

Engraving Technologies

Engraving was historically used for producing engraved metal plates that allowed images to be printed on paper for books, newspapers and magazines. With the development of photography and etching (and other image printing techniques) traditional hand engraving has not been used for regular commercial printing for more than 150 years. However, hand engraving is still used in many countries today for printing bank notes, as it is almost impossible to counterfeit notes created by master engravers.

Engraving, in its most basic form, involves removing a layer of surface material away to permanently mark or indent numbers, text or images, typically on a metal, plastic or glass surface although many other surfaces can be marked.

Metals that are typically engraved are Engraving Brass, Phosphor Bronze, Anodised Aluminium, Stainless Steel, Tool Steel, Mild Steel, Nickel Silver and Zinc.

Plastics that are typically engraved are phenolic and impact acrylic laminates of different coloured layers, so that engraving the top layer away reveals a different coloured layer beneath, allowing for highly readable markings. These laminates can be rigid or flexible and suitable for indoor only or outdoor use.

In most industrial and commercial engraving applications today, various traditional methods and modern technologies are used to mark the various surfaces. Traditional methods include hand engraving, screen printing and using manual pantographs. Modern methods include using CNC engraving, milling and routing machines, CNC laser engravers, sublimation ink printing and chemical etching.

Rotary Engraving Systems

CNC rotary engraving systems use a computer controlled rotating cutting tool in a motorized spindle to remove surface material.

The rotating cutting tool, or cutter, cuts into the surface of the material to a predetermined depth and produces a groove of the same shape and size as the tool.

The rate of the cutter rotation is referred to as the cutting speed, and the lateral movement is the feed rate. Each has a profound effect on the quality of the finished cut. In general, softer materials may have higher cutting speeds and feed rates and can be engraved in a single pass. Harder materials require lower cutting speeds and feed rates and may need to be engraved in two passes. The first pass will remove most of the material and the second pass will create a clean cut.

Rotary engraving can be performed on a wide variety of materials including acrylic, soft plastics, rigid plastics (phenolic), soft metals (brass and aluminum) and harder metals (steel and stainless steel).

A common application of rotary engraving is to remove or mill away the background to leave raised letters or images for a "cast" look or create braille print.

*Please contact us on **01275 871720** if you have any queries or would like a competitive quote for your engraving work.*

Laser Engraving Systems

Co2 CNC laser engraving is ideal for both engraving and for cutting holes or shapes. CNC laser engraving allows for much finer marking and cutting than CNC milling. Depending on the type of laser used, a laser will either vaporise the material at which it is pointed, or it will change the material surface creating a contrast.

Lasers can engrave wood, rubber, glass and plastics (including Perspex) as well as natural materials such as slate, marble and granite.

By managing the output power of the laser, its pulse rate and the speed the laser moves over the surface, the cutting or engraving effect can be precisely controlled for each specific material. By reducing the power to a minimum, very thin materials can be engraved or cut.

When the laser is unable to remove the surface of a particular material, such as stainless steel, a chemical layer is sprayed onto the surface first. When the laser comes in contact with the chemical layer, the chemical is fixed to the material. The excess spray is then rinsed off leaving a permanent black image on the surface.

Chemical Etching

Originally, etching was the process of using a strong acid or mordant to cut into the unprotected parts of a metal surface to create a design in intaglio in the metal. As an intaglio method of printmaking it is, along with engraving, the most important technique for old master prints, and remains widely used today. Today other chemicals are also used to mark surfaces or cut through other types of material.

Sublimation Systems

Sublimation is a process whereby an inkjet printed image on special paper is transferred to a polyester coated material when heat (200°C) and pressure are applied. The inks transfer and bond to the coating on the material giving a smooth and durable finish. Other heat transfer methods only apply colour to the surface of the substrate resulting in a finish that can be easily scratched or damaged. For instance, a colour photograph can be sublimated to a metal plate. Sublimation produces stunning and vibrant colours.

Screen Printing

Screen printing uses a woven mesh to support an ink-blocking stencil. The stencil forms open areas of mesh that allow ink to pass to a material. A roller or squeegee is moved across the screen, allowing ink past the mesh to produce a sharp edged print area.

Screen printing is very versatile. The material does not have to be printed under pressure, and it does not have to be flat. Screen printing inks are available for a variety of materials, including metal, plastic, glass, ceramics, textiles, wood and paper.

Full colour prints can be created by printing 4 or more process colours such as CMYK (cyan, magenta, yellow and black).

Pantographs

On a pantograph, the operator lowers the cutter into the material to be engraved and then forms the character by tracing a master type form on another part of the machine. Pantographs are extremely versatile machines that complement the other methods of engraving.