

# Which technology best fits the need? Comparing LCD and dvLED solutions

## Introduction

Over the past decade, video walls have become an increasingly popular digital signage choice. This is because they are particularly effective at engaging people and delivering messages with impact. They present larger, higher resolution images compared to a single display and can be built to almost any configuration to fit a specific space or purpose.

Video walls have found homes in many different types of settings, including corporate offices, retail stores, transportation hubs and sports venues, as well as command and control facilities. When deciding which type of video wall installation is appropriate for your customers' needs, first determine which of the two basic types of technology - LCD or dvLED - is best suited to the specific application. LCD and dvLED displays have very different features and benefits.

## Liquid Crystal Displays

Liquid crystal display (LCD) panels are manufactured by inserting a layer of liquid crystal, a substance that is part solid and part liquid, between two sheets of glass. When electricity is applied to this layer, the crystals shift to create an image. Because the crystals do not produce their own light, some form of backlighting is needed to display the image. Ironically, LEDs are the most popular source of backlighting for LCD panels.



LCD panels are bright and provide high-resolution images. They offer powerful calibration capabilities to deliver an image which is perceived by the viewer as homogenous across multiple screens. They are slim, easy to install and can be configured to many shapes and sizes for creative and scalable video wall deployments. With a low initial cost and energy efficient operation, they offer an impressively low total cost of ownership.

One potential disadvantage of an LCD video wall is that each individual display has a bezel frame, but with image gaps as little as 0.88mm this need not be a hindrance.

## Direct View LED

A light emitting diode (LED) is a tiny semiconductor that converts electricity into visible light. In an LED panel, each color pixel has one red, one blue and one green LED. The combination of these three colors enables the LED to create trillions of colors. In an LED panel, each LED produces its own light, unlike an LCD panel where the backlight passes through the liquid crystal layer. This is where the name "direct view" LED (dvLED) originates.



dvLED panels have many advantages, including superior contrast and viewing angles, long life, energy efficiency and high brightness corresponding to its suitability for both indoor and outdoor applications. Because there are no bezels, dvLED panels configure to create a single large surface area without distraction from image gaps.

## Choosing the Right Panel

LCD panels have traditionally been the popular choice for video walls, particularly for indoor applications, whereas dvLEDs have been the go-to choice for outdoor installations. Recent advances in LED technology means that dvLEDs are now a viable alternative also for indoor applications offering a wider choice to customers.



Selecting the best video wall solution for a specific indoor installation can be challenging. Here are some considerations to keep in mind:

**Pixel pitch:** Measured in millimeters, the pixel pitch is the distance between the center of one pixel and the center of an adjacent pixel. A screen with a smaller pixel pitch has a higher pixel density resulting in a shorter viewing distance. In general, a large screen viewed from afar can have a relatively high pixel pitch, but a screen viewed close up should have a small pixel pitch. LCD video walls today tend to feature a smaller pixel pitch compared to dvLED.

**Image quality:** For tiled settings, it is vital to achieve a perfectly matched image across the entire surface; mismatched colors and misalignments will be very distracting to the eye. Look for reliable color reproduction and uniformity. Proprietary SpectraView Engine technology ensures that image performance matches across LCD panels out of the box while continually stabilizing the luminance behind the scenes. Enhanced imaging performance will control all visual parameters for precise, natural images. In high bright environments look for low reflection surfaces to avoid distracting glare.

**Brightness:** Not only for outdoor installations, brightness is also a major consideration for indoor video walls. Take into account the ambient light conditions to ensure the video wall will have sufficient brightness to provide excellent viewability, pleasing to the eye.



dvLED is capable of creating very high brightness levels of up to 5,000 cd/m<sup>2</sup> or more which is required for large scale outdoor screens, whereas indoor screens typically feature brightness levels of between 500 and 1,200 cd/m<sup>2</sup>.

**Contrast:** The contrast is the ratio of the brightest to the darkest area of the image. The greater the difference, the greater the contrast, making shadows darker and highlights brighter. A higher contrast ratio adds vibrancy to the image. dvLED creates a high contrast ratio by turning off the LED completely, whereas the liquid crystals of an LCD display block the light emitted from the backlight. For dvLED, a high-efficiency LED chip and a black mask ensure deep contrast levels. Both LCD and dvLED have functionality to support high contrast levels and the best choice is down to the viewers' perception.

**Power consumption:** Both technologies can be described as energy efficient with power consumption managed via the display settings. For instance, if a lower brightness level is sufficient to achieve eye-pleasing viewing then power consumption reduces accordingly. The power consumption of a dvLED is dependent on the content type and therefore will be higher when displaying super bright content.

**Heat dissipation:** Because LED (used as a backlight for LCD or for dvLED) emits heat as well as light, heat build-up can be a concern especially in multiple display set-ups and can potentially affect image performance and speed aging. NEC LCD displays feature professional heat management with user controllable fans and a metal back cover to disperse the heat. dvLED emits the majority of heat from the front of the screen surface which makes cooling easier but leads to slightly warmer screen surfaces. Consult with the manufacturer or supplier to better understand how each solution manages heat dissipation and what requirements are needed for your application.

**Build quality:** Indoor video walls in public spaces should be robust enough to withstand exposure to harsh environmental conditions including minor knocks. LCD displays must be of robust commercial build with a metal back cover and be specially designed for integration into video walls. Use an appropriately designed mounting infrastructure preferably from the

same supplier as the display. Choose from a high quality dvLED manufacturer with a robust connection system between modules enabling precise placement and adjustment.



**Front and rear service access:** For easier installation and lower-cost maintenance, make sure video wall panels have front and rear access. dvLED manufacturers such as NEC provide direct front access to each module and LCD video walls can be equipped with special mounts that enable front access. Both ways ensure easy access to the display for maintenance, repair and installation.



**Cost:** LCD panels are less expensive than dvLED panels, but the gap is narrowing. A finer pixel pitch is the primary contributor to a higher cost in a dvLED display, so it is important to work with your solution provider to ensure that the pixel pitch matches your client's budget, image quality expectations, viewing distances and content type.

**Long life:** dvLED modules benefit from impressive longevity. Their typical lifetimes range from 70,000 to 100,000 hours before they reach a brightness output 50% below the original value. LCD video walls also provide a long life expectancy, 60% to 70% of that of dvLED.



Individual LCD displays can be easily replaced or adjusted according to neighboring screens in the wall should maintenance be required. Similarly, dvLED video walls are equipped with spare parts that ensure color consistency across the entire surface following a module replacement. Having the ability to calibrate the display will prove essential in the later years of the video wall's lifespan, this is because calibration enables the colors and brightness of each pixel or panel to be closely matched to the others in the wall. Ultimately, calibration will make the video wall look like new across its entire lifetime.

**Turnkey solution:** For many customers, choosing a video wall installation that is a complete end-to-end solution including hardware and services will best satisfy their need. Sharp NEC provides expert consultancy in order to find the perfect fit video wall display technology to fit your customer needs.

### The Big Picture

Because of recent advances in dvLED technology, customers considering an indoor video wall installation now have options beyond the traditional LCD solutions. The decision between LCD or dvLED depends on a wide range of factors; by matching client need against the benefits of the technologies available, a cost-effective, long-term signage solution can be achieved. Your Sharp NEC sales partner or authorized NEC reseller provides customized consultancy in order to find the perfect fit solution for your application and specific needs.