

PRODUCT REPORT

GLASS + GRAPHIC IMAGING

Pulp Glass Imaging™
SentryGlas® Expressions™
A DuPont™ technology

by





Welcome to Pulp Studio

As a pioneer of the decorative glass industry Pulp Studio has been committed to the use and manufacturing of specialty glass products since 1996. During our history Pulp Studio has been producing architectural glass products that include graphic imaging under the brand name Pulp Glass Imaging™ (PGI). As imaging on glass has become more popular Pulp Studio recognized that the newest technology in the industry, SentryGlas® Expressions™ by Dupont (SGX), was the most advanced process available in today's developing market. It seemed only natural that two leaders of the industry would join forces to offer SentryGlas® Expressions™. Pulp Studio is honored to partner with Dupont to bring you both the Expressions™ technology along with Pulp Glass Imaging™.

To better understand the process and use of glass with graphic interlayers it is important to first answer some basic questions about the installation you are considering. There are three different glass technologies that Pulp Studio can offer you with graphic imaging. Which one is best suited for your project is defined by the variables and requirements of each individual project.

Each of these technologies has its pros and cons, and the process of selecting which technology will best suit your project will evolve as we begin to answer some questions. Pulp Studio's goal is to offer the designer and installer a complete glass product ready for installation with a minimum of frustration. By answering some common questions about these graphic technologies we hope that this booklet will help to achieve a more complete understanding of the details that are included in the design and manufacturing process.

We look forward to hearing from you to discuss your next project.



Bernard Lax
Chief Executive Officer

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General Questions

Which of the three different technologies is best suited for my application?

The three different techniques available for graphic imaging are:

1. SentryGlas® Expressions™ (SGX)
2. Pulp Glass Imaging™ (PGI)
3. Flatbed Digital Printing and Ceramic Decorated Glass also known as ceramic-frit.

For the purpose of this discussion, we are not going to concentrate on ceramic frit. Ceramic products utilize screen-printing that makes the process of multiple colors and non-repeating designs a very expensive technology for multiple color imaging. It is best used on projects that are one or two color designs with repeating images. Ceramics can be very cost effective for larger projects, but tend to be rather costly for smaller jobs, or projects that include multiple color imaging. Ceramic colors are also limited to very specific shades and do not offer the range of colors that can be generated through digital imaging. Both products, SGX and PGI, are similar in that they both use digitally generated interlayers that are then laminated between two pieces of glass to build a composite glass panel.

SentryGlas® Expressions™, also referred to as SGX, is a patented Dupont technology that is produced under license to Pulp Studio Inc. The technology utilizes graphic images printed directly onto a PVB substrate with an ink system that was developed exclusively for SGX. One of the major benefits of this system is its ability to remain sustainable in direct sunlight and eliminate the concerns of short-term fading. Although it can be used for both for interior and exterior installations, it does have the advantage of exterior sustainability over other products in the marketplace. Two other attributes of SGX images are that they can be printed in white and there is a maximum printable width available of 96”.

Pulp Glass Imaging™, also referred to as PGI uses a true photographic process to create the substrate used in a laminated glass product. This process is only available for interior projects as the colors in the photographic film are subject to fading when installed in direct sunlight or in exterior applications. Despite this one negative component, PGI is best utilized when the graphic design demands photographic quality.

Flatbed Digital Printing generally utilizes UV curable inks and should not be mistaken for inks that are sustainable to exposure for long periods to Ultraviolet Rays, such as on exterior installations on architectural projects. These systems generally print directly onto the glass and are a good option for short-term applications, such as interior signage or tabletops. They generally do not perform well relative to the minimum adhesion requirements for a laminated glass when the image is placed inside a laminated glass composite, or as an ink system where sustainability is required. Pulp Studio only recommends this system on specific applications where long-term use is not required. This option will not be discussed as part of this document.



