

## Tospearl™ 120FL, 130FL, 145FL, 1100FL

### Silicone Beads for BOPP Film Applications

#### Description

Tospearl 120FL, 130FL, 145FL and 1100FL spherical silicone beads have narrow particle size distributions and mean particle diameters of approximately 2, 3, 4.5 and 10 microns, respectively. Their uniform particle sizes, thermal stabilities and low surface energies make them excellent candidates to consider for use as additives to BOPP films in which slip and antiblock properties are required.

#### Key Features and Typical Benefits

- Can enhance antiblocking and slip for polyolefin films such as BOPP due to spherical geometry and narrow particle size distributions.
- Can be compounded with thermoplastics using typical polymer processing equipment (e.g. extruders) because of high heat resistance.
- Can help achieve stable and low coefficient of friction (CoF) surfaces after film when extrusion beads do not migrate.
- Do not typically cause change in the printability of films.

#### Typical Physical Properties

Property	Tospearl 120FL beads	Tospearl 130FL beads	Tospearl 145FL beads	Tospearl 1100FL beads
Appearance	White spherical beads	White spherical beads	White spherical beads	White spherical beads
Mean particle diameter <sup>1</sup> (µm)	1.8 - 2.3	2.3 - 3.1	4.0 - 5.0	8.5 - 10.5
Weight loss @ 250 °C and 0.5 hours, %	< 1.0	< 1.0	< 1.0	< 1.0
pH <sup>2</sup>	6.0 - 8.0	6.0 - 8.0	6.0 - 8.0	6.0 - 8.0
Bulk specific gravity	0.35	0.36	0.43	0.66
Particle specific gravity	1.32	1.32	1.32	1.32
Refractive index	1.42	1.42	1.42	1.42

<sup>1</sup>Instrument: Coulter Counter Multisizer II

Tospearl™ 120FL, 130FL, 145FL, 1100FL

(electrical sensing zone method)

<sup>2</sup>A 2% dispersion in methanol/water (1/1)

Typical properties are average data and are not to be used as or to develop specifications.

### Particle Size Distribution



Tospearl 120FL, 130FL, 145FL and 1100FL beads have a very sharp particle size distribution.

### Scanning Electron Micrographs



SEM illustrates the uniform size distribution of the spherical 2, 3, 4.5 and 10-micron beads.

### Thermal Stability



Instrument: Coulter Counter Multisizer II  
 (electrical sensing zone method)  
 Dispersion medium: aqueous surfactant solution  
 Dispersing condition: Ultrasonic dispersion  
 Note: Test results. Actual results may vary.

The thermogravimetric analysis data of Tospearl 120FL silicone resin beads is shown below. The scan rate was 10 °C per minute. Tospearl 120FL silicone resin beads showed thermal decomposition at temperature in excess of 420 °C. Weight loss was minimized to 12-13% even if heated to 900 °C. Tospearl 130FL, 145FL and 1100FL beads showed the same behavior of thermal properties.

### Potential Applications

Antiblocking and slip agent for BOPP films  
 Tospearl 120FL, 130FL, 145FL and 1100FL beads’ low surface energies, uniform sizes and spherical shapes are key properties that can help impart lubricity properties to films.

The slip properties are illustrated using a simple test.



Angle is recorded when block starts sliding.

A comparison with blank and silica –containing surfaces showed significantly better lubricity of the surface containing the Tospearl FL grades:

	Slide Angle (°)
Tospearl 120FL bead	5°
Silica	17°
Blank	19°

Note: Test results. Actual results may vary.

### Comparison of properties of BOPP film<sup>1</sup> using Tospearl 120FL beads or silica

	Silica (2 µm)	Tospearl 120FL beads (2 µm)
Dosage level (%)	0.15	0.15
Coefficient of Friction <sup>2</sup> @ 23 °C	0.30	0.20
Coefficient of Friction <sup>2</sup> @ 80 °C	1.80	0.60
Coefficient of Friction <sup>3</sup> @ 80 °C	1.40	0.50

Note: Test data. Actual results may vary.

<sup>1</sup>Ideal thickness of skin layer containing **Tospearl 120FL beads** was 40% of the diameter of the particle in order to assure good retention

<sup>2</sup>ASTM D-1894 (film on film)

<sup>3</sup>ASTM D-1894 (film on metal)

Low coefficient of friction surfaces can be obtained with dosage levels of Tospearl 120FL beads as low as 0.05%.

