8 Gravure printing

Introduced c.1954 as a development of photochemically etching a design onto a copper plate that was then wrapped around a base. Its introduction into Europe in the early sixties, along with flexo printing, almost entirely ousted the current technology of the time.

The design screen used for gravure printing is a highly polished engraved cylinder, typically being between 52 and 60cm in circumference. The cylinder has a solid steel centre with a thinly laid, soft copper coat wrapped around it. This copper coating is engraved with the desired design.

Once engraved the cylinder is electroplated with a thin layer of chrome to create a hard wearing coating for durability. This is necessary as copper is very soft and if it was not protected in some way it would be very easily damaged during the printing process.

The tiny recessed chambers really need to be viewed under magnification to fully appreciate how shallow they are, being as they are, only microns deep. These recessed indentations are referred to as ‘cells’ and it is not unusual for there to be, dependent upon the complexity of the design, tens of thousands per square inch. The depth and width of each cell determines how much ink is applied to the paper, and subsequently the strength of colour. The shallower the cell, the lighter the colour; the deeper the cut, the more ink is applied and the stronger the colour.

On the print machine the cylinder sits partly submerged in an ink trough, whereupon the engraved cells ‘fill-up’ with ink as it rotates. Before the cylinder can release this cargo of ink the excess, which is laying on the surface of the cylinder, has to be removed. This is done using a razor sharp ‘Doctor blade’ that runs the width of the cylinder. The acutely angled blade...
skims the surface of the cylinder scraping the ink that is not stored in the cells, back into the ink tray.

The print cylinder is then squeezed against a rubber roller with the paper as its sandwich. During the high-speed rotation of the cylinder the cells release the ink onto the face of the paper.

The major benefit of **Gravure** printing is the ability to print fine tonal work and gradation of colour using a single cylinder. This gradation of colour, governed by the depth and width of each individual cell, can be from a solid colour through to anything as subtle as a 20% tint.

Combine this with the fact that a typical **Gravure** machine may have 8 or more cylinder stations, it is easy to appreciate that the perceived amount of colour achievable is extensive.

**WHILST WATER-BASED INKS CAN BE USED FOR GRAVURE, IT IS MORE USUAL TO USE SOLVENT BASED INKS, AS THESE TEND TO GIVE BETTER CONTROLLABILITY AND CONTINUITY OF COLOUR. A PRINTING BENEFIT OF USING SOLVENT INKS OVER WATER BASED ONES IS THE SPEED WITH WHICH THEY DRY. WATER BASED INKS REQUIRE SUBSTANTIALLY MORE HEAT TO ACHIEVE THE SAME RAPID SPEED OF DRYING OF SOLVENT-BASED. SOLVENT INKS NEED ONLY A MINIMUM AMOUNT OF HEAT, IF ANY AT ALL, TO ENSURE THE INK IS DRY BEFORE THE NEXT COLOUR IS APPLIED.**

1. The gravure printing machine
2. An individual print unit on the gravure machine