

Pad Printing vs. Screen Printing

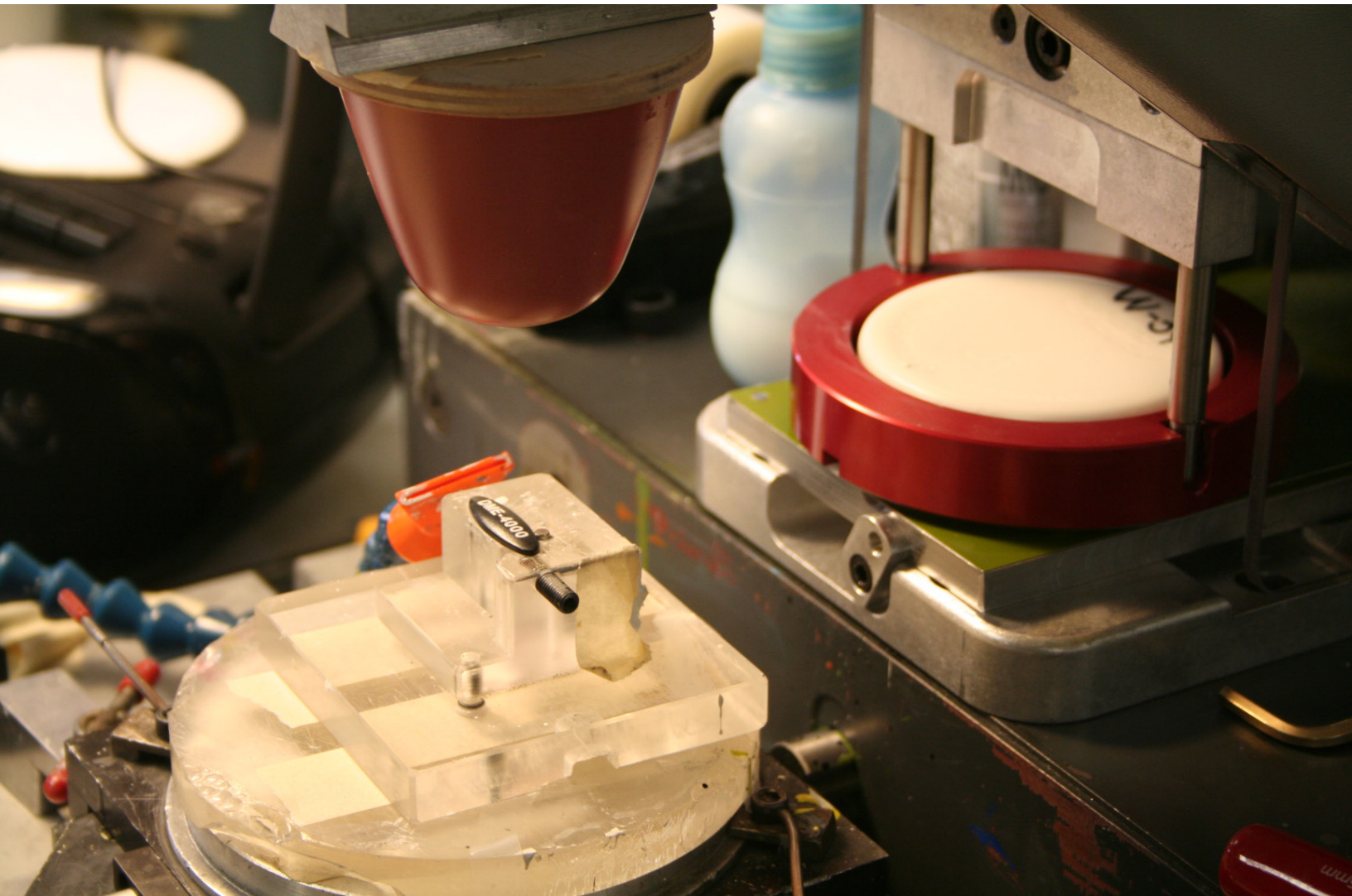
Advantages and Applications



# Introduction

Choosing a graphical printing technique requires extensive consideration into the process, equipment, and mediums you'll be working with. Two of the most prominent printing methods available today are **Pad Printing** and **Screen Printing**.

It's important to understand the advantages and disadvantages of both, especially if you'll be transferring designs to different surfaces. Depending on the object you're printing on, you'll want to understand the strengths and weaknesses for both Pad Printing and Screen Printing.



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# Screen Printing Overview

With origins tracing back to the Chinese Song Dynasty around 960 AD, Screen Printing, otherwise known as Silk-screening, or Serigraphy, involves a woven mesh screen made from polyester, steel, or nylon. The mesh is usually coated with a special emulsion that blocks specific areas of the screen, forming the actual image you're transferring, also known as the stencil.

Screens can also be produced differently depending on the size and shape of the object that your design will transfer onto. The screen mesh itself is stretched and tensioned using a wood or metal frame, similar to a window or door screen. This allows the operator to force ink only into select areas where the design is transferred on to the surface of an object, otherwise known as the substrate.

