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Fibersort

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RESOURCE AND MATERIALS EFFICIENCY

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Overview

The Fibersort is a technology that automatically sorts large volumes of garments and finished textile products by fibre composition. Once sorted, these materials become reliable, consistent input materials for high-value textile-to-textile recyclers. Once commercialized, it will create a tipping point for a new, circular textile industry.

This Industry Reference Sheet provides an overview of post-consumer textile material availability in North-West Europe, as well as suggested grades for textile-to-textile recycling feedstocks, their related price ranges and material certification expectations for collectors/sorters and recyclers. The purpose of this document is to provide collector/sorters, municipalities and recyclers with the information needed to understand the importance, fit and potential for the Fibersort technology.

Post-consumer textile availability in North-West Europe

The following is an estimation[1] of the annual breakdown of the post-consumer textile flows in North-West Europe.[2]

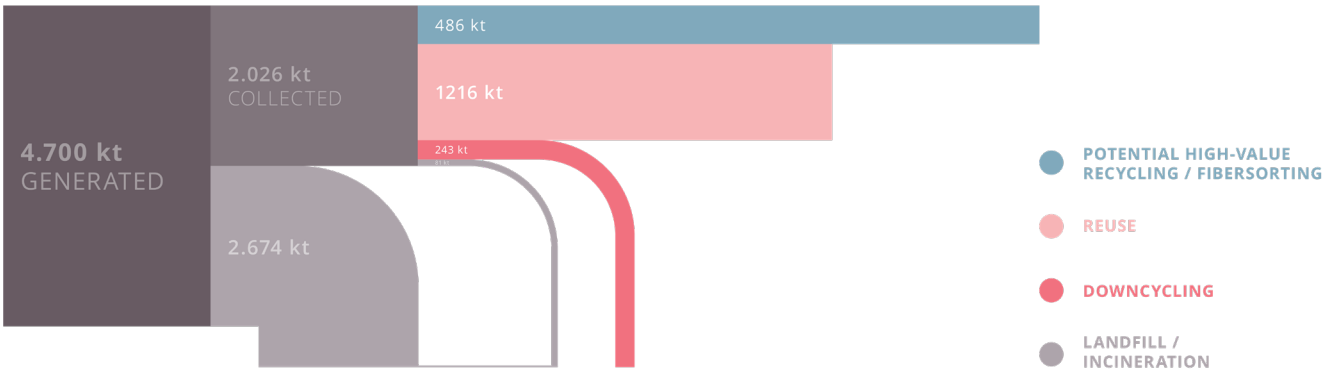

Figure 1: Annual post-consumer textile flows in North-West Europe

The figure above shows that 24% of collected post-consumer textiles are suitable to be Fibersorted[3] and have the potential to be used as textile-to-textile recycling feedstock. Within North-West Europe, this amounts to 486 Kilotonnes, the same weight as 50 Eiffel Towers, which could be recycled into new textile products. Currently, these textiles are used for downcycling or are landfilled or incinerated. As consumption and collection rates continue to grow and clothing qualities continue to decline, the number of textiles in the end-of-use phase will be sure to increase in the future, making the Fibersort and textile-to-textile recycling technologies evermore important.

Suggested grades for textile-to-textile recycling feedstocks

The list of grades below have the highest near-term potential for use as feedstocks for textile-to-textile recycling. The Fibersort sorts for these fibre categories, or grades, because these are the post-consumer textiles that have an end market and can be used for textile-to-textile recycling purposes, currently or in the near-term. Additional grades may be added and sorted for in the future depending on market demand. As of 2019, the Fibersort is programmed to sort 14 distinct grades, and has the capability to distinguish many more. For simplicity, less significant fibre grades have been combined in this report.

Suggested grades	Textiles available for Fibersort[4] (tonnes)	Estimated % of total waste stream[5]	Price range per kg (euros)[6]
100% Cotton	240,570	49.5%	0.10 to 0.30
100% Polyester	29,160	6%	0.05 to 0.15
100% Viscose	4,374	0.9%	0.05 to 0.15
100% Wool	2,430	0.5%	0.30 to 0.60
100% Acrylic	8,262	1.7%	0.05 to 0.15
Other pure fibres	6,318	1.3%	0.05 to 0.15
Other blends	98,658	20.3%	0.0
+80% Wool blends	5,346	1.1%	0.20 to 0.40
Cotton/poly blends	90,882	18.7%	0.05 to 0.15

Table 1: Suggested grades, availabilitiy and pricing of sorted post-consumer textiles

This table shows the relation between the volume and value of post-consumer textiles by fibre grade. Future technologies may change the demand and value of post-consumer textiles.

