



TEX2CE

Decision Tree



1. START: MONOMATERIAL?

The first question that is asked is whether the product consists out of one single material.

If Yes, continue to section 6

If No, continue to section 2

2. DISASSEMBLY INTO DIFFERENT PARTS NEEDED?

A large portion of textile products consists of different parts, which need to be disassembled to allow recycling. A typical example is hard parts such as zippers and buttons. These parts need to be removed to not hinder the recycling process. Additionally, parts existing out of different materials can be stitched together. These need to be separated from each other and sorted to their corresponding recycling technique.

If disassembly is needed, the use of a disassembly thread can be investigated. Examples include the *Resortecs Smart Stitch* (degradation due to heat) and the *Wear2 thread* (degradation due to microwaves).

3. DELAMINATION OF MULTILAYERS NEEDED?

Multimaterial multilayered textiles are at present not recyclable. It is therefore necessary to separate the textile layers and remove coatings or prints, for example.

If no delamination is needed, continue to section 4.

If delamination of multilayers is needed, two different routes can be envisioned (continue reading)

SOLVENT-BASED SEPARATION:

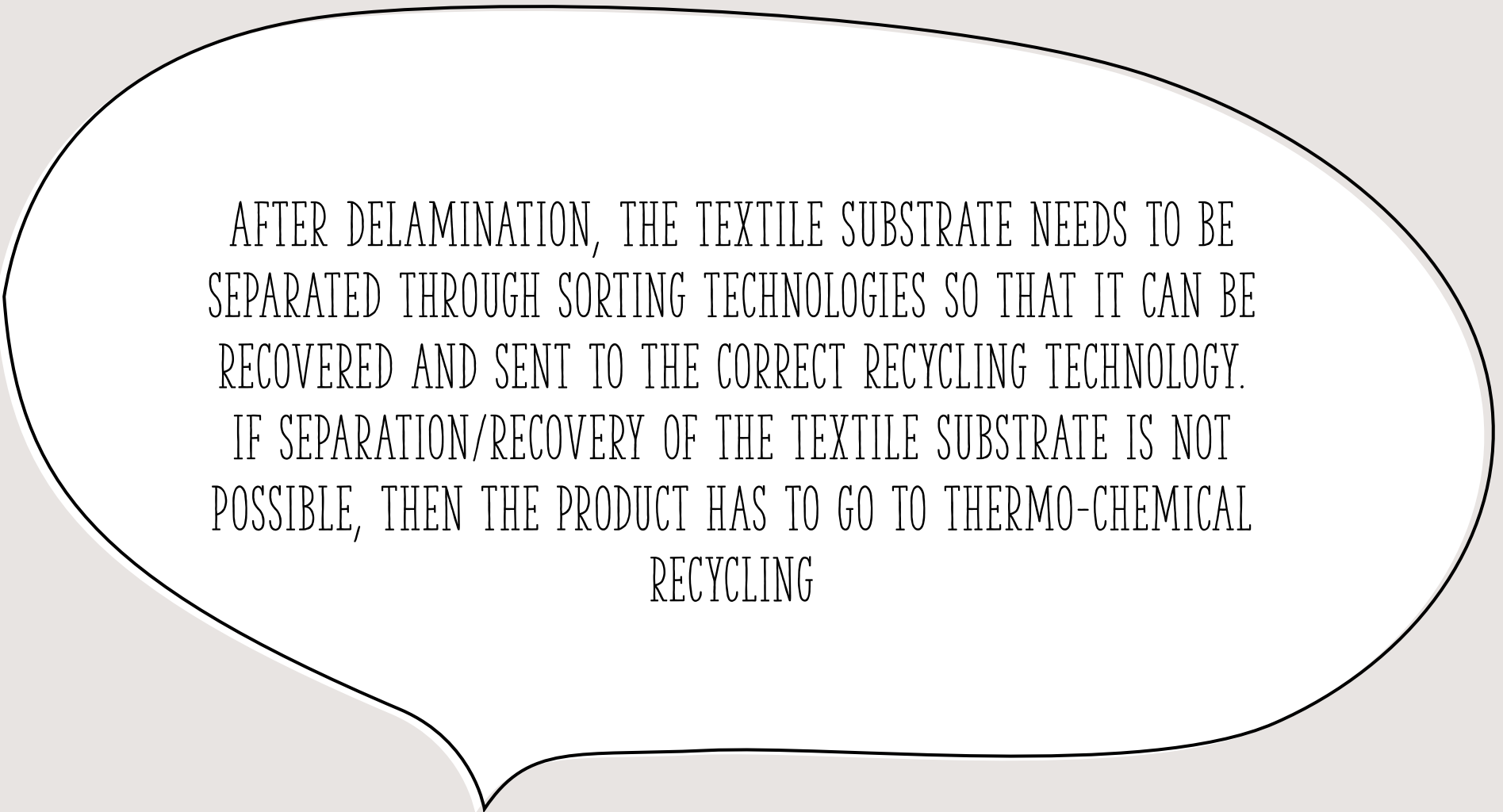
by using a solvent (preferably a green solvent), an adhesive layer, tie layer or specific polymer layer can be targeted and dissolved/solvolyzed. This can be used for conventional products.

