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# VIEWING WINDOWS FOR SWIMMING POOLS AND AQUARIUMS

This Tech Talk provides you with important information on selecting the best glass for viewing windows used in swimming pools and aquariums.

## design approach

### GENERAL RULES

Glass viewing windows in swimming pools and aquariums are subjected to hydrostatic pressures. Consequently, an indepth analysis is required during the design stage to ensure safety requirements are met.

When considering glass for viewing windows in swimming pools and aquariums, it is important to follow some general rules.

1. Use laminated, fully-tempered glass plies. Annealed or heat-strengthened glass can be used, but this often results in very thick laminations.
2. Use a safety factor of ten.
3. Use a lamination of two tempered glass plies. For large sizes and/or deep water, use a 3- or 4-ply lamination of 1/2" tempered glass.
4. Viewing windows that are exposed to hydrostatic pressures cannot feature single monolithic glass.
5. All glass plies must be of the same thickness. The thickness of the plastic interlayer does not affect the strength of the lamination. Figure 2 applies to glass that is firmly supported on all four edges.

### DETERMINING GLASS MAKEUP

To help determine the best glass makeup for viewing windows (see Figure 1) you need to first calculate the equivalent water depth. The equivalent water depth is equal to one-third multiplied by the water depth at the top edge of the viewing window plus two-thirds multiplied by the water depth at the bottom edge of the viewing window in feet.

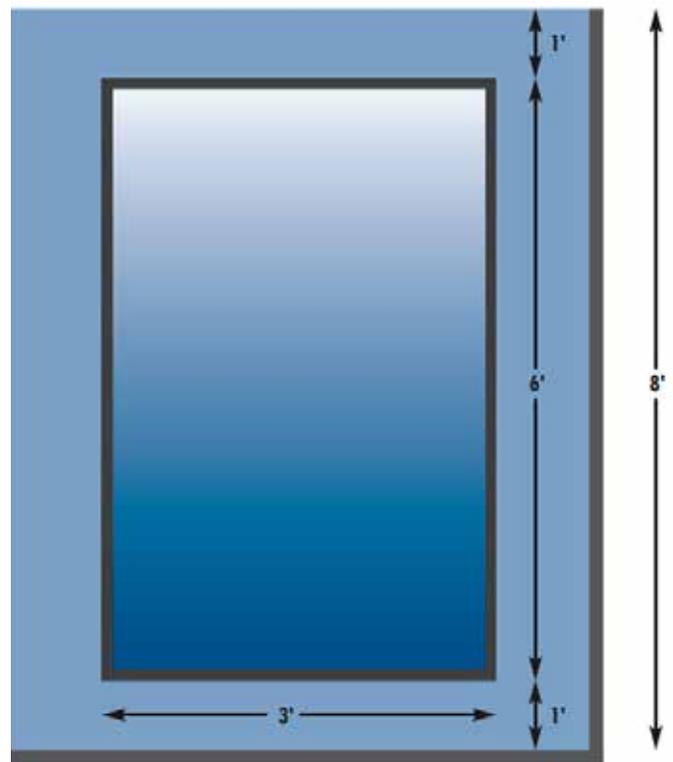
For example, an 8-foot-deep pool has a 3-foot by 6-foot window located one foot below the surface. It also extends to one foot above the bottom of the pool. First, calculate the equivalent water depth:

$$(1/3 \times 1') + (2/3 \times 7')=5.0'$$

Next, calculate the window size in square feet.

$$3' \times 6'=18'$$

Then, pinpoint the location where the glass area and water depth intersect (see Figure 2). The window area measures 18 square feet and the equivalent water measures 5.0 feet. (The maximum glass area is shown along the vertical axis and the equivalent water depth is shown along the horizontal axis). The minimum glass thickness is represented by the diagonal line directly above this intersection, providing you with the minimum recommended laminated glass makeup of two plies of 1/2" tempered glass.

