

PROTEAN™ Water Barrier is an aqueous, water-resistant barrier coating that is a plant-based alternative to petroleum-based plastics, bio-plastics, polylactic acid, waxes and silicone. This unique formula becomes interlaced in the paper matrix, lending impressive strength properties to the base paper. The properties also deliver superior water-resistance to paper-based products that is comparable to bio-plastics with a lower overall product coat weight.

This novel formula is a recyclable, efficient and cost-effective alternative for manufacturers looking to replace their plastic-coatings as an environmentally-responsible decision for future generations. PROTEAN™ is a versatile and flexible technology that can be easily adjusted for different applications without compromising performance.

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

#### SUSTAINABILITY:

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

#### MANUFACTURING EFFICIENCY:

- Scalable and adaptable using existing mill equipment
- Can be applied using curtain coating, size press and rod coating equipment
- Offers an excellent surface for printability
- Maintains fiber flexibility for converting
- Can run up to 20% faster and dries quickly

#### VERSATILITY:

- Can be used as an additive or a barrier coating
- 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
- Suitable as an emulsion for other coating agents
- Available as a full or a spot application
- Is used as a platform technology for new applications

#### SAFETY:

- Meets specifications described in Generally Recognized as Safe (GRAS) notices GRN 227 and 325
- FDA approved under 21 CFR 172.867
- Non-toxic

### PROTEAN™ Water Barrier can be used for several paper and paperboard applications including, but not limited to:



#### 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.



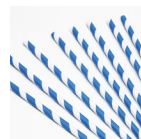
#### DISPOSABLE COFFEE CUPS

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™