Right:
World War II Memorial,
Minnesota State Capitol
Mall, St. Paul, MN

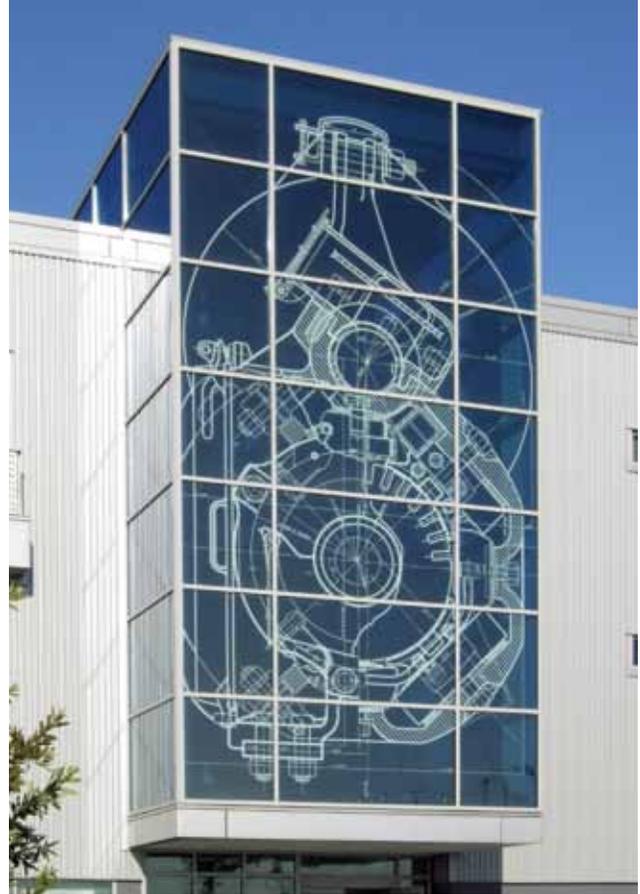
What types of images can be created?

The image is up to you and your creativity. There are some limitations that certain images may present, but between the two systems there is almost no image that cannot be developed. Which process we use will ultimately depend on where it is being installed, how it is being installed and the quality of image required for the particular installation. Full color, halftone or single color (including white) can all be achieved.

Are the images always transparent when they are printed?

Although the two different images both start by being printed on transparent substrates, the image on the two different processes yield different results. SGX inks are not completely transparent, they are actually semi-transparent. PGI imaging is a photographic process and yields truly transparent results even in the colored areas.

One thing that is important to note is that true photographic film can have a minor haze level to it in large clear transparent areas. If your image has large clear sections, it may be better to use SGX. This is something we can usually determine when we first see your design.



Will the hue in clear glass affect the colors in the image?

Yes it will. All clear float glass has a green hue as part of the body of the glass. This green hue becomes more concentrated and deeper as the glass being used gets thicker. The hue can significantly affect lighter shades and turn them into completely different and unacceptable colors.

To minimize the effect of the green hue we recommend using low-iron in place of clear glass. Low iron glass with trade names such as Starphire, Optiwhite, Crystal Clear and Diamante are float glass products that are made specifically to remove the green hue from the glass when viewing it from the face. Although these products greatly enhance the color accuracy of what you see in the final product, they are not always necessary.

Which glass will best suit your project can be discussed after our staff reviews the details of your project.

Left:
Burger Bar,
Natick, MA

Above:
Metro East Light Rail
Vehicle Maintenance and
Operations Facility,
San Francisco, CA

Are the colors in the final image always vivid in the final installation?

No they are not. It is always important to remember that how you see the color in the glass is affected greatly on what your eyes see and not what is actually printed.

How you see images has a great deal to do with transmitted and reflected light. When a dark image is on a transparent background the image will absorb the light and allow your eyes to focus behind the image, thus making it more difficult to see. If the image is created with lighter colors the image will reflect light and make the image more visible.

A good example of this is how you see through a household window screen from the inside of a house looking out. The screening is dark and your eyes will focus on the light behind the screening, thus allowing you to see right through it. If the screening was white your eyes will focus on the reflected light and the screening will be more visible and more difficult to see through.

Depending on where your installation is located, the direction of both transmitted and reflective light can have an effect on how your eyes will see the color. It may be that you will not see the full density of the color and the image will look washed out.

How can I improve the color density and viewing of the image in the glass?

The first step is to ask yourself some questions.

1. Am I going to be looking at the glass from both sides?
2. If I am looking at the glass from both sides, is it imperative that the image appear exactly the same from both sides?
3. Is my image going to be used with backlighting?
4. Is it necessary that the glass be completely transparent?
5. If the glass is used on a building exterior, will it be necessary for people inside the building to see through the glass to the outside?
6. If the glass is being used on a building exterior, will the glass be combined into an insulated unit?

Answering these questions will assist us in determining how we can develop different backgrounds for your glass.

Below:
Riverbank High School,
Riverbank, CA



How does a background improve the image quality?

To better understand the issue of backgrounds you must apply the basic principles of transmitted versus reflected light. This can be a complicated topic, but the basic principle is that your eyes have a tendency to see images more vividly when they reflect light. Images that have transmitted light shining through them are diluted by the transmitted light and therefore less vivid to the eye.

