How to use the Projection Planner 2.0

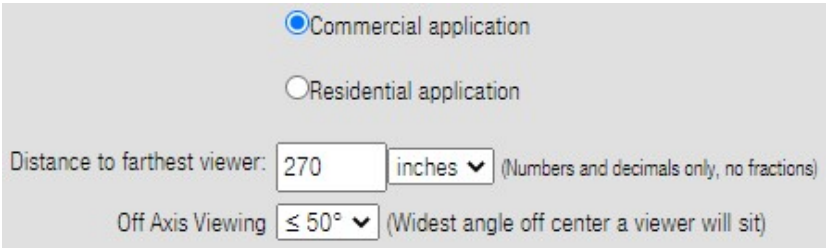
V20.06.3

The Draper Projection Planner 2.0 is a tool for designers to calculate the system brightness in ft lamberts and system contrast of a projection system factoring in the ambient light in the room. This helps to calculate how good an image could look for that specific application for each of the available Draper screen surfaces.

Glossary of terms at end of document.

Seating Information:

This section will give seating information that are important in calculating proper image size and selecting a surface that will best support the off axis angles of the viewers.



Application

Select the application to be for either Commercial or Residential.
The commercial market bases proper image size on the farthest viewer. The residential market typically bases image size on the main viewer. Some high-end home theaters designers may use some design practices based on the theater design, but that is not a market that Draper focuses much on so we will not go there.

Distance to the farthest viewer/main viewer

If you already know what size screen you need you can bypass this entry and enter the image size in the next section.
If the application is commercial, enter the distance to the farthest viewer for the calculator to determine a proper image size in the next section.
If the application is residential, enter the distance to the main viewer for the calculator to determine a proper image size in the next section.

Off Axis Viewing

Enter a value that represents the widest angle from center perpendicular that a viewer would sit. This is important if you are interested in using a screen surface with a high gain or is ambient light rejecting (ALR). These surfaces have higher reflectivity that can come at a cost to off axis viewing performance. Entering this info will help to narrow down which screen surfaces will work best for the seating configuration in your application.

Image Information:

This section is to determine image size. Using information based on viewer distance in the last section, it can calculate a recommended image size. If you already know what image size you want, you can skip to the Aspect Ratio and Image Size entry.
If 'Commercial' was selected in the last section, the calculator will make image size calculations based on the AVIXA DISCAS standard which is a standard used for proper image size in the commercial market. If you are not familiar with this standard you should get a copy of the standard and refer to the information in it.
If 'Residential' was selected in the last section, the calculator will make image size calculations based on a ratio commonly used in the residential market for HD content.

Commercial Application
DISCAS Viewing Category

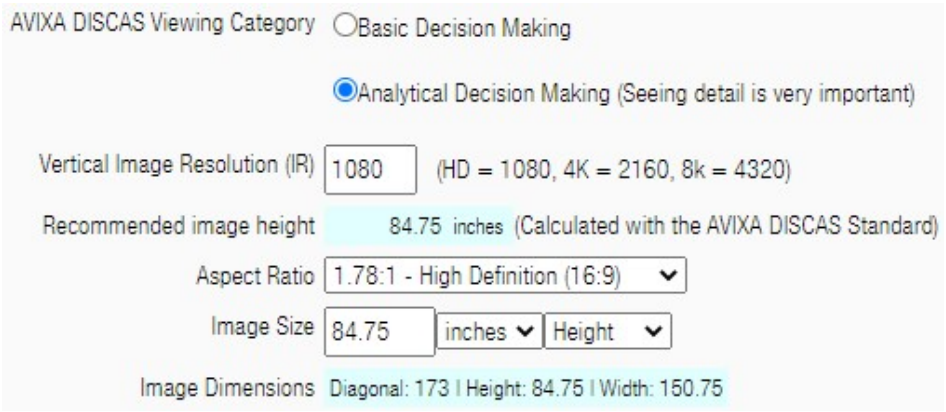
Select the AVIXA DISCAS viewing category that matches your application. There are two categories in this standard. Basic Decision Making (BDM) describes most mixed-use applications where most of the time the system will be used for a mix of presentation, video and some basic document viewing. Analytical Decision Making describes fewer applications that are more critical viewing of medical imagery, architectural drawings, financial date, etc… Refer to the AVIXA PISCR standard documents for more information.

Basic Decision Making

%EH

% Element Height complicates calculating for this viewing category. It represents the % of the overall image that elements in the content are. That is dependent on the content. It could be fonts, objects, characters, etc… Many of us may not fully know the use of the system years prior to construction. You should refer to the DISCAS standard documents. For general use with resolutions of 1080p or WUXGA, we recommend a value between 2%-2.5%. The recommended image height will be highlighted in the first blue box.

