Face-mounting techniques for contemporary photographs and digital images

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This paper presents the background, methods and products used to face-mount photographs and digital prints. Possible issues with the various face-mounting methods are also discussed.

Mounting photographic and digital images in a contemporary manner that will stand the test of time is one of the challenges for the contemporary photographer and gallery. Since the 1980s an increasingly popular mounting methods is face-mounting the image to acrylic. The reasons are based on presentation requirements and the desire to provide a frameless but quality aesthetic appearance.

Two forms of face-mounting are pressure-sensitive adhesive films and the use of a silicone-based gel to adhere the image to clear polymethyl methacrylate (PMMA) – acrylic – a patented process known as Diasec®. These methods and the materials used in them will be explained.

The papers used, printing process and the display environment are all considered when deciding which form of face-mounting is best suited for the photographs or prints. The presentation of a face-mounted print is restricted only by the size of the photographic paper and of the acrylic sheet used. Prints can be produced as wide as 2.2 metres, with even larger lengths. With such large formats, the structural stability of a photograph is an important consideration.

Finally, questions regarding the longevity, transportation, cleaning and hanging of the finished works are discussed.

Keywords

Introduction

A trend preferred by many contemporary digital and photographic artists is to present their images in a frameless manner. These photographic and digital images require protection from the environment to allow them to be displayed. A photograph or digital image, mounted to a mat or foam board but left unframed, or pinned to a wall, a method used by many contemporary artists, can cause physical damage and/or chemical degradation of the image.

Digital prints originated in the 1950s but it is since 1990 that new technologies have ensured greater access to wide-format printers and digital cameras with the ability to produce images that can be printed on these wide-format printers. Major improvements in papers and inks have helped create interest in digital prints from the fine art print market. As these digital and photographic prints are passed to museum and gallery collections, they bring the necessity for curators and conservators to understand the materials that are used to produce the prints and to mount and display them. The purpose of this paper is to explain the background, methods and products used in the process of face-mounting photographic and digital prints. Whilst several previous papers have been written regarding the methodology of face-mounting techniques, this paper explores the methods from the focus of a commercial practitioner of the various face-mounting processes used throughout the commercial and fine art industries.

The basic concept of mounting is the physical attachment of an image to a substrate that will permanently flatten the image and prevent it from bubbling, cockling or warping. When this physical attachment ceases to hold, bond failure occurs. Incorrect

techniques and the expansion and contraction of individual paper and substrate layers during normal humidity and temperature variations are the biggest causes of bond failure. If the mounting has been applied using appropriate mounting techniques and manufacturing procedures, the bond will hold indefinitely. Bond failure or weakening is expected over time for all pressure-sensitive adhesives, but bond failure may be hastened by poor handling or the incorrect choice of materials. Matching the paper to the correct adhesive and materials is an important step in the mounting process.

One form of mounting is face-mounting, a permanent method of bonding a photo or digital print face-up against the back of a hard sheet of transparent acrylic. Glass or polycarbonate sheets can also be used, although this is rare. Through the process of face-mounting the substrate becomes both the protective glazing and the support for the image.

It also becomes an integral part of the artwork and the viewer is drawn to the significance of the acrylic as part of the appearance of the image. Unlike photographs and digital prints framed traditionally behind glass that create a distance between the viewer and the artwork, it becomes important in an exhibition environment for viewers to realise that touching the acrylic means they are actually touching the artwork.

A major consideration of any face-mount operator is the availability of another print, in the event a problem occurs during the face-mounting process and the print requires replacing. No face-mounting operator should accept any print that cannot be replaced.

Background

It is widely accepted that the idea of face-mounting photographs originated in 1969 when Heinz Sovilla-Brulhart, a Swiss chemist, worked on a method of mounting photographs behind a sheet of clear polymethyl methacrylate (acrylic).

Following a period of trials and alterations to his methods, Heinz Sovilla-Brulhart lodged patents in several countries in 1972 for his method of face-mounting using a primer and a moisture curing silicone rubber to adhere photographic papers to a sheet of clear acrylic. He launched a company, Diasec Sovilla SA, to oversee the production of the primer required in the process, and registered a trademarked name – Diasec® – for the process.

In 1992, Heinz Sovilla-Brulhart passed away and his widow and son have taken over the licence, and production and distribution of the special primer – the solution that enhances adhesion between the silicone rubber, the acrylic sheet and the emulsion.

Diasec was initially used extensively in the European advertising industry to display large billboards and other commercial displays. As years passed, the Diasec mounting method came to the attention of several European fine art photographic artists who learned that the images mounted with the Diasec process were showing good signs of longevity and no colour shift.

These photographers started exhibiting works produced with the Diasec process and the fine art world started to notice and add these Diasec-mounted works to their collections. Today many major galleries include Diasec-mounted works in their collections.

