

Another in the series “What’s that?”

## PULPING

Pulping refers to any process by which a fibrous raw material is reduced to a useable fibrous mass. For the pulping of wood, it is the means by which the bonds are systematically ruptured within the wood structure. This rupturing can be accomplished mechanically, thermally, chemically or by a combination of these treatments. Additionally, there is the process of recovering usable pulp fibre from various waste paper sources.

**Mechanical pulping** is the oldest method in use. It functions by pressing a short log of wood lengthwise against a wetted, roughened grinding stone revolving at a speed of around 1200m/min. Fibres removed from the wood are abraded and washed away from the stone surface. The diluted slurry is screened to remove unwanted particles. Water is extracted to make it a useable pulp stock for papermaking.

A more recent development in mechanical pulping involves shredding chips of wood (generally softwood) between rotating discs in a device called a refiner. This pulp (Refiner Mechanical Pulp or RMP) typically retains more long fibres than the stone ground process and yields a stronger paper. Most new installations now employ thermal and/or chemical pre-softening of the chips. The use of pressurised steam pre-treatment produces a product called thermomechanical pulp (TMP) which is stronger than RMP and contains very little screen reject material.

In **chemical pulping**, the wood chips are cooked with appropriate chemicals at high temperature and pressure. The objective is to degrade and dissolve away all but the cellulose fibre in the form of intact fibres. The two principle chemical processes are the (alkaline) Kraft process and the (acidic) sulphite process. The Kraft process cooks the wood chips with sodium hydroxide and sodium sulphide. ‘Kraft’ is the German word for strong, and Kraft pulps produce very strong paper products.

In the sulphite process, a mixture of sulphurous acid and bisulfide ion is used. Sulphite pulps are lighter in colour than Kraft pulps and can be bleached more easily, but the paper is weaker. This, along with restrictions on the type of wood that can be involved, has caused a decline in its use relative to Kraft.

**Semi-chemical pulping** combines chemical and mechanical methods. Essentially the wood chips are partially softened with chemicals and then passed to the mechanical pulping in the form of disc refiners. Included under the classification of semi-chemical pulping are the high yield Kraft and high yield sulphide processes. In both instances the cooking is limited and the fibre break-up is done mechanically.