Analytical Decision Making

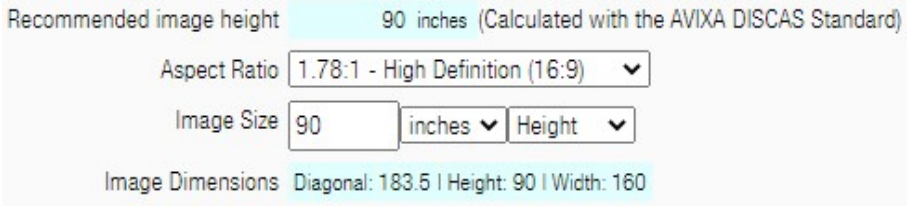


Vertical Image Resolution

Enter the vertical image resolution of the content. The recommended image height will be highlighted in the first blue box.

Residential Application

As mentioned earlier, if you entered the distance to the main viewer properly, the calculator will make image size calculations based on a ratio commonly used in the residential market for HD content. The recommended image height will be highlighted in the first blue box.



Aspect Ratio

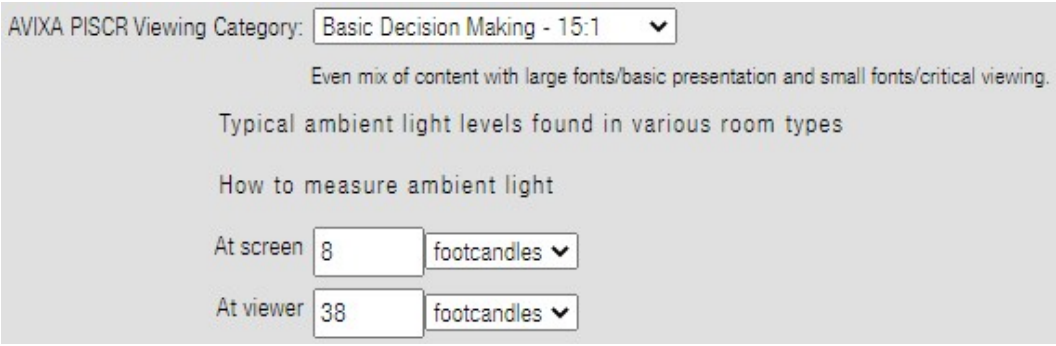
Select the aspect ratio of the image you would like, the calculator will now calculate out the other image dimensions in the second blue box to the nearest ¼". Its typically best to match the aspect ratio of the

screen to the native aspect ratio of the projector, this way the scaling processor of the projector will always try to fill the screen properly with its default settings. The drop down has all the current aspect ratios supported by projectors.

Image Dimensions
If you want to enter a different image size from what was recommended or enter a different dimension (width or diagonal) you can do that and the calculator will display all other dimensions in the second blue box to the nearest ¼". You can enter height, width or diagonal in inches, feet or centimeters.

Ambient Light:

This is the most important section in the calculator. The calculator cannot calculate for proper system brightness or system contrast if you do not enter proper values of light for the space.



PISCR Viewing Category
Select the AVIXA PISCR viewing category that matches your application. There are four categories in this standard. As mentioned earlier, Basic Decision Making (BDM) – 15:1 describes most mixed-use applications we run into most of the time where the system will be used for a mix of presentation, video and some basic document viewing. The PISCR standard states a minimum value for system contrast ratio required to properly view the four viewing categories listed. Refer to the AVIXA PISCR standard documents for more information.

Typical ambient light levels found in various room types
This is a link that will bring up a chart into view that will list typical light levels in many of the applications we run into. This is helpful information if the space does not exist yet and you can still take some values from the chart and use as a 'best guess' and see what your potential system brightness and system contrast could be for the space using the various screen surfaces Draper offers. The chart will give a range of light in foot candles. Its recommended to enter a higher number in the range of a given application to give some room for error. If you click on the link again the chart will be hidden.

How to measure ambient light
This is a link that will bring up information on how to measure light at the screen and at the viewer using an incident light meter. The link above is helpful if the space doesn't exist, but if you can actually measure light in a space that is existing, that is better than guessing.

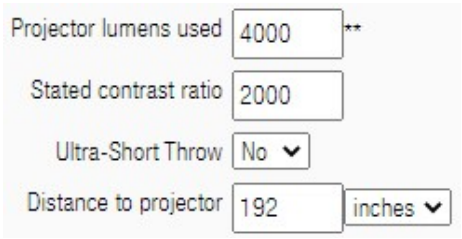
At Screen (light)
Enter the amount of ambient light at the screen surface. The amount of light on the screen surface will affect the system contrast ratio (image black). If there is more than 5fc of light hitting the screen surface it will be difficult to get BDM 15:1 system contrast ratio or higher with a matte white screen you should consider an ALR screen surface. If you notice a white surface getting decent system contrast ratio numbers, its probably because the system brightness is too high. At some point a white surface will start to bloom the white over into adjacent black areas and hurt detail as well as wash out saturated colors. We don't cap foot lamberts (FL) because some may want to run a projector in 'eco mode'. Lighting control is important! And always make sure shades are used at windows during projection use.

