



There are a wide range of hardwood and softwood trees that are used in papermaking.

Hardwoods are trees that lose their leaves in autumn.

The shorter hardwood fibres provide bulk, smoothness and opacity and are used to produce fluting medium (wavy layers inside cardboard) and printings and writings papers.

Softwoods are cone bearing trees with needles or scale-like leaves. They provide long cellulose fibres used to produce papers where strength is needed such as packaging papers.

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Pulping Processes

Paper manufacturing mainly uses off-cuts and trimmings from trees used in furniture and timber production. The unwanted wood is transformed into wood chips which are then pulped through any one of the following processes:

Sulphate or Kraft

This alkaline chemical pulping process is used to produce the majority of pulp worldwide. It uses caustic soda and sodium sulphate to "cook" the wood chips. Softwood pulped this way gives paper strength and flexibility while hardwood chips lend opacity and printability to the final product. Around 93% of pulp imported into the UK is sulphate, both soft and hardwood. It is used in all kinds of paper such as printings and writings, copier, coated, labels, packaging and many speciality papers except newsprint. This makes the process ideal for all printing papers.

Sulphite

Acid or neutral chemicals are used in this less popular process. The papermaking fibres are often softer and more flexible than the sulphate process, making the pulp ideal for blotting and photographic paper.

Chemi-Thermo-Mechanical-Pulp (CTMP)

Wood chips are ground down between a rotating steel disc and a fixed plate in mechanical pulping. CTMP takes this method a stage further by pre-softening the wood first with sodium sulphite. This process gives higher yields than chemical pulping so is suitable for bulk grades such as newsprint, tissue and packaging

boards. Hardwood CTMP is also used in bulky printing papers and as a substitute for hardwood sulphate pulp.

The pulp is then dried out, baled and transported to a paper mill. When ready, the mill re-pulps the bales and mixes in ingredients such as colours to give the final grade any characteristics it requires. The final mixture is dried out on the paper machine and fed in one continuous sheet onto a roller to form a huge roll of paper. These rolls are sent to a converter for cutting down into sheets or smaller rolls before being dispatched to a paper merchant or direct to a printer.

Hardwood Trees

ACACIA

Black Wattle (*Acacia mollissima*)

Acacia mollissima and *mearnsii* are native to Australia, grown in east and south Africa and other parts of the world. *Mangium* is native to Indonesia and northern Australia.



ASPEN

European Aspen (*Populus tremula*)

Native to Scotland, Ireland, England and Wales, grown across Europe including Sweden, Poland and Russia. Also found in northern Africa and Asia.



Quaking or Trembling Aspen (*Populus tremuloides*)

Grown from Alaska to Newfoundland and southward to Virginia, the Rocky

Mountains, extending south to southern Arizona and northern New Mexico.

BIRCH

American Birch (*Betula alleghaniensis*)

Occurs in South eastern Canada and many east coast states in US including Vermont, New York and Tennessee as well as northern Europe and northern Asia.



Downy Birch (*Betula pubescens*)

Grown in Sweden and Finland.

European Birch (*Betula sp.*)

Grown in Europe, the United Kingdom and Scandinavia.

Paper Birch (*Betula papyrifera*)

Found across southern Canada and as far and wide as Alaska, Wyoming, Massachusetts and New Hampshire in the US.

Silver Birch (*Betula pendula*)

Grown in central Spain and the US but primarily found in northern and eastern Europe, the United Kingdom, Norway, Finland and Sweden.

EUCALYPTUS

Eucalyptus (*Eucalyptus camaldulensis*)

Found in Portugal and Spain.



Eucalyptus (*Eucalyptus europylla*)

Grown in Brazil, Portugal, Spain and Australia.

Eucalyptus (*Eucalyptus globulus*)

Cultivated in Portugal and Spain.

Eucalyptus (*Eucalyptus grandis*)

Grown in Brazil.

Eucalyptus (*Eucalyptus resinifera*)

Found in eastern Australia.

