

Photos courtesy Signs of Gold

Gold Leaf Applications

By Francis S. Lestingi

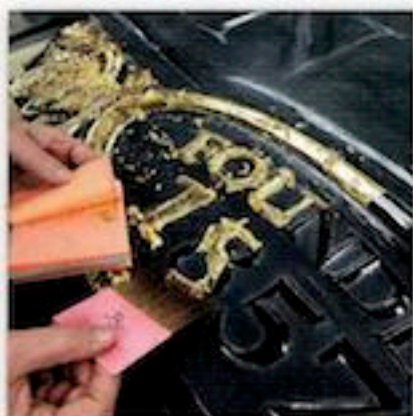
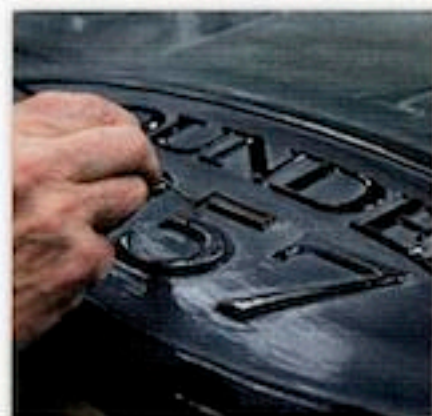
Gilding can still only be achieved by hand.

While automation has transformed many aspects of signmaking in recent years, genuine gold leaf application remains virtually unaffected. Contemporary gilding (i.e. gold attachment) techniques continue to be achieved entirely by hand, without machinery. As such, the use of gold in signmaking is still very much a craft to be learned, rather than a process that could be automated through technology any time soon.

That said, 'working by hand' entails the use of delicate tools. Genuine gold leaf is usually available in sheets that are only about 0.25 micrometres (0.01 mils) thick, which is one thousandth the



Carved letters need to be primed and topcoated with high-gloss enamel before application of adhesive and gold leaf.



Dusting with kaolin helps later by making each brushstroke highly visible.

thickness of a sheet of paper. If the material were to be touched by hand, it would essentially dissolve—even though it is mostly non-reactive and can endure well in outdoor signage because it is almost fully impervious to the elements.

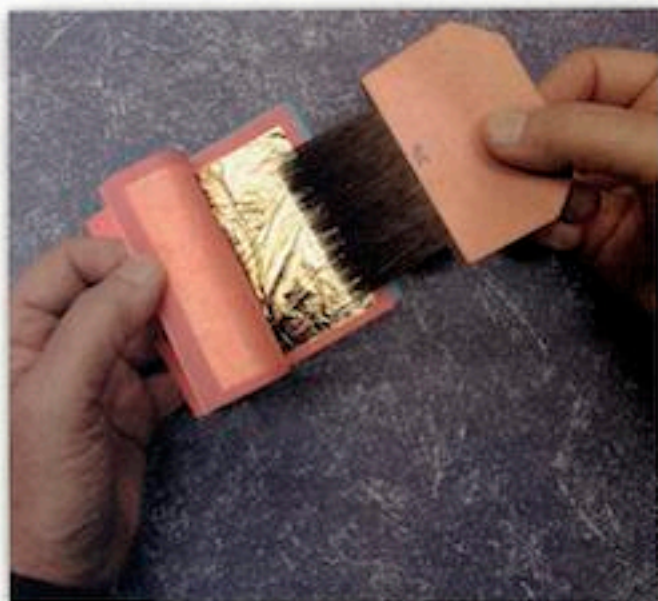
Indeed, with gold's strong resistance to oxidative corrosion, it never needs to be clearcoated. The only exceptions are applications like truck lettering or those subject to 'finger traffic,' *i.e.* which can be negatively affected by repeated abrasion. Even then, a clearcoat will reduce the gold leaf's lustre somewhat and, eventually, cause it to crack.

Substrate preparation

A variety of sign substrates can be gilded, including wood, plastic, metal, high-density urethane (HDU), plywood and marble. As long as the surface is glossy and non-porous, a very good gild can be achieved.

It is important to prepare substrates properly before gilding, as their surfaces should be as smooth as possible to ensure a brilliant appearance later. If letters are carved into a substrate or appliques added to it, for example, they will need to be primed and topcoated with a high-gloss enamel before applying the adhesive and gold leaf.

Some signmakers use a yellow topcoat in the hope of disguising any voids or 'holidays' (*i.e.* areas where gold is missing) that may occur while gilding. This is ineffective, however, as no paint can mask a gilding error.



Once it is 'charged' with a tiny amount of oil, the gilder's tip transfers gold leaf from the booklet to the coated sign surface.



Since full sheets are not needed in most cases, a gilder's knife is used to cut the gold leaf into smaller segments.



Skew dusting with a gilder's mop will remove any excess gold. These 'skewings' should be saved, as they remain highly valuable.

