

# National Collection of End-of-life Textiles in Finland





# Towards the circular system of end-of-life textiles

Lounais-Suomen Jätehuolto (LSJH) is planning a refinement plant for recycling end-of-life textiles in Finland. At the refinement plant, the textiles will be opened mechanically on the processing line to create recycled fibre that companies can use as the raw material for their products.

Refining end-of-life textiles into recycled fibre is the missing link from the circular system of textiles in Finland. It will enable a diverse range of partnerships in collection and sorting of end-of-life textiles as well as in the use of recycled fibers.

The refinement plant is being built in stages. The first stage involves expanding the collection of end-of-life textiles from the LSJH operating area to other municipal waste management companies in southern Finland. In addition to this, the LSJH is piloting other supplementary collections, such as the KaMu collection at shopping centres, clothing stores, and flea markets during 2020.

At the second stage, collection will expand further to the areas of other municipal waste management companies. The collected end-of-life textiles will be processed in Paimio, Finland on a pilot stage processing line that will be commissioned in 2021. LSJH and its participating business partners will use this pilot stage refining to carry out company pilots aiming for recycled fibre product development.

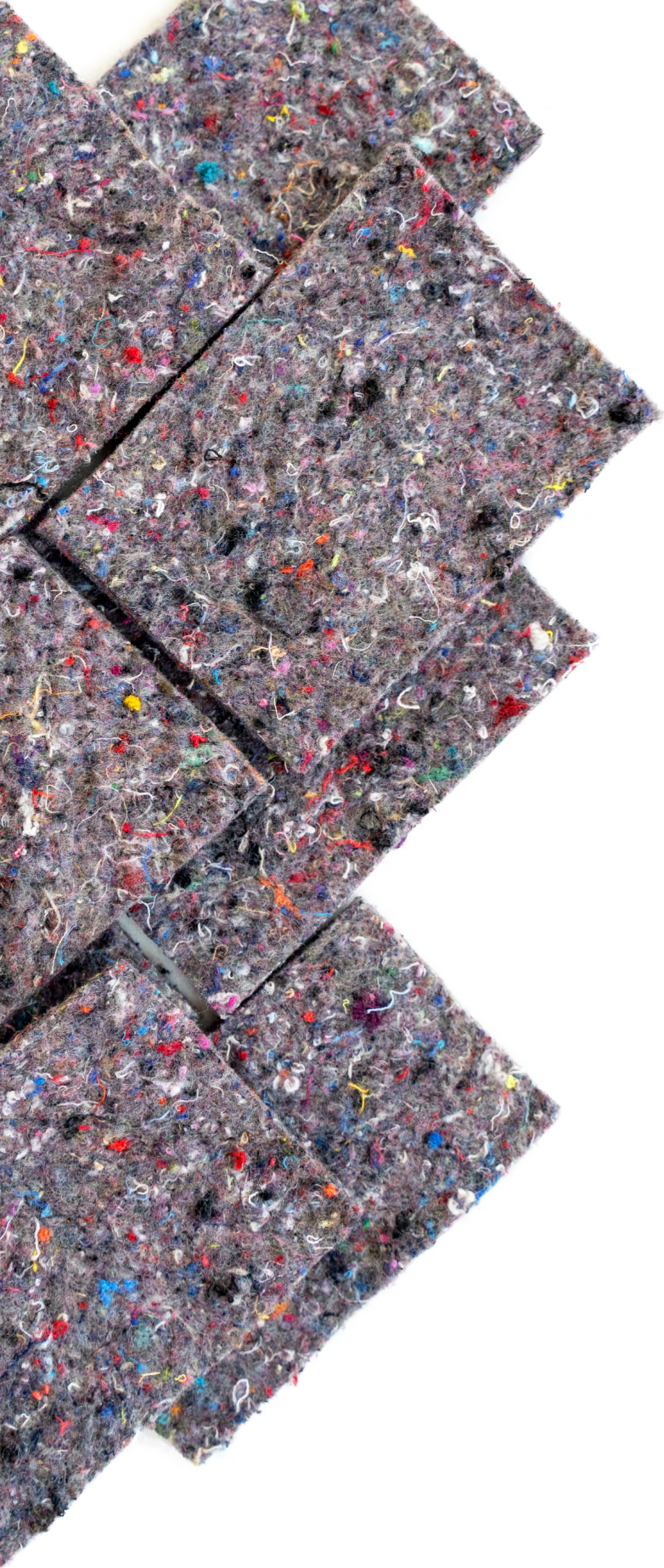
The third stage will involve preparing to launch a full-scale refinement plant in the Topinpuisto circular economy hub in Turku, Finland. The objective is to make the collection of end-of-life textiles national by 2023.



