

Dissolving wood pulp

Sappi is the **world's largest producer of DWP**.

Unlike synthetic fabrics derived from non-renewable fossil fuels, **cellulosic fabrics** made from **DWP** breathe like **natural fibres**, have a **soft natural feel**, and offer high levels of **absorbency**.

A sustainably renewable natural fibre to meet the world's needs...

What is dissolving wood pulp (DWP)?

DWP, known within Sappi as **Specialised Cellulose**, is a purified cellulose pulp suitable for subsequent chemical conversion into a range of products. Cellulose — the most common biopolymer on earth — is the structural component of the cell walls of green plants.

What does 'dissolving' refer to?

Dissolved DWP can be spun into textile fibres, cast into a film or regenerated into a sponge. Derivatisation of the DWP without dissolution can also produce a wide range of products with different functionalities eg cellulose ethers.

What is DWP used for?

DWP 91-95% cellulose content is mostly used to make viscose fibres for use in textiles. Higher cellulose content DWP is used to make rayon yarn for industrial products such as the cord used in tyres, rayon staple for high-quality fabrics, acetate and other speciality products.

Most of the DWP Sappi produces is used to make cellulosic fibres — fashion and decorating textiles. Sappi is currently the world's largest producer of DWP.

Is all DWP the same?

No, DWP can be tailored to suit applications and meet customer requirements. The most commonly adjusted property is pulp purity. Removing lignin and hemicellulose yields high purity DWP (91-98% cellulose).

Where does Sappi produce DWP?

Combined, our three DWP mills, on two continents, can produce 1.34 million tons per annum (tpa).

South Africa

- **Saiccor Mill** 800,000tpa sulphite DWP capacity. Acquired by Sappi in 1989, this mill has been manufacturing DWP since 1955.
- **Ngodwana Mill** 210,000tpa kraft DWP capacity since 2013.

North America

- **Cloquet Mill** 330,000tpa kraft DWP capacity since 2013; can switch between DWP and paper.

We are expanding our DWP capacity at Ngodwana and Saiccor Mills by up to 60,000tpa at each mill, and debottlenecking capacity at both mills.

We are also adding 30,000tpa at Cloquet Mill through debottlenecking in a project that will be completed in 2019.

Cloquet Mill can **swing** between **dissolving wood pulp** and **hardwood paper pulp** and paper production to **optimise margins** for the US business.

We can produce **1.4 million tpa** of **DWP** and are **expanding capacity** in Southern Africa and North America.

Most of the **DWP** Sappi produces is used to for **fashion** and **decorating textiles**.

What is DWP made from?

Both Saiccor and Ngodwana Mills use *Eucalyptus* (hardwood) woodfibre sourced from responsibly managed plantations in close proximity to the mills. Cloquet Mill uses mixed northern hardwoods: aspen (approximately 65%) and maple (35%).

Is the timber Sappi uses to make DWP certified?

Our South African mills use wood fibre that is FSC®¹-certified. At Cloquet Mill, 100% of our woodfibre meets both the FSC® controlled wood and SFI® Certified Sourcing Standard. Certification by these internationally accredited organisations provides assurance that the woodfibre used in our DWP originates from sustainably managed forests and plantations.

What else can DWP be used for?

Products produced from DWP can be used in a wide range of applications: • Rheological modifiers in products such as lipstick • Cigarette filters • Fillers in fat-free yoghurt, tablets and washing powders • Cellophane wrap • Micro crystalline cellulose (MCC) is used as a binder in pharmaceuticals and as a thickener in food • Ethers are used in various industries such as pharmaceuticals, food, personal care and construction and as binding agents in paints.

What is the primary market for Sappi's DWP?

Our DWP is sold globally for use in textiles, including: Viscose staple fibres (VSF) or rayon — most of our DWP is sold into this segment and solvent spun fibres (lyocell).

Does Sappi still have confidence in the DWP market, given the prevailing over-supply?

Based on global GDP and population growth expectations and increasing affluence, particularly in Asia², we remain confident in this market segment and its continued growth.

What advantages do cellulosic fibres offer?

Breathability properties

Unlike petroleum-based fabrics, fabrics made from cellulosic fibres breathe and are comfortable to wear.

Substitution of competing fibres

Derived from woodfibre grown in sustainably managed forests and plantations, VSF has a sustainable future compared to fibres produced from finite resources, like fossil fuels. In many applications VSF is also a substitute for cotton which is highly dependent on the availability of arable land and susceptible to capricious weather conditions.

Environmental considerations

Unlike many other crops, the sustainably managed plantations and forests from which we source woodfibre are not irrigated and our minimal use of pesticides is strictly controlled by the forest certification systems we conform to. Woodfibre yields 2-3 times more cellulose than cotton per hectare.

1 Our mills' and forestry certification details, including FSC®, SFI® and PEFC™, are available online (<https://www.sappi.com/certifications>) and summarised in the Sustainability FAQs — Our certifications.
2 <http://www.oecd.org/dev/44457738.pdf>

Our pulping processes – The primary goal of pulping is wood delignification