In fact, it is preferable to use a high-gloss black paint for the topcoat, so the voids will be obvious; all the better to spot and correct them.

Another helpful step in substrate preparation is to dust the surface with kaolin, the ultra-fine powdered form of the mineral kaolinite. This can be undertaken with an artist's mop brush, spattering and spreading the powder as a film across the topcoated surface. Once the excess dust is vacuumed away, an infinitesimally thin layer will remain, just enough to make the black paint look grey.

Adhesive application

Gilding relies on an adhesive mordant, commonly known as 'size.' The two main types are water-based and oil-based sizes.

Water-based gilding, which dates back to Egypt in the fifth century B.C., is used today for windows, other types of glass, furniture, interior carvings and picture frames. Exterior signs, on the other hand, rely on oil-based gilding, which dates back to 15th-century Italy.

The size should be applied in as thin a layer as possible. If it is applied too thickly as a coating, the gold leaf will sink into it, resulting in a duller gild.

An oil-based size is colourless, so it can be tricky to see clearly during application. One option for improving visibility would be to add a tint. Unfortunately, any additive—such as a dye, paint tint or lettering enamel—poses the risk of changing the size's chemical and physical properties.

This is why the aforementioned dusting is helpful. As the size is applied on the grey kaolin-coated surface—using an artist's white sable brush or, for areas that need sharp, clean edges, a quill lettering brush—each stroke is highly visible, resembling a new coat of high-

gloss black paint. It is all the easier, then, to judge when the size's coverage is complete.

The kaolin dust has far less of a contaminating effect on the size than an additive would, so adhesive integrity is maintained. Indeed, all applications of size can benefit from pre-dusting, including high-relief appliqués and masked flat or carved letters.

Kaolin also helps prevent 'shiners,' i.e. gold specks adhering to the wrong parts of a newly painted substrate. And the powder can easily be removed later with a water-moistened paper towel or an appropriate water-based solvent cleaner.

The oil-based size will need time to cure after surface application, so it can achieve sufficient tack for the gold leaf. There are fast and slow formulations available, which may cure in only one to three hours or well after 12 hours.

The reason to choose a slow oil-based size is to support a more brilliant and durable gild. Indeed, the longer the cure, the better. Some gilders opting for the slow size prefer to wait for at least 48 hours before applying any gold leaf.

Those who test the quality of the tack usually do so by gently running their knuckle along the size. If there is a slight squeak, the size has cured sufficiently.

Types of gold

Pure 24-karat gold leaf provides a visually striking appearance, but is typically too soft for sign applications. Instead, signmakers turn to alloys that combine malleable gold with copper and silver to ensure a more 'workable' type of leaf.

Popular alloys are often still quite pure, such as 23-karat and 23.5-karat gold leaf (see Figure 1), which are good options for outdoor sign gilding. Other alloys with lower gold content, such as 21-karat 'moon gold' and 18-karat 'lemon gold,' should only be used for indoor signs.



Lighter 'patent gold' may suffice when gilding cove borders, flat surfaces and other simple applications.



Very light tamping with a white sable brush may be needed to ensure full contact between the gold leaf and the adhesive.

Oil-based gilding dates back to 15th-century Italy.

'Loose leaf' gold offers the desired lustre and can be used to gild complex objects and intricate shapes. It weighs about 18 to 20 g (0.6 to 0.7 oz) per 1,000 sheets. The gold sheets are sandwiched between tissue sheets dusted with 'rouge' powder to prevent unwanted adhesion. As even a full book of these sheets is floppy, they should be backed by a piece of firm posterboard before any work begins with the gold leaf.

As mentioned earlier, the gold leaf is too delicate to be handled directly. Instead, gilder's tools are needed, including the following:

- Gilder's tip.
- Gilder's knife.
- Gilder's mop brush.
- White sable brushes.

Working from the last sheet to the first, the gilder should use the tip—'charged' with a tiny amount of oil, to attract the gold leaf to the hairs of the brush—to transfer the leaf from the booklet to the size-coated sign surface. In turn, the oil base of the size attracts the gold leaf to attach to itself. The simplest way to achieve the 'charge' is to apply the gilder's tip to a small source of oil, which could be lip balm or even the gilder's face.

The knife, meanwhile, is used to cut the gold leaf into smaller segments as desired. In most cases, full sheets are not needed, so the leaves are instead cut into strips as narrow as 6.4 mm (0.25 in.). The knife does not have to be particularly sharp, but it must be clean and smooth or it could cause rips and tears.

For simpler applications, like gilding cove borders or flat surfaces, 'patent gold' may suffice. It weighs about 12 to 18 g (0.4 to 0.6 oz) per 1,000 sheets.

Tools are not needed when handling this lighter material, as each leaf is attached to a sheet of tissue,

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which can simply be pressed lightly into place. A soft white sable brush can be used to ensure it adheres properly.

