



KURARAY POVAL™, EXCEVAL™, ELVANOL™ and MOWIFLEX™ are the trademarks for polyvinyl alcohols made by Kuraray. Their key characteristics – outstanding film-forming properties and high binding strength – add real value to your products. Our polymers are water-soluble, highly reactive, crosslinkable and foamable. They have high pigment binding capacity, protective colloid characteristics and thickening effects. The physical and chemical properties of KURARAY POVAL™ make it ideal for a wide variety of applications, ranging from adhesives through paper and ceramics to packaging

films. Many of our polymers are food contact-approved and thus suitable for food applications. Ecologically KURARAY POVAL™ is advantageous due to its biodegradability and the fact that combustion does not generate residues. It is available in various particle sizes from granules to fine powders. Kuraray produces its wide range of KURARAY POVAL™ grades in Japan, Singapore, Germany and the USA. Kuraray's global production and service network make us your partner of choice for innovative, high-quality PVOH resins. **KURARAY - Here to Innovate.**

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## EXCEVAL™

A fluorine free, biodegradable\* and repulpable barrier polymer



## Barrier packaging in a circular economy

Plastic packaging is a big generator of waste and only a small part of this waste is recycled. Increasing consumer awareness regarding plastic pollution on land and sea has pushed more and more governments to put bans on plastic. Besides plastics the use of fluorinated polymers in food packaging is also under discussion. Brand owners are following this closely and they are looking to replace plastic packaging and fluorinated polymers with more sustainable packaging options.

The replacement of plastic packaging and fluorine-containing packaging calls for smart, innovative and sustainable packaging solutions. This is a big opportunity for paper and board coated with Kuraray's fluorine-free, biodegradable\* and repulpable barrier polymer EXCEVAL™.

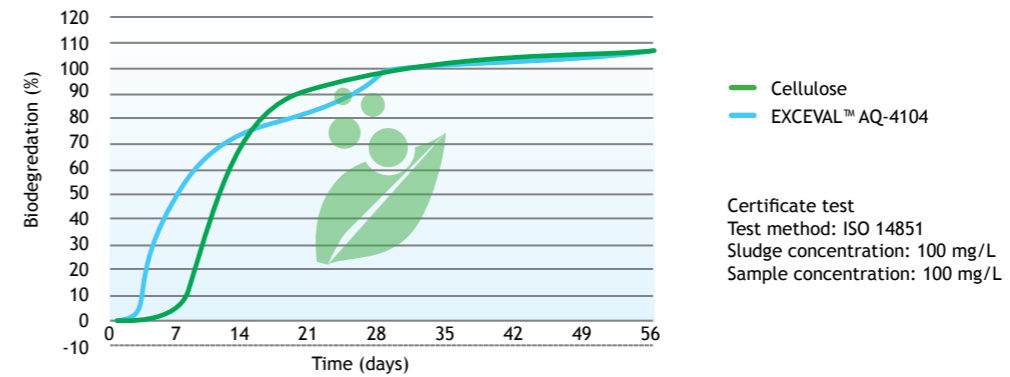
\* EXCEVAL™ is biodegradable in water according to ISO 14851

## EXCEVAL™ - modified moisture resistant polyvinyl alcohol with a high barrier against oxygen, oil and grease

EXCEVAL™ is modified polyvinyl alcohol. It is a nonionic water-soluble polymer which makes it well suited for water-based barrier coatings. EXCEVAL™ is a linear and crystalline polymer. The hydrophilic nature of polyvinyl alcohol makes it an excellent barrier against grease and oil, as well as mineral oils. The hydrogen bonds between the polymer chains, together with the crystalline structure, make EXCEVAL™ one of the best barrier polymers, against oxygen and other gases such as carbon dioxide, on the market. The modification of EXCEVAL™ makes it more moisture resistant and a better film former compared to conventional polyvinyl alcohol. EXCEVAL™ may be used as food contact material as it complies with BfR, FDA (FCN 1179) and China GB.

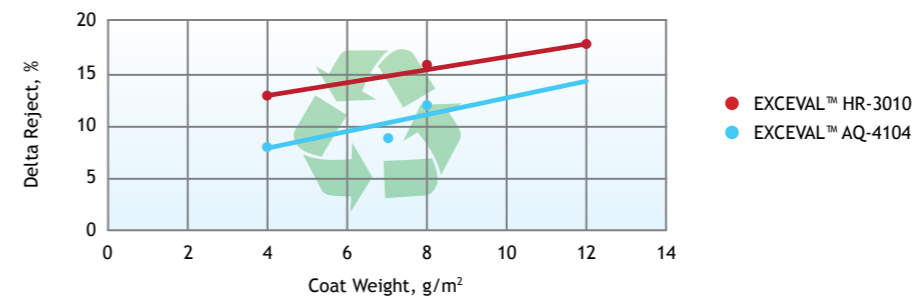
## Biodegradability of EXCEVAL™

Polyvinyl alcohol (PVOH) is recognized as one of the very few vinyl polymers which is water soluble and biodegradable in water in the presence of suitably acclimatized micro-organisms. Also, EXCEVAL™ is biodegradable according to ISO 14851. This has been confirmed by internal tests as well as at external laboratories. EXCEVAL™ has also been shown to fulfill the requirements of compostability when it comes to biodegradation, heavy metal content, fluorine content and ecotoxicity.

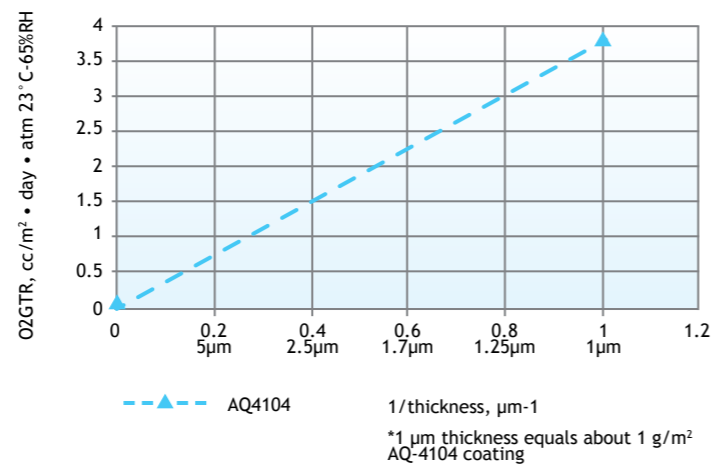


## Recyclability of EXCEVAL™ coated paper and board

EXCEVAL™ coated paper and board can offer a sustainable and recyclable alternative to plastic packaging. Studies made in cooperation with a university confirm that EXCEVAL™ coated paper and board is repulpable and thus can be recycled in standard paper streams. The results show that the type of EXCEVAL™ as well as its coat weight influence the fiber reject, but still both of the investigated EXCEVAL™ grades were considered repulpable.



O2GTR versus Coating Weight of EXCEVAL™ AQ-4104



## EXCEVAL™ product portfolio

Our EXCEVAL™ polymers are already widely used in the paper industry. They can be coated with all commonly used coating methods like metric size press, blade coating, rod coating, gravure coating or curtain coating. Kuraray offers a wide range of products to meet the requirements and needs of different applications.

Please contact your local Kuraray office to discuss the right EXCEVAL™ product for your needs.