At Viewer (light)
Enter the amount of ambient light at the viewer. The amount of light getting into the viewers eyes will determine how much projection system brightness will be required to exceed by a healthy margin the ambient light getting into their eyes. The more light at the viewers eyes, the more projector lumens and/or screen surface gain will be required for a given screen size. And it is always better to use more projector

lumens than screen gain because higher gain will affect off axis viewing performance and brightness uniformity. And projection lumens can add a lot to system budget. Lighting control is important! And always make sure shades are used at windows during projection use.

Projector Information:

This section is to take all projector information into account in the system design.



Projector Lumens
Enter the amount of projector lumens which will be the biggest factor in how bright the projection system will be (ft lamberts). The calculator will actually use 80% of stated lumens in calculations to better represent light output over time or with optional optics (lenses). Also, if you use a 16:10 projector with a 16:9 screen you need to deduct 10% of lumens before you enter the amount since the projector will not be filling the panel/s entirely. The same goes for using a 16:9 projector for a 16:10 screen. If a manufacturer gives multiple types of lumen specs, use the lower value which is most cases is ANSI lumens to minimize margin of error.

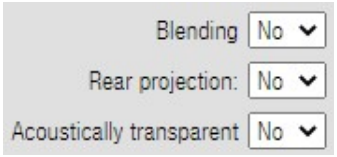
Stated Contrast Ratio
Enter the stated contrast ratio of the projector. This is the 'device contrast ratio' in a perfect environment what its black levels are capable of. This value could have a noticeable impact on system contrast ratio in a dark environment. If there is more than a few ft candles of light on the screen surface this value will have very little or no impact.

Ultra-Short Throw
Enter yes or no if a UST projector will be used in the system. If yes, the calculator will only display surfaces that are highly diffusive in the results chart for minimal hot spotting. There will always be some degree of hot spotting when UST projectors are used, that is one of the down sides of having to use these projectors. For more information on why hot spotting occurs contact your Draper rep.

Distance to projector
Enter the throw distance from the screen surface to the projector lens. The calculator will factor this info into its calculations and let you know if any surfaces will result in a hot spotting condition. If you do not enter a proper value, the calculator cannot inform you of a hot spotting condition.

Applications:

This section is to help narrow the search for a proper screen surface by entering any info that are for more special applications.



Blending
Enter yes or no if blending will be used in the system. If yes, the calculator will only display full diffusor (matte) surfaces in the results chart for best diffusion of light out to all angles in the viewing area so that the blend zones will not be seen standing off axis. ALR or gained screen surfaces should not be used for blending as they are not full diffusors.

Rear Projection
Enter yes or no if rear projection will be used in the system. If yes, the calculator will only display vinyl rear projection surfaces. We do not display rigid glass, acrylic or semi-rigid acrylic (VersaRoll) because these products are custom. Please contact your rep to discuss the use of these. Also, the selection of RP surface is very dependent on the throw distance ratio/lens ratio. For short throw distance ratios, low gain diffusive

white surfaces must be used so that there will be no hot spotting. Positive gained high contrast grey surfaces cannot be used with short throw distance ratios because they are too transmissive and will cause noticeable hot spotting.

Acoustically Transparent
Enter yes or no if acoustically transparent surfaces will be needed. If yes, the calculator will only display acoustically transparent surfaces. These surfaces are limited in image height and could also cause a 'moire effect' in the image due to the structure in the perforation or weave interfering with the pixel structure in the projected image. Please contact your rep to discuss the use of these.

Display the selected surface families:

This section lets you only display specific screen surface families. This can keep list size down if you typically stick to a certain surface family like the Draper premium TecVision line that has the largest selection of tensioned surfaces to address most front projection applications.

- [x] TecVision® (engineered surfaces)
- [x] OptiFlex (tensioned)
- [x] OptiView (free hanging)
- [x] CineFlex (rear projection)
- [x] ClearSound (acoustically transparent)

Calculate

Click on calculate and the calculator will run for a few seconds, access a database and then display results.

Calculate

Results

Results in green are surfaces that meet the criteria you entered.
Results in red are surfaces that did not meet the criteria you entered.
Yellow cells indicate a problem.

