

Guidance: Mechanical Recycling of Cotton

This document is being published as an excerpt from Textile Exchange's upcoming Guide to Recycled Inputs, and is relevant for material recycling under both the RCS and the GRS.

Textile Exchange has identified cases where combed products made of mechanically recycled cotton fiber are being certified under RCS or GRS but could not be made of recycled material due to technical limitations.

The following calibration was published by Textile Exchange on May 17, 2021:

Due to the technical limitations of combing, carded, and recycled cotton yarn, only products containing mechanically recycled cotton with a yarn count of <Ne 34 and a fiber length of <22mm may be certified to the RCS or GRS without additional due diligence by the certification body. Products containing mechanically recycled cotton with a yarn count of >Ne 40 or a fiber length of >25mm shall not be certified to the RCS or GRS since they are not technically possible to produce.

Any products certified to the RCS or GRS prior to May 15, 2021, that contain yarn counts of >Ne 34 or a fiber length of >22mm may remain certified for the duration of the scope certificate validity but shall be reviewed in detail prior to recertification. Therefore, the certification body shall ensure to check that products listed on the scope certificate meet this threshold during the next audit of a site where applicable.

Effective May 15, 2021, scope or transaction certificates shall not be issued for products containing mechanically recycled cotton with a yarn count of >Ne 40 or a fiber length of >25mm.

This document provides more detailed information to allow certification bodies to assess a product (yarn) made from mixed cotton and other blended fibers under RCS and/or GRS for both currently certified sites and new applicants.

Questions regarding this policy may be sent to Assurance@TextileExchange.org.

Section A - Commonly Used Process

Garneting (shredding) of spinning yarn hard waste, selvage (selvedge), fabric cutting waste, or garment cutting waste can achieve a maximum fiber length as outlined in section A1.

A1. Parameters for Mechanically Recycled Cotton Fiber

| Feedstock | Output Fiber Length (mm) |
|--|--------------------------|
| Pre-consumer garment cutting waste | 6 to 21 |
| Pre-consumer yarn hard waste | 6 to 26* |
| Pre-consumer yarn hard, woven selvage (selvedge) waste | 6 to 21 |
| Post-consumer denim/jean waste | 6 to 18 |

*Dependent on the input quality of pre-consumer materials.

Spinning sites perform mixing or blending of material to create yarn. The table in section A2 outlines a list of possible yarn counts.

A2. Possible Yarn Counts with Mixing and Blending Ratios

| Type of Spinning | Yarn Counts | Mechanically Recycled Cotton | Any Cotton (for mixing) | Other (for Blending – non-cotton) |
|---|--------------------------|--|-------------------------|---|
| | | <i>Recycled Pre-consumer Post-consumer</i> | <i>Virgin</i> | <i>Virgin Recycled Pre-consumer Post-consumer</i> |
| Open End (OE)/Rotor | Ne 1 to Ne 24 (maximum) | 5% to 100% | 0% to 95% | 0% to 95% |
| Open End (OE)/Rotor | Ne 24 to Ne 34 (maximum) | 5% to 50% | 50% to 95% | 50% to 95% |
| Ringspun / Air jet (Vortex) spun – Carded, Carded compact, | Ne 1 to Ne 16 (maximum) | 5% to 100% | 0% to 95% | 0% to 95% |

| Type of Spinning | Yarn Counts | Mechanically Recycled Cotton | Any Cotton (for mixing) | Other (for Blending – non-cotton) |
|---|--------------------------|------------------------------|-------------------------|-----------------------------------|
| Carded core-spun | | | | |
| Ringspun / Air jet (Vortex) spun – Carded, Carded compact, Carded core-spun | Ne 16 to Ne 34 (maximum) | 5% to 60% | 40% to 95% | 40% to 95% |
| Ringspun / Air jet (Vortex) spun – Combed, Compact, Combed core-spun | Not possible to make | | | |

The certification body may issue scope and transaction certificates as outlined in the calibration included above and shall verify these details during the on-site audit. The certification body should invalidate or not issue scope and transaction certificates where specifications fall outside of the possible fiber lengths and yarn counts.

Section B - Innovative Processes

Some production sites claim that technological innovation allows them to achieve a higher quality (fiber length and yarn counts) with mechanically recycled cotton fiber compared to regular production (as per Section A). However, a fiber length of up to 26mm can only be achieved with pre-consumer yarn hard waste as shown in B1.