If we determine that the application can utilize a background, then we can experiment with a variety of materials to improve how the image and the color saturation can be enhanced. We refer to this as "reducing the light transmission through the glass". Reducing light transmission can be achieved by using a variety of diffusing options within the glass composite. In both products, PGI and SGX, we can offer options of diffusion that establish backgrounds for the images at levels of 80%, 65%, 50%, 35%, 12%, as well as utilizing backpainted glass for an opaque condition. We can also create backgrounds through the use of specialty treated glass, such as acid-etched or patterned.

An important element to note is that when using backgrounds behind the image, the image will appear different from both sides of the glass. The selection and use of a background interlayer will affect how you see the image from the opposite side.

What are some examples of how images in specific applications are affected by light transmission?

Example # 1. The choice of SGX as a curtain wall product using a transparent background.

Even though the image is printed on a completely clear substrate this doesn't always mean that a diffusion layer is required for the image to show. During daylight hours a building generally becomes a reflective surface, and our eyes do not see past the glass of the buildings' façades. It is generally difficult to see inside the building. The first element to be considered is if the inks are dark or light colors. It may be that the lighter colors reflect sunlight and allow them to be more visible during the day, whereas dark colors used in the same application may absorb light and not be as visible.

Example # 2. Using either SGX or PGI as a conference room wall.

If there is significant lighting in the conference room, viewing the image from the opposite side of the wall may not appear as vivid as it can be because your eye will concentrate on the light behind the wall. Applying an acid-etch glass or translucent background interlayer will cut down on the transmitted light and allow the image to appear more vibrant to the eye.





What are the size limitations of the different materials?

There are many variables that dictate the maximum size of both PGI and SGX. Due to the different types of products we manufacture, it is difficult for us to establish a standard dimension or sheet size. Sizes of the final glass product are affected by many different variables, however within the variety of materials we use, we have established guidelines for the maximum size of any individual panel for each process.

SentryGlas® Expressions™ 96" x 180"
Pulp Glass Imaging™ 48" x 120"

We ask that you always confirm the maximum size parameter for the process you have selected to use. The overall size can be affected by the maximum size of the substrate, the glass being used, the processing equipment and sometimes where and how it is being installed. Please note that with specialty glass there are always elements of the product that may or may not be acceptable for your installation requirements. We ask that you always call us to clarify your use to see if there are elements that need to be considered prior to issuing a specification.

What about glass thickness?

We can make both PGI and SGX in any glass thickness required from a minimum of 5/16" to multi-layer panels up to 4" in thickness.

Opposite page:
Avalon Hotel,
New York, NY

Above:
Wolfgang Puck American
Grille, Bogata Hotel,
Atlantic City, NJ

How long will SGX and PGI last?

In interior installations, both processes can last indefinitely, although there is no specific testing data for indoor installations. There are PGI installations that have been existing for over 12 years with no significant fading. The only product for use in an exterior installation is SGX. Tests on SGX show excellent printed image light fastness. Light fastness is a term used in the print industry to describe image resistance to fading. The main factors that contribute to fading are light, humidity and pollutants such as ozone or smoke. SentryGlas® Expressions™ printed interlayers are laminated to glass which protects the embedded image from pollutants and humidity. The proprietary interlayer also blocks the transmission of UV rays that can contribute to fading.

Can SentryGlas® Expressions™ be combined into an insulated glass unit?

Yes it can, but there are some things to consider. Most insulated units are generally built with some form of specialty glass (i.e. Low-E) to enhance the solar performance. Many of these types of glass can have a tint or severe reflectivity. When specifying a Low-E glass it is important to understand how the placement of the Low-E glass within the insulated unit will affect the viewing of the image. For instance, if a highly reflective Low-E glass is used with the coating on the second surface of the insulated unit, the reflective coating may make it difficult during the day to see the image. This occurrence can be improved by selecting a Low-E glass with less reflective qualities. If the Low-E is moved to surface # 3, then the concern might be how much more heat will build up in the insulated unit. These are questions to consider when consulting your glazing experts.

What are the benefits of one over the other?

	SGX	PGI
Greater than 48" wide	•	–
Greater than 120" tall	•	–
Exposure to Ultra Violet Light	•	–
White printing	•	–
High Color Density	– a	•
		–
Wall Partitioning	•	•
Door Lites	• b	• c, d
Tabletops	•	•
Office Dividers	•	•
Store Fronts	• e	–
Curtain Walls	• e	• interiors only
Signage	•	• interiors only
Furniture	•	•
Handrails	•	–
Skylights	• e	–
Windows	• e	•
Light Fixtures	•	•
Wall Panels	•	•
Elevator Cab Paneling	•	•
Floors	•	•
Stairs	•	•

Notes:

- a. SGX color density is limited by the CMYK color space
- b. Can be done in both framed and frameless applications
- c. Pulp Studio advises against frameless doors with patch fittings.
- d. Top and bottom rail doors are completely adequate for this configuration.
- e. Due to the typically high exposure to ultraviolet light in these applications SentryGlas® Expressions™ is the only recommended option

How does frameless structural glazing in curtain walls affect the use of SentryGlas® Expressions™?

