

The PROTEAN® Water Barrier platform provides options for the pulp, paper and packaging industries to replace environmentally persistent water barriers, such as plastic coatings and petroleum derived sizings, with eco-friendly alternatives. Our proprietary wet end additive and coating formulas become interlaced in the paper matrix, lending impressive strength properties and can be used as a wet-end additive or barrier coating solution. PROTEAN Water is biodegradable as it is 100% biobased.

The solutions are efficient and cost-effective alternatives for manufacturers looking to support their sustainability claims. HSMG® has acquired significant expertise related to the use of PROTEAN and will work with clients to tailor coating formulations to address a full range of barrier requirements.

### When compared to legacy technologies, PROTEAN Water Barrier can offer the following benefits:

#### SUSTAINABILITY:

- Made from natural, renewable resources
- Paper is repulpable and recyclable
- 100% biodegradable and compostable formulations available
- Free of wax and silicone
- Does not require special conditions for end of life disposal

#### MANUFACTURING EFFICIENCY:

- Scalable and adaptable using existing mill equipment
- Can be applied using curtain coating, size press, rod or blade coating equipment
- Offers an excellent surface for printability
- Maintains fiber flexibility for converting

#### VERSATILITY:

- Compatible with other barrier systems such as OGR, oxygen, water vapor
- Suitable for hot or cold products
- Compatible with bleached or unbleached papers
- Can be applied on one or both sides of paper
- Coating can be applied before or after printing
- Available as a full or a spot application

#### SAFETY:

- FDA approved under 21 CFR 172.867
- Meets specifications described in Generally Recognized as Safe (GRAS) notices GRN 227 and 325
- Exemplary formulations are BPI certified under 10528940
- BFR XXXVI & XXXVI/2
- Non-toxic

### PROTEAN Water Barrier can be used for several paper and paperboard applications including:



#### PAPER-MULCH

Low cost coating to provide superior water-resistance and paper strength. This is a new generation of paper-mulch that won't degrade as quickly.



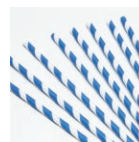
#### DISPOSABLE COFFEE CUPS

These are plastic-free paper cups using PROTEAN™ Water Barrier coating to provide high water-resistance instead of plastic-film and can be recycled without segregation.



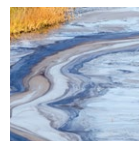
#### GROCERY BAGS

A perfect solution to replace plastic bags with stronger, more durable paper bags enhanced by our coating. They are reusable and tough enough to handle blustery weather conditions.



#### PAPER STRAWS

Improves the consumer experience as straws will withstand being submerged in liquid for a longer period with enhanced water-resistance qualities. Also allows manufacturers to use less raw materials, without compromising performance.



#### OIL ABSORBENTS

Safe, efficient oil-loving technology that is an economical alternative to existing oil-spill management solutions. The oil can be quickly recovered, and the oil sponge can easily be reused several times.

Contact HSMG® to learn more about PROTEAN® Water Barrier