(Continue reading)

DEBONDING-ON-DEMAND

This is a design4recycling approach in which typically an extra layer in between textile and coating/print is added or a pretreatment of the textile is performed, both options allowing for debonding at End-of-Life. Several technologies exist:

- NIAGA produces a polyester-based reversible adhesive in the shape of a thermoplastic hotmelt. This has applications in mattresses, flooring and furniture panels. Due to its thermoplastic nature, the adhesive loses its mechanical strength upon heating.
- The Swedish company Vividye developed a technology for the removal of prints. They use a pretreatment of the textile, after which a print with any market-available color can be applied. At EoL, the print is removed by using a specific solvent-based process.
- French company Rescoll has developed the INDAR primer, which is a solvent-based primer that can be applied in between the substrate and the coating layer. At EoL, the primer can be triggered by applying heat at the specified triggering temperature (130°C, 150°C or 170°C). At that point, the primer swells, resulting in delamination of the coating from the substrate. [\(continue reading\)](#)



AFTER DELAMINATION, THE TEXTILE SUBSTRATE NEEDS TO BE
SEPARATED THROUGH SORTING TECHNOLOGIES SO THAT IT CAN BE
RECOVERED AND SENT TO THE CORRECT RECYCLING TECHNOLOGY.
IF SEPARATION/RECOVERY OF THE TEXTILE SUBSTRATE IS NOT
POSSIBLE, THEN THE PRODUCT HAS TO GO TO THERMO-CHEMICAL
RECYCLING

4. FIBER BLEND?

After recovery of the textile substrate, the next question that needs to be asked is if the textile is made out of a fiber blend or not.

If Yes, continue to [section 5](#).

If No, continue to [section 6](#).

5. POLYCOTTON?

If the textile is made from a fiber blend, it is important to ask if the blend is polycotton or not.



If Yes, then several fiber separating technologies are possible:

Chemical polymer recycling
via solvent-based dissolution

Chemical recycling via
hydrothermal processes

Chemical recycling via
enzymatic processes



If No, then the remaining options are:

Mechanical recycling

Thermo-chemical recycling

6. WHAT MATERIAL?

Depending on the textile material that needs to be recycled, several options are available. 8 options are listed below.

6.1. Cotton/cellulose

For cotton/cellulosic textiles, the following recycling technologies are an option:

1. Mechanical recycling
2. Chemical polymer recycling via pulping

6.2. Polyester (PET)

For polyester (PET) textiles, the following recycling technologies are an option:

1. Mechanical recycling
2. Thermo-mechanical recycling
3. Chemical polymer recycling via dissolution
4. Chemical monomer recycling via glycolysis, methanolysis or hydrolysis

6.3. PA6

For polyamide6 textiles, the following recycling technologies are an option:

1. Mechanical recycling
2. Thermo-mechanical recycling
3. Chemical monomer recycling

6.4. PP

For polypropylene textiles, the following recycling technologies are an option:

1. Mechanical recycling
2. Thermo-mechanical recycling
3. Chemical polymer recycling via dissolution

6.5. Acryl

For acrylic textiles, the following recycling technologies are an option:

1. Mechanical recycling
2. Chemical polymer recycling via dissolution

6.6. PLA

For polylactic acid (PLA) textiles, the following recycling technologies are an option:

