



The Chemical Company
19 Narragansett Avenue
Jamestown, RI 02835
Phone: (401) 423- 3100

Epoxidized Soybean Oil

Product Specification

Product Description

TCC's ESO (**Epoxidized Soybean Oil**) adds a new dimension to improvements in PVC compounds. High Oxirane oxygen efficiency from specially processed soybean oil produces a total compatibility and stabilization performance that is second to none.

Epoxidized oils have been marketed for over three decades. Early products were deficient due to a high residual iodine value of the finished epoxide which ranged from 20-25. Thought to be a substitute for DOP, they were misapplied resulting in early spew or exudation.

It was discovered over the next few years that to achieve approximately ninety-five percent of the total compatibility potential, the iodine value of 5-7, was a necessity. It was found that below an iodine value of three, no absolute compatibility correlation using artificial or natural exposures could be made due to other variables such as hydroxyl value, viscosity, polymerization effects, and base soybean oil.

TCC's **Epoxidized Soybean Oil** utilizes only the highest iodine value, lowest saturated soybean oil available in the country. This reduces the probability of randomly high saturated triglycerides which adversely affecting formulation compatibility.

Epoxidized Soybean Oil has been found to be the best value of all stabilizing additives. ESO has been accepted as a standard industry formulation tool, affecting cost reductions and improving performance in heat and light stability. No other additive enjoys such universal acceptance for all types of vinyl compounds.

TCC's **Epoxidized Soybean Oil** functions as the most effective known synergist to metallic stabilizer compounds in vinyl systems. At the same time, TCC's **Epoxidized Soybean Oil** functions as a true polymeric type plasticizer by adding flexibility and retarding volatilization, water extraction, and migration due to its high molecular weight.

Packaging

TCC's **Epoxidized Soybean Oil** is available in 55 gallon (450 lb net) steel drums, bulk tank trucks, bulk rail cars, and totes.

Suggestions for Use

- Plasticization of all PVC flexible and semi-flexible compounds.
- Heat and light stabilization of all flexible, semi-rigid, and rigid PVC compounds.
- Pigment dispersions as an outstanding grinding liquid.
- Plate-out resistant compounds requiring high epoxy levels.
- Acid acceptance in chlorinated hydrocarbons, phosphoric acid esters, and natural resins.
- Plasticization of PVC (Polyvinyl Chloride) and PVA (Polyvinyl Acetate) emulsions.
- Plasticization of chlorinated rubber, nitrocellulose, and neoprene.
- Process improvement in certain rigid compounds.
- Acid scavenging in soy based ink compounds.

Applications in PVC Compounds

- Floor covering.
- Coated fabrics: automotive and furniture upholstery, sporting equipment, wall coverings, clothing and luggage.
- Unsupported films.
- Pigment dispersions.
- Injection molding compounds.

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- Wire and cable coatings.
- Plastics & Organics used in molding, dipping, and casting applications.
- Extrusions: wetting, gasketing, weather strip, beverage tubing, hose.
- Foam for padding, seating, automotive and packaging.
- Blow molded bottles.
- Printed semi-rigid and rigid laminate film.

TCC's Epoxidized Soybean Oil

Typical Physical Properties

Oxirane Oxygen	7.0% Min
Specific Gravity 25°/25°C	0.993
Color - APHA	150 Max
Pounds Per Gallon @ 25°C	8.3
Viscosity Stokes @ 25°C	4.2
Acid Value	0.5 Max
Molecular Weight	1,000
Freeze Point	0°C
Fire Point	315°C
Refractive Index @ 25°C	1.472
Odor	Mild

Product Benefits

1. Efficient Heat & Light Stabilization
2. Low Viscosity.
3. High Detergent Resistance.
4. Low Volatility.
5. Improves Processing Speed.
6. Excellent Pigment Wetting.
7. Improves Plastics Viscosity Stability.
8. Low Styrene & Lacquer Mar.
9. High oil & Gas Resistance.

Compatibility

Compatible With:

Polyvinyl Chloride
Chlorinated Rubber
Ethyl Cellulose
Nitrocellulose
Polyvinyl Acetate

Partially Compatible With:

Alkyds

Incompatible With:

Cellulose Acetate
Cellulose Acetate Propionate
Polyvinyl Butyral

Solvents

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Miscible:
Aromatic Hydrocarbons
Butanol
Esters
Ketones
Plasticizers

Partly Miscible:
Aliphatic Hydrocarbons
Ethanol

Immiscible:
Water

Performance Information @ 50 phr

	TCC	Epoxy A	Epoxy B	DOP
Tensile Strength	2770	2805	2758	2650
Elongation	377	358	380	392
100% Modulus	1587	1690	1577	1450
Tear Strength	505	540	507	452
Durometer Hardness	90	92	90	85
Clash & Berg (Tf=135,000)	-11°C	-9.5°C	-11°C	-23°C
Volatility	0.3	0.3	0.4	4.1
Water Extraction	0.03	0.05	0.04	0.26
Soap Extraction	0.28	0.31	0.33	4.20
Gasoline Extraction	2.2	2.5	2.9	13.6
Mineral Oil Extraction	0.96	0.87	1.26	3.1
Motor Oil Extraction	1.41	1.27	1.59	3.77
Hexane Extraction	2.50	2.35	3.12	16.60
Neoprene Migration	7.1	7.4	8.6	18.6
GRS Migration	6.6	6.5	7.3	19.9
DC Volume Resistivity, Ohm Cm	.8x10 ¹³	.85x10 ¹³	1.0x10 ¹³	1.0x10 ¹³
Accelerated UV Hrs to Slight Spew	26	21	17	8

Epoxidized Soybean Oil

Environmental and Safety Information

BEFORE HANDLING THIS MATERIAL, READ AND UNDERSTAND THE MSDS (MATERIAL SAFETY DATA SHEET) FOR ADDITIONAL INFORMATION ON PERSONAL PROTECTIVE EQUIPMENT AND FOR SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION.

For Environmental, Safety & Toxicology information, contact our Customer Service Department at (800) 446-2800 to request a Material Safety Data Sheet. We believe strongly in Responsible Care as a Public Commitment.

More Technical Information Available

Ask your TCC representative for further information about other additives for use in PVC resins, PVC alloys, and other polymer systems. TCC produces a full line of heat stabilizers, impact modifiers, process aids and epoxidized vegetable oils.



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TCC offers complete technical service and assistance. Our laboratories and personnel are ready to assist you in any phase of your evaluation, from formulation development to end product testing.

TCC Epoxy Plasticizers

The TCC line of epoxy plasticizers offers flexible PVC producers the highest quality, dual-function epoxidized vegetable oils available. TCC has the ability to produce material with exacting specifications to meet varied customer requirements.