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# Introduction

Lounais-Suomen Jätehuolto Oy (LSJH) is creating a national plan for collecting the end-of-life textiles. The plan is being made in cooperation with Finnish municipal waste management companies and the Telaketju network, which promotes the circular economy of end-of-life textiles.

The purpose is twofold: to bring the collection of end-of-life textiles close to the residents and to promote smooth cooperation between the municipal waste management companies and other operators. The plan will help to find out how profitable it is to process end-of-life textiles on an industrial scale in Finland.

This publication will go through the reasons why it is important to have national harmonisation and prioritisation for the collection, how and when this collection

will be carried out, and how the various operators will participate in the collection.

The plan includes various collection models. These form the basis for cooperation between the municipal waste management companies. The plan takes two things into account: firstly, waste hierarchy and, secondly, the conditions for mechanically recycling end-of-life textiles in Finland. A national, decentralised pre-sorting network for end-of-life textiles is based on harmonised sorting instructions and the best practices already learned through the Telaketju network.



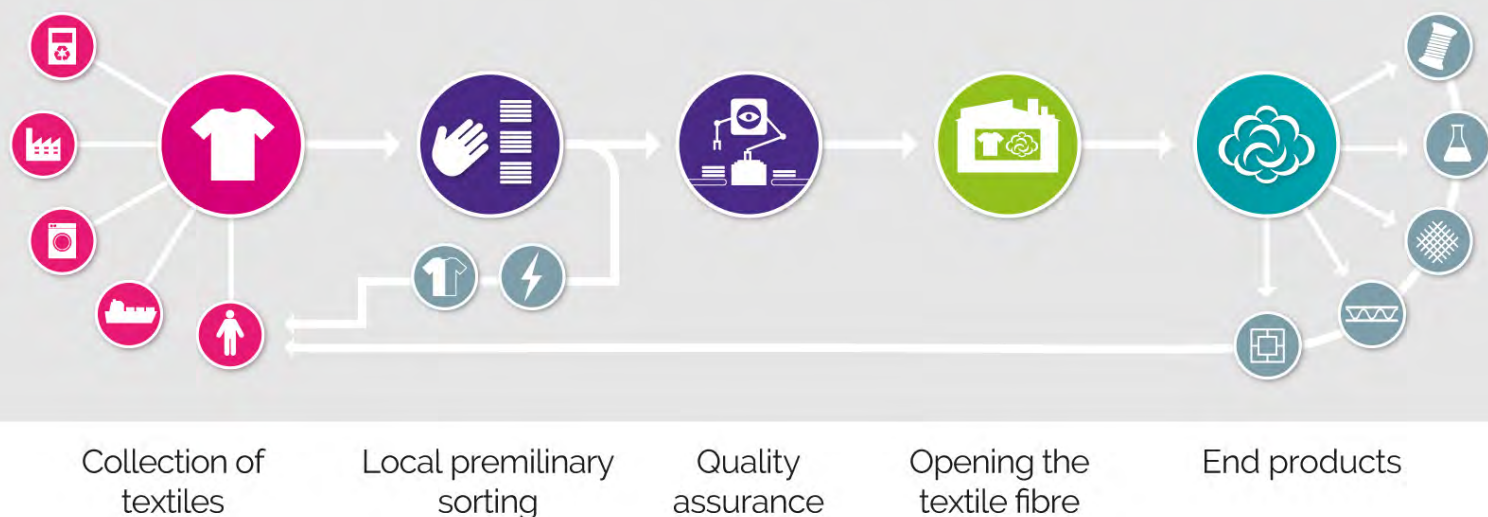
[lsjh.fi](https://lsjh.fi)

[telaketju.fi](https://telaketju.fi)



## From refinement to recycling

Circular system of post-consumer textiles





## What are end-of-life textiles?

"End-of-life textiles" mean textiles that are discarded by their owners. Such textiles include both textile waste and textile products that are used, but undamaged. Unsorted post-consumer textiles from households are municipal waste.