As with most frameless systems the glass is attached to the metal substructure with structural adhesives. These adhesives are available in a variety of colors. When the glass is actually affixed to the structure the adhesive flattens out and creates what may appear to be a complete colored border on the attached sides of the glass. This colored border can appear to be up to 2" wide. On this type of installation the image is carried all the way to the edge of the glass. This means that part of the image will have an opaque background, which is the color of the adhesive. This can cause the image to not be visible or highly visible, depending on the adhesive color used in those areas along the edges of the panel of glass.

Can SGX and PGI be made with tempered glass?

Yes it can, although not all glass necessarily needs to be tempered when it is laminated. There are both code and performance reasons why we temper and laminate a piece of glass. In many instances just laminating the glass may be all that is needed. There are some applications where we do not temper and laminate PGI. We will make top and bottom rail doors with PGI, but we do not recommend the use of patch fittings with this technology. Consult your glazing expert or salesperson for assistance with this.

Can I use spider arms and point fittings with both processes?

Yes, however we do have some limitation with PGI in certain applications. Our graphics specialist will review your system to determine if PGI can or cannot be used. SGX can always be used with point fitting connections.

Do SGX and PGI have any limitations regarding fabrication?

Both glass image products can be fabricated as other laminated glass that we produce.



Above:
Private residence

The Process

If I am interested in using glass with graphic imaging, how does the process start?

It begins with your drawings and determining the system you intend to use to support the glass. Knowing the details of the framing system will dictate the process we use and help us make decisions along the way.

Once we have selected a process we can then begin discussing the type of image you intend to use and this will help us decide on whether background layers are necessary.

What do I need to know about the image files that need to be created?

Most people do not realize is the amount of data which is required to create large graphic files with high quality resolution. Many designers find images that are low-resolution images from a variety of sources and utilize these images for cutting and pasting into plans, etc. What they do not realize is that these images are not adequate for enlarging to the final size required. In fact, most designers do not realize that their computers are not adequate to manage the data within these huge files. The creation of the image files are a step by step process and the designer should never assume that the graphic file they are working with in the design development will be adequate for the final project.

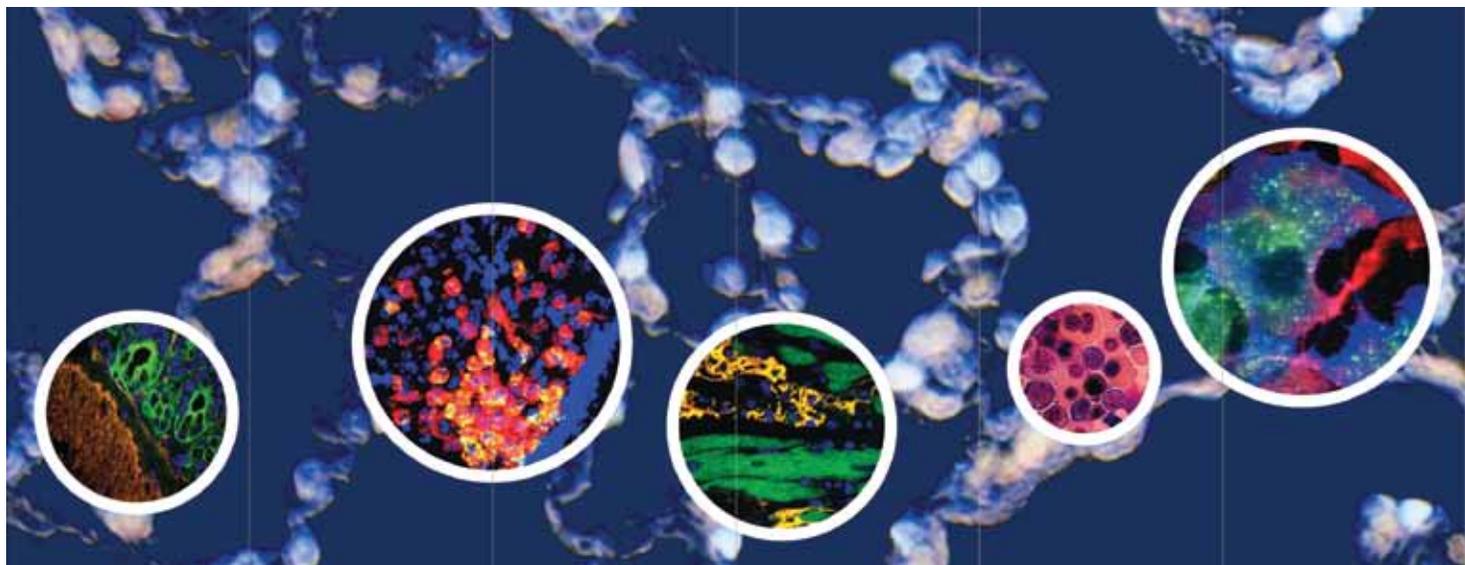
If you are not able to work with large format files there are tricks we can share with you which will allow you to work on your own until you are ready to turn the artwork over to us. If for any reason you are unable to develop the artwork on your own, Pulp Studio offers a full service art studio called ARTWERKS, which will assist you in your project development. All services are billed on an hourly basis and you can contact your salesperson for information on how to get in contact with the proper associate at ARTWERKS.

