Colour Variations in Glass

Why the following glass types can be slightly different colours

Clear Glass
All glass is essentially made from the “Float Glass” process but the mixture of raw materials can vary slightly. The most noticeable is the iron content and this can make some clear glass more green than others. The iron content can be reduced (low iron glass) to produce extra clear glass, but this is more expensive.

Tinted Glass
The inclusion of metal oxides creates tinted glass in a range of colours (bronze, grey, blue, green), but some manufacturers have slightly different formulations and tint colours. In general the bronze and grey colours are similar but the others can vary and may not be able to be matched.
In addition the tint varies with the thickness and this adds further complications to colour matching. Therefore if you want tinted glass to match it should be all one thickness and from the same supplier for best uniformity.

Laminated Glass
Clear laminated glass is very similar to clear monolithic float glass of the same thickness, and in most cases no colour variation is noticeable. However, it can happen in some lighting conditions. Tinted PVB laminated glass does not match tinted float glass as it’s the PVB interlayer that is tinted and not normally the glass. In addition there are several suppliers of tinted interlayer and their colours and appearance in certain lighting conditions can vary.
The laminate can be made with tinted glass to match if required, and some are offered in this format as standard.

Toughened Glass
The toughening process does not alter the clear or tint colour but can introduce thermal stress patterns that are visible through polarized light, often known as leopard spots.

Reflective & Coated Glass
Coated glass colours do change when viewed at different times of the day, depending on the weather, surrounding reflections, building orientation and the angle at which the glass is viewed.
In addition the appearance of reflective glass is distinctly different if the coating is glazed outside on surface 1 or inside on surface 2.
The appearance of clear Self Cleaning and Low E coated glass is also slightly different to clear float but this is not normally significant. Some Low E glass can exhibit a blue haze, especially noticeable if part of the glass is shaded.

Insulating Glass Units (IGU)
An IGU will not normally look different from monolithic glass if using the same outer glass. However, the introduction of a Low E coating can slightly increase reflectivity and the internal pressure changes in the unit can create flexing in the glass that changes reflected images.
In addition some rare visual effects are possible, such as;
Brewster’s Fringes, which is a light refraction phenomenon seen as a rainbow effect
Newton’s Rings, which is a circular rainbow effect evident when the panes are touching in the centre.
(For more information refer data sheet on IGU Design Limitations)
Reflection

As a standard IGU has four reflective surfaces, a higher level of reflectivity occurs and multiple images in reflection may be created. This will be more apparent when viewed on an angle to the glass and is an inherent property of the unit.

Due to the sealed airspace of an IGU differences in temperature and atmospheric pressure from the time of manufacture will cause the IGU to act as a lens. This can cause significant changes in the images reflected from the windows due to glass deflection. The appearance is of a convex distortion when the glass is bowing outwards and a concave distortion when bowing inwards. The effect will be more noticeable when reflective coatings are incorporated within the IGU, and in larger units. These distortions are a result of the laws of physics and cannot be eliminated.

Haze

Haze is the scattering of light rays when visible light passes through a transparent material. The amount of haze in ordinary glass is very low and is not detected by the human eye.

High performing IGU’s often incorporate Low E coated glass. With any coated glass it is possible to see the presence of the coating under certain lighting conditions. When bright sunlight shines directly onto partly shaded, coated glass and there is deep shade on both sides of the glass, haze may be visible and usually has the appearance of a blue-grey film or dust on the glass. The shaded area will be free of the effect, giving a clean appearance in the shadow.

The effect will be more noticeable on some types of coated glass than on others. Vacuum or sputter coated Low E glass products generally have a very low amount of haze, Pyrolytic coatings tend to have higher levels of haze that can be more readily seen by the human eye. Haze is not a manufacturing flaw, rather an industry known and recognised inherent feature of IGU’s.