Thus far, end-of-life textiles have been included in mixed waste and utilized as energy in Finland. When we include end-of-life textiles in mixed waste, we lose the possibilities of recycling them as material. Source sorting is one of the conditions for material recycling. Arranging a separate collection is the other condition.

End-of-life textiles come from households and consumers, but also from industrial by-product flows, laundries, workwear manufacturers, shop disposals, textile waste from charity organisations, and textile service producers.

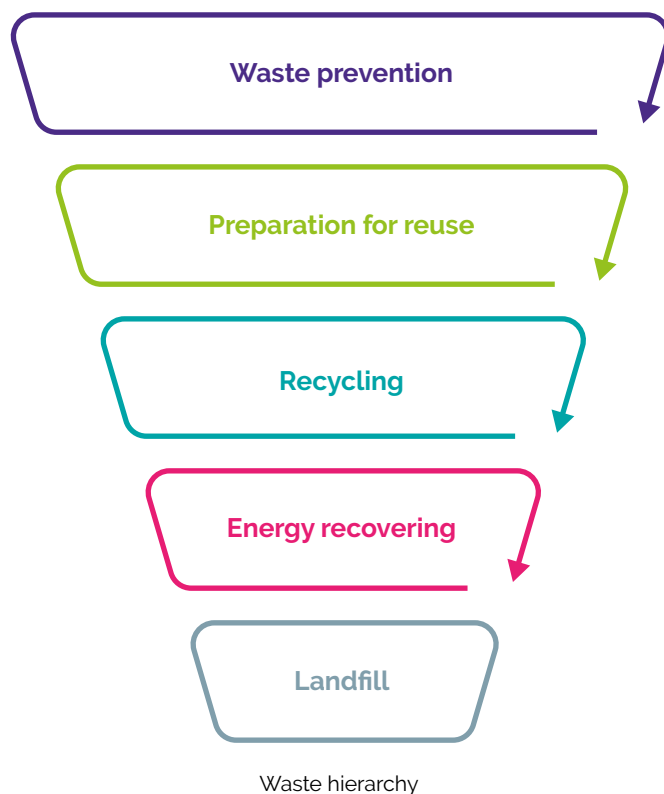
Textiles from businesses are not under municipality's responsibility, but the law allows to process them through the national collection plan. Materiaalitori.fi is a Finnish national portal where companies can search processing services for the waste created by their operations. The portal was opened at the beginning of 2020. If a company does not find any reception or processing service on reasonable terms via Materiaalitori.fi within two weeks, the company can ask either LSJH or a local municipal waste management company for these services.



## Waste hierarchy and legislation regulate collection and sorting

According to waste hierarchy, we should prevent waste from being generated and recover any waste whenever possible. If this is not possible, waste is primarily recycled as material and, secondarily, recovered as energy at waste incineration plants. In Finland, we do not place municipal waste in landfills.

According to the waste hierarchy, end-of-life textiles collected from households should be sorted to find any quality products that are usable and that still have sale value.



In accordance with the targets set by the European Commission, 55 % of municipal waste must be recycled in 2025, 60 % in 2030, and 65 % in 2035. The recycling objectives for plastic, glass, metal, and wood waste will clearly be raised from what they are currently. The objectives for paper and carton packaging waste will be raised as well. Under the present bill, textile waste must be separately collected in Finland already by 2023.

We can reach these ambitious recycling objectives by stepping up waste sorting and separate collection and by creating a framework for quality recycling activities in Finland.



[telaketju.fi/tietopankki](https://telaketju.fi/tietopankki)  
[materiaalitori.fi](https://materiaalitori.fi)



## Municipal waste management companies collecting end-of-life textiles

In order to arrange the national collection of end-of-life textiles, all municipal waste management companies are needed to participate in and arrange the collection and pre-sorting in their own operating areas. For successful collection and pre-sorting, we need extensive cooperation and a variety of action models.



