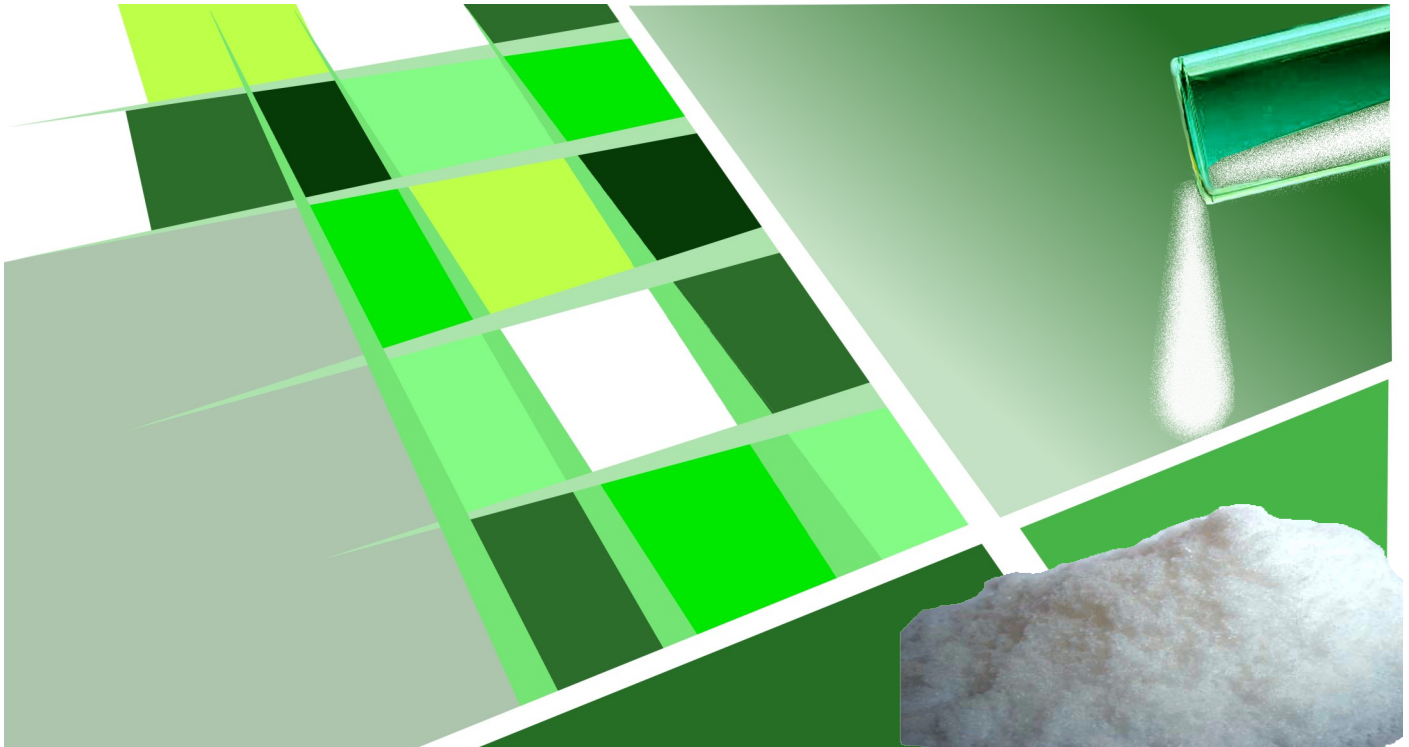




Trilene Freeflow™

For Outstanding Performance Choose Trilene Freeflow™



Increase Throughput

Decrease Downtime

Reduce Scrap

Add Functionality

Trilene Freeflow™ delivers processing & end use advantages from mixing and compounding to finished product like no other! Lion Copolymer presents the family of Trilene Freeflow™ and Liquid Elastomer “Processing Aids”, for most plastic and rubber processing. Achieve higher output, decrease down time, reduce scrap and add functionality. Add functionality to PE & PP for printability without surface treatment, eliminate melt fracture, decrease mixing times, reduce scrap, decrease injection, compression, transfer, blow molding and rotomolding time, save energy and speed up extrusion output.

