extra

FRANZISKA MORLOK
TILL BECKMANN

extra

Encyclopaedia of Experimental Print Finishing

with contributions
by Markus Zehentbauer
and Uwe Jäger

BIRKHÄUSER
BASEL · BOSTON · BERLIN

As designers interested in using print finishes we always ended up facing the same problem: a lack of proper examples illustrating the effects and possibilities of the individual techniques. Because they rely on photographs, design books fail to convey the haptic quality of finishes. For a truer representation of the different finishes, we had to turn to the sample books of individual companies, but these are often very technique-based and fail to convey the aesthetic attraction. Nor do they give insights into the full range of possibilities, because each firm usually specialises in just a few techniques.

There are two opposing currents in contemporary graphics. As digital design becomes ever more important there is also growing interest in haptic qualities, special papers, and quality work. Print finishes are one possibility for lending greater materiality and durability to two-dimensional graphic design. Some techniques, such as *lenticular printing* [▸ 30] or *diffraction foils* [▸ 39], bring movement to a surface, while others, such as *rub-off ink* [▸ 27] or *thermochromic ink* [▸ 22], invite interaction. In this book we set out to show actual examples of the full diversity of finishing techniques, giving visual and technical overviews of the available options.

For the visual part we invited thirty international designers each to explore and interpret one of the techniques. The only rule was the technique itself (needless to say the design had to be technically feasible). Their experimental designs show how finishes can go far beyond the usual functional applications in packaging and advertising (for example, to make a car look shiny or a wine label appear more refined). These pages with examples of finishes are cross-referenced with articles about the techniques, forming a visual index that allows the book to be used intuitively.

The techniques are explained in five comprehensive sections: printing and varnishing, foil lamination, embossing, cutting and edge finishing. Thirty-three individual texts describe the techniques used and explain their most important properties, advantages, and drawbacks. We outline a few basic rules for dealing with the individual techniques, but that should not be taken as meaning there are no alternatives. Essays address general questions about planning [▸ 78], perception [▸ 92], and environmental considerations [▸ 96], and we have an interview with the Swiss designers Müller + Hess [▸ 82], who opened up their treasure trove of design experiments for us. All the important specialist terms are explained in the glossary.

The outcome is a designer's reference work by thirty graphic designers from nine countries with eleven production firms, thirty-three finishing techniques, five kinds of paper, and forty-six spot colours in the final artwork. That tested the limits – not only of the layout software. We had spent a long time looking for this book, but never found it. So in the end we made it ourselves.

Printing & Varnishing

Matt, satin, and gloss varnishes [▷2] spot varnish
Alongside *foil lamination* [▷1, ▸36], varnishing is the commonest paper-finishing technique. Varnish is applied by *offset printing, flexography,* or *screen printing*, with *screen printing* allowing the thickest application. Varnish printed across the whole surface protects the printed product from wear and dirt. It can, however, also be used as a design feature on parts or the whole surface, and even to reproduce fine details, raster images, and small typefaces.

Various different effects can be achieved using varnishes. Gloss varnish, for example, reflects a lot of light and can be used to simulate the qualities of photographs: the details appear sharper, the colours more saturated. The silky surface of matt varnish reduces reflection by scattering the light, and is therefore especially suitable for text. The effect of satin varnish is in-between matt and gloss: it emphasises the surface without making it appear dull.

The most important varnishes and processes for surface finishing

UV varnish
UV varnishes have the most striking effect of all varnishes. Their gloss is glossier, their matt duller. They are suitable for full-surface as well as partial printing (for example to bring out fine details, raster images, or small typefaces). UV varnishes are highly *viscous* and have a solid content close to 100 per cent; they retain their plasticity as they harden under UV light. For that reason UV varnishes are also used as *tactile varnish* [▷5, ▸13] and *structured varnish* [▷4, ▸12]. They are solvent-free, highly protective, and wear-resistant. UV varnishes can be applied *in-line* by *offset printing* or *flexography* using a varnishing unit, or by *screen printing* which allows thicker application.

Dispersion varnish, water-based varnish
Water-based dispersion varnishes offer a finish ranging from matt to medium gloss. They can be used as a protective coating and/or for aesthetic purposes. Their effect is not as marked as UV varnishes, but they do protect the paper from yellowing. Dispersion varnishes are applied *in-line* by *offset printing* using a varnishing unit.

Oil-based varnish
Oil-based varnishes are used above all as surface protection. They increase the stability and sheen of the printed product, but their gloss is too low for a strong aesthetic impact and they do not protect the paper from yellowing. Oil-based varnishes are applied *in-line* by *offset printing* using an inking unit.

Drip-off varnish
Drip-off varnish is applied in a two-stage *in-line offset printing process* that can be used to generate striking matt/gloss contrasts. First, a special oil-based matt varnish is applied to the parts that are to appear matt. Then a high-gloss dispersion varnish is applied to the whole surface but allowed to drip off the repelling matt areas before drying. The effect works best on glossy *coated paper*.