What is the difference between a single image and a tiled design?

A single image is a design that may be an individual piece of glass or a repeating image design where the same image appears on multiple pieces of glass in the same continuous installation.

Tiled designs are large images that have non-repeating artwork, which continue across multiple pieces of glass and are intended to be seen as one large super graphic.

**Below:
University of Washington
Medical Center,
Seattle, WA**



What happens after the original design concept is developed?

Ultimately either our studio or the designer must create individual READY-TO-PRINT files for the project. These files are the full size graphic files used to print the interlayer. Each file will represent a single piece of glass.

A READY-TO-PRINT file cannot be prepared until the designer or ARTWERKS receives approved shop drawings or field measurements from the installer. Along with the glass sizes, we also require the framing details or size of any glazing joints for butt-seamed installations. All of these details are necessary in order to prepare READY-TO-PRINT files.

Why are the frame details and glazing joints an important factor in the preparation of ready-to-print files?

When glass goes into a frame the actual glass size is not always the same as the daylight, or visible size. In order to maintain transition alignment from one panel to another, the preparer of the files may need to strip out sections of the overall artwork to insure the image flows correctly from one panel to the next. In order to do this the artist must have all the details and measurements of the framing systems or glazing joint allowance to insure the proper amount of graphic is removed. This applies primarily to tiled graphic designs, however, there may be cases where the glass bite of the frame on a repeating image is important to know so that the image is prepared in such a way that the image is properly centered in the visible part of the glass.

What are the technical requirements for the graphics/artwork?

The acceptable resolution of an image file has a great deal to do with the type of image being developed. Large graphic images can sometimes be very effective at resolutions below 150dpi, while photographic quality images made need to be closer to 300 dpi until we are able to see the image you intend to use there is no specific answer to this question.

For high-quality printing, raster image files generally should be 200-300 dpi at final production size or full size. It is best to provide a file at as high a resolution as practical with minimal compression.

What most people find is that the file management of these large files becomes overwhelming. It is always best to work with your files in smaller scales and then enlarge them at the last step. A trick to see the resolution of your ongoing work, without enlarging the whole file, is to just grab a small window of one of the images, and then enlarge it to a 24" x 24" image at full size. This will generally give you an idea of the dpi quality for your final output, however to insure you get the correct product the first time we suggest you retain ARTWERKS to prepare your proofs.

What kind of the final proof will be provided to me?

Pulp Studio provides working drawings with the artwork for approval prior to manufacturing. The installer or designer is required to provide the following when ordering:

1. Shop drawings in AutoCAD
2. Artwork files (on disk or uploaded to our FTP site)
3. List of glass sizes with installation mark numbers

What is the best way to light a graphic glass wall?

Lighting graphic walls is more elusive than most people realize. If you are considering lighting a large area we recommend you consult with Pulp Studio and your lighting designer.

Who prepares the final artwork and files?

There are two options. The first option is that the design firm for the project prepares all of the artwork files. In this case they will need to understand the steps to properly manage the artwork in order to create an image capable of being enlarged to its final size, and ultimately capable of providing READY-TO-PRINT files to Pulp Studio for the final output. READY-TO-PRINT means that the files are saved full size for the entire elevation of the glass for either a tiled pattern, or as individual files for individual pieces of glass. When the designer prepares these files they must base all of their final image files on the field measurements provided by the glass installer.

The second option is to retain ARTWERKS@Pulp Studio. This is a separate division of Pulp Studio and your work will be developed through this group. ARTWERKS can handle all of your pre-press needs by utilizing both Mac and PC, and industry standard for graphic applications in preparing and processing your artwork. ARTWERKS can provide high quality image scanning, photographic reproduction, color correcting and photo retouching if desired. They can also assist in image manipulation, tiling and individual file preparation. Since ARTWERKS is the division that also facilitates the printing of our graphic imaging laminates, they understand the nuances and requirements to have your artwork prepared properly no matter which process you are using.