Whether you're a resin designer, compounder or converter, Trilene Freeflow™ makes your life easy in processing linear low-density polyethylene (LLDPE), high-density polyethylene (HDPE), PP, and Metallocene resins.

Trilene Freeflow™



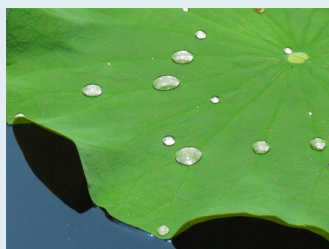
How does Trilene Freeflow™ work to bring you value!

The new Trilene Freeflow™ processing Aids speed up and smooth the extrusion passage by lubricating and reducing the COF in the path to processing. In mixing and compounding it's low molecular weight facilitates the mixing process for compounds with high loading of fillers and recycle polymers, producing better quality mix with zero VOC. In blown and cast film fabrication Trilene Freeflow™ reduces melt fracture and increases output of quality film.

See for yourself; an extrudate with and without Trilene Freeflow™

Balancing Properties and Processing in the Polyolefins Film

Whether you're a resin designer, compounder or converter, Trilene Freeflow™ opens the door to new possibilities in processing linear low-density polyethylene (LLDPE), high-density polyethylene (HDPE), and metallocene resins. You'll find that Trilene Freeflow™ provides outstanding defense against poor quality films and processing problems with improved performance and processability. Defect-free film translates directly to your bottom line.



Specify Trilene Freeflow™ in Powder Form

Trilene Freeflow™ additives are supplied in powder form packaged in standard 40-pound multilayer paper bags. If you're feeding a system that require pellets or other packaging options, contact your Lion Copolymer representative.

Add functionality for painting, decorating and stamping non printable surfaces

We offer some Trilene Freeflow™ and liquid Trilene® with high levels of diene capable of imparting functionality to PE and PP. Some end use applications with polyolefins require printing, painting, decoration, and stamping, like toys for example, polyolefins are notorious for not accepting any paint without corona, flame or chemical etch treatment. With Trilene® functionality can be enhanced to reduce treat level or eliminate that step.

Small things make a big difference...

It is small details that help your bottom line, like polymer process aids (PPAs). In a typical resin formulation, adding less than one part per hundred of Trilene Freeflow™ eliminates melt fracture in blown films and in all extrusions. By rapidly reducing COF with internal die surfaces, Trilene Freeflow™ leads to fast transitions, reduced scrap and higher production output; all of which improves profits for your business.

General Rubber Compounding

Trilene® Liquid Polymers are low molecular weight EPDM polymers. Trilene® 65 (DCPD) and 67 (ENB) are viscous liquids whereas Trilene® 77 (ENB) is a crystalline wax at room temperature.

Therefore, Trilene® 77 is easy to handle during weighing and mixing operations. It can be cut on a guillotine and does not stick to its container or other items with which it comes in contact. However, at temperatures above 50-55°C (122-131°F), the crystallinity melts and Trilene® 77 becomes a liquid like Trilene® 65 and Trilene® 67.

Trilene Freeflow™
The choice is yours...



Results

In the peroxide cured compound, Trilene® 65 and Trilene® 77 provided significant advantages over the unplasticized control and the formulation with the paraffinic oil.

- Compared with the unplasticized control, the Trilene® polymers reduced Mooney viscosity by 20-25%. Rubber Processability Analyzer (RPA) tests showed that the Trilene polymers had a similar effect on viscosities at the higher shear rates encountered in molding, mixing, and calendering operations.
- In comparison with Sunpar 2280, the Trilene® polymers produced vulcanizates with lower chloroform-acetone extracts. They also had lower volatility in thermogravimetric analysis (TGA) tests.
- The Trilene® polymers gave volume swells in DOT #3 and #4 brake fluids that were comparable to the unplasticized control. The conventional paraffinic oil was more susceptible to extraction into the brake fluids.
- Results for a sulfur cured formulation were similar to the peroxide cure. Trilene® 67 as well as Trilene® 77 produced formulations with better processing than the unplasticized control and lower extracts and volatiles than the paraffinic oil.

