

Stewart Screen Science for System Designers.

How To Use the Projection System Calculator

Description: The projection system calculator will help you select the proper screen material, the correct projector lumen output and the proper projector focal length to meet your project applications. This calculator will also configure theoretical ANSI checkerboard contrast ratios utilizing difference screen materials for any ambient room light scenarios.

Explanation of units of measurement used in this calculator.

Foot Lambert units are used to measure screen image brightness. To give you a mental benchmark for foot lambert brightness, a quality movie theater will have a screen brightness of 12 to 16 ft. lamberts in a darkened room. A new fresh plasma will have an output of approximately 40 to 45 foot lamberts and is normally viewed with some room lights present.

Lumens are used to measure a projector's peak light output. When screen size is increased, screen gain is reduced, and/or ambient light is present, then projector lumens must be increased to maintain a pleasing screen image.

Foot Candle units are employed to measure the amount of ambient light falling directly on a particular area. This projection system calculator configures ambient light on the screen wall and also ambient light directly over the viewing area. Under most room lighting designs, there will be considerably less ambient light on the screen wall than directly over viewing area. It is important to configure the ambient light that is entering the viewers eye point. Bright lighting over conference tables and work stations reduce the human eye's iris opening which in turn allows less screen light to get to the brain. This calculator will configure the ambient light over viewing area and will alert you when a higher lumen projector is required.

ANSI Contrast Ratio measures the dynamic range between the peak image brightness and the deepest black level that can be measured on an ANSI back and white checkerboard test pattern. This measurement takes into account the totality of projector output, screen brightness, screen gain and room ambient light reflecting off the screen surface back to the viewer. The ANSI contrast ratio is the single most important number when analyzing a proposed projection system as it is a summary of the performance of the screen image quality. Note: ANSI contrast ratio is not to be confused with projector on-off contrast ratios which are typical stated as 1000 to 1 up to 30000 to 1.

Ansi Contrast Ratio Bench Marks:

Conference Rooms, Board Rooms, Training Rooms: 8-20 to 1, Power Point, Spread Sheets, Some Video.

Worship: 18-40- to 1, Song Text, IMAG, Slide Shows, HD, Video.

Media & Entertainment: 15-60 to 1. Video, HD, Web, Gaming

Entertainment: 50-150 to 1. Video, HD, Moderate to Quality Theater Image.

THX Theater: 150 to 1 or higher. Truly Cinematic Quality, Studio Review Rooms, Flagship Commercial Theaters.

Using Stewart Projection System Calculator for Existing Rooms with Stewart Foot Candle Light Meter. To measure ambient light on the screen wall, place the photo sensor disk flat against the wall. Make sure that your body is not blocking the ambient light and casting any shadows on the sensor. Note the Foot Candle measurement. The next measurement is to record the ambient light over the viewing area. Place the photo sensor disk in the up position towards the overhead lightning. Note the Foot candle measurement so that it can be entered into the calculator.

Using Stewart Projection System Calculator for Rooms that Have Not Been Constructed.

When designing an AV system for a room where you can not take actual ambient light readings you can employ this calculator to determine and specify the maximum Foot Candles of light on the screen wall and in the viewing area when the media is in use. This specification can be communicated the lighting designer, architect, and/or users.

Stewart Projection System Calculator

Foot Lambert & Contrast Ratio Calculations
For all Rear Projection Efficiency Screens



Image Width (inches): **120**

Ambient Light Foot Candles On Screen Surface: **3**

ANSI Lumens: **3000**

Projector Throw Distance (inches): **115**

Ambient Light Foot Candles Directly Over Viewing Area: **30**

Glossary:

- FL: Theoretical Peak Brightness
- CR: Theoretical ANSI Checkerboard Contrast Ratio
- RV: Ambient Light Reflectance Percentage Value
- HDVA: Half Gain Viewing Angle
- MIN. TD: Minimum Throw Distance For White Field Uniformity
- LAMB: Lambertian Surface - Never Exceeds Half Gain

	MATERIAL	Maximum Size Available	Ambient Light Resistance	Edge Blending Properties	Passive 3-D use	GAIN	HDVA	RV	MIN. TD	4:3 Aspect Ratio			16:9 Aspect Ratio			Projector Lens Compatibility
										FL	CR		FL	CR		
GLASS	Aeroglas 70	10.88' x 30'	Poor	Excellent	Poor	0.7	78° plus	0.25	88.4	27.9	26.8	Need brighter projector	37.4	35.6		YES
	Aeroglas 100	10.88' x 30'	Fair	Good	Poor	1.0	60° plus	0.29	120.0	38.9	45.9		53.4	61.4		NO
	Techscreen 100	10.88' x 30'	Good	Poor to Fair	Fair	1.0	30°	0.15	158.0	30.9	88.7		53.4	118.7		NO
	Techscreen 150	10.88' x 30'	Excellent	Poor	Excellent	1.5	31°	0.11	180.0	50.9	181.4		80.1	242.7		NO
	StarGlas 80	10.5' x 17'	Excellent	Poor to Fair	Excellent	0.65	47°	0.055	96.0	25.9	157.2	Need brighter projector	34.7	210.4		YES
	StarGlas 100	10.5' x 17'	Fair	Good	Poor	1.0	53°	0.27	120.0	30.9	40.3		53.4	65.9		NO
ACRYLIC	Aeroplex 70	8' x 23'	Poor	Excellent	Poor	0.7	78° plus	0.25	88.4	27.9	26.8	Need brighter projector	37.4	35.6		YES
	Aeroplex 100	8' x 23'	Fair	Good	Poor	1.0	60° plus	0.29	120.0	38.9	45.9		53.4	61.4		NO
	Graphix 70	8' x 23'	Good	Fair to Good	Poor	0.7	60°	0.11	86.0	27.9	84.6	Need brighter projector	37.4	113.3		YES
	Graphix 100	8' x 23'	Good to Excellent	Poor to Fair	Poor	1.0	43°	0.10	132.0	38.9	133.0		53.4	176.0		NO
	Techplex 100	8' x 23'	Good	Poor to Fair	Fair	1.0	38°	0.15	158.0	38.9	88.7		53.4	118.7		NO
	Techplex 150	8' x 23'	Excellent	Poor	Excellent	1.5	31°	0.11	180.0	50.9	181.4		80.1	242.7		NO

*Specifications are subject to change without notice

Image Height	4x3 ft:	90	16x9 ft:	67.24
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