ACRYLIC vs. GLASS

With the advent of hullside windows on most cruisers and yachts, designers and engineers must weigh up between using either acrylic or glass whether tempered or in laminated form.

Both Acrylic and laminated glass are transparent materials capable of withstanding high impact and weathering under all conditions per ISO 12216.

Acrylic is a polymer with excellent characteristics, offering superior formability, yet delivering excellent optical quality.

Laminated glass is manufactured using a different method, principally created using numerous layers of float glass fused together, interleaved with sheets of an adhesive polymer such as PVB. This makes the assembly very strong.

Nevertheless, polymers have evolved considerably and are now available in new formulations surpassing the characteristics of glass. Key advantages are outlined in this document.

If you wish discuss a particular project, or receive further details, please click here:

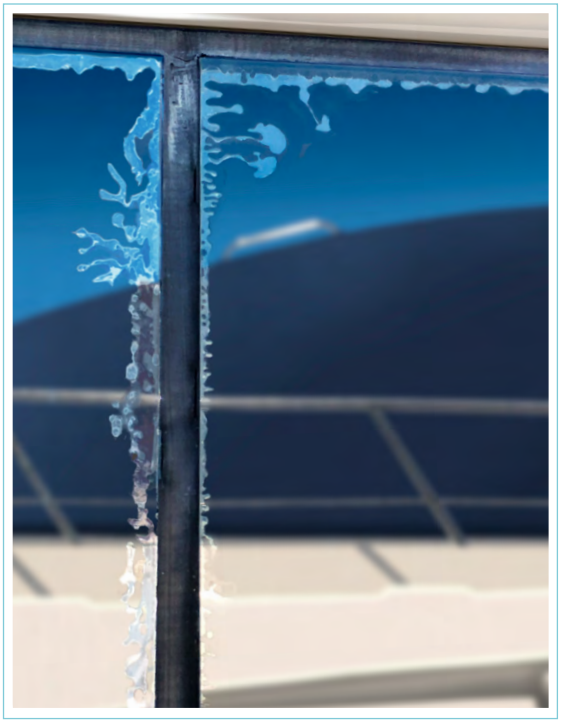
1. IMPACT RESISTANCE: EXCELLENT

Acrylic has a higher impact strength than glass and does not shatter when exposed to high strains or blunt force. The crack resistance is especially valuable when maneuvering yachts close to docks.

This is just one advantage why acrylic is used for viewing ports on deep sea submarines.

Furthermore, laminated glass is also subject to delamination, whereupon the bonding between layers fails, displayed as unsightly patterns known as "travelling air pockets".

Aside of being unsightly, over time these air pockets can seriously diminish visibility around the edges of the affected transparencies.



2. WEIGHT: LESS THAN 50%

At less than half the weight of glass — (SG: 1.19 vs. 2.45) — acrylic is an excellent alternative, especially where weight plays a key factor in design. With current trends erring towards ever more efficient, environmentally conscious manufacturing processes for vehicles and boats, designers are becoming aver more focused on shedding as much weight as possible to achieve greater performance and fuel efficiency.

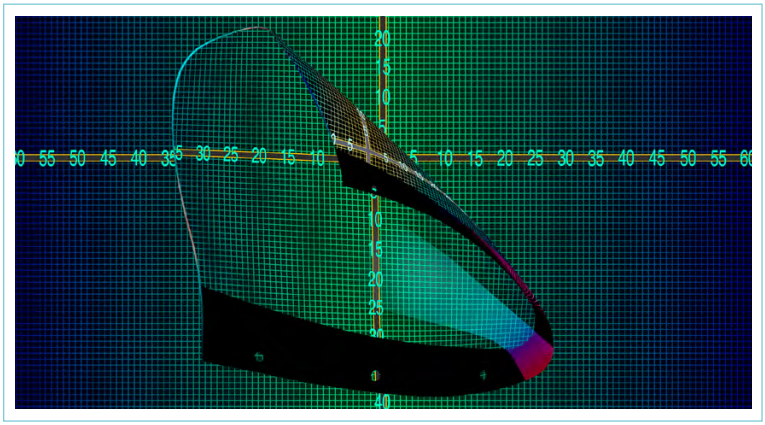
3. COST: SUBSTANTIALLY LOWER

The rule of thumb flat unprocessed glass is less expensive than an acrylic. However, a tempered glass will be about equivalent, and formed and/or laminated glass will be far more costly to produce than acrylic.

If a window is to have a more defined shape, the forming tools for glass are usually steel or ceramic, while acrylic only requires fiberglass reinforced resin. As such, the difference in tooling costs are substantial; a consideration which becomes far more important for low-volume production.

AcryliCo as able to assist you in quoting estimates for both the masters and forming tools.

4. FORMABILITY: HIGHLY VERSATILE



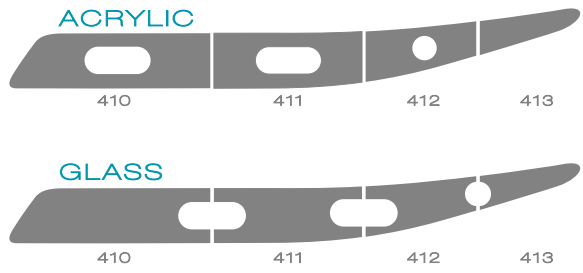
Although glass can be formed into curved shapes, due to its restrictive malleability, the finished shape will be quite limited, with complex shapes being far more challenging to achieve.

By contrast, acrylic can be formed into far more radical compound shapes with ease, yet able to retain excellent optical properties with a minimum of aberration.

5. PORTLIGHTS: EASE OF INSTALLATION

In a similar vein, portlights and hullside windows can be inserted just about anywhere when manufactured in acrylic. By contrast, with laminated glass, while it is possible to drill through glass, it isn't easy; especially where large portholes are required.

In such cases, and since it's easier to cut glass from the edge, and because hullsides are generally made in several sections, the porthole is cut-out in between two sections. By contrast, acrylic offers a more professional finish, with complete flexibility only limited by a designer's creative flair.



Glass Portlight

6. OPTICAL TRANSMISSION: UP TO 15% BETTER

Acrylic transmits more light than glass; in fact, up to 92% of visible light is transmitted through acrylic. By contrast, mineral glass transmits between 80-90%, depending on the type of glass.

In cases where laminated glass has several layers, such as ballistic formulations, the image observed through the pane tends to adopt a greenish hue, which is not observable in acrylics.

7. THERMAL CONDUCTIVITY AND UV BLOCK: SUPERIOR

Thermal conductivity I acrylic is lower than laminated glass. This is advantageous for insulation, such as skylights, resulting in lower running costs for heating and air-conditioning.

New acrylic formulations are now capable to offer 99% UV blocking and approximately 35% of IR dependant to the tint being used.

This also has the added advantage to protect the adhesives used to bond the window in its receptacle without the use of a blackout strip, known as a Frit. Furthermore, these specialty grades also protect interior electronic components and upholstery from fading.

8. SCRATCH RESISTANCE: APPROACHING GLASS

The surface of acrylic is softer and more easily scratched than mineral glass. However, new technologies have been developed where a silicate hard coating is applied to the exterior surface of acrylic transparencies, affording far superior protection thus resisting most scratches and making acrylic impervious to chemical attacks.

Nevertheless, as with glass, if the transparency is compromised the entire window must be replaced.