Recommendations

Trilene® Liquid Polymers function as reactive plasticizers in EPDM molding applications such as brake parts, O-rings, and gaskets. Trilene® 77 can be used in situations where handling of thick,

Extrusion

Trilene® Liquid Polymers function as reactive plasticizers in EPDM molding applications such as brake parts, O-rings, and gaskets. Trilene® 77 can be used in situations where handling of thick,

Calendering

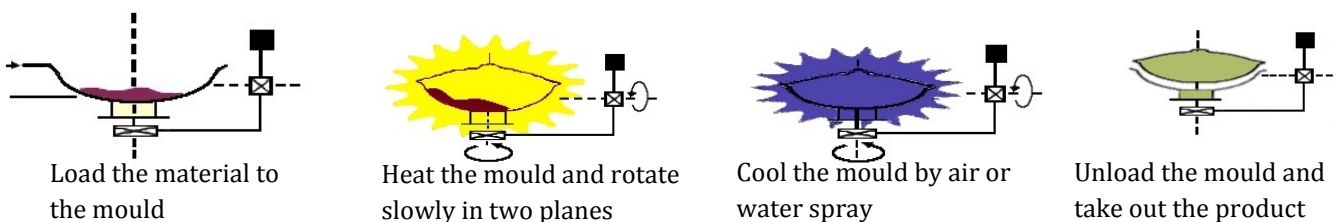
Optimum calendering requires a broad molecular weight distribution for easy processing. Nothing broadens molecular weight distribution like the addition of Trilene® to improve flow through the nip of the calender.

Wire & Cable

The low molecular weight Trilene® can improve flow and extrusion smoothness, providing uniform contact with the copper conductor for optimum electrical properties. In molded applications, the flow improvement imparted by Trilene® assures complete mold fill with no voids.

Rotational Molding

- Rotational molding technology is enabling to create light-weight, seamless, stress-free parts of virtually any size in the most complex shapes.
- Rotationally molded products represent a wide range of materials, performance characteristics, colors, surface textures and finishes.
- The products can be custom-designed to meet precise market requirements more



- No changes to existing mold needed in rotomolding with Trilene Freeflow™.
- Strong edge and corner: Rotomold's edge can be thicker than 5 mm. This solves the problem that many hollow products have weak edges / corners. Cross linking of Trilene gives integrity to all weak spots. Trilene® gives better structural integrity.
- Complex shapes can be achievable with small amount of Trilene Freeflow™. And better impact resistance.
- Significantly reduce cycle times and hence energy cost.

Universal Processing Aid

Trilene Freeflow™ process aids work with most polyolefin resins and compounds, from linear low density (LLDPE) to high-density (HDPE) polyethylene resins, polypropylene and metallocene technology resins. Trilene Freeflow™ can also be used with other polymers including PS, SEBS and ABS to boost quality and production.

Product Offering

- **Trilene Freeflow™ 65**
ethylene propylene dicyclopentadiene terpolymer
non-extractable, non-migrating, reactive process aid for peroxide cure
- **Trilene Freeflow™ 66**
ethylene propylene ethylidene norbornene terpolymer
non-extractable, non-migrating, reactive process aid for peroxide or sulfur cure
- **Trilene Freeflow™ 67**
ethylene propylene ethylidene norbornene terpolymer
non-extractable, non-migrating, reactive process aid for peroxide or sulfur cure
- **Trilene Freeflow™ 76**
ethylene propylene ethylidene norbornene terpolymer
non-extractable, non-migrating, reactive process aid for peroxide or sulfur cure
- **Trilene Freeflow™ 77**
ethylene propylene ethylidene norbornene terpolymer
non-extractable, non-migrating, reactive process aid for peroxide or sulfur cure
- **Trilene Freeflow™ CP-80**
ethylene-propylene copolymer excellent process aid for EPDM, BR, NR, & SBR
- **Trilene Freeflow™ CP-1100**
ethylene-propylene copolymer excellent process aid for EPDM, BR, NR, & SBR





Look What Trilene Freeflow can do for you.....