1. Mechanical recycling
2. Thermo-mechanical recycling
3. Chemical monomer recycling

6.7. Aramid

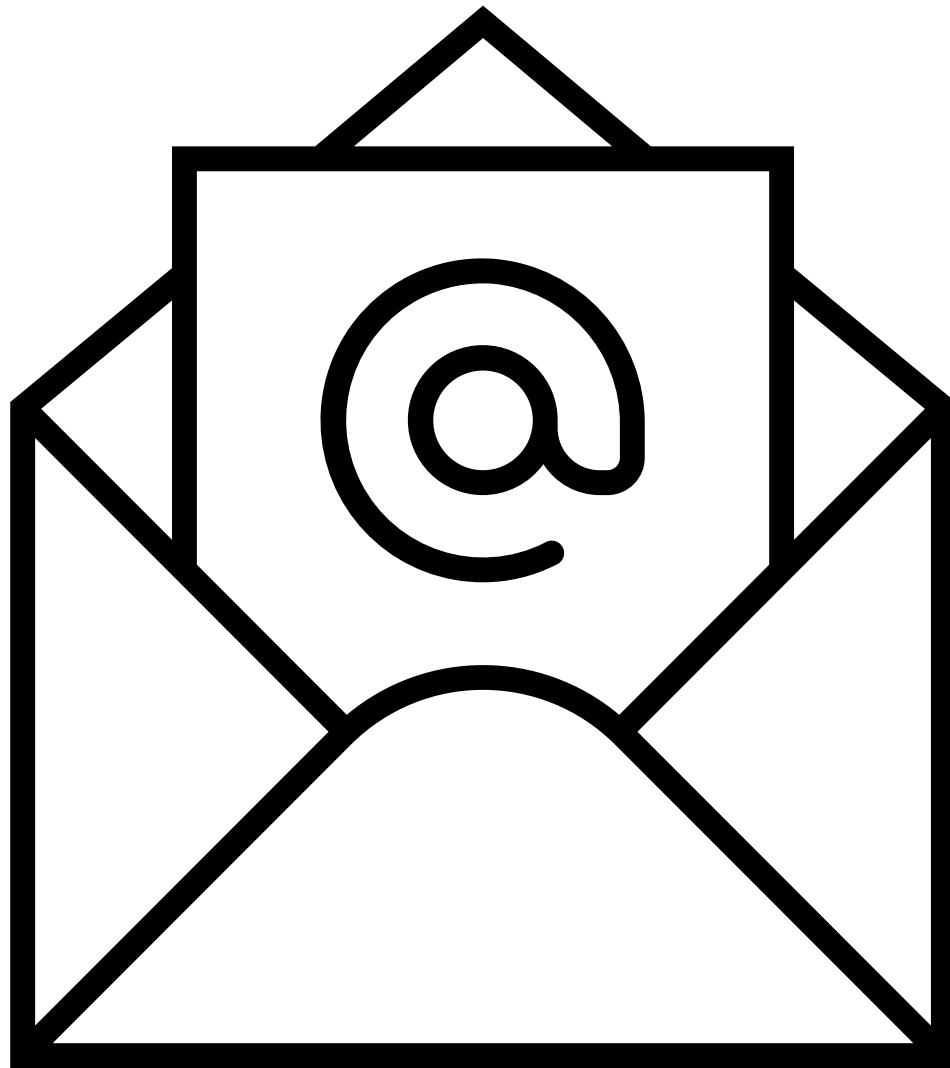
For aramid textiles, the following recycling technologies are an option:

1. Mechanical recycling
2. Chemical polymer recycling via dissolution

6.8. Other

If the textile material is not listed above:

1. Mechanical recycling
2. Thermo-mechanical recycling



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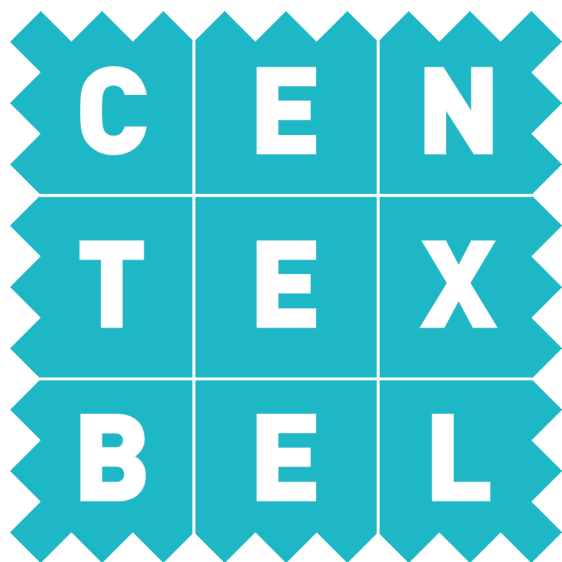
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More info



VLAIO

TEX2CE IS SUPPORTED
BY VLAIO

Project number HBC.2021.0942

