



PROTEAN™ represents a platform coating technology for paper and paper packaging which can be applied to give various performance properties to paper, including, but not limited to, improving wet strength, water resistance and grease resistance. The PROTEAN™ platform comprises aqueous barrier coatings that are plant-based alternatives to legacy technologies such as petroleum-based plastics, bio-plastic, polylactic acid, wax, fluorocarbons and silicone for paper-based products.

Paper-based products are known for their high thermal stability, good oxygen barrier function, chemical and mechanical resilience, ability to fully biodegrade and non-toxic nature. PROTEAN™ coatings complements those properties and further provides water-resistant or grease-resistant qualities to any application without the sustainability premium costs often associated with novel solutions. Initially created to reduce the global reliance on petroleum-based plastics, PROTEAN™ barrier coatings offer benefits for paper and paperboard products by providing superior fiber strength enhancing qualities to the base paper. The technology is unique as it can be recycled without segregation, and it can biodegrade and compost under standard conditions.

### When compared to legacy technologies, PROTEAN™ coatings offer the following benefits:

#### SUSTAINABILITY:

- Made from natural, renewable resources
- Sustainable from creation to disposal
- Free of plastic, fluorochemicals and silicone
- Recyclable
- 100% biodegradable and 100% compostable
- Does not require special conditions for end of life disposal
- Paper is repulpable
- Helps manufacturers reduce their carbon footprint

#### 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:

- Available in a water-resistant and grease-resistant formula
- Can be used as a barrier coating or as an additive
- Customizable for each application
- Delivers performance without premium pricing
- Can be used as an emulsifier for binders
- Is used as a platform technology for new applications

#### SAFETY:

- FDA approved for food contact
- Zero plasticizers
- No BPA
- No fluorocarbons

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



#### AGRICULTURAL — 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.



#### FOOD SERVICE — DISPOSABLE COFFEE CUPS

Plastic-free paper cups to help the environment with a plant-based coating provide high water-resistance instead of plastic-film and can be recycled without segregation.



#### FOOD SERVICE — HOT & COLD FOOD CONTAINERS

Fluorine-free alternative that covers a full spectrum of the 3M kit range. It can be easily converted, offers superior performance and high-quality printing. These containers are repulpable and can easily be recycled.



#### FOOD SERVICE — OIL- & GREASE-RESISTANT WRAPS

Fluorine-free alternative that covers a full spectrum of the 3M kit range. It maintains flexibility for converting, offers superior performance and provides a smooth surface for impressive aesthetics.



#### OIL ABSORBENTS — CLEAN UP MATERIALS

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 HS Manufacturing Group® to learn more about PROTEAN™