What is photographic reproduction?

A typical mistake many people make when developing large graphics is that they start off by selecting an image that is of a low resolution. A common misconception is that you can scan an image and then save it again at a much higher dpi. This does not work.

When viewed microscopically, digital images are a series of dots (pixels). The resolution quality is determined by what size the dots are when the original image was saved. The smaller the dots, the higher the resolution, the larger the dots the lower the resolution. If you scan an existing digital image the scanner reads and picks up the exact same size dots as the original image being scanned. The scanner cannot increase or decrease the size of the dots.

There are also software packages that claim to be able to improve resolution from low-resolution files. These do not work, save your money.

What needs to happen is what we call photographic reproduction. The process starts by taking your digital (low-resolution) image and making a very small print of the image on an opaque piece of material, such as a piece of paper with a matte finish. The goal is to achieve a high-resolution quality print that can be photographed.

Once the image is produced, the print is then photographed to create a 4" x 5" photographic transparency. Since this transparency is not digitally created there are no existing pixels, just image. Once we have this transparency we can drum scan this image and save it as a high-resolution file with more pixels, thus allowing the image to be enlarged for final printing without losing any image quality.

It is important that images are professionally scanned and color corrected with a high-quality scanner. If these facilities are not available to you ARTWERKS@Pulp Studio can prepare your artwork and take the guesswork out of preparing your artwork files.

What if I have original artwork for sampling and I don't want to go through his entire process yet?

We will accept preliminary 12 x 12 sample files for testing and presentation purposes.

A sample may be produced in a dpi that is for testing purposes only. These samples may not be a good representation of the final enlarged output. Please keep this in mind when using these samples in presentations.

How do I make sure the colors in my image match the final output?

SGX and PGI will print with different color and saturation results. There are times that the color you see on your screen and the way it transfers to the print are different. The colors can be affected by the substrate that we are printing on, as well as the dpi. Low-resolution images will always print lighter than the shade intended.

To give us an idea of what color is intended, you should provide either a Pantone color number or color chips of the dominant colors in your image. (Refer to file requirements specifications sheet) If we see that the intended shade does not match the Pantone call out or color chip, we will attempt to adjust the color as necessary. We recommend that you supply a proof of your artwork to use as a reference if possible

How do I get a budget prepared?

First you need to review your project with a Pulp Studio salesperson. They will submit your information to the studio for review and budgeting. They may have a graphic imaging specialist from the studio get in touch with you for more information if necessary. The time period to receive a budget back is generally within two days.

How are panels identified during manufacturing and installation?

When Pulp Studio receives the READY-TO-PRINT files and frame details, we rework these files to include panel information marking when possible. Depending on how the glass is installed, these markings are added in an area hidden by the frame. These marks include the panel number, the artwork file name and Pulp Studio's name and phone number.

The purpose of the mark is to help identify the panel throughout the manufacturing and installation process as well as an identification mark to make the process replacing a piece of glass years later a simple procedure.

What is going to be delivered to my glazing contractor?

Pulp Studio will deliver to your installer a finished product fabricated to your specifications. Your glazing contractor will get a booklet which contains handling precautions, piece orientation and an installation schematic which will show the location of each piece of glass in the opening. Each panel of glass will have a watermark or label that is identified according to the schematic layout. They will also receive a color printout of what each piece looks like which will assist them in identifying the pieces on the ground.

Is this an easy product to handle in architectural installations?

Yes. Other than the printed interlayer this is no difference in handling this glass to any other laminated glass as specified by the Glass Association of North America (GANA). Any professional glazing contractor should have no problems in handling and installing this product into your project provided they adhere to GANA's Glazing Manual and Laminated Glazing Reference Manual.

How do I care for the product?

There are no special care instructions for glass made with graphic imaging. The care instructions are the same as any other piece of glass. You can request from your salesperson a copy of Pulp Studio's glass cleaning instructions.

What is the price for glass with graphic imaging?

The price is a moving target and has a number of factors that affect it. If you answer the questions below and provide this information to your sales representative we can prepare a budget for you.

1. Where and how will the graphic panels be installed and in what type of system?
2. Will the edges of the panels be exposed?
3. What glass thickness are you considering: 5/16", 7/16", 9/16", 11/16", 13/16", etc.?
4. What are the approximate sizes of the panels are you considering?
5. Will the graphic panel be part of an insulated unit for exterior use?
6. If the graphic panel is part of an insulated unit, what type of glass will be on the other side of the insulated unit?
7. Is the image you intend to use a single image, a repeating image or an image tiled over many panels? Where is the projected located?