Other manufacturers developed pressure-sensitive acrylic adhesives that attempted to achieve the same bonding and presentation outcome as the Diasec process. Due to the limited availability of Diasec outside Europe, these double-sided adhesives became popular as an alternative.

'The main advantage of the use of a silicone rubber over that of conventional adhesives was that the curing process could occur spontaneously in the air-tight space that was present between the print and the acrylic sheet by utilising the moisture in the gelatine emulsion of the photograph. Silicone rubber is chemically stable and inert. It is also known as a material that can withstand great changes in temperature and relative humidity and age without yellowing. The photographic emulsion is essentially sealed in an airless environment that should not harm it chemically and should protect it from fluctuations of RH and atmospheric pollutants in the environment'. (Pénichon and Jürgens, 2002)

Face-mounting cannot protect the photograph from poor printing and emulsion processes. Fading of some face-mounted prints originating from poorly processed photographic prints has been noted by Diasec producers. It does not relate to the print media used, but appears to be originating from the actual processing of the photos at particular labs. Any residual chemicals remaining in the photograph can be trapped within a face-mounted image.

Face-mounting with pressure-sensitive adhesive

The pressure-sensitive adhesive used for face-mounting is an optically clear acrylic-based film. Major brands used are PermaTrans® IP2100, Facemount™ UV, OptiMount Ultra and gudy® ultra clear. The film is a clear polyester carrier sandwiched between two layers of acrylic adhesive protected on each side by a clear polyester release liner. It is best applied with an automatic roller laminating machine at room temperature, 18–21°C.

The major problem associated with this style of face-mounting is the tendency for static build-up on the acrylic, which attracts dust particles during the critical mounting period, making it difficult to mount an image without a blister of dust appearing trapped between the surface of the image and the acrylic.

As some PMMA sheets can outgas when exposed to high temperatures, creating bubbles and tunnels between the sheets and the mounting film, manufacturer MACtac USA recommends

conditioning these sheets overnight in a controlled room above 60ºC before mounting with their PermaTrans IP2100 to help minimise this effect.

Neschen AG manufactures gudy ultra clear and states that the product will provide 'excellent optical characteristics for up to six years indoors'.

'These end-use life estimates are based on accelerated ageing studies and outdoor exposure, under conditions experienced in vertical central European temperate climates. Exposure to severe humidity and ultraviolet light, as in southern Europe and also in tropical, sub-tropical or desert regions, will cause more rapid deterioration. This also applies to polluted areas, high altitude and south-facing exposure'. (Neschen Technical Data notes – translated from German)

Drytac Europe Ltd manufactures Facemount, a 25µ (1 mil) optically clear polyester mounting film coated on both sides with a pressure-sensitive, solvent-based acrylic adhesive, which is protected prior to use on both sides with siliconised polyester. Another material more suited to fine art images is Facemount UV, an optically clear, UV-stable, pressure-sensitive mounting adhesive protected on each side by a 25µ clear polyester release liner.

OptiMount Ultra and OptiMount adhesives are manufactured by SEAL (now part of the Neschen Group). OptiMount Ultra is an optically clear, double-sided permanent mounting solvent-based acrylic adhesive with a polyester carrier. OptiMount Ultra contains UV protection. OptiMount is a double-sided, pressure-sensitive, aqueous dispersed adhesive with a clear polyester carrier. OptiMount is a less expensive version of the OptiMount Ultra, but it does not contain any UV inhibitors and is not as optically clear. This product is not designed for use with fine art photographic or digital prints.

The acrylic is pre-cut to the finished size, the protective paper mask or film is removed and the surface inspected for any surface variances or scratches that may render the acrylic unusable. The operator runs the acrylic through a roller laminator to attach one side of the double-sided adhesive, peeling back one of the release liners as it travels through the rollers.

The excess adhesive film is trimmed from the edges of the sheet of acrylic. The operator then cleans the face of the print to be face-mounted. This is a critical step in the process as it provides the final moment to remove any dust particles or foreign matter. A final thorough inspection of the image surface is imperative to ensure any damage to the surface is noted and potentially rectified prior to the image being mounted behind the acrylic surface.

It is important to appreciate the high static properties of acrylic at this stage as the acrylic surface will be exposed to the surrounding air during the face-mounting process and any airborne debris or dust will be attracted to the exposed acrylic surface during this critical time. Once the print and the acrylic surface are ready, the second layer of the release liner on the mounted adhesive is peeled back approximately 30 mm and the print is placed face-down onto the adhesive mounted acrylic. The edge covering the peeled back portion of the adhesive is carefully lined up along the straight edge of the acrylic. The remainder of the print is lined up along the other three edges of the acrylic. Once the operator is satisfied with the print line up, the first edge is manually pressed down onto the exposed adhesive edge (the leading edge). The leading edge is placed against the rollers of the laminator machine and the adhesive release liner is gradually removed as the acrylic sheet and print travel together through the rollers.

