VISCOSE

fashionpositive+
Cradle to Cradle Products Innovation Institute

+ What is viscose?

Viscose is a regenerated cellulosic fiber, made from purified cellulose obtained from wood pulp.

There are many types of viscose including lyocell, viscose rayon, modal and cuprammonium rayon. These are all regenerated cellulosic fibers, but each has a slightly different manufacturing process, uses different types of wood or cellulose sources and requires different chemicals during processing. The resulting finished fibers have different aesthetic qualities such as hand and drape.

Viscose can also be referred to as rayon. Usually, the word “rayon” refers to viscose rayon or just viscose, and this is the most common type of rayon. In Europe the fabric is known simply as “viscose”, which has been ruled an acceptable alternative term for rayon by the U.S. Federal Trade Commission.

+ How is viscose made?

In the viscose production process, cellulose is transformed into viscose through a series of manufacturing steps, some of which employ hazardous chemicals. It, like other types of viscose, employs a three-step manufacturing process.

1. Wood pulp is treated with sodium hydroxide and carbon sulfide to give a very viscous (hence the name) xanthate derivative.
2. The dissolved cellulose is forced through spinnerets, which resemble showerheads, to form filament fibers.
3. The xanthate derivative is then converted back to a cellulose fiber in a subsequent step.

The viscose method uses wood, bamboo, soy or sugar cane as a source of cellulose, which makes it cheaper to produce than other types of viscose. However, the viscose process generates large amounts of contaminated waste water, which may negate the cost savings if the water is properly remediated prior to discharge.

+ What currently limits viscose as an input for the circular economy?

There are several issues with viscose as an input for the circular economy. Firstly, the chemicals used in processing are hazardous both to humans and the environment and use non-renewable petrochemicals. Specifically, carbon sulfide is highly toxic to workers and is released into the air during viscose manufacturing. Carbon sulfide causes serious neurological, cardiovascular and liver problems, as well as burns and blindness. Large amounts of hazardous waste water effluent are also produced during manufacturing.

Additionally, viscose's wood feedstock may be sourced from ancient and endangered forests. Approximately 70 million trees are logged annually for fabrics — approximately one-third of which are from ancient and endangered forests.

+ Why was viscose chosen for the Call to Innovation?

Viscose was chosen for the Call to Innovation because it is popular with fashion brands and is a valuable fiber that is gaining market demand.

Viscose, if produced in the correct facility with sustainable sourcing, could be a good candidate for *Cradle to Cradle Certi ied* GOLD level certification. It can potentially be derived from fast-growing renewable resources, produced using closed loop manufacturing and is more biodegradable than cotton.

+ What is the action plan for viscose through the Call to Innovation?

Fashion Positive PLUS members have identified viscose as a desirable material with high potential as an input to the circular economy. They are seeking a supplier with necessary technologies in place to protect workers from hazardous chemicals and to minimize emissions both to air and water by using closed loop manufacturing. The supplier must also have a traceability program in place to ensure the wood is obtained from fast-growing resources and not ancient and endangered forests.

The Fashion Positive PLUS member group will engage one to two suppliers in September 2017 to begin the certification process for viscose. PLUS members are coordinating their circularity work with the not-for-profit environmental organization Canopy (www.canopystyle.org), which is organizing an industry campaign to ensure viscose is not sourced from ancient and endangered forests.

Once the viscose has been optimized and certified, it will be added to the Fashion Positive Materials Collection.

+ What's exciting about priming viscose as an input for the circular economy?

Viscose is growing in popularity because of its desirable aesthetic. Viscose is exciting because, if produced in a sustainable way by using fast-growing tree species and closed loop manufacturing, it has the potential to make positive impact through its high volume of fashion industry usage.