

Loss of tone ("toning")

Loss of tone is a gradual decrease in colour intensity from the gripper edge to the tail of a sheet. Experience has shown that it is less where the subject matter is distributed over the entire circumference of the plate and more pronounced where printing areas alternate with blanks (fig. 1 and 2).

If the cause were inadequate capacity of the inking unit, toning would have to be expected to occur in the opposite direction. It is a fact, however, that it is the less the larger the printing area of the plate, i. e. the area to be inked. I wish to point out that the term "loss of tone", as here used, does not mean local faintness of impression as an effect of the cylinder gap (fig. 3).

What causes loss of tone

There is some dissension of opinion as to the cause of toning. Some lay the blame on inadequacy of the inking unit. Others hold the cylinder gap responsible or say that the cylinder packings are not truly circular in the region of the sheet tail and therefore unable to exert sufficient pressure. Such explanations appear to miss the point.

The best way to determine the cause of toning is to start from the standard procedure of acceptance testing of a new machine. This includes printing from blank and normally undamped plates as a check on accuracy of register and absence of streaking. There is almost no perceptible loss of tone. It is known, however, from the theory of ink film splitting that accumulation of ink on the forme rollers caused by the cylinder gap

is practically avoided due to backward splitting of the film in the direction toward the large ink drum. Should the plate nonetheless get an excessive supply of ink because none is absorbed in the region of the cylinder gap, this excess is fed back via the forme rollers. In other words there is constant equalization of the ink flow while prints are taken from the undamped plate. When the sheets thus printed are laid alongside test sheets from a half-tone plate a striking difference will be observed. While there is no loss of tone in the "blank" print, it is conspicuous in the one from the screened plate that has taken less ink. The inference is that water must account for loss of tone. The problem of inking in offset work, therefore, cannot be adequately treated without giving attention to the damping unit.

The present state of the art is such that the distribution of water over the plate width can be kept under control. The question is: what becomes of the water that runs into the inking unit and there increases in quantity with every cylinder revolution when the machine handles paper sizes that are small in relation to the plate area? Fig. 4 exemplifies a case in which the half-tone area is approximately one half of the plate area. This example clearly shows the extent of the wetted surface that comes into contact with the forme rollers during each revolution, hence the amount of water that enters the inking unit. The known consequence of water excess is undesirable emulsifying of water and ink with resultant toning, faint impression, slow dry-