These are not all the questions that need to be answered but they will give us a starting point for creating a budget for you project.

File Formats

SentryGlas® Expressions™ File Requirements

SGX is a megabyte-demanding color process requiring files of enormous sizes. We recommend resolutions of 300dpi at the final size for optimum quality and color; but if document size is an issue, we encourage proof-size tests at various resolutions to appreciate the differences in the sampled resolutions. We require a high-resolution printed sample or a hard copy sample of your art to be used as reference of color and content. This can be shipped to the attention of Rebecca Gerten at the address listed below. The best file format to use is either Tiff or EPS but we encourage submitting documents in their native form, e.g., Adobe Illustrator, Adobe InDesign, etc. We support files from Adobe CS4, which includes Photoshop, Illustrator and InDesign; also from Corel Draw X4. We DO NOT support PDF file format. Adobe Acrobat PDF was made primarily to prepare, transport and view files for conventional printing, making your documents to be formatted incorrectly causing undesirable results. Since we are not a conventional printer, PDF files are not supported by Pulp Studio for any of our imaging services. When working with your images, color space is very important; we want the best color output possible. The best color space to use in SGX printing is RGB. RGB is a larger color space than CMYK, meaning that your images will print better by staying in RGB, however if they have already been converted to CMYK there is no ben-

efit in changing them back to RGB. In regards to JPG, we strongly advice AGAINST the use of JPG file format; JPG was primarily made to view and transport images for on-screen-viewing, not to printing at high resolution. JPG reduces the file size by removing printable color information which is vital for SGX printing. As previously stated, Tiff or EPS are the preferred file formats. When tiling a large image over several panes of glass, you need to consider the framing or joint conditions before trimming your images. Consult the glazer to discuss glass bite and field measurements information to assure accuracy. Also, please add ¼" bleed all around and provide trim marks which represent the final glass size; for this, bear in mind that due to the framing or joint information your bleed area could be part of the next panel, depending on the actual conditions. If you are using a custom ICC-color-profile in your application, please include a copy of it; we will use it to insure better color representation. When packaging your documents onto a CD or DVD, don't forget to include ALL used images and fonts as well or convert your fonts to outlines; we don't support any fonts. If you have trouble in creating or formatting your images based on these guidelines, we can help. We cater a Full Service Art Department capable of undertaking the gargantuan tasks of preparing graphics for SentryGlas® Expressions™ for you.

Recommended File Formats for Electronic Data*

Photoshop (Mac/PC) PSD, EPS, TIFF

Illustrator (Mac/PC) AI, EPS

**All fonts must be included. If using Illustrator, please convert fonts to paths or outlines.*

Other Formats

Corel Draw (PC) CDR

InDesign (Mac/PC) INDD

If supplying documents with links, please make sure that all associated graphics and fonts are included.

Accepted File Media

CD-ROM (Mac/PC)

DVD-ROM (Mac/PC)

FTP (Mac/PC)

Pulp Glass Imaging™ (PGI) File Requirements

PGI is a true digital photographic output which strictly requires RGB images; do not convert your graphics to CMYK, as CMYK will reproduce undesired effects on PGI. In regards to JPG, we strongly advise AGAINST the use of this file format; JPG format compresses the file size by reducing color information which is vital for PGI printing; JPG was primarily made to view and transport images for on-screen-viewing or for the internet, not for printing at high resolutions. We require a high-resolution printed sample or a hard copy sample of your art to be used as reference of color and content. This can be shipped to the attention of Rebecca Gerten at the address listed below. We recommend files to have an optimum resolution of 200 dpi at the final size for best quality and color. This type of output is not very forgiving so sacrificing quality for document size is not advised. The best file format to use is either TIFF or EPS; however we encourage submitting documents in their native format, e.g. Adobe Illustrator, Adobe InDesign, etc. We support files from Adobe CS4, which includes Photoshop, Illustrator and InDesign; also from Corel Draw X4. We DO NOT support PDF file format for printing. Adobe Acrobat PDF was made primarily to prepare, transport and view files for conventional printing, formatting your documents incorrectly causing undesirable results. Since we are not a conventional printer, PDF files are not sup-

ported by Pulp Studio for any of our imaging services. When tiling a large image over several panes of glass, you need to consider the framing or joint conditions before trimming your images. Consult the glazer to discuss glass bite and field measurements information to assure accuracy. Also, please add ¼" bleed all around and provide trim marks which represent the final glass size; for this, bear in mind that due to the framing or joint information your bleed area could be part of the next panel, depending on the actual conditions. If you are using a custom ICC-color-profile in your application, please include a copy of it; we will use it to insure better color representation. When packaging your documents onto a CD or DVD, don't forget to include ALL used images and fonts as well or convert your fonts to outlines; we don't support any fonts. If you have trouble in creating or formatting your images based on these guidelines, we can help. We recognize what is required to handle the large tasks of preparing graphics; we cater a Full Service Art Department capable of undertaking any large graphics task for you.

