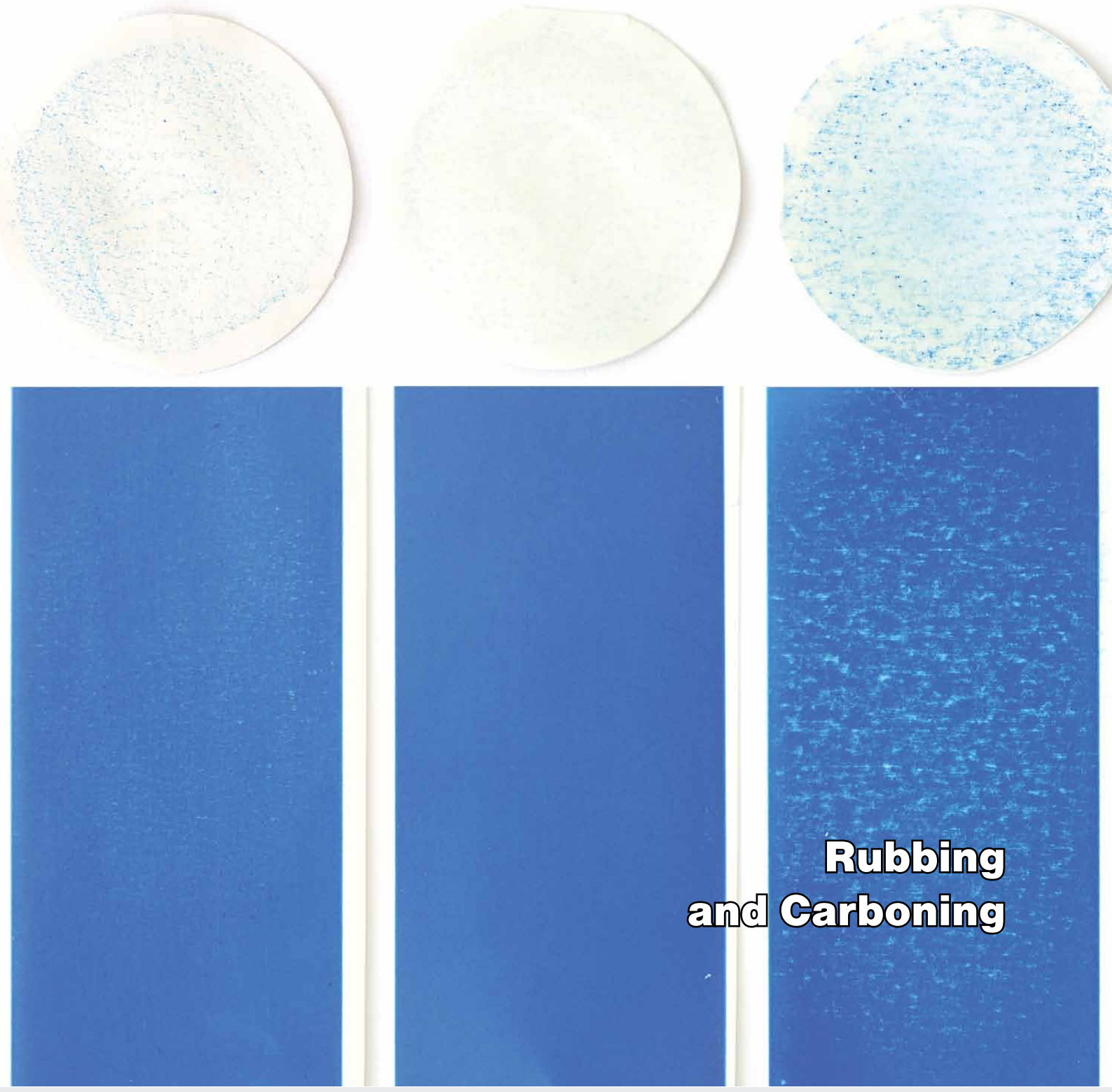
INKFORMATION



Rubbing and Carboning

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Rubbing and carboning differ with respect to the way they arise and their appearance, and this is why they should be viewed as separate phenomena. A print with good rub resistance can exhibit a high level of carboning (and vice versa), whereas a print with poor rub resistance can perform well in a carboning test.

Rubbing

Rubbing is a problem that arises when printing matt-coated papers in particular. Owing to the characteristically rough structure of matt-coated papers, their surface is considerably more abrasive compared with that of gloss-coated papers.

