



A functional environmentally safe plastic, designed for the circular economy

Aquapak's Hydropol™ is a specially engineered material that can create a range of packaging products that are designed to eliminate plastic pollution at source

Repulping

The intermediate hydrolysis grades, Hydropol 33100 series, have been designed to be compatible with paper recycling processes. They have been independently tested for repulpability (mimicking a standard paper recycling mill typically at a repulping temperature of 40°C) and have all passed the testing protocols.

Summary of findings:

- Uncoated and Hydropol coated DSSmith 85gsm papers judged Level A+ by *Italian National Recyclability Standard: UNI 11743 (Paper and board: Determination of recyclability of cellulose-based materials and products)*
- UNI 11743 provides objective process and quality parameters for evaluating the recyclability of cellulose based materials and products simulating the main phases of industrial processes
- *The evaluation protocol : Test Method MC 501:2017 Analysis of the recyclability level of cellulose-based materials and products*
- Aticelca 501:2017 method is a useful tool to certify the level of recyclability and ability for recycling mills to process the material or product efficiently from a technological and economic perspective, to recover cellulose fibres it contains using widely used papermaking technologies for processing recycled paper.
- Hydropol coated DSSmith papers achieved the highest ranking:
 - The results can be used to direct the development of new materials or products within ecodesign and circular economy
 - Results can support compliance with EN 13430 standard
 - Results can be used as part of voluntary self declaration or third party verification with wording to communicate recyclability ' Level A+ RECYCLABLE WITH PAPER Aticelca 501'



- Hydropol 33100 coated paper disintegrates with complete dispersion of fibres when repulped at 40°C and above (coating is almost non-detectable when repulped at 20°C) -meets criteria outlined in ISO 5263-1 *Laboratory Disintegration of chemical pulps*
- No evidence of Hydropol coating on mesh 8 with Bauer McNett fractionation-indicates complete polymer dissolution and fibre dispersion
- Solubilised Hydropol at high loading rates appears to have no effect on paper sheet properties in the case of recycled grey board furnish. For virgin copier paper furnish, no effects were noted for bulk, roughness (bottom), tear index, drainage and Schopper. Slight changes were noted for porosity, roughness (top), burst index, tensile index and freeness
- Hydropol coated paper would repulp and release valuable fibre for paper and board manufacturing
- Hydropol coating would dissolve and would NOT form part of 'mill rejects stream' (Note: valuable fibre is entrained and lost with mill rejects (yield loss); rejects are costly to dispose for mills without waste to energy systems)
- Hydropol coating appears not to be substantive to fibre and unlikely to contribute either positively or negatively to paper sheet properties
- Hydropol coated paper could be recycled with Mixed Paper or OCC at packaging mills
- Segregated Hydropol coated paper e.g. coated white food board could be recycled at virgin-fibre based mills
- Effluent from Grey board+ Hydropol coated paper (20%) did not inhibit activated sludge bacterial respiration rates (i.e. no acute toxicity)
- Treatability of Hydropol by mill effluent treatment systems (DAF, AD and activated sludge)
- Laboratory tests showed that PVOH is slowly biodegraded under anaerobic conditions (34.3% reduction over 28 days), and is almost completely removed under aerobic conditions (99.3% reduction over 28 days)



Please see the appendix below for the full report.

Aquapak is working in several projects with global brands, major converters and waste and recyclers to demonstrate the above recycling and recovery solutions at scale. Whilst many of these projects are commercially sensitive Aquapak will provide information and results where possible.

A handwritten signature in dark blue ink, appearing to read "E. Smith".

Dr Elizabeth Smith
Technical Manager