

DIFFERENCES IN GLAZING COLOUR

Consumer Guide



Difference in glazing colour

There are certain occasions when recently installed glass elements can exhibit a different colour in relation to the glass adjacent to it, for example if a single window has been replaced in a bay of several. Whilst the colour differences may not be aesthetically pleasing they're rarely a cause for concern and will normally continue to offer excellent performance.

What is glazing colour?

Before we look at some possible reasons for differences in glass colour, it's important to understand what glass colour actually is, since it's not perhaps as straightforward as you may first expect.

We can start with the glass itself, which of course as a material has its own innate colour, or lack of colour, since most glass panes used in glazing for windows & doors are typically very clear and so neutral in colour. In recent years glass panes have become more neutral as a result of reducing iron content in the raw materials.

The iron content poses no concern to the glass whatsoever, it merely gives the glass a slight green tinge which is often only noticeable when the glass is viewed from a cut edge. But as a result the standard glass pane available in the UK is now a reduced or mid-iron glass, and has been for around the last decade. It's also possible to use low-iron glass which has an even lower iron content, however this is more typically used in museum or art gallery displays than in general glazing.

It is of course also possible to use glass panes which have been deliberately tinted. Indeed these tinted glass panes were used as the first type of solar control, since the tinted colours (typically green, grey, bronze or blue) would absorb solar energy rather than directly transmit it through the pane.

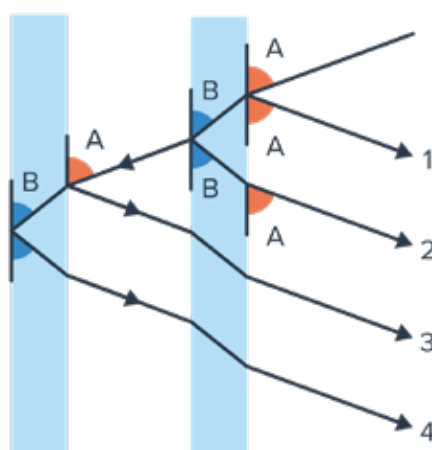
Regardless of whether the glass pane is neutral or tinted, the colour darkens very slightly as the pane's thickness increases. It follows then that since our modern homes almost always have a minimum of double glazing, we have an increased thickness due to the two panes of glass. Our modern homes also require thermal insulation to comply with building regulations and so we use a 'Low E' coating which itself has a colour. Performance of the glass can be further enhanced with the addition of solar control which will also affect the colour. So, you can appreciate that the colour of glazing is already a composite of various factors.

If glass is tinted, for example in some conservatory glazing, we expect to look through the glass and whatever objects we view will be skewed in appearance by the tint of the glass colour itself. We describe this effect of the glass itself to impart a coloured hue to the objects we view through it as changing the 'colour in transmission'



Colour and Reflection

Taking those two panes of glass in our double glazed unit once again, each pane has two surfaces from which light is reflected, which means our double glazed unit has a total of four surfaces from which light is reflected. Any surfaces which contain a coating such as the 'Low E' for thermal insulation will reflect light slightly differently. If we stand outside on a sunny day when the light is shining directly upon a window and we look specifically at the reflected images of objects parallel to the glass these too will likely have a slight coloured hue imparted upon them. We refer to this as the 'colour in reflection'.



Now to complicate matters. In some instances when viewing our windows and looking at the colour what we're actually seeing is not really the 'colour in transmission' or the 'colour in reflection', but rather a blend of both combined together with several other factors including:

The colour of the light source itself (natural daylight is neutral, whereas interior home lighting can be 'warm' or skewed to the yellow spectrum)

The colour of the ambient conditions on the far side of the glass (a window will look different depending upon if the building interior is well lit or completely dark)

Any foreign elements present on the glass surface such as: dirt, dust, algae, watermarks etc.

It's for this reason that most glass samples are supplied to architects with instructions to view the glass in the conditions it will actually be used in, as opposed to viewed in an office under artificial lighting.

In the next section of this document, we will explore examples of glazing colour variations, examining the potential causes and determining whether they can be addressed.



