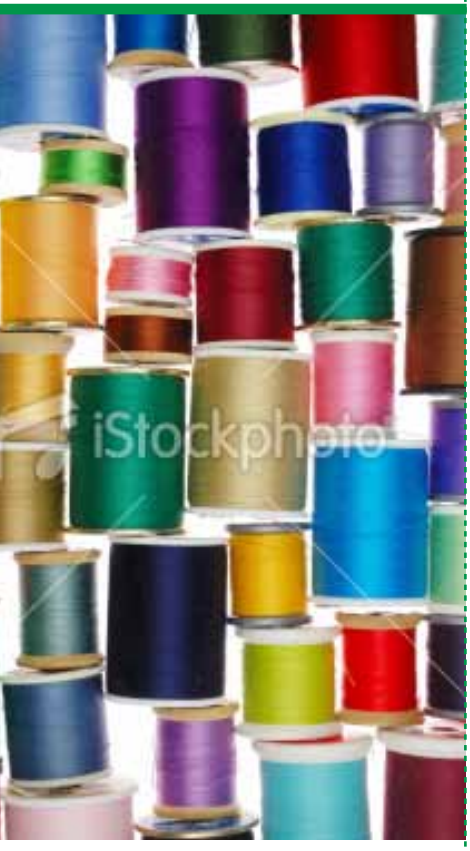
CLEAN by Design

Understanding the Three Generations of Viscose Rayon

There are three types of rayon on the market today: conventional viscose rayon, Modal and Lyocell (Tencel).

VISCOSE RAYON



All viscose rayon is neither natural nor synthetic

- It is a manufactured fiber derived from natural plant material, typically softwood trees, but is then dissolved into a strong chemical solvent, processed, and spun into fiber

There are two important aspects to the environmental impact of each type of viscose rayon: the type of plant material (cellulose) and the chemicals used to process the fiber

Conventional (first generation) viscose rayon consumes a lot of water and power, and releases chemical pollution into our air

- Production of viscose rayon is relatively energy and Green House Gas (GHG) intensive (compared to natural fibers): 100 MJ of energy/kg of viscose fiber vs. 55 MJ/kg when producing cotton.
- Carbon disulfide, the most common solvent in typical viscose rayon production, is highly toxic to both humans and the environment
- Use of carbon disulfide is typically highly dispersant; 50% of what is used is released into our air

Modal is a second-generation viscose rayon also made from the viscose process. It has a higher wet strength, making it machine-washable.

- Because Modal does not need to be dry-cleaned and can be machine washed in cold water, its overall environmental impact is less than conventional viscose rayon

However, Modal is manufactured with the same toxic solvents as conventional rayon, which seriously erodes its environmental credentials

Lyocell/Tencel is a third-generation viscose rayon that is solvent spun using the lyocell process, which does not release impurities into the environment

- Typical source of cellulose for this process is wood (like oak or birch), but also eucalyptus. Eucalyptus is a preferred source because it grows fast and thick on low-grade land, and is considered more sustainable.
- Tencel is the registered trade name for Lyocell (Tencel + Plus uses primarily eucalyptus)

Lyocell is a much better choice for the environment

- Lyocell does not use carbon disulfide, but rather a more environmentally friendly solution of amine oxide
- Lyocell production uses a closed-loop manufacturing system in which the solvent is almost completely recovered

Lyocell does rely on nanotechnology to shape its fibers with a process still not fully understood for its impacts on human health

We recommend using lyocell (Tencel) over modal or conventional viscose rayon whenever possible.

For detailed information on Viscose Rayon, please see our in-depth report and citations to research sources.

To find out more about fiber choices and how they relate to the four heaviest environmental impacts in the fashion industry, please see the Clean By Design website: **www.nrdc.org/cleanbydesign**

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