Once the screen is properly placed and secured over the substrate, the operator pours a specific volume of ink over the screen. A sharp-edged blade, roller, or squeegee is used to press the ink through the stencil. Ink is forced to travel through the open mesh areas only, and as a result, transfers the design or image on to the object's surface. Excess ink will remain above the screen.

The process is repeated using a separate screen for each color until a completed image or design is produced. Once complete, the object is placed into an oven and heated to allow the ink to be cured and permanently adhere to the surface.

## Advantages of Screen Printing

Screen printing offers several advantages due to the ability for its ink to thoroughly conceal the material underneath it. Overall, it's an efficient approach for designs using several colors. Printed images are sharp and defined, offering a high quality design transfer.

Not only is the process inexpensive and fairly easy to learn, it's also versatile, as different inks can be used to work with different material surfaces such as fabrics, metals, plastics, wood, glass, ceramics, and paper. Since the operator is applying pressure onto the object's surface, inks apply firmly and will last for years.

- ✓ Lower tooling and setup costs
- ✓ Can accommodate large image sizes



## Advantages of Screen Printing *(Cont.)*

Assuming the screen is not damaged during the transfer process, it can be used for multiple print runs. Another advantage is that a single screen image produced could be scaled up or down depending on the size required, allowing you to print large scale or small scale images of the same design. Screen printing is less process intensive in the beginning when compared to other techniques. However, you'll still have to place different screens over an object to achieve various colors combinations.

While traditional Screen Printing methods by hand are fairly quick and affordable for beginners, the technology has since evolved to include automated machines such as screen printing presses and rotary screen printing. New Screen Printing technologies have recently begun to exponentially increase production volume and decrease output time.

## Common Applications for Screen Printing

Screen printing is extremely versatile when compared to other printing processes. Since it works on a wide range of inks and surfaces, it can be used in a variety of industries. Typical applications include clothing designs, balloons, artwork, stickers, signs, labels, fabrics, and a myriad of visual graphics and labeling for consumer products. Overall, the textile industry is one of the largest users of screen printing for fabrics used in upholstery, linens, bedcovers, and other household items.



Companies and organizations across the globe use screen printing for promotional products, brand awareness, and marketing, these include technology, military, as well as industrial sectors.

In addition, screen printing is used on printed electronics, semiconductors, machinery, and control panels to provide information, warnings, or directions when using electrical or mechanical instruments.



# Pad Printing Overview

The first known instance of Pad Printing for industrial purposes can be traced to watchmakers in Switzerland using the process to imprint watch faces. Today, pad printing has evolved into a modern process, utilizing specialized mechanical equipment called a pad printing machine that “stamps” a design or image onto a three dimensional object.

Pad printing machines consist of three primary components: printing ink, image plates, and rubber or silicone printing pads. Depending on the project, pad printing systems will vary in shape and size but all use the same concept. Similar to using everyday rubber stamps on paper, pad printing involves the transferring of printing ink from the printing pad onto a three dimensional object.

An image plate is first produced with an etching of your design. Ink is filled over the surface of the plate, covering the etched areas. The machine holds both the printing pad and your object in place. In a matter of time, the ink on the printing plate will become sticky, ready to be picked up and transferred by the rubber printing pad and onto your object. As the pad is pressed onto your object, the ink is transferred, creating a crisp and defined image of your design. The process is repeated by the machine until a complete image is formed on the object (substrate).

Selecting a pad for your Pad Printer is one of the more complex tasks one must deal with when considering Pad Printing. There are several variables to consider when choosing the appropriate pad for the job. This includes: pad shape, pad size, pad height, pad hardness, pad surface finish, and pad material. There are hundreds of pads to choose from, making Pad Printing incredibly versatile for most project needs. Understanding how these choices affect print quality will help you determine the right match.

## Advantages of Pad Printing

Pad Printing offers incredible image clarity and resolution and is also capable of varying tones, edges, and details in a printed image. While Screen Printing is used for objects with simpler geometries and flatter surfaces, Pad Printing is versatile for three-dimensional or unusually shaped objects, irregular surfaces, larger production volumes, and automated consistency. Another primary advantage of Pad Printing is the ability to customize both the rubber pads and image plates according to your design requirements. While Pad Printing is typically more expensive, the process produces extremely accurate and reliable image results.



## Advantages of Pad Printing (Cont.)

More modernized versions of Pad Printing machines include precision robotic printing capabilities and laser guided accuracy measurement, capable of accommodating a wider range of products. Pad Printing machines can also work with products that consist of two or more different heights - printing images on both the lower and higher areas at the same time.

- ✓ Can print on curved surfaces
- ✓ Superior quality on textured surfaces

Another advantage of Pad Printing is in the ink composition. Choosing the proper ink ultimately depends on the surface you'll be printing on. Generally, these are divided into two categories: one component ink and two component ink. One component ink is ideal for thermoplastic surfaces such as PVC, Polystyrene, Polyethylene, and Polypropylene. Two component inks (feature an ink and a hardening chemical) are typically used for objects that will be subjected to high mechanical stress or chemical exposure.

## Common Applications for Pad Printing

Pad Printing is commonly used for objects with more complicated three dimensional geometries or irregular shapes and surfaces. For example, the keys on keyboards require pad printing to transfer the image of each number, letter, and symbol.

