

## Paper

### Paper: from Its Origins to Today

The old adage "necessity is the mother of invention" also applies to the history of paper. At first, man wrote on whatever was available: bone fragments, turtle shells, pieces of wood or bamboo, and silk.

But silk was very expensive, and soon a less costly substitute was sought. Around 105 AD, the overseer of the Chinese Imperial workshops, Ts'ai Lun, and his workers created a pulp from easily obtainable materials: linen rags, hemp and mulberry bark. Once dried, this pulp could be written upon.

And so paper was created in the first century AD.

### Paper in the Western World

Obviously, communication was very difficult for our ancestors, because nearly one thousand years passed before the new invention was brought to the West by the Arabs. At first, paper was not widely used, as the kings were skeptical about the longevity of this unknown and seemingly fragile substance. But the growing need for writing materials and the lack of alternatives gave paper a firm foothold throughout Europe by the early fourteenth century.

### Today, Paper Has a Direction

When paper is torn into strips in one direction, the edges of the tear are relatively straight; but tear paper in the other direction and the edges are irregular and jagged. Why does this happen?

Paper is like wood, which is much easier to cut along the fibres than across them. Paper also contains fibres that are aligned in a particular direction.

During paper manufacture, cellulose pulp made from wood is poured onto a slow-moving screen. During this process, the fibres in the pulp are deposited in the machine direction,



that is, aligned in the direction of motion of the conveyor belt carrying the screen.

This gives the paper, once it has been sized, pressed and dried, greater tear resistance in the direction perpendicular to the cellulose fibres.

Since paper is subjected to printing, binding and other processes, tear resistance is an extremely important property.

