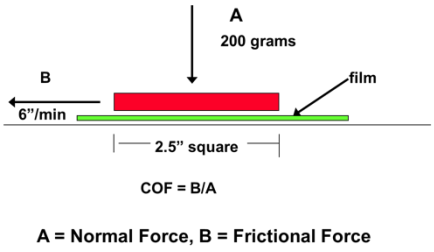
Slip Additives

Slip additives are utilized in polymers to reduce friction and adhesion of adjacent surfaces.

Summary

Slip additives are used to enhance and reduce handling problems used extensively in the manufacture of polyolefin films. In their natural state, most polyolefins exhibit a degree of tackiness and hence, cannot be readily processed into packaging films without the presence of slip additives to ease their ability to separate and slide.

Slips are used to reduce a film's resistance to sliding over itself or parts of converting equipment. Commercially important, slips are in the chemical family known as amides and are typically referred to as "fast bloom" (oleamide) and "slow bloom" (erucamide). Fast bloom slips are typically used when forming the end product in line. Slow blooming slips are typically used for roll stock which is later converted to a finished product. Other amides are used in the case of special processes (e.g. higher heat extrusion coating applications or customized mixtures where balancing slip and antiblock properties are required.) Effectiveness of slip is normally determined by COEFFICIENT OF FRICTION (COF). COF is a ratio of the force required to slide one layer of film across another relative to the gravimetric force exerted on it.



Product Overview

Ampacet supplies a full complement of slip agent offerings including traditional migratory, consistent, and permanent non-migratory.

Traditional slips are often employed in monolayer films where the gauge of the film acts as a "reservoir" of additive which blooms to the surface and lowers COF.

Consistent slip agent is unique in that it offers the easier ability to dial in medium COF targets; offers consistent performance over a broad temperature range; and is minimally affected by the presence of other inorganic additives in the formulation.

Non-migratory slips are often employed by film extruders within coex applications. These can be added to the skin layer only where the performance is necessary without fear of migrating to the core layer where they will do no good in reducing COF. They also offer the potential ability of running a film with a differential COF: a high COF in the skin layer where no slip is added; and a reduced COF in the opposite layer where the slip is placed.

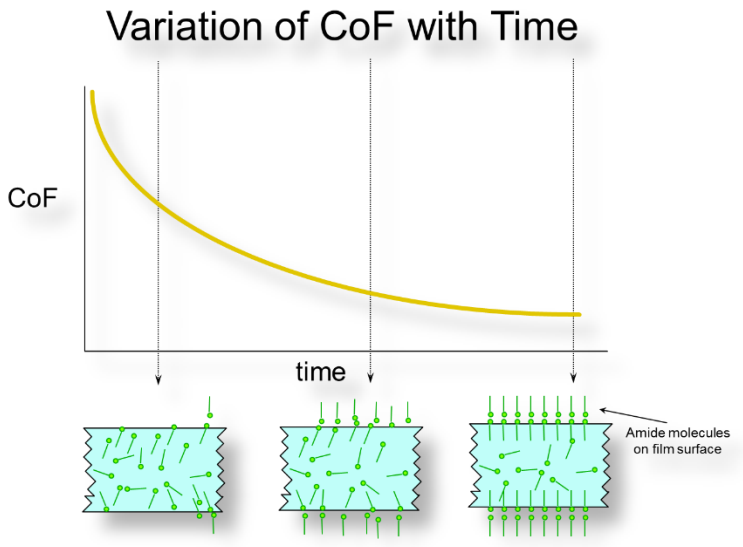
Products/Codes

Production Code	Resin	Description	LDR	FDA
10090	PE	5% Erucamide (slow bloom)	1.0-2.0%	YES
100497	PE	1% Erucamide (slow bloom)	1.0-5.0%	YES
100492	PE	2% Erucamide (slow bloom)	1.0-5.0%	YES
101797	PE	5% Oleamide (fast bloom)	1.0-2.0%	YES
102109	PE	Consistent Slip	1.0-3.0%	YES
101724-U	PE	Non-migratory Slip	3.0-5.0%	YES

Performance Data Details

- Slip levels generally range from 0.02% - 0.1% (200-1,000 ppm) slip in the final film.
- COF reduces with time for migratory slip agents but is maintained with non-migratory slip
- COF reduction is directly related but not linear to the concentration of slip
- Increasing gauge requires less total slip due to having a larger reservoir of additive by volume

Definition	COF	Slip Content (ppm)
Low Slip / High COF	0.50-0.80	200 – 400
Medium Slip	0.20-0.40	500 – 600
High Slip / Low COF	0.05-0.20	700 – 1000



For more information on **Slip Additives**, its uses and complete Regulatory Status, contact your Ampacet Account Executive or visit **www.ampacet.com.**

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