



3044 Adriatic Court, Peachtree Corners, GA 30071

(P) 770-495-9554 (F) 404-521-4396

sales@thehansongroup.com

www.thehansongroup.com

PW-EXF 6514

Technical Bulletin for Hydrophobic Additive for Fabric and Film

General

PW-EXF 6514 is a melt-blendable additive that modifies the surface tension of the polymer substrate, improving the contact angle.

We have developed a highly effective hydrophobic additive for use in various polymers. Its chemical structure was carefully selected based on solubility in both polymer and water, ensuring optimal diffusion from the polymer matrix. The chosen molecular weight provides excellent thermal stability during processing. Polymer characteristics such as morphology and crystallinity were analyzed to guide formulation. These parameters were critical in selecting a chemistry that maximizes the surface energy difference between water or alcohol and the polymer, resulting in enhanced hydrophobicity—improving water and alcohol repellency in fabrics and increasing contact angle in polypropylene molded parts.

Applications

Polymer type: Polypropylene, Polyethylene, Nylon (PA), and Polyester (PET)

Processing: Fabrics for Hygiene and Medical use, films for packaging and lamination, composites, and air filtration

Production of the Master Batch

The following processing parameters were used during processing of this additive.

Equipment to manufacture the additive masterbatch was a nine zones, 34 mm twin screw of 38 L/D, with co-rotating screw of 34 mm in diameter and high-pitched kneading as well as turbine mixing elements.

Vent: Open (atmospheric), at zone 6.

Die: 2 holes and screen pack of 20 mesh size.

Screw speed: set at 300 RPM.

Pelletizing: strand cut using a waterbath and pelletizer.

Temperature Profile for Polyethylene Products

Zone	1	2	3	4	5	6	7	8	9
Temp (°F)	150	320	320	330	330	340	340	340	360

Temperature Profile for Polypropylene Products

Zone	1	2	3	4	5	6	7	8	9
Temp (°F)	150	380	380	380	380	380	380	390	400

Processing

The solid raw materials are mixed in a low intensity mixer.

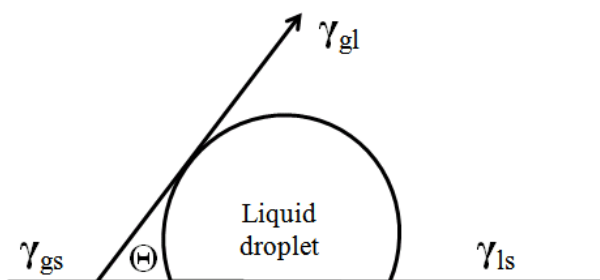
Test Methods used to confirm the efficacy:

For film (PP or PE) the test method is contact angle measurement.

This test method follows Young's Equation:

$$\gamma_{gs} = \gamma_{ls} + \gamma_{gl} \cos \Theta$$

g- Gas l- Liquid s- Solid



Masterbatches were prepared in PP polymer using a 20% loading of the additives. The masterbatch was used at a 4% LDR in PP resin to blow film. Contact angle was measured on the film. Films were 25 microns in thickness.

Performance Data

Contact angle measured by ASTM D2578.

The following table is the contact angle observed on films. The values are an average of three readings each.

Sample #	Active Ingredient	Contact Angle (°)
Control PP film	N/A	95
Competitive 1	1% Fluorinated	98
Competitive 2	Siloxane	86
Competitive 3	Glycerol tristearate	104
PW-EXF 6514	4% compound	110

A higher contact angle indicates greater hydrophobicity, while a lower contact angle reflects increased hydrophilicity of the additive.

For Spunbonded and Meltblown fabrics, hydrohead and alcohol repellency test.

Spunbonded – No oven aging – Hydrohead testing via IST 80.6 (01)

Sample	Alcohol Repellency Rating No.
25 gsm (Gram/Sq.M) PP control	15.1
PW-EXF 6514	15.3
1% fluorinated organic compound (FX-1801)	15.0

Spunbonded – No oven aging – Alcohol repellency via IST 80.8

Sample	Alcohol Repellency Rating No.
25 gsm(Gram/Sq.M) PP control	2
1% Fluorinated additive	3
PW-EXF 6514	3.5

Spunbonded – Oven aged at 50° C for 2 hours – Alcohol repellency via IST 80.8

Sample	Alcohol Repellency Rating No.
25 gsm(Gram/Sq.M) PP control	2
Fluorinated chemical 1%	4
PW-EXF 6514	4