



01.10.2019 / Ronald Reddmann

Expert tip: Interaction between printing ink and adhesive

Do you process full-surface offset printed papers with mineral oil based printing inks? Or are digital printing systems employed which use fuser oils? Depending on the technology, these substances, which are relevant for the printing process, can have a significant impact on the durability of the perfect binding.

First, the case of conventional application in sheet-fed offset printing. The fact is that most of the mineral oils contained in the printing ink penetrate the paper or cardboard during the drying process. The mineral content remaining in the paper depends on the degree of surface coverage. Depending on the amount of ink, more than one gram of oil may be present per square meter of paper surface.

Store for as long as possible

But what impact does this have on perfect binding? There is a certain affinity between mineral oil-based offset inks and hotmelt adhesives. This means that mineral oils can migrate into the adhesive film. The problem is that this can reduce the adhesive strength over time. Here is an important tip for you: How signatures are stored from printing through to perfect binding plays a major role. The longer that storage is possible - preferably 48 hours or more - the lower the risk of later damage to the book.



Keep gluing surfaces open

For full-surface printed pages, it is also very useful to make a recess in the color areas of the gutter margin. This avoids direct contact between the printing ink and adhesive, reducing the risk of oil migration directly into the spine glue. However, studies have shown that this is not always sufficient. That means caution is still advisable.

What adhesives?

In any case, only hotmelt adhesives with high mineral oil resistance should be used for such production orders. Today, it is still not possible to produce EVA hotmelt adhesives with absolute mineral oil resistance. The exception here is polyurethane adhesive. Even if economic considerations speak for the use of EVA hotmelt adhesives, I advise you to use emulsion glues or PUR adhesives for perfect binding with "risky" ink distribution. They have a higher resistance to printing ink substances. In any event, it is advisable to obtain appropriate advice or warranty from your adhesive supplier.

If the adhesive-bound products are additionally shrink-wrapped in airtight film, the risk of damage increases. This is because the film forms a closed steam space in which the mineral oil particles remain effective over the long term. Apart from the fact that PUR adhesives also need ambient humidity to cure.

The critical point with regard to oil migration is that the resulting losses usually only occur after a longer period of time, i.e. when the products have long been sent to the customer or have already arrived there. Shortly after production, they can usually not be identified.

Web offset

For the sake of completeness, we would like to take a brief look at web offset printing. The above problem does not exist here, as the mineral oil-based substances largely evaporate through hot air drying. However, the heatset drying used can lead to problems during further processing in the perfect binder. After drying, the paper comes out of the dryer with practically no residual moisture. As a result, reactive hotmelt adhesives cross-link with a delay or form waves after binding because the paper then reabsorbs moisture. It is therefore important to moisten the paper again after artificial drying so that the absolute moisture content is three to four percent as a minimum.

Fuser oil in digital printing

Now to digital printing! If fuser oil is used here, similar but not exactly identical error patterns occur. As a rule, you can immediately see here that an adhesive does not hold. For that reason, there is no time delay - as is the case with mineral oil migration. This can always be seen most impressively when the side glue can be removed full-surface from the entire printed surface. Unfortunately, adhesive inlets are also not untypical. According to previous findings, these most probably result from the surface tensions of the fuser oil-wetted pressure ranges.

Oil resistant adhesives

In principle, the following applies here too: Use adhesives that are as oil-resistant as possible (PUR) and aim for pressure-free areas. If this is possible from a design point of view – the buzzword is photo overflows in photo books! As a rule, special attention must be paid to spine preparation. In this case, settings might have to be made for the tools, which deviate from the standard. Regular inspection and maintenance of the tools is also a basic requirement to avoid having to deal with subsequent complaints.



It goes without saying that it would also be ideal in digital printing to leave the products lying for longer to allow the oils to escape. However, here, in particular, things often have to move fast. Polyolefin hotmelts can be an interesting alternative to classic EVA hotmelts. They are more heat-resistant and absorb significantly more components from printing inks without having a negative effect on the sheet edge strength. However, they are not an equivalent alternative to the well-known PUR adhesives. The reason is that, in addition to cold glue, PUR still has the highest pull values and the highest resistance to ink substances.

In all cases, the following applies: The processing of critical materials requires close coordination between users, machine manufacturers, and adhesive and paper suppliers.

I hope these tips will help you produce even better and more durable books on our perfect binders. And if you have any further questions, I will be happy to help you!

Best wishes,

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