The present plans are not final, but they will be focused better once various action models are piloted during 2020 and 2021 and partners' cooperation is ensured. Our objective is to have the collection system ready in 2023.

There are 31 municipal waste management companies in Finland and these are represented by Suomen Kiertovoima ry (KIVO). All the municipal waste management companies in Finland can easily be reached through KIVO and these companies cooperate in many ways to develop circular economy on the national level. This cooperation has created a strong base for the municipal waste management companies to carry out the collection of end-of-life textiles throughout Finland.

The municipal waste management companies are responsible for the waste management obligations set out for municipalities in the legislation. These obligations include arranging the waste management of residential waste and the municipal waste created by municipal administrative activities and service provision. The municipal waste management companies must arrange waste collection and processing by utilising the best available technology (BAT) and by minimising the hazards to our health and environment.

All the arranged collections of end-of-life textiles and textile waste from households should be organised in cooperation with the municipal waste management companies. During the collection pilots taking place in 2020, we are finding out about a variety of action models and some other things: for instance, whether it is practical to begin cooperating with a local waste management company or directly with LSJH. In this process, the case-specific differences are taken into account.



kivo.fi



# National collection of end-of-life textiles



**Collection of end-of-life textiles is expanding in stages throughout Finland.**

We began piloting the collection of end-of-life textiles for the first time in the LSJH area in 2016. Now this collection is expanding in stages to become national under the coordination of LSJH.

We have already gained experience in the collection of end-of-life textiles through the collections arranged by LSJH, but also through those arranged by the participating municipal waste management companies. The Telaketju network pilots and reports have provided us with experience as well.

Third sector operators, such as charity organisations, have collected textiles for reuse already for years. These collections should not be confused with the collection of end-of-life textiles, however. Textiles that can be reused will always end up in the collections of end-of-life textiles even though the residents are instructed to primarily deliver them elsewhere.



# Collection bins

The collection of end-of-life textiles involves a practical challenge because they are more perishable than other waste materials that are collected separately. This sets some requirements for the collection bins, the collection equipment, and the unloading intervals. We already have long-time experience in end-of-life textiles that are collected for reuse. This is worth utilising as we plan the collection.

The LSJH waste sorting stations have covered skips that hold approximately 2,000 kilograms of textiles. LSJH has tried to reduce the dampness problems occurring in these skips by unloading them regularly. Smaller sorting stations collect end-of-life textiles into waste bins that hold 660 litres. These bins have had significant dampness problems because their lids open easily in windy weather, allowing water to get inside.

In the Telaketju project funded by the Ministry of the Environment of Finland, metal textile collection bins were used. Only minor dampness problems occurred in these bins, but unloading them was challenging. The sacks of end-of-life textiles have to be manually moved to roll cages or other waste bins for transport. This way of unloading is slow and ergonomically poor.



Covered skip used in LSJH's sorting stations



Metal textile collection bins



Deep collection container

During the same pilot, it was studied how placing the collection of end-of-life textiles next to a collection by UFF (U-landshjälp från Folk till Folk i Finland sr is a not for profit, non-governmental humanitarian foundation) affected the quality of the collected textiles. In the sorting process of the pilot, no major changes in textile quality was detected even though at first it had seemed that placing the two collections side by side would reduce the volume of poor-quality textiles in the UFF collection. Both collections got reusable textiles and textile waste even though their sorting instructions were different.

Deep collection containers to collect end-of-life textiles are used in the Rauma region. Using these involves the challenge of dampness, but also the challenge of abundant waste ending up in the containers even though it does not belong there. The deep collection containers are unloaded into a skip, which is open during the unloading process. This is why unloading must be scheduled according to the weather.





**The objective is to make the collection of end-of-life textiles easy for the residents.**

## The KaMu collection

LSJH and Fashion Finland (FAFI) are cooperating to develop a collection called "KaMu" in order to make the collection of end-of-life textiles more accessible. The objective of the KaMu collection is twofold: firstly, to get even better access to the end-of-life textiles and, secondly, to make the collection easy for the residents.