Eucalyptus (*Eucalyptus rostrata*)

Occurs in Portugal and Spain.

Eucalyptus (*Eucalyptus saligna*)

Cultivated in Brazil, Portugal, Spain and Australia.

MAPLE

Red Maple (*Acer rubrum*)

Found in south eastern Canada and 34 states in the US from Vermont to Texas.



Silver Maple (*Acer saccharinum*)

Grown in New Brunswick, Nova Scotia, Ontario and Quebec in Canada and 35 US eastern states.

OAK

Black Oak (*Quercus velutina*)

Found in Ontario in Canada and 35 US eastern states.



California Black Oak (*Quercus kelloggii*)

Grown throughout south west Oregon, Coast Ranges and Sierra Nevada, Southern California.

Red Oak (*Quercus rubra*)

Found in south east Canada including New Brunswick and Ontario and 33 US eastern states.

Scarlet Oak (*Quercus coccinea*)

Occurs in Ontario in Canada and in 28 US eastern states.

POPLAR

Balsam Poplar (*Populus balsamifera*)

Found across southern Canada and 34 US states including Alaska, California and Delaware.



Yellow Poplar (*Liriodendron tulipifera*)

Occurs in 30 states in the US including Texas, Louisiana and Virginia.

Softwood Trees

FIR

Balsam Fir (*Abies balsamea*)

Found in southern Canada and 15 north eastern US states.



Douglas Fir (*Pseudotsuga menziesii*)

Occurs in Great Britain, Ireland, France, Belgium, Germany, New

Zealand, Australia, Alberta and British Columbia in Canada, US west coast states such as Arizona, California and Nevada as well as New York.

PINE

Chile Pine or Monkey Puzzle Tree (Araucaria araucana)

Native to Chile and Patagonia, grown in Brazil.

Jack Pine (Pinus banksiana)

Found in Arctic Circle, southern Canada, including Yukon Territory, as well as 14 US states such as Alaska and Indiana.

Loblolly Pine (Pinus taeda)

Native to 15 south eastern states in the US including New Jersey, Florida and Texas.

Lodgepole Pine (Pinus contorta)

Native to both Alaska and Mexico and includes the Pacific Coast variety (contorta). Latifolia grows in the Rocky Mountains, the United Kingdom, Norway, Finland, Sweden and south west of Canada while murrayana grows in south western Washington, western Oregon, California and New Zealand.

Radiata Pine (Pinus radiata)

Native to California, grown in New Zealand, Australia, Chile, South Africa, Spain, France, Argentina, Greece, India, Guadeloupe Island and Mexico.

Scots Pine (Pinus sylvestris)

Grown from Scotland to the Pacific Coast of Siberia, Finland, Sweden and Norway to Spain, Arctic Siberia to Mongolia, Mediterranean, south eastern Canada and north eastern United States, from New England to Iowa.

SPRUCE

Black Spruce (Picea mariana)

Found in north Alaska, spreading east in British Columbia, Canada, and south in the US to New Jersey and west to Minnesota.

Red Spruce (Picea rubens)

Grown east from Ontario to Nova Scotia in Canada, and from New England southwards to the mountains of North Carolina and eastern Tennessee in the US.

White Spruce (Picea glauca)

Occurs in Great Britain, across north America from Alaska, spreading east in British Columbia, Canada, and south in the US to Maine, west to Minnesota, north western Montana, South Dakota and Wyoming.

Norway Spruce (Picea abies)

Found throughout Europe such as the UK, Finland, Norway and Sweden (except Denmark and the Netherlands), south eastern Canada and the north east, the Rocky Mountains and the Pacific Coast regions in the United States.

Sitka Spruce (Picea sitchensis)

Grown in the UK, Norway and Sweden as well as British Columbia, Yukon Territory, Alaska, California, Oregon and Washington.

WESTERN HEMLOCK

Western Hemlock (Tsuga heterophylla)

Occurs in Alberta and on the coast of British Columbia in Canada, Alaska, California, Idaho, Montana, Oregon and Washington in the US, Japan, China and India.