Hybrid process, hybrid varnish
The hybrid process is similar in principle to the drip-off process, but produces an even more marked effect. First a special oil- or water-based matt varnish is applied to the parts that are to appear matt. Then a high-gloss UV varnish is applied over this. The two varnishes interact to create a granular texture. Hybrid varnish can be applied *in-line* by *offset printing*.

Note
The choice of varnish depends above all on whether its primary purpose is protective or aesthetic. All varnishes change the appearance of the ink underneath.

Data
For full-surface applications it is sufficient to specify the varnish required; it is not necessary to define the solid area in the file. Partial applications should be assigned to a clearly defined layer and identified as *spot colour* set to *overprint*. Depending on the motif, *trapping* may be required to avoid *gaps*.

Printing substrate
Varnishes can be printed on *coated* and *uncoated papers,* with different effects for the respective papers. With *screen printing,* varnishes can also be printed on foil, cardboard, and other materials.

Finishing
Full-surface varnish has a protective effect but, unlike *foil lamination,* is not tear-resistant. Varnishes can be combined with other printing and print finishing techniques if no final varnish is applied, for it seals the surface and makes further surface finishing impossible. Specific details should be clarified with the printer.

Costs
Partial varnishing increases costs, because – unlike for full-surface application – an additional plate or screen is required.
★ UV varnish (dispersion, and oil-based varnishes are considerably cheaper)

UV varnish matt

UV varnish gloss

Soft-touch varnish [▷3]
Soft-touch varnish gives surfaces a special texture: depending on the make, it can feel velvety, rubbery, or soft. Its extremely matt finish works especially well with partial applications, but it can also be printed across the whole surface. Soft-touch varnish can be printed by *screen printing, offset printing,* and *flexography*, with *screen printing* allowing thicker application. It is *transparent* and generally colourless, but can also be coloured like any varnish using *pigments*. Soft-touch varnish is widely used in other applications too, for example in the car industry to make interior panels appear softer.

Note
Because soft-touch varnish is extremely matt it mutes the colours underneath, absorbs light and is sensitive to scratching. Scratches are more noticeable on dark bases than on light ones. With fine soft-touch varnishes even filigree details, raster images, and small typefaces can be printed.

Data
Soft-touch varnish should be assigned to a clearly defined layer and identified as *spot colour* set to *overprint*. Depending on the motif, *trapping* may be required to avoid *gaps*.

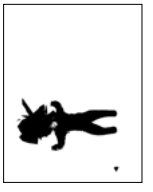
Printing substrate
Coated papers and papers with a smooth surface are best suited to bring out the effect of soft-touch varnish. With *uncoated papers, test prints* are recommended. With *screen printing*, soft-touch varnish can also be printed on foil, cardboard, and other *substrates*.

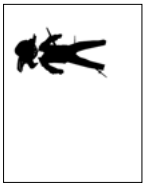
Finishing
Because soft-touch varnish scratches easily, *finishing* must be conducted with the utmost caution. The slip-resistant surface can interfere with automated handling. Soft-touch varnish can be printed *double-sided* and *bled off*.

Costs
★


Cyan, magenta, black


Fluorescent ink Offset printing


Soft-touch varnish


Scented varnish

Structured varnish [▷4] structure varnish, structure effect
Structured varnishes are *UV varnishes* [▶8] that create a particular structure when they harden. They can have optical or textural effects or – with appropriate artwork – the surface structures of wood or textiles. The structural effects are created by various particles added to the varnish. Finer and coarser standard structured varnishes are available, but it can also be mixed to order, for example to create the texture of sandpaper. The varnish has functional uses too, such as non-slip coatings on floor stickers and mousepads. Structured varnish is an especially obvious choice where particular features of a printed product are to be highlighted haptically. It is applied by *screen printing* and is *transparent* and generally colourless, but can also be coloured like any varnish using *pigments*.

Note
The motif to be printed is a factor when selecting a structured varnish. For example, a coarsely structured varnish cannot be used to print sharp edges and fine lines. The finer the image, the finer the structured varnish must be. Because of the effect of the added particles, the varnish is always matt, absorbs light, and mutes the colours underneath.

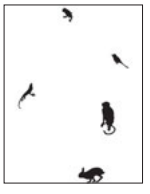
Data
Structured varnish should be assigned to a clearly defined layer and identified as *spot colour* set to *overprint*. Depending on the motif, *trapping* may be required to avoid *gaps*.

Printing substrate
Structured varnish can be printed on *coated* and *uncoated papers*, with different effects on the respective papers. Because it is applied so thickly, a heavier paper is recommended; the paper must not be too soft or the structure will leave marks on the opposing pages. Other *substrates* such as foil and cardboard can also be printed with structured varnish.