Recommended								Not Recommended
Surface Name	**Gain**	**Recommended Off Axis Viewing**	**Room/Projector**	**Min. Throw Distance**	**fL**	**CR**	**Notes**	**Products Available**
TecVision (engineered surfaces) Family								
TecVision XH700X Grey	0.7	90°	Darker room or brighter projector. Min projector lumens: 3857	24	59.9	14		18
TecVision XH800X UST ALR	0.8	65°	Good	24	68.4	20		18
TecVision XH900X ALR	0.9	65°	Good	115	77	24		18
TecVision MS1000X ALR	1	50°	Good	134	85.6	39		18
TecVision CS1000X ALR	1	35°	Good	154	85.6	58	Beyond off axis viewing	18
TecVision CS1200X ALR	1.2	33°	Good	163	102.7	69	Beyond off axis viewing	18
TecVision XT1000X White	1.02	90°	Good	24	87.3	12		18
TecVision XT1100X White	1.1	90°	Good	86	94.1	13		18
TecVision XT1300X White	1.3	90°	Good	106	111.2	16		18
TecVision XT1600X White	1.6	90°	Good	134	136.9	19		18

Cells highlighted Yellow:

Room/Projector: indicates the space should be darker or more lumens are needed with the minimum amount needed displayed.

Min Throw Distance: indicates a hot spotting condition. Throw distance needs to be increased.

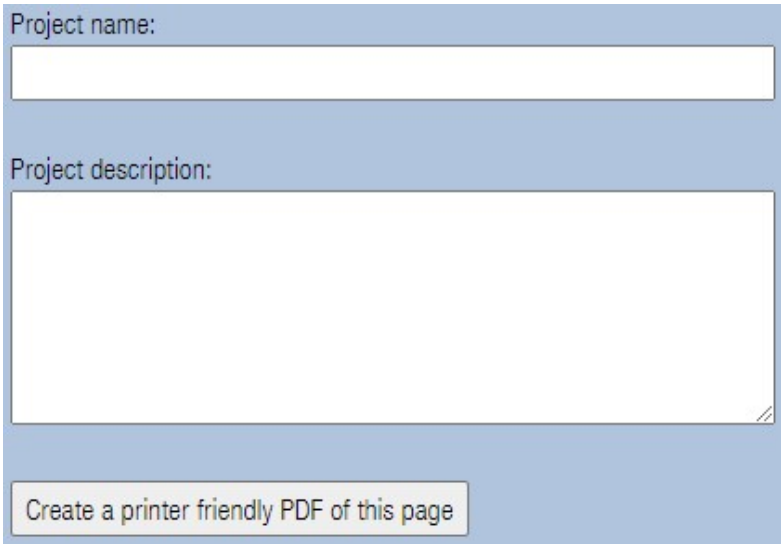
CR: indicates system contrast ratio does not meet or exceed what was entered for a PISCR viewing category.

Notes:
- **Beyond off axis viewing:** criteria entered is beyond the surface off axis viewing performance.
- **Not recommended for blending:** only full diffusor/matte surfaces can be used for blending.
- **Not recommended for rear projection:** only RP surfaces can be used for rear projection.
- **Not recommended for acoustically transparence:** only AT surfaces can be used for acoustic transparence.

In the example above, there are ALR surfaces highlighted in green as well as gained white surfaces. The gained white surfaces are hitting system contrast artificially by having high amounts of system brightness. These levels are too high. The blacks are no better than matte white in this scenario, the gain is making the whites more intense and at some point the white light will bloom over into adjacent black information hurting edge detail as well as wash out colors so that they are not as saturated. We do not put a cap on projector lumens or system brightness because there may be a scenario where a designer wants to put a projector into 'Eco Mode' or some other light source saving mode and we don't want to limit this. For white surfaces there is such thing as 'too bright', and because these surfaces are full diffusors it can hurt the quality of the image. Use 'enough lumens', but for white surfaces don't use too much.

Project Name / Project Description:

You can type a project name and information like projector info, if shades are planned, etc...
Clicking on 'Create a printer friendly PDF of this page' will allow you to create a PDF file of all the info and save it to drive location.



Glossary of Terms

Lumens: unit of measurement used to represent the light output of a projector.

Foot Lambert (fL): unit of measurement used to represent projection system brightness. The amount of ft lamberts needed in a projection system is dependent on the amount of ambient light in the viewer's eyes, projector lumens, image size, screen gain and screen tint.

System Brightness: the brightness of the entire projection system measured in foot lamberts (fL).

Foot Candle: unit of measurement used to represent the amount of ambient light falling on a surface. Can be measured using an incident light meter.

System Contrast Ratio: Contrast expressed as the function of the combination of a projector, screen surface, and ambient light falling on the screen surface.

%EH: Height of an element in relation to the overall image height (refer to AVIXA DISCAS Standard)

If you need any further help or information, please contact your Draper sales representative. You can find contact information on our website at: **https://www.draperinc.com/contactus**