

GENERAL NOTICE No. 6

Impact of regenerated cellulose elements related to paper/cardboard packaging in the recycling stream

SUMMARY

The purpose of this general notice is to assess the **compatibility of paper/cardboard packaging containing regenerated cellulose elements** with the paper/cardboard packaging recycling stream. This notice concerns only paper/cardboard packaging, i.e. containing more than 50% paper/cardboard (in weight); this proportion does not include the proportion of regenerated cellulose making up the packaging's related element(s).



Although the regenerated cellulose manufacturing process is a chemical one, it does not actually modify the cellulose at a molecular level. Regenerated cellulose is therefore a natural polymer that has not been chemically modified and, as such, is not considered as a plastic material under Decree no. 021-517¹.

However, regenerated cellulose has properties and characteristics that differ from the cellulose used to produce paper/cardboard packaging. It can come in the form of film, netting or objects. Regenerated cellulose has different chemical or commercial names including Viscose, Lyocell® and Cellulose hydrate (or cellophane).

For paper/cardboard packaging containing a related element made of regenerated cellulose, **the regenerated cellulose will not be recycled in the paper/cardboard stream but will not disrupt recycling of the paper/cardboard part².**

¹ Decree no. 2021-517 of 29 April 2021 on targets for reducing, reusing and recycling single-use plastic packaging for the 2021-2025 period.

² CEREC may review this document with regard to technological and market developments.

I. Context

a. Market and applications

Applications for regenerated cellulose concerned by the EPR (extended producer responsibility) scheme covering household packaging are as follows:

- Fruit and vegetable nets
- Fabric or transparent windows on paper packaging
- Food packaging
- Confectionery film
- Sachets and flow packs

This material offers an alternative to petroleum-based materials. Regenerated cellulose film has the following properties: transparency, strength, moisture and gas barrier. It has several forming processes such as weaving and extrusion. For netting, regenerated cellulose withstands machine rates and is resistant to product weight. Viscose is also found in coatings or incorporated into paper to improve mechanical properties and reduce sensitivity to hot and cold water. This application is not covered by this notice.

This notice concerns paper/cardboard packaging that includes regenerated cellulose as a related element. It does not apply to regenerated cellulose fibres added to the material or its surface.

b. Manufacturing process

The “Viscose” method is the longest standing method for transforming regenerated cellulose into textile fibres. It involves dissolving and regenerating the cellulose, hence the term regenerated cellulose.

Using a chemical solution, the cellulose contained in the fibres reacts by separating from the other elements contained, thereby creating a viscous solution. After filtration, the solution is regenerated to produce the cellulose originally present. This viscous liquid containing regenerated viscose can then be extruded into film or thread. After this process the properties of the cellulose have changed but not its chemical structure.

2. Recyclability test

a. Analysis criteria and sampling

Assessing the recyclability of paper/cardboard packaging involves pilot-scale tests based on the protocol described on the CEREC website. The protocol is representative of the industrial technologies of European paper recyclers³.

³ See the protocol on the [CEREC website](#)

The assessment of the recyclability of a paper bag with a fabric regenerated cellulose window gives the following conclusions:

b. Results

RECYCLING PROCESS	IMPACT	DESCRIPTION
 PULPER PAPER SUSPENDED IN WATER AND MIXED	✓	<i>The cellulose fibres defibrate/separate correctly, the regenerated cellulose from the related elements separates from the paper/cardboard fraction of the packaging without degradation</i>
 SCREENER UNWANTED COARSE PARTICLES REMOVED	✓	<i>Screening evacuates regenerated cellulose threads or films</i>
 CLEANER FINER PARTICLES REMOVED VIA HYDROCYCLONE	Ø	
 PAPER MACHINE SHEET FORMATION, SPINNING, PRESSING, DRYING	✓	<i>The sheet has a fine appearance with even distribution of the cellulose fibres</i>



Prohibitive impacts



No impacts

Ø Phase not concerned

3. Technical conclusions

Through tests performed by CEREC, it was possible to assess the compatibility of elements composed of regenerated cellulose related to a paper/cardboard packaging item⁴. The results show that the presence of elements composed of regenerated cellulose related to a paper/cardboard packaging item has no impact on the recycling process or the quality of the recycled paper/cardboard.

Regenerated cellulose in the form of nets or windows will be eliminated during the screening stage.

In conclusion, given the current state of equipment and techniques used in Europe, an element composed of regenerated cellulose related to a paper/cardboard packaging item does not disrupt the paper/cardboard packaging recycling stream if its weight represents less than 50% of the packaging to be recycled. However, although it does not disrupt the recycling process the regenerated cellulose itself will not be recycled.

CEREC recommends using the strictly necessary amount of related elements composed of regenerated cellulose to meet the expected functionality so as not to reduce the packaging's recycling yield.

4. Approval

Orianne Broussard

Christian Picard



⁴ We remind you that packaging including a related element composed of regenerated cellulose representing more than 50% of the packaging (in weight) is not eligible for the paper/cardboard recycling stream and is therefore not recyclable in this stream.