

Visual Tolerances:

Terminology:

Glass Terms

Viewing Distance: Distance of the inspectors eyes from the glass. Normally 2000 mm unless otherwise specified

Viewing Angle: The angle of the glass - normally 90°

Frit Area: The printed area of CeramX-Digitally printed glass.

Glass Edge: The edge of the glass. Normally polished.

Monolithic: Monolithic glass is a single sheet of glass.

Laminated: Laminated glass is two or more sheets that have an interlayer between them.

Toughened: Toughened or tempered glass is a type of safety glass which has been thermally treated to increase its strength compared with normal glass.

Fault Types:

Bubble: Small holes partially or wholly enclosed by glass or laminate interlayer which normally contain air.

Tin: Appears as small flakes of glitter in the glass. This is a result of Float Glass (raw glass sheet) production when the molten glass is “floated” on a bed of more dense tin to make a sheet.

Visual Distortion: Objects on the far side of the glass appearing distorted due to varying levels of refraction within the glass.

Scratch: A long narrow surface flaw produced by a hard object (e.g. grit, which produces a perceptible depression).

Bands in Frit: Printer lines in the Frit.

Chip: A mark in the surface where a piece of glass has been removed by an impact

Inclusion: Insoluble matter retained within or on the surface of the glass during manufacture.

Roller Pinholes: A defect on the side of the glass that has been in contact with the toughening rollers (the non-frit side), normally to the outside of the boat. A deep hole cause by dirt on the rollers.

Scar: A scratch which is obtrusively visible being normally white in colour

Void: An area where frit or paint has not adhered to the glass due to small particles of dust or debris adhering to the glass before the ink or paint has dried, and burnt off or removed during the toughening process or drying process, leaving a void in the coating.

De-lamination: De-lamination may occur where the interlayer comes away from the glass in a laminated product.

How to Inspect Glass:

- Stand in the room no less than 2 metres away from the glass and look directly through it.

- For toughened, laminated or coated glasses, stand no less than 3 metres away.
- Where it is not possible to stand at the right distance then stand as far away as you can from the glass.
- Do so in natural daylight, but not directly towards the sun and with no visible moisture on the surface of the glass.
- Glass must be viewed at an angle of 90°.
- The obtrusiveness of blemishes is judged by looking through the glass, not at it, under natural light. It must be understood that glass used for shower screens, balustrades, splashbacks etc. is processes and as a consequence blemishes can be expected.
- Toughened glass may show visual distortions. This is a natural phenomenon and not a fault; laminated glass may have a few more blemishes due to it being made of several layers

Optical Quality & Colour

Glass Express Ltd T/A Gx Glass purchase glass from reputable, recognised glass suppliers with excellent quality records. However, we are unable to control or guarantee any slight differences in the colour, tone or optical quality of any glass that is supplied to us. This may be more pronounced between different batches of glass. The nature of the processes that are employed in producing bespoke products can influence the optical quality of glass. This should be discussed with us when specifying our product.

Manufacturing Tolerances

Cutting & Machining

All glass when processed has a manufacturing tolerance – whereby during the cutting and machining of the glass, we guarantee the sizes to within a specified tolerance for that product. Please see these below:

- 4- 6 mm glass has a manufacturing tolerance of +/- 1 mm
- 8- 10 mm glass has a manufacturing tolerance of +/-2 mm
- 12-15 mm glass has a manufacturing tolerance of +/- 3 mm
- 19 mm glass has a manufacturing tolerance of +/- 4 mm

Toughening Tolerances:

- Maximum bow between points supports ± 10 mm.
- Maximum bow along pane short dimension ± 2
- Roller pinholes less than 0.5mm² are acceptable
 - Up to 20 pinholes between 0.5mm² and 1mm² are acceptable in a
 - $\varnothing 150$ mm cluster. Clusters must be 500mm apart.

Laminating Tolerances

- Maximum step on any edge: 2 mm. Overall thickness: ± 1 mm.
- Maximum bow between points supports ± 10 mm.
- Maximum bow along pane short dimension ± 2 mm.

Visual Approval Tolerances

Glass Edges & Surface

- Chips are not acceptable in the glass edge

Clear Processed Glass

Flat transparent glass, including laminated, toughened or coated glass is acceptable if the following are neither obtrusive nor bunched:

- Bubbles or blisters
- Fine scratches not more than 25 mm long
- Minute particles
- No scratches, scars, bubbles, inclusions or tin to be observable at a distance of 2m from the glass.

Clear Laminated glass

Flat transparent glass, including laminated, toughened or coated glass is acceptable if the following are neither obtrusive nor bunched:

- Bubbles or blisters
- Fine scratches not more than 25 mm long
- One bubble of 2-3 mm diameter per linear meter is acceptable at the junction between the edge and the interlayer.
- In the body of the laminate, bubbles and inclusions / particles up to 3 mm in diameter are acceptable if at least 1 metre apart.
- No scratches, scars, bubbles, inclusions or tin to be observable at a distance of 2 m from the glass.
- If delamination occurs please contact us.