Control panel plates with raised surface details, such as computer parts, also utilize pad printing. For industrial tools, Pad Printing is ideal for printing on drill components, hammers, and other unusually shaped objects that could not be accomplished without the customization of rubber pads and image plates.

Pad Printed objects can also be found in a variety of industries including electronic components, industrial buttons, promotional items, household appliances, toys, specialty consumer products, and sporting goods. Pad Printing can be used on a variety of different materials including plastic, glass, metal, ceramics, silicones, foods, and pharmaceutical products.



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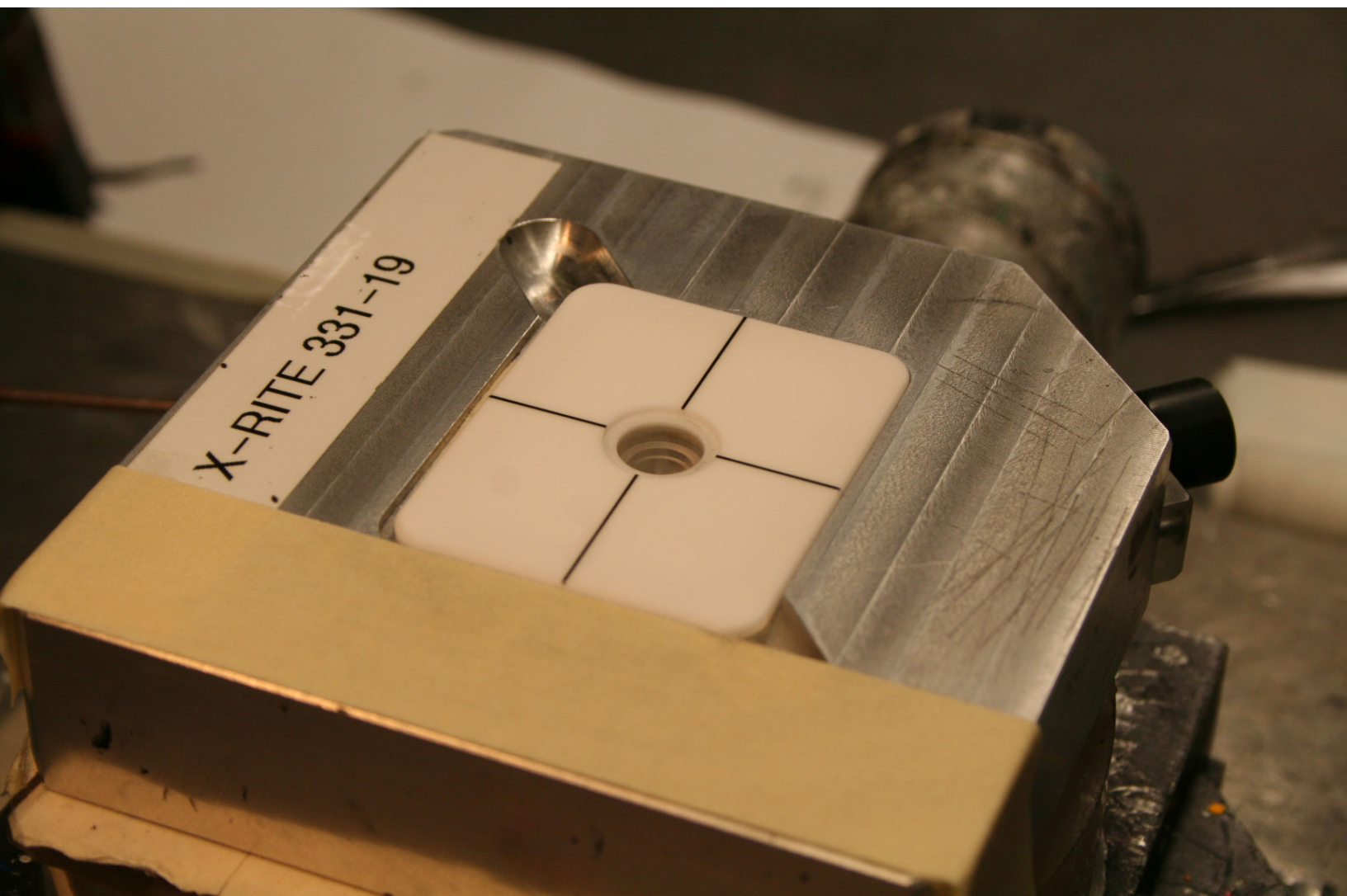
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## Conclusion

Both Screen Printing and Pad Printing offer remarkable ability to transfer designs, images, and text to otherwise ordinary objects. However, either approach will have its own strengths and weaknesses depending on the project requirements.

New technology and innovation have continuously improved both processes, allowing for a wider selection of materials, improved performance, and reliable image quality. While having both capabilities under one roof will allow you to print graphics on just about any material or application, understanding the performance advantages of each will help you plan accordingly so that the right printing process fits the application. As well, knowing the differences provides the opportunity to produce a wide array of impressive graphical objects for commercial applications.



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