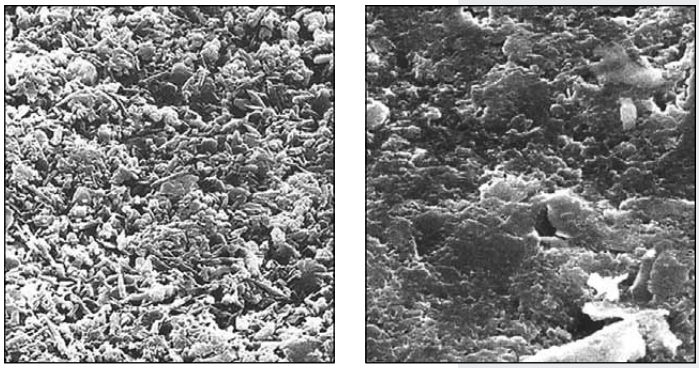

Fig. 1: left – matt-coated paper; right – gloss-coated paper

If the printed surfaces are in direct contact with one another, the printing ink can basically be stripped off the substrate when subjected to pressure and a certain amount of rubbing. The degree to which this occurs essentially depends on the surface characteristics and on the coating pigment used to coat the matt papers.

If we compare the purely paper-related influence on this negative phenomenon, we find there can be a massive difference between the rub resistance of different matt-coated papers.

Moreover, the printing inks also influence the rub resistance properties. These in turn are affected by other contributing properties, such as hardening of the ink film or the addition of waxes to improve surface slip and protect the ink surface by means of floating wax particles.

Fig. 2: Example of rubbing

The most important finishing process for paper is „coating“, which is the machine-coating of a base paper with one or more layers of a white pigment coating.

The pigment coating consists of

- pigments (minerals such as kaolin, chalk, titanium dioxide)
- vehicles
- additives (optical brighteners, resin size, starch)

The job of the vehicles is to distribute the pigments finely in the coating. The coating is used to give the surface of the paper specific qualities with respect to brightness and colour, structure and roughness.

The following grades of coated paper are available:

- matt-coated paper
- semi-matt-coated paper
- gloss-coated paper
- cast-coated paper

The type, quantity and particle size of the anti-setoff powder used in the sheet-fed offset process likewise influence rubbing of prints. Types of powder that contain calcium carbonate or glucose (sugar), in particular, as the powder particle have a highly abrasive effect, because these types of powder behave like sharp-edged, hard crystals.

Fig. 3: prüfbau rub-resistance tester

Solution

To prevent rubbing of a print, it is essential to find an optimum combination of printing ink and paper. It would of course be high desirable to use a “standard ink” with all grades of paper, but field results show again and again that this simply is not realistic. Insofar as the printman is in a position to influence the choice of stock to be used, papers (matt-coated papers, in particular) with good rub-resistance properties should be deployed.

To guarantee optimum rub resistance, we generally recommend the application of a protective coating over the prints. It is in this case important to ensure that an adequately thick film of coating is applied.

Great importance should be attached to the type of anti-setoff powder chosen. A comparative field test has revealed that starch offers far better rub resistance than calcium carbonate or sugar, because starch tends to be rounder in shape and therefore less abrasive. Other important factors are the particle size and the quantity of powder applied. The following rule applies: as small and as little as possible, but just enough and as large as necessary.

The ink must have dried fully. With coated papers, a period of at least 24 hours is recommended before finishing or transporting the prints, this period doubling to at least 48 hours for uncoated papers.

Carboning

Carboning refers to micro-scale rubbing of ink, under high pressure and with minimal movement, against the white sheet facing it, such as occurs on a trimmer. In particular, carboning occurs after cutting bled-off illustrations if the print is lying against white paper.

Fig. 4: Carboning tester

Insights and field experience so far

Our investigations have revealed that the carboning characteristics of a dry ink film are greatly influenced by the substrate. Semi-matt-coated stocks in particular demonstrate highly differing levels of carboning depending on the type of ink used. Even UV inks, whose drying system differs completely from that of conventional inks, suffer from carboning on certain substrates.

It is only possible to identify a distinct correlation between a printing ink and carboning if an ink does not dry thoroughly enough. This is also the case irrespective of the converting process (sheet-fed or web offset) and the drying process of the inks (conventional drying or UV curing).

Solution

Varying the ink formula does not offer an adequate solution to the carboning problem. The measure seen as the most reliable at preventing carboning is to coat the print with an overprint varnish or water-based coating.

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