Backpainted Glass

Flat backpainted glass is acceptable if the following are neither obtrusive nor bunched:

- Bubbles or blisters
- Fine scratches not more than 25 mm long
- Minute particles
- No scratches, scars, bubbles, inclusions, voids or tin to be observable at a distance of 2 m from the glass.

[Please see our guide on how light can affect colour](#)

Digitally Printed Glass

Flat backpainted glass is acceptable if the following are neither obtrusive nor bunched:

- Bubbles or blisters
- Fine scratches not more than 25 mm long
- Minute particles
- One void of 2-3 mm diameter per linear meter is acceptable. In the body of the glass, bubbles and inclusions / particles up to 3 mm in diameter are acceptable if at least 1 metre apart
- No frit bands or roller marks to be observable from a distance of 2m from glass

[Please see our guide on how light can affect colour](#)

Lighting & Colour

Variation of colour and glass thickness

When installing identical coloured panels of back painted glass in the same location such as a full length splashback and two returns, there will likely be a visual colour variation as the painted surface is being viewed on different sized panels and on different planes.

How Does Light Affect Painted ColourX?

Backpainted or printed glass may look different in situ depending on the time of day and your chosen lighting.

The smaller the panel of glass, the more light will be transmitted through the edge; therefore it is always worth trying samples of your chosen colour in the location where they are to be installed.

The brightness and location of lights will also make a difference to how the colour of a panel will be viewed.

This occurs due to an effect it's down to an effect called metamerism – the best illustration of this is when putting on socks; in incandescent light, it may look like you've put on two black socks, only to find out that in different light, such as fluorescent or natural light, that one sock is dark blue.

This can happen with paint colour as well. Both the sample and the source of illumination can affect your perception of colour, so when viewing glass, it should be viewed at a distance of least two metres and at an angle of 90 degrees, under normal daylight conditions.

Natural Light

Natural light affects the way colours appear in various locations. And the effect this light has depends on the direction in which it comes into the room and the position of the sun. If your room is north-facing, the light that enters will be softer and will produce a warmer effect, with darker hues looking darker and light colours a touch more subdued, this is because light from the north adds a touch of blue.

If the location has a southern exposure, it will receive the most intense light. Darker colours will be somewhat brightened and light colours (especially white) have the potential to leave the room washed out.

In the evening, a west facing room will have warmth from the setting sun, adding orange hues and can leave room's that are orange, red, or yellow looking over saturated. Likewise, eastern exposure adds a bit of green.

The best way to determine how natural light will affect ColourX painted glass is always to test a sample of the paint colour in the chosen location. Because one area might be illuminated by direct sunlight, while another stays in the shade, you will be able to get a good idea of how ColourX works in the location overall, also, check the sample colours throughout the day to see how they change as the natural light changes. If you find that the light does affect the colour, you can adjust for this by going a shade darker or lighter with your colour.

Please also note that depending on the time of year, the effects of artificial light combined with natural light may produce a different hue in the evening also.

Artificial Light

Interior residential lighting is usually a combination of incandescent, fluorescent and sometimes halogen lights. Depending on what combination you have will in turn affect your ColourX glass.

Check your samples with the lights on in the room the way you would normally have them on and see how the ColourX sample looks under that particular light. It is worth noting that if your panel is both in shadow in part and in the light in part, that it will affect the ColourX paint look - dark colours may seem dulled in these areas and lighter colours may seem a bit brighter.

Incandescent

Incandescent light bulbs provide warm light with a touch of yellow or amber and are warmer than fluorescent bulbs. Bright and warm colours like red, yellow or orange will appear more intense if your location is lit by incandescent bulbs. Cooler colours like blues or greens may be dulled a bit by incandescent lighting.

Fluorescent

Standard fluorescent lights give off a cool, slightly bluish light and work well with cool colours like blues and greens. Some more specialised fluorescent lights can give off warmer light, but not to the degree of an incandescent.

Halogen

Halogen lights are closest when it comes to replicating natural light. Halogen light is mostly white and bright and doesn't distort colour as much as other artificial light sources. However, it can sometimes cool down colours.

ColourX paint

Particular colours play a part in how much they may or may not change in certain light. Whites and off-whites may seem vanilla, but they are often very adaptable to all light conditions. This can also be said of pale shades of other colours. However, whites and other light colours can sometimes reflect hues from objects in the room, such as furniture, flooring, etc. Brighter, richer colours can often be problematic and colours like khaki, sage and taupe are some of the worst offenders when it comes to changing under different lighting.

Hopefully this will provide some pointers when choosing your ColourX painted glass and understanding how light can affect paint colour.