

Sheet-fed offset ghosting

Various contact effects can arise in the offset printing process, among them, contact yellowing and ghosting. Contact yellowing refers to yellowing of the white paper at points that have direct contact with the ink on the sheet below it (see [TI 29.1.01 E](#)). Ghosting refers to the occurrence of matt-gloss effects in which the front side “leaves marks” on the reverse side. In everyday practice, it is frequently the case that no distinction is made between these two effects, even though one should be due to the great difference in how they manifest themselves.

	Ghosting	Contact yellowing
Manifestation	Matt-gloss effect in ink film	Yellowing in paper
Occurs	Only with perfecting	Already visible on one-sided print
Effect of varnishing	Intensification and/or weakening	Intensification
Lab test possible?	No	Yes

Causes

In the case of ghosting, we can assume that drying of the reverse (or perfecting) side is affected at those points at which it comes into contact with the front side, that is, the reverse side dries differently depending on contact with the front side and/or the paper coating. Acceleration of the drying process leads to greater gloss, while slowing down drying reduces the degree of gloss because more vehicle from the ink is able to be absorbed. These differences in gloss are visible as ghosting.

During drying of the oxidative-drying components of the ink, what are known as ‘decomposition products’ develop; these are volatile substances such as ketones or aldehydes. These substances can influence the drying of an ink film. Since the drying process of ink also depends on the substrate, it is not possible to rule out interaction with the substrate. This is backed up by the fact that ghosting occurs almost exclusively on high-quality, matt- and gloss-coated papers, but scarcely on woodpulp grades. The slowing-down of the drying process may also arise due to a reduction in the level of oxygen at the contact points between the front and reverse sides. Ghosting is sometimes also seen on the front side if the paper is turned quickly after being printed, that is, the drying process of the front side has been affected by the reverse side.

The precise chemical and physical processes that lead to ghosting have not yet been clarified. That said, we do know that the risk of ghosting occurring is increased by the following factors:

- Mainly black solids on the reverse side lie in the stack in partial contact with paper white and the front side.
- Short time intervals between printing of the front and reverse sides.
- High-quality papers, especially matt-coated but also gloss-coated grades.

Measures to prevent or reduce ghosting

- Printing solids on the front side.
- In order to reduce the thickness of the ink film, heavy subjects should undergo under colour reduction (UCR). In this way, the quantity of decomposition products that arise during oxidative drying can be reduced.
- No additives, in particular siccatives, should ever be added to the inks.
- Blowing air through the printed stacks helps; decomposition products can be removed in this way.
- If the print is surface-finished, dispersion varnish (special varnish for paper) should be used in preference to oil-based varnish.
- Varnishing the front side before printing the reverse side.
- No “stay-fresh” offset inks should be used. Such inks are indeed not the only cause of ghosting, but they can increase the risk.
(Ghosting was a fault that already occurred a long time before stay-fresh inks were introduced.)
- Using the low-odour drying TGA ink series.

		Fastness properties per DIN 16 524/25			
		Light WS	Alcohol	Solvent mixture	Alkali
Yellow	41 TGA 5025	5	+	+	+
Magenta	42 TGA 5025	5	+	+	–
Cyan	43 TGA 5025	8	+	+	+
Black	49 TGA 5025	8	+	+	+

This ink series does not give off any troublesome decomposition products during the drying process. Since the high rub resistance values of oxidative-drying inks are not obtained with this ink series, we recommend subsequent varnishing.