

# POSITION PAPER ON THE PCR GRANULATE

AS OF 29 November 2021

## POST-CONSUMER RECYCLATES AS A BUILDING BLOCK OF SUSTAINABLE PRODUCT DEVELOPMENT




In terms of sustainability, the use of recycled materials is an important cornerstone. Recycling and environmental protection are taken into account from the very beginning of the development of new LINHARDT products.

With this position paper we would like to give you a brief overview of our PCR granulate and inform you about special properties of recycled materials.

### GENERAL PROPERTIES OF A RECYCLATE

The recyclate is produced from packaging materials already used by the end consumer. Special processing generates a raw material that is suitable for reuse in a plastic tube.

During production of the PCR material, the starting material is made smaller in a complex process, cleaned and filtered by means of camera systems and centrifuges. The flakes are then extruded into new granulate in a regranulation process. However, the granulate is given certain properties, for example, a typical odour that is noticeable when opening the carton. This odour dissipates within a few minutes. Effects on the sensory properties of the filling material are not to be feared. In the table below, we present further properties of three recycled materials:

Criterion	Greenstar (Biffa)	Planolen natural (Re Plano)	Mothylene natural (Morsinkhof)
Type of material	HDPE		
Granulate colour	greenish lustre	grayish lustre	yellowish lustre
Odour	Slightly acidic odour	Slightly soapy odour	soapy odour
Recyclate filter	~160µm	~80µm	~120µm
Shelf life of tube	12 months		
Storage temperature	+10 °C to +35 °C at 40 – 60 % relative humidity		
Approval	94/62/EC Packaging Directive 1907/2006 REACH regulation		
	0/2011/EU – Consumer goods 1935/2004/EC Contact with food 1223/2009/EC Cosmetics regulation, Appendix II&II	1272/2008/EC CLP regulation (SMR substances)	1272/2008/EC CLP regulation (SMR substances)
			

\* As a matter of principle, we provide our customers with the relevant documentation on the above-mentioned conformities for all products upon request. If required, information on the fulfilment of limit values, with regard to a toxicological investigation (global migration and specific migration) of the starting granulate, can also be provided. In any case, however, a risk assessment is not provided by Linhardt, but must be carried out by the distributor himself or by a service provider commissioned by him, as required by law.

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## POSSIBLE CONSEQUENCES OF PCR USE: PARTICLE AND MATERIAL INCLUSIONS

Despite elaborate processing and filtration, contamination of the recyclate by closures, labels, films, etc. cannot be completely avoided, so that a maximum of 3% impurities may be contained in the PCR granulate.

Due to this production-related contamination, inclusions in the tube casing may occur. These inclusions are particularly visible on the inside of the tube, but may also show up in the form of scratches and surface irregularities (indentations & elevations). The particle sizes depend on the specified filter widths used.

Tube inside:

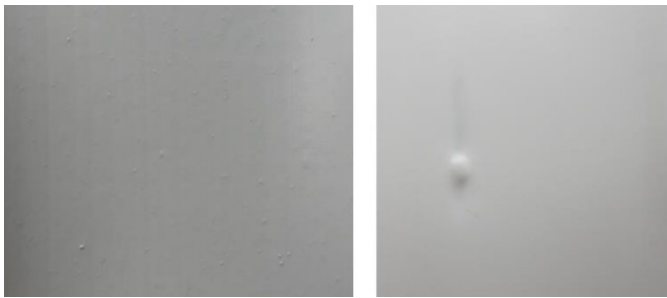


Figure 1: Particle and material inclusions on the inside of the tube

Tube outside (decoration):



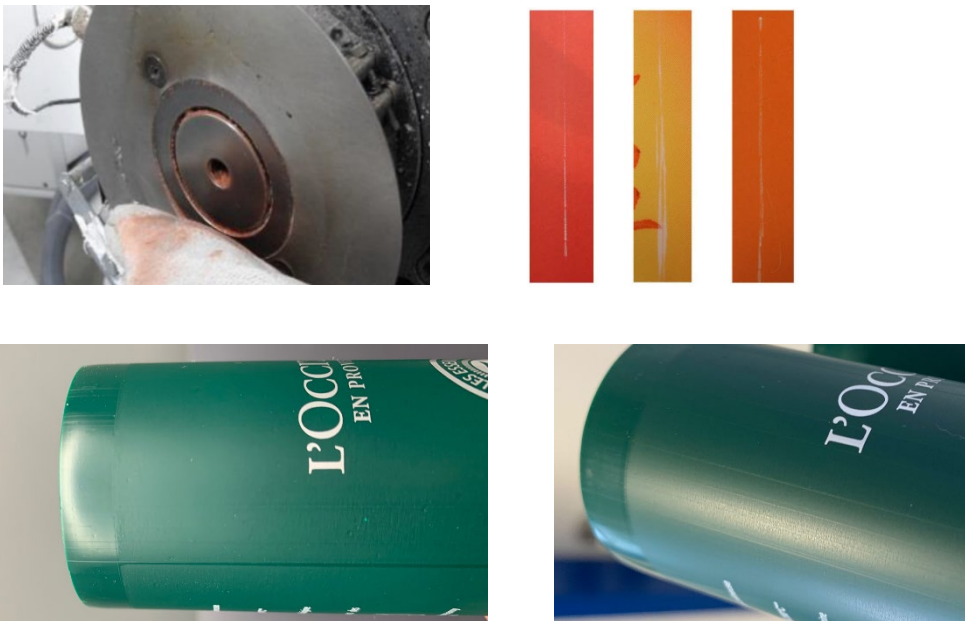
Figure 2: Particles and material inclusions as interfering factors for the decoration on the outside of the tube

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During extrusion, deposits increasingly occur when PCR granules are used. This means that burns may form in the hot extrusion tool, which "scratch" the viscous plastic flowing past. There is also a risk that such scratches may not be covered by printing ink or varnish. With a coloured tube and matt lacquer or dark printing colours, these scratches may be more prominent.

In addition, certain components of the plastic evaporate after exiting the extruder and may precipitate as hydrophobic deposits. These are comparable to waxes and cannot be printed in the subsequent process steps, so that the basic colour of the plastic remains visible:



*Figure 3: Scratching during extrusion*

### GENERAL CONCLUSION

The effects described above result from the material properties and are therefore not subject to complaint. Accordingly, special attention must be paid to raising awareness of the specifics of recyclates among all stakeholders.

LINHARDT demands continuous qualitative development from their suppliers. Therefore, we collaborate with our raw material suppliers on various projects, but also involve the machine suppliers to optimise the processing as well.

If you have any questions or need support, please feel free to contact us at any time.