Advantages

- Easier addition to compounds
- Reduced scrap and waste
- Faster incorporation
- Improved weigh-up accuracy
- Same functionality as liquid
- Use of Trilene® in irrigation pipe with LLDPE can give you a higher out put and smoother surface!
- Trilene Freeflow™ 65 (EPDM) or Trilene Freeflow™ CP 80 (copolymer) as low as 0.7 % in the final formulation in 1.0 MI Dowlex, at 100 RPM on extruder, the surface completely cleared up of melt fracture and reduced amps by 50% !
- Trilene Freeflow™ is easy to handle in its powder form and concentrations in silica 60-70 % active Trilene®!
- One to three percent (1-3%) let down in LLDPE.

Applications

Film Blown & Cast extrusion	Fiber spinning	Transfer Molding
Extrusion	Extrusion coating	Calendaring
Wire and cable	Extruded foam	General Rubber mixing
Blow molding	Injection molding	General Rubber Compounding
Pipe and tubing	Compression molding	

What a technology!

Safe to handle, safe for food contact Trilene Freeflow™ PPAs are stable at standard formulation and processing temperatures. Some Trilene Freeflow™ products meet US FDA, European, Canadian and Japanese food requirements for use as an extrusion aid in manufacturing extruded polyolefins for food contact applications. For food contact status of specific Trilene Freeflow™ products, please contact Lion Copolymer representative.

Trilene Freeflow™ meets the Regulatory Compliance Statement for Food Contact Materials additive.

- **FDA Status of Trilene® Liquid Polymers**
- **FDA Regulations 21CFR**

Trilene® Grades	Adhesives §175.105	Closures & Sealing Gaskets	Olefin Polymers	Rubber Articles for Repeated use
Copolymers				
CP80	C	C	C	C
CP1100	C	C	C	C
DCPD Terpolymers				
65	C	N	N	C
ENB Terpolymers				
66	N	N	N	C
76	N	N	N	C
ENB Terpolymers (greater than 5% ENB)				
67	N	N	N	N
77	N	N	N	N

Polymers are designated as either, "C" for "in compliance" with FDA Regulations, or "N" for "not in compliance" with FDA Regulations. Designation of certain types as "not in compliance with FDA Regulations" should not be construed to mean that they are hazardous.

DA Regulations Covering Trilene® Liquid Polymers

Abbreviated explanations of the regulations referred to in this brochure are given below. For complete information, please refer to the actual 21CFR regulations.

21 CFR §175.105 - Adhesives

Use: Packaging, transporting, or holding food

Limitations: For use with dry foods or food separated by a functional barrier. Restricted to substances listed in Section (c)(5) of §175.105.

21 CFR §177.1210 - Closures with Sealing Gaskets for Food Containers

Use: In producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding

Limitations: Restricted to substances generally recognized as safe that have prior sanction, or are listed in 177.1210, Section (c).

21 CFR §177.1520 - Olefin Polymers

Use: As articles or components of articles intended for use in contact with food.

Limitations: Olefin copolymers must comply with Section (a) 3(i) and terpolymers must comply with Sections (a) (3) (iii) and (c) 3.4 of 177.1520.

21 CFR §177.2600 - Rubber Articles Intended for Repeated Use

Use: In producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding food.

Limitations: Articles must comply with Section (c) (4) (i) and (iii) of §177.2600. Rubber articles in contact with aqueous or fatty foods must comply with extraction guidelines set forth in Sections (e) and (f) respectively of §177.2600.



Lion Copolymer, LLC

5955 Scenic Highway
Baton Rouge, LA 70805-2044

Phone: 800-535-9960
Fax: 225-267-3621

www.lioncopolymer.com

Lion Copolymer: A Leader in Synthetic Rubber