B1. Mechanically Recycled Cotton Fiber Parameter

| Feedstock | Output Fiber Length (mm) |
|--|--------------------------|
| Pre-consumer yarn hard waste [High quality fiber (length 29-40) in pre-consumer yarn] | Up to 26 |

B2. Possible Yarn Counts with Mixing and Blending Ratios

The following table outlines the possible yarn counts with mixing and blending ratios in correlation with B1 as input.

| Type of Spinning | Yarn Counts | Mechanically Recycled Cotton | Any Cotton (for mixing) | Other (for Blending – non-cotton) |
|--|---|----------------------------------|-------------------------|---|
| | | <i>Recycled Pre-consumer</i> | <i>Virgin</i> | <i>Virgin Recycled Pre-consumer Post-consumer</i> |
| Open end/ Ringspun / Air jet (Vortex) Spun – Carded, Carded Compact | Ne 20 to Ne 30 (maximum) | 5% to 100% | 0% to 95% | 0% to 95% |
| Ringspun / Air jet (Vortex) Spun – Carded, Carded Compact | Ne 34 to Ne 40 (maximum) | 5% to 25% | 75% to 95% | 75% to 95% |
| Open End (OE)/Rotor | Any yarn count | Not applicable | 5% to 95% | (5% to 95%) |
| Ringspun / Air jet (Vortex) spun – Carded, Carded | Fiber length and yarn count relationship needs to be ensured (see Organic Cotton – A Fiber Classification Guide pages 4 through 6) | | | |

| Type of Spinning | Yarn Counts | Mechanically Recycled Cotton | Any Cotton (for mixing) | Other (for Blending – non-cotton) |
|---|-------------|------------------------------|-------------------------|-----------------------------------|
| Compact, Combed, Combed Compact, Core-spun | | | | |

The certification body should verify such claims (as per B1 and B2) by reviewing a third party test report and collecting a sample during the audit. Details of findings should be shared with Textile Exchange prior to issuing or renewing certification.

Section C - Certification Body Actions

C1. New Applicants

- C1.1** The certification body should collect and share information with the Textile Exchange prior to approving fiber and yarn counts outlined in B1 and B2.
- C1.2** The certification body should inform Textile Exchange if fiber and yarn counts outlined in A1 and A2 are not possible to make.

C2. Organizations with Valid RCS and/or GRS Scope Certificate(s)

- C2.1** The certification body should collect the information related to production claims outlined in B1 and B2 during the next audit and share it with the Textile Exchange prior to recertification.
- C2.2** The certification body should inform Textile Exchange if fiber and yarns counts outlined in A1 and A2 are not possible to make.
- C2.3** The certification body may issue transaction certificates for such product(s) provided that the certification body is satisfied with the authenticity of the product based on the data collected for C2.4.
- C2.4** The certification body should collect the information below and share it with the Textile Exchange Assurance Team for further evaluation:

- C2.4.1** A process and material flow chart (from recycler up to spinning);

- C2.4.2** A list and photos of pre-consumer waste used as recycling inputs;
 - C2.4.3** A list and photos of post-consumer waste used as recycling inputs;
 - C2.4.4** A recycled cotton fiber test report;
 - C2.4.5** A list of all possible yarn counts (e.g. mix – recycled cotton + cotton, or recycled cotton + polyester/MMCF/acrylic);
 - C2.4.6** A yarn test report for yarn(s) outlined in C2.4.5 that outlines the yarn count, CSP/RKM value, and hairiness value;
 - C2.4.7** A comparative study/chart based on the test report that outlines:
 - a. Virgin cotton vs mechanically recycled cotton fiber, and
 - b. Yarn made with virgin cotton vs mechanically recycled cotton with yarn count and yarn count CV (coefficient of observed variation), CSP/RKM value, and hairiness value; and
 - C2.4.8** A fabric test report for pilling for fabrics made with mechanically recycled cotton.
- C2.5** A third party laboratory accredited to ISO 17025 should be used for testing of fiber and yarn quality.
- C2.6** The certification body and/or Textile Exchange may ask for additional information and/or supporting evidence.

Section D - Additional Reference Information

The following links are for reference only. They provide a diagram and process outline as found within *The Increasing Importance of Recycling in the Staple-Fiber Spinning Process, Part 1* published by Rieter:

- <https://www.rieter.com/products/spinning-systems/recycling-spinning-system>
- https://www.rieter.com/fileadmin/user_upload/services/documents/expertise/textile-technology/rieter-special-print-recycling-3379-v1n-en_01.pdf