Know Your Fibers: What is Lyocell?

Our Know Your Fibers series provides information about different types of fibers for our readers. This quarter, we take a look at lyocell.

A Brief History of Lyocell

Lyocell is a form of rayon which consists of cellulose fiber made from wood pulp or cotton linter. It was first developed through the pilot stage by (the now-defunct) American Enka in 1972, and they called it Newcell. Later, the fiber was commercialized by Courtaulds Fibers in the 1980s. In 1990 the first plant was opened in Mobile, AL, and Courtaulds renamed the fiber “Tencel.” When Lenzing AG purchased the Tencel plants in 2004, they combined it with their lyocell business, but they kept the Tencel™ name. They are the only major producer of lyocell fiber.

Rayon vs. Lyocell Process

As mentioned earlier, the raw material for lyocell is wood pulp or cotton linter, and like rayon the pulp is milled and bleached. However, lyocell is created using a different chemical process. Instead of using caustic soda, lyocell involves dissolution of the cellulose products in a solvent, N-methylmorpholine (NMMO, an organic non-toxic solvent). The spinning technique is also simpler and using NMMO is deemed to be more environmentally friendly, since the organic, non-toxic solvent chemical can be recycled and reused for a closed-loop productions process.

After the cellulose is dissolved in the NMMO it is extruded through a spinneret which has small holes (the diameter of the
holes determines the fiber diameter). On the other side of the spinneret, the organic solvent is removed and forms fiber filaments, one per hole. These filaments are cut into the desired fiber lengths and baled to be sold. This process allows for the recycling of almost all the organic solvent for reuse. Contrarily, rayon production does not allow for recycling so there are waste streams associated with its manufacturing.

**Lyocell Properties**

Lyocell has the hand feel of cotton and drapes well, is machine washable and resists wrinkles. The main difference in lyocell fiber versus rayon is it has higher tensile strength, both wet and dry. Lyocell does lose some strength when wet, though not as much as rayon (of course, purified cotton is stronger when wet). The degree of polymerization is great in lyocell; it’s about twice that of rayon, but cotton is still four to six times higher—which is why cotton does not lose strength when wet.

Feel free to drop us a line if you have any questions or comments!