Finishing
The coarser the structured varnish, the more caution is necessary to exercise during *finishing*, as the structure can scratch or make a mark. *Double-sided* printing with structured varnish is in principle possible, but the printer should be consulted and tests carried out. Structured varnish should not be *bled off*, to prevent cracking and flaking when trimmed.

Costs
★


CMYK


Structured varnish

Tactile varnish [▷5] relief varnish, Braille varnish
Tactile varnish is a highly *viscous UV varnish* [▶8] that is applied exceptionally thickly. Used to make lettering and other elements stand out three-dimensionally without deforming the *substrate,* it has a solid content of nearly 100 per cent and retains its plasticity as it hardens. Owing to its special haptic qualities it is also used to print Braille. Tactile varnish is applied by *screen printing* and the thickness of the application can be adjusted. It is *transparent* and either glossy or matt, but can also be coloured with *pigments*.

Note
The best effect is achieved where tactile varnish is used for linear motifs. Fine lines and other details cannot be made quite so thick but they still stand out well. Large areas, on the other hand, appear uneven with indistinct edges, and the varnish sinks in the middle. Because the *resolution* of tactile varnish is limited, the printer should be consulted about the minimum line thickness. Like all other varnishes, *transparent* tactile varnish alters the effect of the colours underneath.

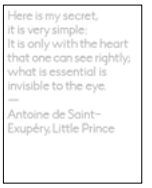
Data
Tactile varnish should be assigned to a clearly defined layer and identified as *spot colour* set to *overprint*. Depending on the motif, *trapping* may be required to avoid *gaps*.

Printing substrate
Tactile varnish works best on *coated papers* and papers with a smooth surface. With *uncoated paper test prints* are recommended. Because it is applied so thickly, a heavier paper is recommended. Other materials such as foil and cardboard can also be printed with tactile varnish.

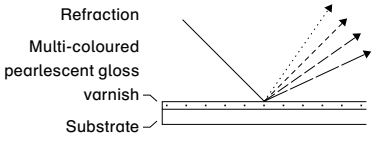
Finishing
Finishing must be conducted with the utmost caution, to avoid damaging the thickly applied tactile varnish. To avoid leaving marks on the opposing pages, paper printed with tactile varnish should be cut carefully in small batches. Tactile varnish should be printed only on one side and not *bled off*, to prevent it from cracking and flaking when trimmed.

Costs
★

CMYK



Tactile varnish



Effect pigment varnish [▷6] effect varnish, effect ink, Iriodin ink, interference ink, pearlescent ink

Inks containing effect pigments such as aluminium, polyester, or pearlescent particles can generate an enormous range of results, reflecting and refracting the light or producing *interference* effects, with the exact effect depending on the size, composition, and surface properties of the particles. Effect pigment varnishes all have a metallic sheen and are more subtle than *glitter varnishes* [▷7, ▸16]. There are metallic, *Iriodin*, multi-colour, and tilt effects. With the tilt effect, the colour changes depending on the viewing angle and the light, for example from metallic green to metallic purple. The multi-colour effect uses metallic pigments that shine in the colours of the rainbow.

Effect pigment varnishes are *transparent*, so the higher the proportion of effect pigments the more opaque they are and the stronger the result. They can be applied either over the top of printing inks, for greater effect, or underneath. In both cases, the effect pigments blend visually with the printing ink to create variable colour effects. Effect pigment varnishes can be printed by *offset* or *screen printing*, the latter allowing a thicker application and the use of coarser *pigments* for a more powerful result. Special security pigments with similar effects are used to print forgery-proof documents: the particles appear as black dots when photocopied or scanned.

Note

The motif to be printed is a crucial factor when selecting effect pigments. For example, it is impossible to print fine lines and sharp edges using coarse effect pigments. The more delicate the image, the finer the effect pigments must be. Effect pigment varnishes are *transparent* and react very differently depending on the underlying colours; most effect pigment inks work best on a dark base.

Data

Effect pigment varnish should be assigned to a clearly defined layer and identified as *spot colour* set to *overprint*. Depending on the motif, *trapping* may be required to avoid *gaps*.

Printing substrate
Effect pigment varnishes can be printed on *coated* and *uncoated papers,* with different results depending on which is used. A *test print* is recommended, because the *pigments* have to be matched with the *substrate*. With *screen printing*, effect pigment varnishes can also be printed on foil, cardboard, and other *substrates*.

Finishing
Depending on the *substrate* and pigment size, effect pigment varnish can crack when folded. To avoid this, the *substrate* should be carefully scored first. Effect pigment varnish can be printed *double-sided* and *bled off*. Certain metallic inks rub off and have to be protected by a *varnish coating* [▶8]. That should be clarified in advance with the printer, and tested if necessary.

Costs
Effect pigments are relatively expensive, but costs can be saved by applying less thickly.
★★

CMYK

Effect pigment varnish