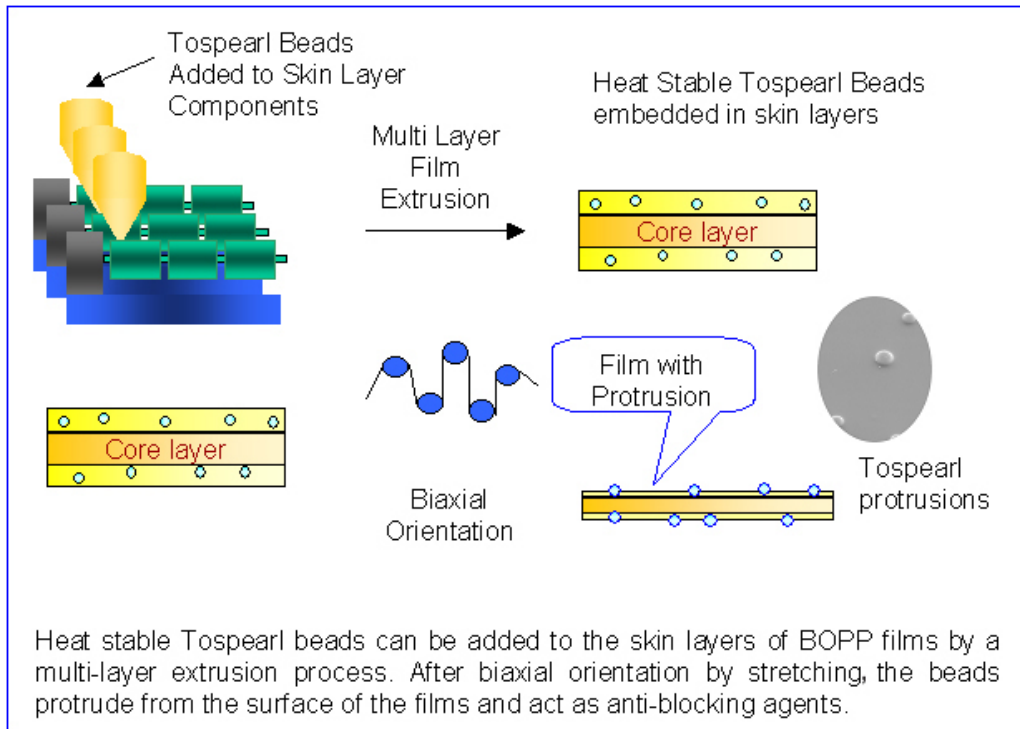
Good hot-slip properties facilitate easy processing and faster line speeds in packaging applications, such as cigarette production, and converting equipment. Tospearl FL grades can help prevent film from tearing.

The antiblocking properties of Tospearl FL beads can help prevent adhesion during film production, either on a finished roll, or on the inside of the bubble.

Additionally, the small differences between the refractive indices of Tospearl FL beads and the polyolefin resin can help yield films of high transparency and clarity, with high gloss properties.

Competitive products often lead to higher coefficients of friction and poorer haze values for the BOPP film.

### BOPP Film Process



### Patent Status

Standard copy to come

### Product Safety, Handling and Storage

Standard copy to come

### Limitations

Standard copy to come

**Contact Information**

Email

[commercial.services@momentive.com](mailto:commercial.services@momentive.com)

**Telephone**

<b>Americas</b>	<b>Latin America</b>	<b>EMEAI- Europe, Middle East, Africa &amp; India</b>	<b>ASIA PACIFIC</b>
+1 800 295 2392 Toll free* +704 805 6946 Direct Number	<b>Brazil</b> +55 11 4534 9650 Direct Number	<b>Europe</b> +390510924300 Direct number	<b>China</b> 800 820 0202 Toll free +86 21 3860 4892 Direct number
*All American countries	<b>Mexico</b> +52 55 2169 7670 Direct Number	<b>India, Middle East &amp; Africa</b> + 91 44 71212207 Direct number* <b>*All Middle Eastern countries, Africa, India,</b>	<b>Japan</b> +81 3 5544 3111 Direct number <b>Korea</b> +82 2 6201 4600

For literature and technical assistance, visit our website at: [www.momentive.com](http://www.momentive.com)

**DISCLAIMER:**

**THE MATERIALS, PRODUCTS AND SERVICES OF MOMENTIVE PERFORMANCE MATERIALS INC. AND ITS SUBSIDIARIES AND AFFILIATES (COLLECTIVELY “SUPPLIER”), ARE SOLD SUBJECT TO SUPPLIER’S STANDARD CONDITIONS OF SALE, WHICH ARE INCLUDED IN THE APPLICABLE DISTRIBUTOR OR OTHER SALES AGREEMENT, PRINTED ON THE BACK OF ORDER ACKNOWLEDGMENTS AND INVOICES, AND AVAILABLE UPON REQUEST. ALTHOUGH ANY INFORMATION, RECOMMENDATIONS, OR ADVICE CONTAINED HEREIN IS GIVEN IN GOOD FAITH, SUPPLIER MAKES NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, (i) THAT THE RESULTS DESCRIBED HEREIN WILL BE OBTAINED UNDER END-USE CONDITIONS, OR (ii) AS TO THE EFFECTIVENESS OR SAFETY OF ANY DESIGN INCORPORATING ITS PRODUCTS, MATERIALS, SERVICES, RECOMMENDATIONS OR ADVICE. EXCEPT AS PROVIDED IN SUPPLIER’S STANDARD CONDITIONS OF SALE, SUPPLIER AND ITS REPRESENTATIVES SHALL IN NO EVENT BE RESPONSIBLE FOR ANY LOSS RESULTING FROM ANY USE OF ITS MATERIALS, PRODUCTS OR SERVICES DESCRIBED HEREIN.** Each user bears full responsibility for making its own determination as to the suitability of Supplier’s materials, services, recommendations, or advice for its own particular use. Each user must identify and perform all tests and analyses necessary to assure that its finished parts incorporating Supplier’s products, materials, or services will be safe and suitable for use under end-use conditions. Nothing in this or any other document, nor any oral recommendation or advice, shall be deemed to alter, vary, supersede, or waive any provision of Supplier’s standard Conditions of Sale or this Disclaimer, unless any such modification is specifically agreed to in a writing signed by Supplier. No statement contained herein concerning a possible or suggested use of any material, product, service or design is intended, or should be construed, to grant

Tospear™ 120FL,130FL, 145FL, 1100FL

any license under any patent or other intellectual property right of Supplier covering such use or design, or as a recommendation for the use of such material, product, service or design in the infringement of any patent or other intellectual property right.

\*Tospear™ is a trademark of Momentive Performance Materials Inc.

The use of the "™" symbol designates registered or unregistered trademarks of Momentive Performance Materials Inc. or its affiliated companies. Momentive and the Momentive logo are trademarks of Momentive Performance Materials Inc.