

Bagasse Pulp Uses in Papermaking

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Generally, nonwood plant fiber pulps can be grouped into two broad categories:

- common nonwoods or hardwood substitutes such as **sugarcane bagasse**, cereal straws, bamboo (shorter fiber species), reeds and grasses, esparto, kenaf (whole stalk or core fiber), corn stalks, sorghum stalks etc.
- specialty nonwoods or softwood substitutes such as cotton staple and linters; flax, hemp and kenaf bast fibers; sisal; abaca; bamboo (longer fiber species); hesperaloe etc.

As with wood, there are differing chemical and physical properties within the two groups depending on the nonwood fiber raw material (see **Nonwood Plant Fiber Characteristics**).

Of the common nonwood fibers, **bagasse** pulp mills are typically among the largest nonwood mills which have been build because large volumes of bagasse are available in one spot - the sugar mill. Typically, **bagasse pulp** is produced in integrated pulp and paper mills, and softwood kraft or sulfite pulp is added to provide the strength requirements to the paper. However, specialty nonwood pulp may be used instead of softwood kraft or sulfite pulp thus producing a 100% nonwood paper. The possible combinations are endless and can be adjusted to meet market requirements.

Furthermore, it is possible to add small quantities (up to 20 - 30%) of **bagasse pulp** to primarily woodpulp-based papers without impairing paper properties or paper machine runnability. This provides wood-based mills which are hardwood deficient but located within a region with available **bagasse** resources with the option of adding-on a straw pulping line to supplement their fiber requirements.

The following table provides some uses for **bagasse pulps** in papermaking. It is by no means complete as many other products could be added to the table. Rather this table provides an indication of the many possibilities which are available for the use of **bagasse fiber** in papermaking. When reviewing this table, please note:

- The bagasse pulp in the furnish is chemical pulp unless noted otherwise.
- The long fiber pulp typically would be kraft or sulfite chemical pulp (or a mixture of the two) made from softwoods, and bleached, semi-bleached or unbleached depending on the type of paper or paperboard. However, it is possible that one of the specialty nonwood fiber pulps could be used instead of softwood.

Bagasse Pulp and Long Fiber Virgin Woodpulp			
Type of Paper	Bagasse (%)	Long Fiber Pulp (%)	Quality
Bond papers	80 - 90	10 - 20	excellent
Bristol boards	100	0	excellent
"B" grade wrapping papers	60 - 70	30 - 40	acceptable
Corrugating medium	90	10	excellent
Glassine	80 - 90	10 - 20	very good
Greaseproof	75 - 85	15 - 25	excellent
Lightweight MG wrapping ⁽¹⁾	65 - 75	25 - 35	good
Linerboard	60 - 70	30 - 40	acceptable
Newsprint ⁽²⁾	80 - 100	0 - 20	very good
Sack kraft papers ⁽³⁾	50 - 60	40 - 50	acceptable
Sanitary tissue & toweling	80 - 85	15 - 20	very good
Test liner ⁽⁴⁾	75 - 85	15 - 25	good
Waxing papers	50 - 60	40 - 50	good
Wood-content printing papers	80 - 90 ⁽⁵⁾	10 - 20	very good
Wood-content writing papers	80 - 90 ⁽⁵⁾	10 - 20	very good
Woodfree printing papers	0 - 100	0 - 10	very good
Woodfree writing papers	0 - 100	0 - 10	very good

Notes: (1) Bleached or unbleached.
 (2) Typically includes combination of chemical and chemimechanical bagasse pulps.
 (3) Clupak required on paper machine.
 (4) Select kraft wastepaper could replace a portion of the long fiber virgin woodpulp.
 (5) Bleached chemimechanical or high-yield chemical pulp used for part of bagasse furnish.