Pulp Studio has a Full Service Art Department.
Please contact us by e-mail at:
graphics@pulpstudio.com
3211 S. La Cienega Blvd., Los Angeles, CA 90016
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www.pulpstudio.com

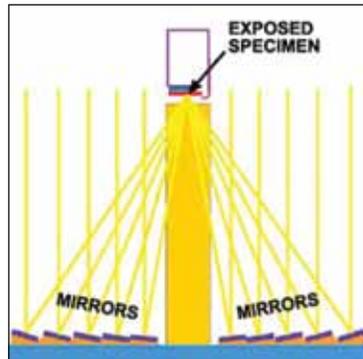


**Right: Andaz Hotel,
Hollywood, CA**

SentryGlas® Expressions™ decorative interlayer (Patent Pending)

Tests show excellent printed image lightfastness. Lightfastness is a term used in the print industry to describe image resistance to fading. The main factors that contribute to fading are light, humidity and pollutants such as ozone or smoke.

SentryGlas® Expressions™ printed interlayers are laminated to glass, which protects the embedded image from pollutants and humidity. The proprietary interlayer also blocks the transmission of UV rays that can contribute to fading. The pigments chosen for SentryGlas® Expressions™ printed interlayers are also used in excellent weathering automotive and architectural paints. To test lightfastness of SentryGlas® Expressions™ printed interlayers, DuPont has placed printed, laminated samples in a sunlight-intensifying test apparatus located in the Arizona desert (see illustration, right). To date, SentryGlas® Expressions™ has achieved the equivalent of 5 years of lightfastness in the accelerated testing. It is expected to demonstrate many additional years as testing continues.



Lightfastness Test Criteria

- Light Source: Arizona Desert, concentrated sunlight
- Test Protocol: ASTM G90 cycle 2
- Fade Criteria: E calculated using CMC* (1:1) formula
- Measurements: < 4 E for 5-yr period

*The CMC formula is a modification by the Color Measurement Committee of the Society of Dyer and Colourists to the color space and color difference calculations determined by the CIE Colorimetry Committee. The purpose of the modification is to correlate visual acceptability to instrument-measured color changes. We use the 1:1 CMC formula, which is considered the perceptibility form of the equation.

This data demonstrates that these pigments should have limited fading or discoloration for at least 5 years of exposure. Color changes during this time would not be noticeable by an ordinary observer without an unweathered sample for direct comparison.

Technical Information for Graphics

Warranty

SentryGlas® Expressions™ (SGX)
Interior and Exterior

- 5 year limited warranty against delaminating
- 10 year limited warranty against fading

Pulp Glass Imaging™ (PGI)
Interior Only

- 5 year limited warranty against delaminating
- 5 year limited warranty against fading

Safety Standards

All laminated glass products conform to ASTM C1172 Standard Specifications for Laminated Flat Glass. Standard laminates made of both SGX and PGI comply with ANSI Z 97.1-1984 and 16 CFR 1201 II as safety glazing.

When our laminated products includes the use of heat-treated glass, those products conform to ASTM C 1048 Standard Specifications for Heat-Treated Glass.

Fully tempered glass with stamped logos comply with ANSI Z 97.1 2004 and CPSC 16 CFR 1201 as Safety Glazing.

Heat-Strengthened glass is produced with surface compression of 3500-7500 psi, however Heat-Strengthened glass is not considered safety glazing.

Glazing Installation

When installing laminated glass, manufacturers generally recommend resilient non-hardening sealant compounds, tapes or electrometric gaskets and following the glazing techniques set forth in the GANA Glazing Manual. These guidelines state that laminated glass should not be exposed to direct contact with organic solvents, and that weep systems should be incorporated to prevent exposure to water or moisture vapor for prolonged periods. Either exposure can lead to delaminating, haziness or other discoloration along the laminated glass edge. It is recommended that compatibility between the sealant and laminated architectural glass be examined for the same reasons. It is important to remember that although sealant compatibility with laminated architectural glass is an important factor from an aesthetic standpoint, the specifier must also consider compatibility of the sealants with laminated glass. For this reason we only recommend the use of Non-Acidic (Neutral Cure) sealants be used whenever glazing laminated glass.



Right:
Centennial Hills,
Las Vegas, NV

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