

Rayon and Viscose: What Rayon Is, Its Properties and How It Is Made

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In one paragraph

Rayon is a fibre made from cellulose, usually wood pulp, that is dissolved and then regenerated as a fibre. It is neither natural nor synthetic: the raw material is a plant polymer, but the fibre is made in a factory. “Rayon” is the US name; in Europe the same fibre is called viscose, after the viscose process that makes most of it (16 CFR 303.7; Regulation (EU) No 1007/2011). Rayon is soft, drapes well, absorbs more moisture than cotton and dyes brightly, but ordinary viscose loses about half its strength when wet, so it shrinks and stretches if washed roughly. Modal and lyocell are newer forms that stay strong wet. Together these fibres made 8.4 million tonnes in 2024, 6% of the world’s fibre, and viscose was 80% of that (Textile Exchange).

At a glance

Rayon, viscose, modal, lyocell, cupro: the names

Name	What the law says (EU Regulation 1007/2011, Annex I)
Viscose	“regenerated cellulose fibre obtained by the viscose process for filament and discontinuous fibre”
Modal	“a regenerated cellulose fibre obtained by a modified viscose process having a high breaking force and high wet modulus”, with minimum strength values set by formula
Lyocell	“a regenerated cellulose fibre obtained by dissolution, and an organic solvent (mixture of organic chemicals and water) spinning process, without formation of derivatives”
Cupro	“regenerated cellulose fibre obtained by the cuprammonium process”

Key figures and their sources

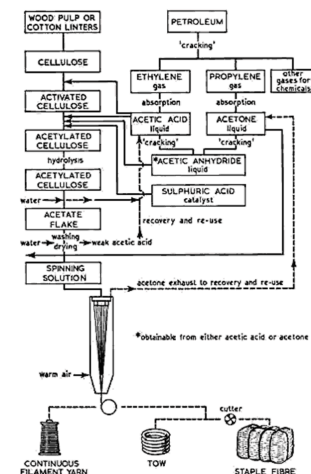
- As a result, it becomes unstable and may stretch or shrink when wet”, and “If machine washed, untreated regular rayons can shrink as much as 10 percent” (Ohio State University Extension, HYG-5538).
Source: Ohio State University Extension, HYG-5538 (web.archive.org)
- Lenzing says that for its TENCEL lyocell “more than 99.8% of the solvent is recovered and fed back into the loop” (Lenzing, claim proof, October 2024).
Source: Lenzing, claim proof, October 2024 (tencel.com)
- “Carbon disulfide is used primarily as a solvent in the viscose rayon (about 65%) and cellophane (about 10-12%) industries”, and in exposed workers “the nervous system appears to be the critical target for carbon disulfide-induced toxicity” (WHO, Concise International Chemical Assessment Document 46, 2002).
Source: WHO, Concise International Chemical Assessment Document 46, 2002 (incchem.org)
- Man-made cellulosic fibres grew from 7.9 million tonnes in 2023 to 8.4 million in 2024, and “Global MMCF production has more than doubled since 1990, when annual production was around 3 million tonnes” (Textile Exchange, Materials Market Report 2025).
Source: Textile Exchange, Materials Market Report 2025 (textileexchange.org)

- Sateri, China: “the largest MMCF producer in the world”, with “annual capacity of 2.4 million metric tonnes (including Viscose and Lyocell)” (Sateri).
Source: Sateri (sateri.com)
- Lenzing, Austria: nominal fibre capacity of 1,110,000 tonnes in 2025, under the brands TENCEL, LENZING ECOVERO and VEOCEL (Lenzing, March 2026).
Source: Lenzing, March 2026 (a.storyblok.com)
- Grasim, India, the Aditya Birla Group’s fibre company, is “India’s largest” maker of cellulosic staple fibre, with about 890,000 tonnes a year of capacity at Vilayat, Kharach, Nagda and Harihar, and 51,000 tonnes of filament yarn at Veraval and Kalyan (Grasim, integrated annual report 2025-26).
Source: Grasim, integrated annual report 2025-26 (grasim.com)

