

## PROTEAN<sup>®</sup> Water

The PROTEAN Water 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 becomes 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 inherent properties deliver impressive water-resistance to paper-based products that is competitive with bioplastics with a lower coat weight. Solutions can be tailored to meet the performance and environmental profile targets of the application, from simple contact angle to formulations with compatible barriers for high-performance applications like poly-free cupstock. Tailored formulations can be applied at commercial speeds using existing or readily available production equipment, including puddle, metering rod, blade, spray and press applications.

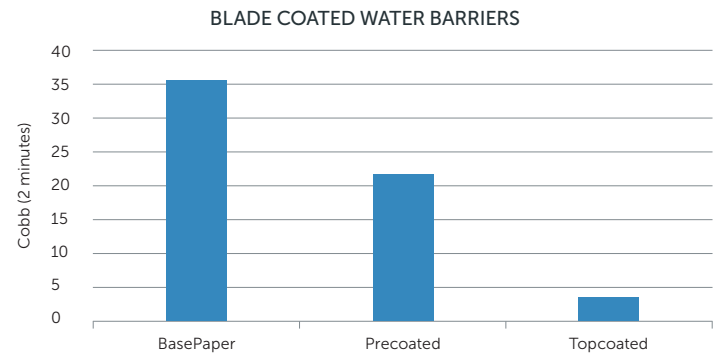
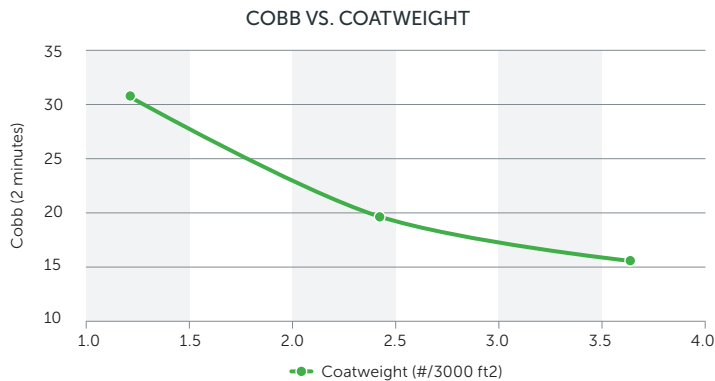
HSMG has acquired significant expertise related to the use of PROTEAN and will work with clients to tailor coating formulations to address a full range of barrier requirements.

### Benefits:

- Cost competitive
- Derived from natural and renewable resources
- Suitable for hot and cold products
- Serves as a replacement for plastic coatings, bioplastics and silicones
- Excellent hydrophobicity solutions for many paper grades
- Can be used on bleached or unbleached papers
- Coating can be applied before or after printing

## PROTEAN Water Barrier Performance

These graphs demonstrate barrier performance by coat weight achieved with a blade pilot coater application.



## PROTEAN Water Rheology

### Formulation Experience

- Coating viscosity/solids are highly adjustable to match the application needs and coating equipment requirements.
- The patented chemistry provides a water barrier by creating a hydrophobic surface.
- The highest levels of water resistance are achieved via formulations that also provide additional physical barrier functionality.
- Typical low application rate coatings are generally 10-20% solids:
  - Brookfield viscosity 25-50 cps at 100 rpm
  - Hercules viscosity 18-25 cps at 4400 rpm
- The pH ranges from 7.0 to 9.9, based on components used.
- The shelf life can be 6+ months.

Contact HSMG<sup>®</sup> to learn more about PROTEAN<sup>®</sup> Water Barrier



### Regulatory

- PROTEAN® coating solutions are FDA approved under 21 CFR 172.867 and meet specifications described in Generally Recognized as Safe (GRAS) notices GRN 227 and 325, with the exception of liquid infant formula containers. PROTEAN is compliant with BfR XXXVI.
- PROTEAN is BPI certified under CERT # 105298940 for composting and applications made utilizing the technology is recyclable and is repulpable..

### Example of Formulations

APPLICATIONS	100% BIO-BASED MATERIALS	END OF LIFE OPTIONS	
		COMPOSTABLE	RECYCLABLE
Agricultural paper mulch		✓	✓
Oil spill absorbents	✓	✓	*
Retail paper bags	✓	✓	✓
Paper straws	✓	✓	✓
Poly-free cupstock			✓

\* Oil spill absorbents cannot be recycled after use

Effective Date: April 1, 2020

The information contained herein is offered as guidance for your own investigations into suitability for relevant applications. HSMG makes no warranty about the accuracy of the information or fitness for use of the materials.

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