

# Rear projection screen technology

## Selecting the right screen to optimize display performance

By Ed Kiyoi, Director of Product Marketing, Clarity Visual Systems

### The importance of choosing the right screen

The choice of the correct screen type is driven by the environmental conditions of any installation, as well as the image quality requirements of the customer. Whether you are providing solutions for business messaging applications, where ambient light is often well controlled; or solutions for consumer messaging, where ambient light is less likely to be controlled, Clarity offers a variety of screen choices to best suit your customer's needs.

The design of a rear-projection screen determines how the raw lumens at the output of the projection lens are converted into the useable brightness, contrast and viewing angle of a displayed image. Different screen options will provide different combinations of image quality parameters. Once you have determined the viewing conditions of a particular application, you can consider the acceptable trade-offs between image performance factors. Is viewing angle more important than brightness? Or is the opposite true? Knowing your screen options and how they will affect the end product can help you to develop a solution to best meet your customer's expectations.

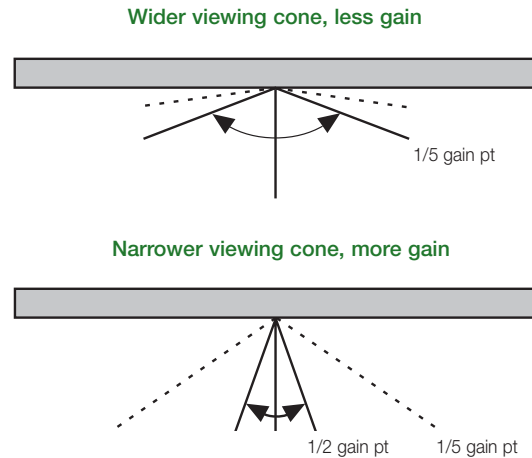
### A guide to screen technology

#### Screen gain

Gain is defined as the brightness output of a screen. Some screen designs direct light into a specific viewing cone resulting in an increase in brightness inside that particular viewing cone.<sup>1</sup> The brightness inside a particular cone is measured as a gain greater than one.

#### Viewing cone

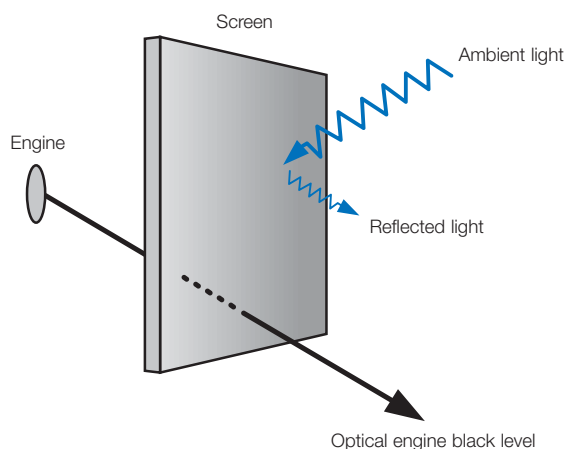
Viewing cone is defined by ANSI (body that defines standards for projection systems) as "the angle from vertical at which point the screen gain has fallen to 50 percent," otherwise known as 1/2 gain point.<sup>2</sup>



#### Reflectance

The amount of ambient light reflected by a screen is a key parameter. Ambient light is any light that is not generated from the projector. Ideally, a screen would not reflect any light (zero percent reflectance), but no technology exists today to deliver that level of performance. An increase in reflected light decreases the effective black level performance of a screen, thereby decreasing the contrast ratio of the displayed image.

#### Reflected light directly impacts black level performance



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<sup>1</sup> A screen can not create light. High gain is always achieved at the expense of a narrower viewing cone.

<sup>2</sup> Images are viewable well beyond the 1/2 gain point. All manufacturers may not adhere to the ANSI standard for specifying viewing angle as Clarity does.

## Clarity screen types and appropriate applications

Clarity offers three screen options to ensure our display systems meet performance criteria in different applications.

### Wide-View black glass screen

The Wide-Angle glass screen provides the largest viewing cone and best image quality across a wide viewing angle. It should be used in applications where a wide viewing angle is required. This is the most commonly used screen in the majority of wall applications.

### High-Contrast black glass screen

Clarity's High-Contrast glass screen provides the highest contrast and image quality over a moderate viewing angle. It is best used when the angles of view are tightly controlled.

### High-Gain acrylic screen

A High-Gain acrylic screen delivers the highest brightness performance for applications where both viewing angle and ambient light are known quantities and can be tightly controlled.

For more information on screen technologies and other topics, visit [www.clarityvisual.com/technotes](http://www.clarityvisual.com/technotes).



## Brightness, viewing angle and contrast ratio – making the right tradeoffs

Clarity's High-Gain acrylic screen is the best choice for those applications where high image brightness is desired. But for many applications, using a screen with lower brightness but higher viewing angle and contrast ratio attains better image quality and viewability. The photo above shows a 3x3 wall with the center display using the Wide-View glass screen, and the surrounding displays using High-Gain acrylic screens. In this case the high amount of ambient light significantly reduces the displayed contrast ratio on the High-Gain acrylic screens. Even though the Wide-View glass screen has lower brightness, it is clearly the preferred choice for this application.

## Clarity screen options

Screen type	Wide-View glass	High-Contrast glass	High-Gain acrylic
On-axis gain	1.0	1.7	4.0
1/2 gain pt. (H)	80°(±40°)	70°(±35°)	46°
(V)			16°
1/5 gain pt. (H)	135°(±67.5°)	90°(±45°)	84°
(V)			30°
Reflectance	0.4%	0.4%	4.8%

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