Certification Requirements

To be competitive in the future circular textiles industry, collectors/sorters and recyclers should become familiar with certifications and standards. Certifications and standards[7] serve to bring legitimacy to certain claims relating to environmental and social conditions. With the increased use of recycled post-consumer textiles, it is also becoming common for brands to request certifications to verify end products containing a certain percentage of recycled content.

Standards could also be set to ensure certain social or environmental conditions are met in processing facilities, such as requiring that second-hand clothes are only exported to places where worker rights are upheld. While currently, there is not a certification or standard specifically for Fibersorted fractions, there are various certifications and standards that relate to the use/recycling of post-consumer textiles.

Certification/ Standard	Apply to collector/ sorters	Related to recycled content	Details
Global Recycling Certification (GRS)		X	Sets requirements for 3rd party certification of recycled content, chain of custody, social and environmental practices and chemical restrictions. Monitors from recycler to final B2B transaction.
Recycling Claim Standard (RCS)		X	Recycled input requirements, chain of custody and labelling. Monitors from recycler to final B2B transaction.
Cradle to Cradle Certified (C2C)	X	X	Product assessments based on material health, material reutilization, renewable energy and carbon management, water stewardship, and social fairness
ISO standards and European Directives	X		European Directives such as the Waste Framework Directive and ISO Standard 14001. Regional certification bodies, such as TÜV in the Netherlands, can verify that these standards are met.
Individual Company Codes of Conduct	X	X	Brands and manufacturers could request individual standards be applied to a supply chain. Specifics would vary.
The Nordic Textile Reuse and Recycling Commitment	X	X	Voluntary commitment for Nordic collectors/sorters. Focused on environmental impact and facilitating reuse and recycling of textiles.

Table 2: Overview of certifications/standards related to recycled post-consumer textiles

Appendix

1. We are aware of data gaps that are present. An update of this report will be published at the end of the project

2. This estimation of post-consumer textile flows is based off a combination of research the Fibersort project conducted, Manual Sort of Post-Consumer Textiles in NWE and desktop research including: Fachverband Textilrecycling (FTR) Konsum, Bedarf und Wiederverwendung von Bekleidung und Textilien in Deutschland (2015); EcoTLC, 2016 At A Glance (2016); WRAP Textiles Market Situation Report (2016); FFact, Massabalans van in Nederland ingezameld en geïmporteerd textiel (2014). Belgian figures were estimated based on average per capita consumption and collection rates across North-West Europe.

3. Previous research, Manual Sort of Post-Consumer Textiles in NWE, determined that approximately 22% of the post-consumer textile waste stream in NWE has the potential to be Fibersorted and used for textile-to-textile recycling processes. This figure was averaged with feedback from stakeholders and project partners resulting in a figure of 24%. Recycling solutions currently in development could increase the types of fibres/fibre blends that can be used in textile-to-textile recycling, so in the future a larger portion of what is being downcycled could potentially be diverted for high-value use.

4. The post-consumer textiles that are available to be Fibersorted is an estimation of textiles that would be considered non-rewearable; can no longer be used in their current form and are made from a single material. As stated previously, this figure is estimated to be 24% of collected textiles.

5. The estimated fibre breakdown of non-rewearable textiles was determined in previous Fibersort research, Manual Sort of Post-Consumer Textiles in North-West Europe. Note this research had a limited sample size. Similar research, conducted by Telaketju, showed different fibre breakdown results: https://telaketju.turkuamk.fi/in-english/composition-of-end-of-life-textile-in-southwest-finland/

6. The price ranges do not include transportation or costs of processing. The prices are for textiles sold in garment-form (no hardware removed) and are not sorted by colour. These prices are estimates based on input from various stakeholders, reflect current collection and could change due to future supply and demand changes.

7. It must be noted that certifications and standards could increase operating costs and therefore benefit/cost analysis should be considered.