The KaMu collection is being planned and piloted together with a variety of operators that have already arranged collections of end-of-life textiles on their own. These operators include shopping centres, flea markets, and stores selling fashion wear, clothing or household textiles.

One of the good things about the collections arranged earlier is that they are centrally located, close to the residents. In addition to this, the collections are held in monitored indoor areas so that the collection bins do not attract anything that does not belong there.

Furthermore, the textiles stay dry. However, there is another challenge: the collectors often tend to look for recovery solutions on their own. Sometimes they look outside Finland on a case-by-case basis. This causes the textile flows to disperse so that a sufficient volume of textiles to develop a Finnish recycling solution cannot be ensured. It is of primary importance for the collections to be carried out in cooperation with the municipal waste management companies.

The KaMu collection partner offers its customers a collection point where they can bring end-of-life textiles when they go shopping. This partner can also send any textiles that are left unsold to a collection of end-of-life textiles. Otherwise, these textiles would be incinerated. Getting the textiles to the right collection extends their life cycle. It also makes it possible to reuse the textiles as they are or to recover them as material in accordance with waste hierarchy.

In itself, the KaMu collection does not cost its partners anything. The KaMu collection partner is responsible for arranging a space for a collection point and informing its customers about the KaMu collection.

The LSJH operating area serves as the pilot area of the KaMu collection. The pilots are being carried out during 2020. The long-term objective is to put the best action models into practice nationally so that they cover all of Finland.



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# Agreements between municipal waste management companies

The national collection of end-of-life textiles is based on two separate agreements, which guarantee horizontal cooperation between the municipal waste management companies.

- **A cooperation agreement**, concluded under similar terms between LSJH and each participating municipal waste management company
- **A delivery contract**, concluded under terms that are specified for each party case by case

The parties deliver end-of-life textiles to the pilot stage refinement plant. These textiles may include only those that are under the municipality's responsibility. The municipal waste management companies that sign the cooperation agreement commit to deliver the volume of end-of-life textiles covered by the agreement and to pay for processing that volume.

At the first stage, LSJH concluded a cooperation agreement with four municipal waste management companies: Helsingin seudun ympäristöpalvelut HSY, Pirkanmaan Jätehuolto Oy, Loimi-Hämeen Jätehuolto Oy, and Rauman seudun jätehuoltolaitos. The first agreements were concluded in February of 2020. LSJH is expanding the portfolio of agreements in stages by offering municipal waste management companies the opportunity to enter into the cooperation agreement.

## Cooperation Agreement

The cooperation agreement of the municipal waste management companies sets out the principles, which the companies observe when collecting and pre-sorting end-of-life textiles and delivering them to the pilot stage refinement plant for end-of-life textiles. The plant will be located in Paimio, Finland.

The cooperation is based on each municipal waste management company being responsible for applying the collection and sorting models to their individual areas in accordance with the mutually agreed plan.

The cooperation agreement is our response to the tightening requirements of waste legislation and textile recycling. Through the agreement, we can minimise and share risks by cooperating to take care of the service obligations of the municipal waste management companies.

