Delta E ≤ 2 Colour Accuracy

ViewSonic’s Delta E ≤ 2 colour accuracy means superior, accurate colour reproduction, achieving better than the eye can see colour difference.

What is Delta E?

Delta E is the standard calculation metric which correlates the human visual judgment of differences between two perceived colours. This standard quantifies this difference and is used to calculate the deviation from the benchmark standards which allows a tolerance level to be set (based on L*a*b coordinates). Generally speaking, the lower the Delta E number, the closer the display matches the input colour to the display’s reproduced colour. The Comission Internationale de l'Eclairge (International Commission on Illumination) or CIE, has established Delta E as the standard colour distance metric, revising past definitions to incorporate the human eye being more sensitive to certain colours. To address these issues, in addition to finding accepted tolerance levels, CIELAB can be used to scale, with the underlying theory being no two colours can be both red and green nor blue and yellow at the same time. With a lightness scale vertically in the center, colours can then be expressed with single values.

CIELAB:

As stated previously, this model is the standard and is represented by a colour plotted-diagram with L* denoting lightness, a* denoting the red/green values and b* denoting the yellow/blue values. The scale is spherical by nature with white (i.e. maximum brightness L*=100), black (i.e. total absorption L*=0), and grey (i.e. neutral grey L*=50) being the vertical center of the sphere. The horizontal plane is depicted with values of either +a/-a (which depicts a shift towards red/green respectively) and +b/-b (depicts a shift towards yellow/blue respectively). Each colour is then a measure of their a*, b* and L* values, giving a definitive point of reference on the colour scale. This scale gives a precise value with each value having a specific point on the scale, creating that particular hue of colour. This is a very important component of Delta E, being the standard measurement tool to measure the difference (Delta E) between the colours represented (displayed) and the deviation from the true colour location on the CIELAB scale.

To Measure Monitor Delta E:

There are 32 standard colours that ViewSonic monitors use to create the CIELAB standard colours. These colours are standardised and based on the CIELAB colour locations. Imagine taking a colour palette of 32...
standard colours and with using complex algorithms, a powerful LUT, gamma curve and enhanced monitor reproduction capabilities, matching these colours to their exact hue.

During this process, the input colour is taken and matched, producing a Delta E number that displays the distance between the CIELAB matched input colour and the colour being displayed. Delta E is used to ensure the colour being displayed is reproduced with colour hue that matches so closely to the colour input that the human eye can’t perceive the difference. (Delta E ≤ 2).

**What does Delta E number mean?**

The higher the Delta E (ΔE), the further away the colour is from the true hue, using CIELAB. Perfect colour has a Delta E of zero, although this cannot be detected using the human eye. The minimal detectable difference is between 1-2.5 Delta E. Without a fully-realised colour management system, it is very unlikely that monitor calibration can achieve this level of performance for primary and secondary colours. Most virtual displays have a full complement of gray scale settings, so for white, calibration can often meet this standard.

If a Delta E number is less than 1 between two colours that are not touching, it is barely perceivable by the average human observer. A Delta E between 3 and 6 is usually considered an acceptable number in commercial reproduction, but the colour difference may be perceived by printing and graphic professionals. (Note: Human vision is more sensitive to colour differences if two colours actually touch each other).

**Why Delta E is important to professionals?**

- **Colour Accuracy:** With a lower Delta E, the image colour from input signals, like cameras and camcorders, can be more accurate while displayed on the monitor, without colour distortion. This is incredibly important for professionals that need to have exact colour replication.
- **No colour difference between multiple monitors:** Professionals may use multiple monitors for creating graphics. On one monitor, graphics and video can be edited and then can be reviewed on a second, without colour degradation or inaccuracies. With lower a Delta E, professionals are able to have accurate and consistent colour reproduction.
How does ViewSonic VP2780-4K achieve a lower Delta E?

With a variety of capabilities working in sync, the ViewSonic VP2780-4K Ultra HD monitor achieves a lower Delta E and is able to provide accurate colour reproduction, ensuring the highest standards are met. The VP2780-4K achieves a low Delta E by utilising a powerful colour engine with 14-bit LUT (look-up-table) and 3D LUT that processes 4.39 trillion colours and matches colour brightness and ensures smooth colour gradients with an improved gamma curve. With gamma 2.2 being the industry standard for colour reproduction, the VP2780-4K offers the best choice for any situation, in addition to providing the lowest Delta E amongst Ultra HD monitors on the market. With the help of a superior colour engine, advanced LUTs and dedicated staff of engineers and colour experts, ViewSonic is able to surpass its competitors with true colour reproduction, proving it with our Delta E \( \leq 2 \) colour standard.

**VP2780-4K Product Spec:**

- Colour Accuracy: Delta E \( \leq 2 \)
- Resolution: Ultra HD, 3840 x 2160
- Colour Depth: 10 bits, 1.07 Billion Colours
- Colour Range: 100% sRGB
- Viewing Angle: 178° / 178°
- LUT (look up table): 14-bit LUT & 3D LUT
- Input: HDMI 2.0, DisplayPort 1.2 x 1, Mini DisplayPort 1.2 x 1, USB 3.0 x 4