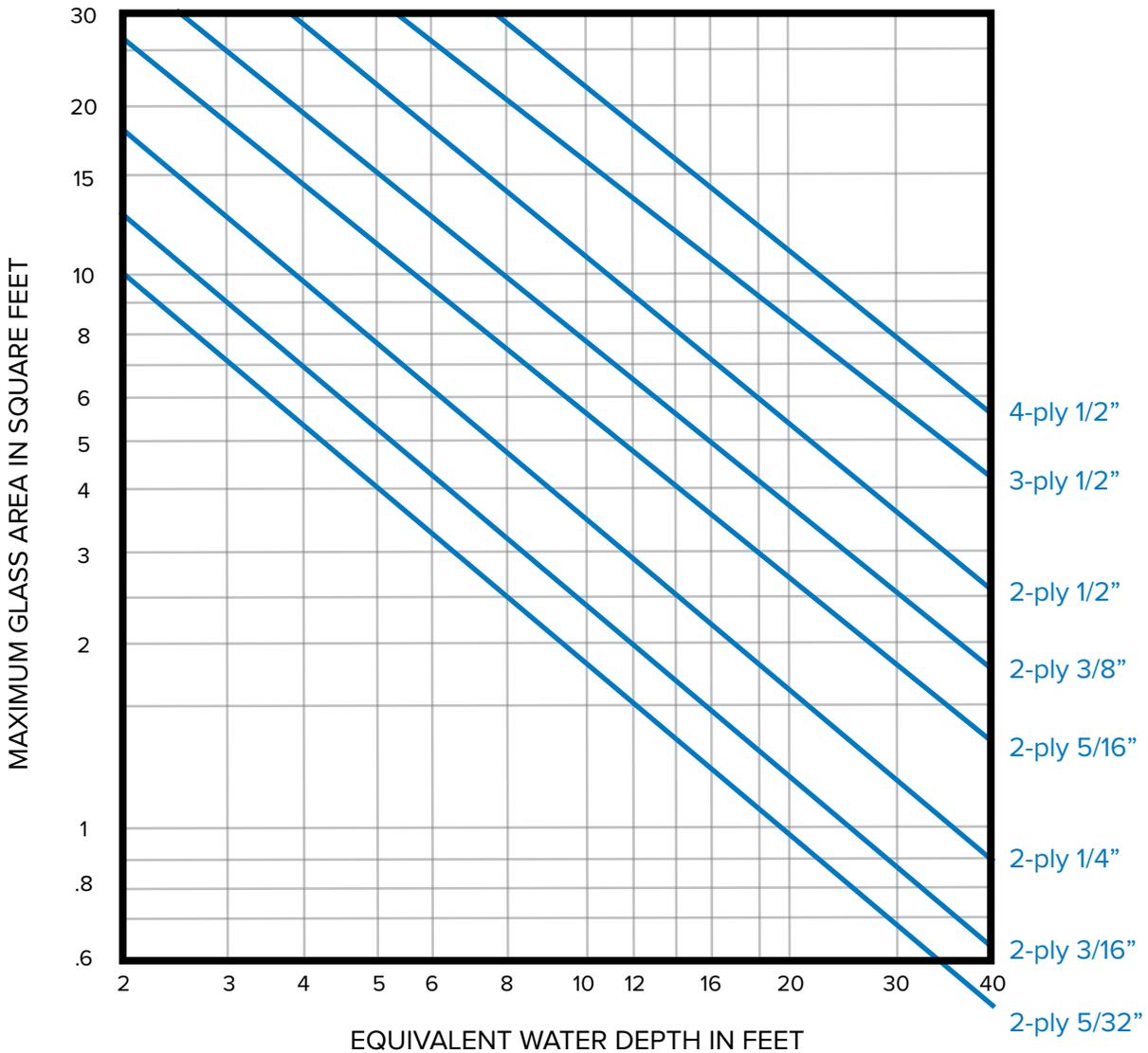


**Figure 1:** This drawing outlines the dimensions and depths of the swimming pool viewing window posed in the example above.

*continued . . .*

**Figure 2:**

This graph shows what the maximum sizes viewing windows of varying thicknesses can be corresponding to their equivalent water depths.



## glass solutions

### THE LEADER IN GLASS FABRICATION

As an international company, Viracon offers the most complete range of high-performance architectural glass products available worldwide. We're a company that not only fabricates glass, we're also a company that delivers design, aesthetic, budget and performance solutions for client projects. Our success is reflected in our long-lasting client relationships, which have given Viracon a visible presence on skylines around the world, including Asia, Africa, Australia, Europe, North America, South America and the Middle East.

Since 1970, Viracon has expanded its facilities to perform more glass fabricating processes at a single site than any other fabricator in the world. We believe in selling glass solutions, which means helping clients explore all the options for each step of a project. Our complete product line includes tempered, heatstrengthened, insulating, laminated, silkscreened, spandrel, hurricane-resistant, acoustical and highperformance coated glass.



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