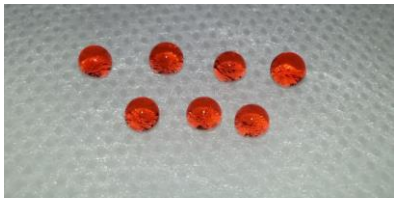
TECHNICAL DATA SHEET

REPELSHELL®

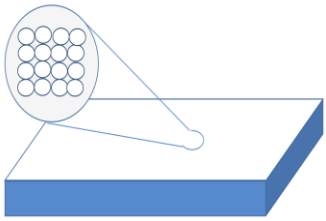
REPELLANT POWDER ADDITIVE FOR PLASTICS



Water Droplets Dyed Red on RepelShell® Plastic

OVERVIEW

RepelShell® is a thermally stable, surface modifying powder additive for plastic resins. By utilizing the functionalization capability of the RepelShell® platform, the additive represents a family of materials that can be tailored specifically for different bulk resins. NBD has illustrated that at low weight loadings (1-5%), NBD hybrid plastic resins can achieve a greater hydrophobicity and oleophobicity than the current highest performing surface characteristics of fluoropolymers (ex: PTFE, PFA) without trading off mechanical properties of the underlying bulk.

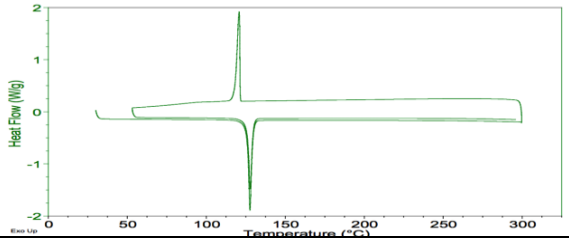


TECHNOLOGY

RepelShell™ is the result of using a unique hybrid organic-inorganic chemistry technique that manipulates different chemical groups in a highly dense fashion. By functionalizing specific to the bulk resin, interactions with the soft block polymer can occur which allows for an even nano-distribution at the surface for the plastic part that results in a boost in hydrophobicity and oleophobicity compared to the virgin polymer. This thermally stable material is added in the compounding step for melt blending resulting in hybrid pellets that can be processed at the same conditions of the underlying bulk.

TECHNICAL SPECIFICATIONS

Chemistry
Chemical Family: Organosilane
Room Temperature State: Powder (solid)
Storage Recommendations: Glass Bottle, 10° C – 80° C
Shelf Life: 2 years
Product Description: RepelShell® is a powder additive that can be melt blended into bulk polymers.

Material Characteristics
Particle Size: 1+ um
Upper Limit Thermal Stability Temperature: 309 C
Thermal Stability Demonstrated by DSC: 
Static contact angle: Water 105-120° / Hexadecane 55-80° (polymer dependent)
Bulk Polymers Additives available: Thermoplastic Polyurethane (TPU), Thermoplastic Elastomers (TPE), PolyAmide, Acrylonitrile Butadiene Styrene (ABS), Polyethylene Terephthalate (PET), Polybutylene Terephthalate (PBT), Polypropylene (PP), High Density Polyethylene (HDPE), Low Density Polyethylene (LDPE/LLDPE), Nylon 12, Poly(methyl methacrylate) (PMMA)

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Mechanical Testing to confirm less than 5% change in mechanical properties:
ASTM D2240, DIN 53516, ASTM D 412, ASTM D 624, ASTM D790

Appliance
Compounding Process: Utilize side feeder for compounding line that can add in material at specified weight loading. Masterbatching is not recommended due to required control of dispersion of additive in polymer.
Hybrid Pellets can be injection molded or extruded into parts per normal processing recommendations.
Injection mold temperature is recommended to be increased by minimum 10C for optimal results

Handling
Chemical Stable at normal temperature and storage conditions
Avoid: Heat, flames and sparks