It is not possible to use compressed air during this process as any dust particles near the work can be blown onto the tacky adhesive while it is exposed. Any dust or foreign matter trapped between the adhesive and the image will be seen through the acrylic and will also create an air pocket, which will be unsightly and can detract from the image. Practitioners of this laminate form of face-mounting strive to create dust-free environments as much as possible.

Once the print has been successfully face-mounted to the acrylic, a suitable substrate is often mounted to the verso of the print to protect it from the environment. Not all prints have a backing material. Many operators using this method of face-mounting will use another double-sided adhesive to mount Sintra® or a similar PVC product as a backing. The hanging materials will then be placed on the back of the Sintra® ready to hang on the wall. Some operators will use an aluminium composite material (ACM) as the backing of the print. ACM products are made from two thin sheets of 0.2 mm or 0.3 mm aluminium with a solid polyethylene core, resulting in a 2, 3 or 4 mm thickness material. ACM products, along with solid aluminium or acrylic sheets, are considered the highest quality backing material choices for face-mounted images.

Face-mounting with pressure-sensitive adhesives has several potential problems over time. As the acrylic sheet expands and contracts with changes in humidity and temperature in the environment, the polyester adhesive needs to be flexible to move with the acrylic. Over time the adhesive loses its flexibility and the potential occurs for a 'spider web' pattern to appear on the surface of the image, caused by the creasing of the adhesive film. Over time the adhesive bond can be lost and patches of delaminated image can appear (usually close to the edge of the image).

Face-mounting with Diasec®

Diasec mounting is done on a large, double-roller machine. A sheet of acrylic is cut to a slightly larger size than the print

image and the protective film is removed from one surface of the acrylic. A primer is applied to this exposed surface and allowed to dry. Then the print is placed face-down onto the acrylic and a straight edge (the leading edge) is taped to one edge of the acrylic to create a hinge. The leading edge is pushed against the rollers of the machine and the print is lifted back over the rollers so it is face-up.

The adhesive is then applied along the width of the acrylic in several rows. The print and acrylic are sent together through the machine allowing a thin film of the adhesive to be firmly pressed onto the acrylic evenly. During the process compressed air is applied to both surfaces to prevent any dust particles from settling on either surface.

Once the process is complete the image is closely inspected and then stored for a period of 24 hours to allow the adhesive to cure. Some papers require a longer curing time. The cured material is a permanently flexible, chemically stable and inert substance that can withstand great changes in temperature and relative humidity, and ages without yellowing.

The products used in the primer and adhesive have anti-fungal and anti-bacterial properties, and contain UV inhibitors and no plasticisers.

Diasec mounting firms use Plexiglas® or Perspex® brands of acrylic to mount the prints as they are the only two brands that provide a guarantee against yellowing for thirty years, a guarantee against off-gassing of the acrylic and good UV stability.

Once the adhesive has cured, a substrate of ACM is typically applied to the back of the print to protect it. Solid aluminium sheet is sometimes used but ACM gives the properties of solid aluminium with half the weight and greater rigidity, which is an advantage when moving and transporting large pieces.

The properties of the adhesive and application method allow very large images to be mounted with the Diasec process. The machines allow processing of images 220 cm wide and the constraint for this face-mounting method is the 202 x 305 cm sheet size of readily available acrylic. Larger works of art are produced by butting finished Diasec-mounted images against one another.

Face-mount papers

When face-mounting a photograph or digital image, the type of paper used in the printing process can aid in determining the method of face-mounting used.

Diasec was invented for use with photographic papers and all contemporary photographic media, including but not limited to Cibachrome, Duratrans, Fujiflex and Endura Metallic papers. Diasec has been the only successful method of minimising the problems caused by careless handling of Cibachrome and

Ilfordchrome images, when cusping occurs. The adhesive fills in the cusps in the media during the mounting process, rendering the damage almost invisible.

Inkjet papers are increasingly used for face-mounting both with Diasec and pressure-sensitive adhesive films. Diasec mounting requires a matt inkjet paper to enable the adhesive gel to bond successfully with the paper. Photo rag papers and matt inkjet papers work successfully with Diasec. Inkjet papers with a lustre, satin or gloss surface cannot be successfully Diasec-mounted unless they are first protected with a laminating film. If these papers are mounted using the Diasec process without laminating, small round pockets throughout the image, and particularly in the lighter and white areas of the print, will release from the acrylic. The adhesive cannot bond to the coating of these papers. Laminating the image solves this problem, but some silvering of the surface, typical with any laminating process, may occur.