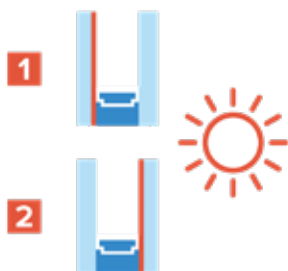
Glazing colour issue examples

We can take a look at a few examples when glazing colours may deviate from expectations and look at the likely causes and whether or not they can be rectified:

Avoidable

Same Glazing

Different coating position - Internal

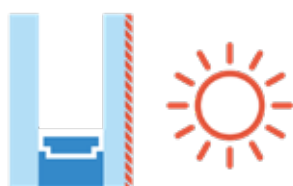


Coatings on glass panes affect their colour appearance and the position of the coated pane within a double glazed unit can cause a colour difference - even if the same coating is used.

For example, window 1 has its 'Low E' coating on the surface of the inner pane which faces the cavity, whereas window 2 has its coating on the surface of the outer pane which faces the cavity. In this situation it is likely that there will be an aesthetic difference but the problem can be resolved by ensuring each glazed unit has its coating in the same position.

Same Glazing

Different coating position - External

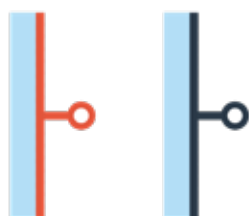


Most glass coatings are designed to only be used facing into the sealed cavity of insulating glass units (IGU), this includes the vast majority of modern 'Low E' coatings.

If these types of coating are incorrectly positioned facing the exterior of the IGU they will react with the atmosphere and discolour. Over and above the visual discolouration caused by this, the IGU cannot function as intended and the only solution is to replace it.

Same Glazing

Coating specification



Where projects are completed in phases it may result in the glazing being ordered and supplied in batches rather than all together.

This creates the potential for different coating specifications to be used in the different phases, either accidentally or due to availability, leading to a visual difference between them.

This can be avoided by ensuring the same specific coating reference from the same manufacturer is used across all phases.

Unavoidable

Replacement Glazing



Coated glass manufacturers are continually developing their range of products to meet the mandatory requirements of regulations and to keep pace with the changing demands of the built environment market. This can result in a coating being modified or even being withdrawn completely and replaced by a new coating.

With replacement glazing, depending on the time frame since the glazing was produced and installed, it is possible that the coating used is no longer available. In this situation, where a glazed unit is replaced, due to for example breakage, the replacement unit will have to be produced with an alternative coating and a visual difference is likely.

Same Glazing

Different Elevation

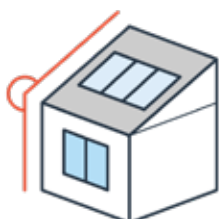


Even when the same glazing specification in a building is all manufactured and installed at the same time there can be instances when visual colour differences may be apparent.

The angles at which glazing is viewed and from which it receives natural light may naturally alter its visual appearance, and so the glazing to different elevations of the same building may appear different when viewed from different angles or at different times, even with the same specification of glass throughout.

Same Glazing

Different Angle



In an ideal world, our glazing when seen from any angle would appear exactly the same colour. Unfortunately this is not possible, and the laws of physics are largely to blame. Glass is always assessed at 90° to the glass surface(s), or rather directly in front of it. As soon as we deviate from this 90° angle we are altering the path that light will take from the glazing to our eyes and thus the aesthetic of the glass will change as a result. The same is true of a TV screen or computer monitor whose appearance changes when seen from different angles.

Frequently Asked Questions

What glass has been used in my glazed units?

Unfortunately there is no technology that currently exists which can scan, measure or assess any glazed product and determine which specific product it is. This is understandable given that we are dealing with a mostly transparent medium on which a barcode or similar would be unsightly if affixed to it. The stamps that do appear on some glass panes are there for either product compliance or safety reasons, and do not give any specifics of which product was used.

Will I be able to get new glass to match my old glazing?

At present the industry is not able to colour match any glazing, for various reasons. Along with the various reasons given throughout this document, there is no possibility to redesign a coating to match an old one on an ad-hoc basis. The scale of glass production, where modern glass manufacturers have furnaces capable of producing as much as 1,000 metric tonnes of glass each day, means that producing only a few square metres for replacements to match some old existing glazing would not be feasible.

Do glass products with equal performance characteristics usually indicate a visual match? (e.g. light transmission or G value)

Unfortunately not. Using performance characteristics to try to find a visual match might give an indication of which products may be similar, but it's rare to find products from different manufacturers whose performance figures are close AND a visual match.

Are all tinted glass products visually the same across different manufacturers?

Again this is rarely the case. Whilst a manufacturer might simply label their tinted glass as 'green' or 'blue', there is no guarantee that it will be the same shade of colour as A N Other manufacturer, even from the same manufacturer there exists the possibility of slight variation between different production runs.