Diagrams



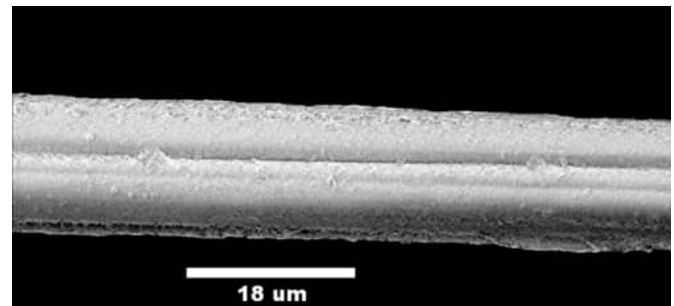
A viscose wrap dress. Its photographer notes that although it was sold as wrinkle-free, the creases still show. Photo: Tobias “ToMar” Maier, Wikimedia Commons, CC BY-SA 3.0.



How cellulose acetate is made. Unlike rayon, acetate is not regenerated: the cellulose stays an ester.



Paterson, New Jersey, 18 March 1937: a rayon skein wrapped in cloth before immersion in solution. Photo: Lewis Hine, US National Archives, via Wikimedia Commons, public domain.



A rayon fibre under the scanning electron microscope. The lengthwise striations are typical of viscose.

Revision questions

The questions readers ask most, with the article's own answer.

Is rayon natural or synthetic?

Neither. Rayon is a manufactured fibre, but not a synthetic one: it is cellulose, the same polymer as cotton, taken from wood and reshaped.

Is “bamboo” fabric rayon?

Almost always. The US Federal Trade Commission’s guidance is blunt: “most ‘bamboo’ textile products, if not all, really are rayon”, and “While different plants, including bamboo, can be used as a source material to create rayon, there’s no trace of the original plant in the finished rayon product”.

Test yourself

Ten questions on this topic. Answer them without looking, then check on the last page.

1. How does the crystallinity of viscose compare with that of lyocell?
2. How does EU Regulation 1007/2011 define modal?
3. Which solvent is used to dissolve pulp in lyocell manufacture, in place of carbon disulphide?
4. In the viscose process, what happens at the xanthation stage?
5. What does the spinning bath for viscose rayon contain, and what does it do?
6. What share of its dry strength does ordinary viscose keep when wet?
7. How does the moisture regain of rayon compare with that of cotton?
8. How much carbon disulphide is consumed per tonne of viscose staple fibre (EU reference document)?
9. What was the first commercially produced man-made fibre, and where and when did its manufacture begin?
10. How does rayon behave in a burn test?

Answers

Each answer is stated in the article; the section to read again is named after it.

1. **Viscose 30 to 40%; lyocell 50 to 65%.**
See: Is rayon natural or synthetic?
2. **A regenerated cellulose fibre from a modified viscose process, with high breaking force and high wet modulus.**
See: Rayon, viscose, modal, lyocell, cupro: the names
3. **N-methylmorpholine-N-oxide (NMMO), an organic solvent.**
See: Types of rayon
4. **Carbon disulphide converts it to sodium cellulose xanthate.**
See: How viscose rayon is made
5. **Sulphuric acid with sodium sulphate and zinc sulphate; it decomposes the xanthate and regenerates cellulose fibre.**
See: How viscose rayon is made
6. **Only about 40 to 54%.**
See: Properties of rayon fibres
7. **Rayon 11-14%, against 7-8% for cotton.**
See: Pros and cons of rayon
8. **80 to 100 kg.**
See: Rayon and the environment
9. **Chardonnet silk, in 1891 at a factory in Besançon.**
See: A short history of rayon
10. **It burns with a small flame, incandescent ash and an odour of burnt paper, like cotton.**
See: How to identify rayon

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