However, these same gloss and smooth surface papers work well with face-mounting using the pressure-sensitive film adhesive method. The photo rag papers and other textured inkjet papers will not work well with the film adhesives due to the silvering effect.

Longevity of face-mounted prints

Diasec-mounted images processed in the early 1970s still exist, showing no signs of colour shift or paper degradation. Prints mounted with some pressure-sensitive films have not fared as well, in part because early mounted prints did not have a backing mounted to the paper. This early experience has led to the practice of back-mounting the images for protection. However, some manufacturers state in their technical data sheets that their adhesives will last a minimum of five years indoors. Some earlier pressure-sensitive films had a tendency to yellow over time. Further research is required in this area.

Transportation

The major priority when packaging and transporting face-mounted images is to protect the front surface of the acrylic from scratches and to protect the sides and corners of the artwork from dents caused by rough handling.

Where possible it is advisable to retain the manufacturer's protective material on the front surface of the acrylic. However, when there is doubt about the integrity of the surface, this film must be removed for inspection of the surface prior to face-mounting. The film used on UV Plexiglas is more useful as it can be reapplied if required. The paper-based protective films on some alternate brands of acrylic cannot be reapplied as they tear during removal. Prior to packing the artwork in its final packaging material, protecting the front surface and the edges of the artwork with foam helps to protect the most vulnerable

areas. The package is then wrapped in plastic bubble wrap and finally enclosed between two sheets of Corflute® or packed into a wooden shipping crate ready for transport.

Cleaning face-mounted artworks

Being acrylic products, it is important to take care when cleaning face-mounted images. Soft microfibre cloths with distilled water are suitable for everyday cleaning of dust. Products designed to clean acrylics are available and are suitable for cleaning, polishing and reducing the static properties of the acrylic surface. Two recommended products are Kunststoff® and Brillianize®.

Do not use ketones, window-cleaning sprays, alcohol, kitchen scouring compounds, or solvents (such as acetone, benzene, gasoline, carbon tetrachloride, or thinners). Do not use ammonia-based cleaning solutions on the acrylic as they will damage the sheet and cause it to craze.

Installing face-mounted images

Some operators will simply apply a thin strip of closed-cell polyvinyl chloride (PVC), approximately 30 to 40 mm wide, along the top portion of the verso of the print to enable the face-mounted image to be hung on a wall. This often leads to bond failure of the images, as the weight of the acrylic can cause the paper print to pull away from the batten strip holding the piece to the wall, causing tearing of the print and possible impact damage if the acrylic drops to the ground.

The recommended method is the use of a four-sided aluminium sub-frame that enhances the rigidity of the work, provides a hanging mechanism and enables the images to 'float' on the wall. Diasec-mounted images also use this system.

Conclusion

Face-mounted images continue to grow in popularity. Consumers enjoy the glossy 'wet' look and the ability to mount large images in a protective mount that floats off the wall. Fine art collectors have accepted face-mounted prints as a viable art medium as demonstrated by the number of images appearing in major public and private collections and selling at major art auction houses throughout the world.

The face-mounting process is not for the faint-hearted or ill-prepared operator. A thorough knowledge of the print media, attention to detail, a suitable environment and training are required to achieve a high quality product. Different methods of face-mounting have their place and the experienced operator will ensure the most suitable method is used for each print. Choosing the most suitable process and materials will have an impact upon the quality of presentation and the long-term stability of the image.

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Materials

Sintra® 3A Composites

Brillianize®

Kunststoff®

DiBond® 3A Composites

gudy® ultra clear
Neschen AG, Hans-Neschen-Str. 1, 31675 Bückeburg, Germany

OptiMount Ultra and OptiMount
Neschen Americas, 7091 Troy Hill Drive, Elkridge, MD 21075, USA

PermaTrans® IP2100
MACtac USA, 4560 Darrow Road, Stow, OH 44224, USA

Facemount™ 75µ and Facemount™ UV
Drytac Europe Ltd, Drytac House, Filwood Road, Bristol, UK BS16 3RY

Author biography

Miranda Smith is the current vice-chairperson of the Australia–New Zealand Chapter of the Professional Picture Framing Association (PPFA). Miranda is the only Western Australian to have successfully passed the Certified Picture Framing qualification from the PPFA.

Miranda is the hands-on owner of two related businesses in Perth:

- Gallery 360 – an art gallery that also incorporates Western Australia's largest preservation picture-framing team
- Image Finish – WA's leading specialist for large-format printing, mounting and laminating photographs and digital images to acrylic, aluminium and other preservation substrates.

Miranda has worked with face-mounting using the pressure-sensitive adhesives and the Diasec processes. She holds the Australian licence for the Diasec face-mounting process.

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Notes