While patent gold has a place in limited applications and is novice-friendly, for most professional work a gilder must graduate to using loose leaf.

Precision gilding

The primary advantage of loose leaf over patent gold is the capability to cut strips in a variety of widths, using the knife. The white sable brushes, too, are helpful for precision work—e.g. to fill a void—because their hairs, though soft, are rigid enough to tear off, move and apply tiny pieces of gold leaf.

Once the leaf has been applied to the size, it may require a very modest degree of ‘tamping’ to ensure full contact. The pressure applied with the soft brush should be extremely gentle. The less the gold is touched, the better. Excessive contact will scratch the leaf or sink it into the size, thereby reducing the lustre.

While water- and oil-based gilding are two very disparate techniques, sometimes terminology from one field infiltrates the other, with potentially detrimental results:



Gilding with glue

One alternative to an oil-based size is to attach a vinyl mask to the substrate and then apply an expandable polyurethane (PU) adhesive-type glue to the masked area.

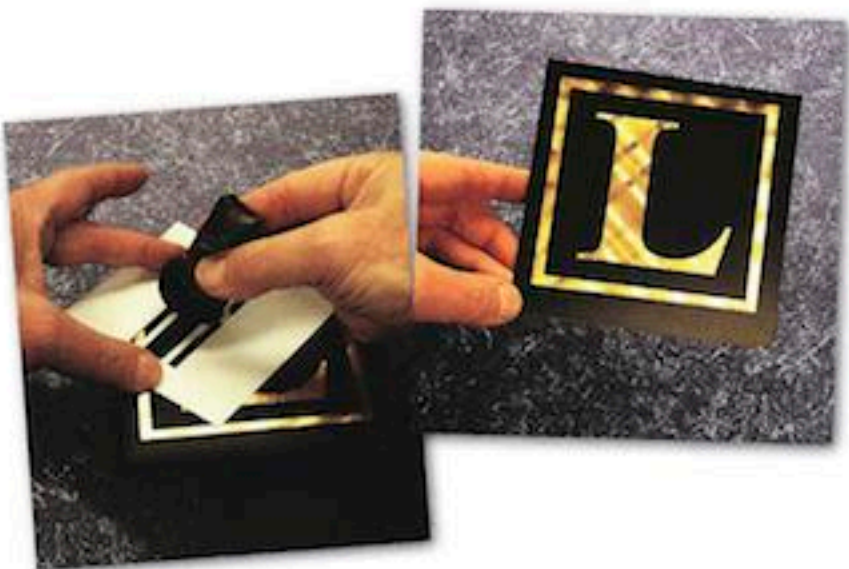
Using a chopstick, the glue is initially spread in a uniform fashion—but then, after about 10 minutes, it is stippled by moving the stick up and down, creating a non-uniform texture.

After another 10 minutes, the mask is removed and loose leaf gold is applied with a gilder's tip, making sure not to pick up any glue on the tip. As the glue cures, the gold leaf will be fused to it, creating a striking stippled gold effect. Finally, a white sable brush can skew-dust this ‘stippled gild.’

The durability of this textured gild has been observed to be similar to that of a traditional oil-based gild.



Gold leaf can be creatively scratched for esthetic purposes of etching. The simplest method is 'engine turning.'



Using a cut template 'mask' can help achieve more elegant etching patterns, making the gold appear lighter or darker.

The term 'burnishing' is a problematic example. In surface water-based gilding—and not for glass signage—one of the final steps involves polishing the gold leaf with an agate burnisher. In oil-based gilding, however, there is no such thing. It is very important to never try to burnish or polish the gold leaf on a sign, as this will result in a scratched, lustre-free gild.

The only appropriate final step after the very slight tamping is to remove excess gold 'skewings'—which look like veins—with a gilder's mop. This can be described as skew dusting and has no similarity to burnishing. The skewings should be saved, as they are valuable and can be sold to gold refiners.

While one should generally never scratch gold, however, the leaf can be creatively scratched for esthetic purposes of etching, so long as the process is carefully controlled. Gold on a flat substrate, for example, might be etched to improve its appearance when interacting with light.

This requires the nap (i.e. raised surface) of a piece of velvet cloth—which can ensure uniformity of scratching—rounded and wrapped over



The creative use of etching can help emphasize a sense of depth for letters and numbers.

a cotton ball. The simplest technique is 'engine turning,' which involves twisting the velvet piece in a circular pattern on the gold leaf.

More elegant patterns can be achieved by stroking the velvet over a cut template 'mask' in straight lines. Horizontal lines will make the gold look lighter, while vertical lines will make it appear darker. One creative use of this type of etching is to create optical illusions, whereby two-dimensional (2-D) letters or numbers appear three-dimensional (3-D).

Francis S. Lestingi, PhD, owns and manages Signs of Gold, specializing in hand-carved, gilded wooden signs, and is a member of the Society of Gilders' board of trustees. For more information, visit www.signsofgold.com.