping or slowing the incoming water is critical to saving your vessel. This chart shows how your pump is quickly overwhelmed by a fairly small hole or breach.

A 1.5 " hole in your boat, only 2 feet below the waterline would fill a 50 gallon drum in 50 seconds. This is $2 x$ what a many bilge pumps can handle.

And 50 gallons weighs over 400 pounds of lost flotation.

| BOAT FLOODING RATES (gallons per minute) \& BILGE PUMP OVERLOAD FACTOR |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| DEPTH OF HOLE | DIAMETER OF OPENING (HOLE) |  |  |  |  |  |  |
| BELOW WATERLINE | 1" (25mm) | $1.5^{\prime \prime}$ (38mm) | 2" (51mm) | $2.5^{\prime \prime}$ (64mm) | $3^{\prime \prime}$ (76mm) | 3.5" $(89 \mathrm{~mm})$ | $4^{\prime \prime}$ (102mm) |
| $\begin{aligned} & \mathbf{1}^{\prime}(30 \mathrm{~cm}) \\ & 1600 \mathrm{GPH} \text { Pump }=26 \mathrm{GPM} \\ & \hline \end{aligned}$ | 20 | $\begin{gathered} 44 \\ 1.7 \mathrm{x} \\ \hline \end{gathered}$ | $\begin{array}{r} 79 \\ 3 \mathrm{x} \\ \hline \end{array}$ | $\begin{array}{r} 123 \\ 4.7 x \\ \hline \end{array}$ | $\begin{gathered} 177 \\ 6.8 \mathrm{x} \\ \hline \end{gathered}$ | $\begin{array}{r} \mathbf{2 4 1} \\ 9.3 x \\ \hline \end{array}$ | $\begin{gathered} \mathbf{3 1 4} \\ 12.1 \mathrm{x} \end{gathered}$ |
| $\begin{aligned} & 2^{\prime}(61 \mathrm{~cm}) \\ & 2000 \mathrm{GPH} \text { Pump }=33 \mathrm{GPM} \\ & \hline \end{aligned}$ | 28 | $\begin{gathered} 62 \\ 1.8 \mathrm{x} \\ \hline \end{gathered}$ | $\begin{gathered} 111 \\ 3.4 \mathrm{x} \end{gathered}$ | $\begin{array}{r} 174 \\ 5.3 x \\ \hline \end{array}$ | $\begin{array}{r} 250 \\ 7.6 \mathrm{x} \\ \hline \end{array}$ | $\begin{gathered} 340 \\ 10.3 \mathrm{x} \end{gathered}$ | $\begin{gathered} \mathbf{4 4 4} \\ 13.5 \mathrm{x} \end{gathered}$ |
| $\begin{aligned} & 3^{\prime}(91 \mathrm{~cm}) \\ & 2000 \mathrm{GPH} \text { Pump }=33 \mathrm{GPM} \\ & \hline \end{aligned}$ | 34 | $\begin{array}{r} 77 \\ 2.3 x \\ \hline \end{array}$ | $\begin{array}{r} 136 \\ 4.1 \mathrm{x} \\ \hline \end{array}$ | $\begin{array}{r} 213 \\ 6.5 x \\ \hline \end{array}$ | $\begin{array}{r} 306 \\ 9.3 \mathrm{x} \\ \hline \end{array}$ | $\begin{gathered} \mathbf{4 1 7} \\ 12.6 \mathrm{x} \\ \hline \end{gathered}$ | $\begin{gathered} 544 \\ 16.5 \mathrm{x} \\ \hline \end{gathered}$ |
| $\begin{aligned} & 4^{\prime}(1.2 \mathrm{~m}) \\ & 2000 \mathrm{GPH} \text { Pump }=33 \mathrm{GPM} \end{aligned}$ | 44 | $\begin{aligned} & 99 \\ & 3 \mathrm{x} \end{aligned}$ | $\begin{array}{r} 176 \\ 5.3 \mathrm{x} \\ \hline \end{array}$ | $\begin{array}{r} \mathbf{2 7 4} \\ 8.3 x \\ \hline \end{array}$ | $\begin{aligned} & 395 \\ & 12 \mathrm{x} \\ & \hline \end{aligned}$ | $\begin{gathered} 538 \\ 16.3 \mathrm{x} \\ \hline \end{gathered}$ | $\begin{gathered} 702 \\ 21.3 \mathrm{x} \\ \hline \end{gathered}$ |


| BOAT FLOODING RATES (liters per minute) \& BILGE PUMP OVERLOAD FACTOR |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| DEPTH OF HOLE BELOW WATERLINE | DIAMETER OF OPENING (HOLE) |  |  |  |  |  |  |
|  | 25 mm | 38 mm | 50 mm | 65 mm | 75 mm | 90mm | 100mm |
| 30 cm $6000 \text { LPH Pump }=100 \text { LPM }$ | 76 | $\begin{aligned} & 167 \\ & 1.7 x \end{aligned}$ | $\begin{gathered} 299 \\ 3 x \end{gathered}$ | $\begin{gathered} 466 \\ 4.7 x \end{gathered}$ | $\begin{array}{r} 670 \\ 6.7 x \\ \hline \end{array}$ | $\begin{gathered} 912 \\ 9.1 \mathrm{x} \end{gathered}$ | $\begin{aligned} & 1189 \\ & 11.8 \mathrm{x} \end{aligned}$ |
| $\begin{aligned} & 60 \mathrm{~cm} \\ & 7600 \text { LPH Pump }=127 \text { LPM } \end{aligned}$ | 106 | $\begin{gathered} 235 \\ 1.8 \mathrm{x} \\ \hline \end{gathered}$ | $\begin{array}{r} 420 \\ 3.3 \mathrm{x} \\ \hline \end{array}$ | $\begin{array}{r} 659 \\ 5.2 x \\ \hline \end{array}$ | $\begin{gathered} 946 \\ 7.5 \mathrm{x} \\ \hline \end{gathered}$ | $\begin{gathered} 1287 \\ 10.1 \mathrm{x} \\ \hline \end{gathered}$ | $\begin{array}{r} \mathbf{1 6 8 1} \\ 13.2 \mathrm{x} \\ \hline \end{array}$ |
| 90 cm | 129 | $\begin{array}{r} 291 \\ 2.3 x \\ \hline \end{array}$ | $\begin{array}{r} 515 \\ 4.1 x \\ \hline \end{array}$ | $\begin{aligned} & 806 \\ & 6.3 \mathrm{x} \end{aligned}$ | $\begin{array}{r} 1158 \\ 9.1 \mathrm{x} \\ \hline \end{array}$ | $\begin{gathered} 1579 \\ 12.4 \mathrm{x} \\ \hline \end{gathered}$ | $\begin{aligned} & 2059 \\ & 16.2 \mathrm{x} \\ & \hline \end{aligned}$ |
| 1.2m | 167 | $\begin{gathered} \mathbf{3 7 5} \\ 3 \mathrm{x} \end{gathered}$ | $\begin{aligned} & \mathbf{6 6 6} \\ & 5.2 \mathrm{x} \end{aligned}$ | $\begin{array}{r} 1037 \\ 8.2 x \\ \hline \end{array}$ | $\begin{array}{r} \mathbf{1 4 9 5} \\ 11.8 \mathrm{x} \\ \hline \end{array}$ | 2037 18 x | $\begin{array}{r} \mathbf{2 6 5 7} \\ 20.8 \mathrm{x} \\ \hline \end{array}$ |

