

The Use of Polarizing Filters

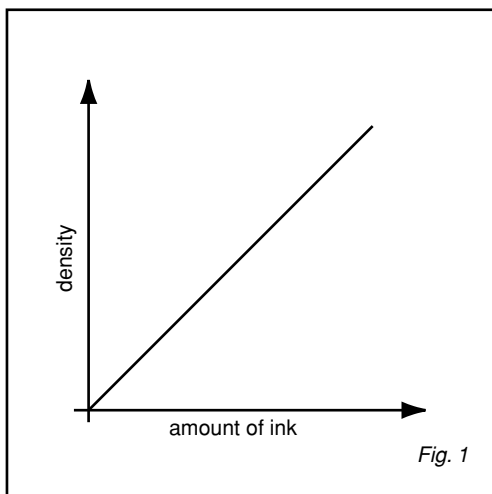
TECHKON APPLICATION NOTE 1

1 Introduction

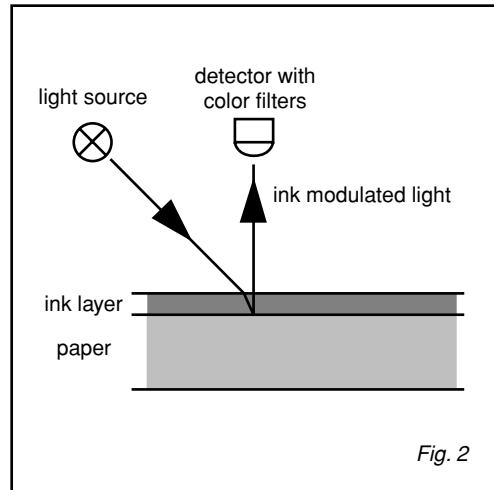
TECHKON densitometers are usually equipped with polarizing filters, as recommended in European and international standards. In the following, the theoretical background and the advantages of using polarizing filters are explained.

2 Measurement principle

Measuring the optical density provides a basis for the control of the quantity of the printed inks C, M, Y and K. The relationship between the optical density and the amount of ink is linear (*Fig. 1*), which enables the user to control the ink simply by measuring the optical density.

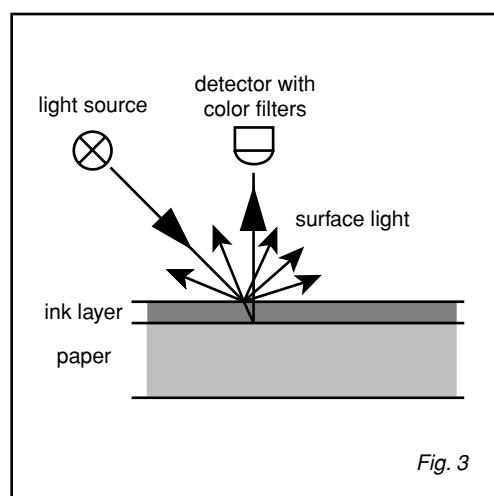


The directed radiation of the light source passes through the ink layer twice before reaching the photodetector (*Fig. 2*). The light received has been modulated by the ink layer (*ink modulated light*). The manner and extent of this modulation depend on the thickness and the composition of the ink layer.



3 The Effect of Surface Light

The light from the light source is partly reflected at the surface without entering the ink layer. This *surface light* does not get modulated by the ink layer. Inevitably some portion of it reaches the photodetector, and has the effect of distorting the measured result.



In effect, the linear relationship between the optical density and the amount of ink is no longer valid.

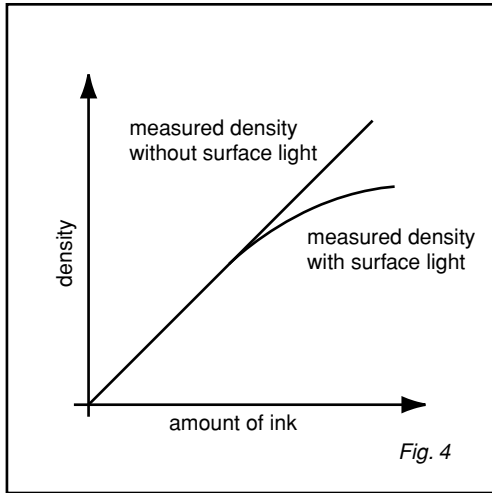


Fig. 4

The influence of surface light is greater with matt surfaces than with glossy surfaces. Matt surfaces reflect a significant amount of light into the direction of the photodetector, whereas high gloss surfaces reflect most of the radiation directly without reaching the photodetector.

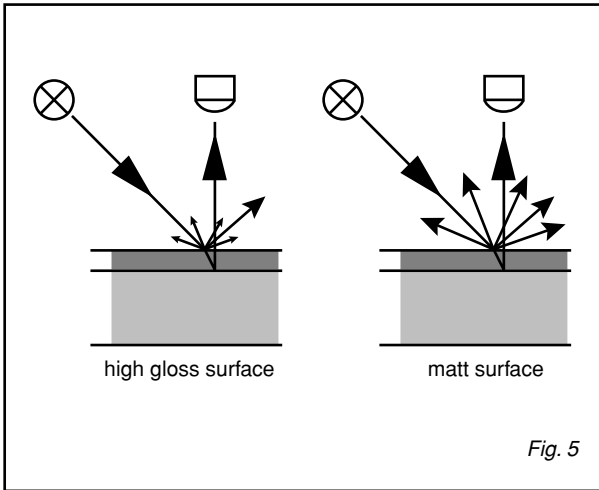


Fig. 5

This results in higher density values for high gloss surfaces, even though the ink layer might have the same thickness.

4 The Function of Polarizing Filters

Polarizing filters P1 and P2 (see Fig. 6) are mounted in crossed directions so as to prevent the surface light from entering the photodetector.

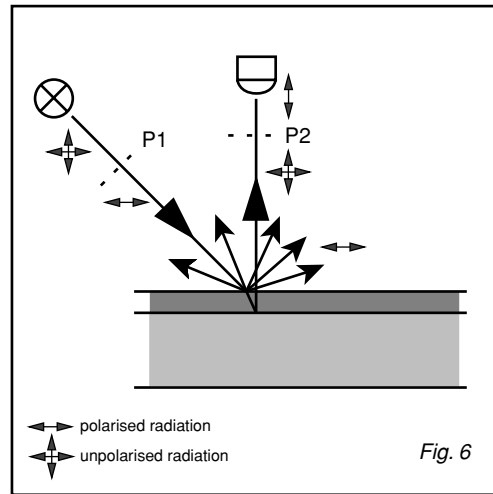


Fig. 6

The light source emits unpolarized radiation, which becomes polarized in the 0°-plane by the filter P1. By passing twice through the ink layer the *ink modulated light* loses its polarity. Only the 90°-plane portion can pass the filter P2 and enter the photodetector. The reflected surface light stays polarized in the 0°-plane, and is stopped by P2. The photodetector thus measures just the light which passed twice through the ink layer, and so the value is not distorted by surface light.