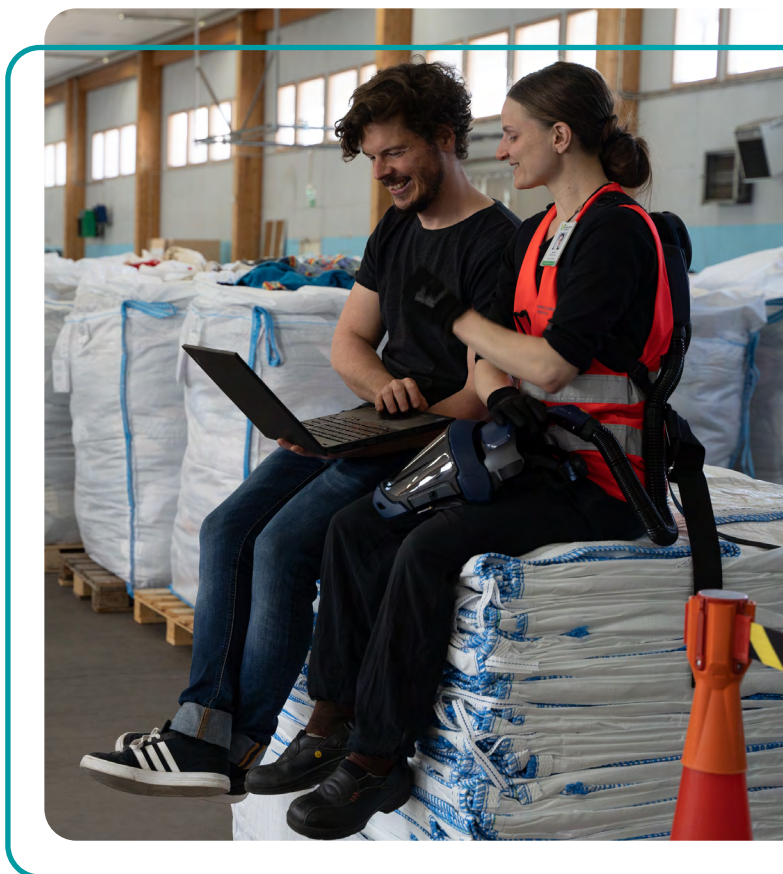
## Delivery Contract

A delivery contract concluded between LSJH and each of the contracting parties sets out the tangible obligations between them and specifies the delivery of end-of-life textiles to the pilot stage refinement plant.

The obligations include things like the minimum and maximum delivery volumes (t/a) in the pilot stage. The estimation of the minimum delivery volume is based on the volume of end-of-life textiles per capita, collected in the LSJH area in 2018 and 2019.

The maximum delivery volume is proportionate to the maximum capacity of the pilot stage processing line and the number of inhabitants. Our intention is to discard the maximum delivery volume once the full-scale refinement plant for end-of-life textiles begins its operations.

The delivery contract also specifies the processing fee category. Each municipal waste management company can decide its fee category, which is determined by how much pre-sorting they carry out locally.





# Local pre-sorting of end-of-life textiles



**Quality sorting is needed for processing and recycling of end-of-life textiles.**

Because textiles are easily perishable, the companies should pre-sort them near the collection place as quickly as possible. This is also why first stage pre-sorting has to be completed before sending the textiles to LSJH. In this way, we can avoid pointless transport and minimise textile spoilage during transport and storage. Through sorting, we wish to guarantee the high quality of the raw material.

Quality sorting according to quality criteria of the utilizer is one of the basic conditions, which make it possible to process and recycle end-of-life textiles.

Sorting is divided into four stages and each municipal waste management company can select one that is suitable for them.



**Video series: Sorting of end-of-life textiles**



### 1. Pre-sorting

The batch contains only dry end-of-life textiles that are included in the collection instructions. The contracting party removes any risk factors that pertain to quality or occupational health. The party sorts textiles out of the batch, for instance, if they are wet, mouldy or extremely soiled.



### 2. Further sorting for reuse

After pre-sorting, the contracting party sorts the batch further to separate the reusable textiles from the ones that are not reusable. The party makes sure that the reusable textiles are processed appropriately and steered to the recovery channels.



### 3. Further sorting for recycling

After pre-sorting, the contracting party sorts the batch further to separate the reusable textiles from the ones that are not reusable and the recyclable textiles from the ones that are structurally unsuitable for recycling. The party makes sure that the reusable textiles and the textiles that are unsuitable for recycling are processed appropriately and steered to the recovery channels.



### 4. Material sorting

The batch contains textiles that are suitable for recycling, sorted according to the type of fibre material. The contracting party delivers the sorted fibre types after packing them separately and marking them appropriately.

During material sorting, the party has the option of using a hand-operated, infrared optical recognition device to support manual sorting and to ensure quality. If the party uses recognition device, LSJH will charge a reduced reception fee.

If the municipal waste management company sorts the end-of-life textiles up to the level of material sorting, the quota of deliveries specified in the delivery contract will be lowered as the volume of end-of-life textiles decreases.





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