

SOY-BASED SOLVENTS

Soy means fewer VOCs, less flammability and less toxicity.

THE PRODUCT - METHYL SOYATE

Methyl soyate, a methyl ester derived from soybean oil, is an excellent “green” alternative industrial solvent for use in various I&I (Industrial and Institutional) cleaners, paint strippers, adhesive and graffiti removers, parts cleaners and degreasers and as a carrier solvent for coatings and adhesives. It is a cost-competitive, low-VOC, low-toxicity, high-flash, effective and readily biodegradable replacement for conventional chlorinated and hydrocarbon solvents, which are under increasing regulatory pressure directed at ozone-depleting chemicals (ODCs), hazardous air pollutants (HAPs) and VOCs.

U.S. SOLVENTS MARKET POTENTIAL FOR METHYL SOYATE

The industries and market applications that utilize solvents vary widely, but most manufacturing and non-manufacturing uses involve solvents to dissolve, suspend, carry or remove other materials. Methyl soyate’s properties offer opportunities to compete in many niche market uses that typically involve formulated specialty products. Conventional solvents with which methyl soyate usually competes represent about 12 percent of the total U.S. solvents market (11 billion pounds). These conventional solvents are: mineral spirits (hydrocarbon solvents), MEK (methyl ethyl ketone), MeCl (methylene chloride), TCE (trichloroethylene), perc (perchloroethylene) and d-Limonene. The 2011 U.S. market demand for methyl soyate solvents was estimated to be 50 million pounds.

MARKET SEGMENTS THAT USE SOY SOLVENTS

CLEANING PRODUCTS

This market has emerged as the largest use segment for methyl soyate-based formulated cleaners. Products are used in institutions (building maintenance), restaurants and households, replacing hydrocarbon, citrus and chlorinated solvents in order to provide improved product safety.

Types of Products:

- Hard-surface cleaners
- Household cleaners
- Glass cleaners
- Floor cleaners
- Waterless hand cleaners
- Bathroom cleaners
- Stainless steel cleaners
- Graffiti removers

COATINGS, INKS AND ADHESIVES

Solvents are used as resin carriers and diluents in alkyd and waterborne paints, coatings and adhesives to replace mineral spirits, MEK and MeCl, which reduces VOCs, flammability and toxicity to workers. Also, soybean oil is a major component of printing inks, especially colored inks, replacing hydrocarbon (petroleum) solvents.

PAINT STRIPPERS

Methyl soyate-based paint strippers are a small but growing market niche that is replacing conventional MeCl-based paint strippers. Regulatory pressure on MeCl is growing because of worker safety and ozone-depletion properties. Methyl soyate can be formulated with other organic cosolvents and surfactants to design desired dwell times, drying rates and water rinsabilities.





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PARTS CLEANERS & DEGREASERS

This is a very large but fragmented market that has relied on the industrial use of TCE vapor degreasing and mineral spirits (solvent 140) for parts cleaning. Both of these solvents are under increasing regulatory control due to flammability and high VOCs (mineral spirits) as well as TCE's potential carcinogenicity. Methyl soyate cosolvent blends with other biosolvents such as ethyl lactate (Vertec Gold) and d-Limonene. CitruSoy® provides a very cost-effective replacement for these solvents.

OTHER REMOVERS - ADHESIVES, MASTICS, RESINS, INKS, ASPHALT, RUST

Methyl soyate-formulated cleaners are successfully used to remove many types of polymeric and petroleum-based materials from processing equipment and fabricated parts. They are also used for safely removing floor tile mastics, cleaning asphalt paving equipment and cleaning up oil and fuel spills on shoreline beaches and stream beds. Conventional solvents replaced in these applications include MEK, MeCl, toluene, mineral spirits and other hydrocarbon solvents.

PHYSICAL PROPERTIES

Methyl soyate provides good solvency with a Kauri-butanol (KB) value of 58. It is a low-VOC solvent (< 25 mg/l), has a high flash point of > 360°F and is low in toxicity relative to most conventional solvents. The only difficult physical properties can be a slow evaporation rate and residual film formation upon drying. These properties can be improved and modified by formulating methyl soyate with polar cosolvents and surfactants and with a secondary wipe or rinse to remove the film residue. Materials compatibility is safe with most metals, plastics and elastomers.

ENVIRONMENTAL REGULATIONS

Methyl soyate is not classified by the U.S. Environmental Protection Agency (EPA) as a HAP or ODC.

AVAILABILITY

The product is commercially available from many manufacturers in the United States.

SOLVENT PRICING

The competitive economics of methyl soyate as an industrial cleaning solvent are very favorable. As of July 2012, methyl

soyate pricing was about \$0.85/lb. With escalating prices of petrochemicals made from natural gas and crude oil, most industrial solvent prices have escalated, creating market opportunities for soy-based solvents.

EMERGING USES AND APPLICATIONS

Potential for soy solvents in the solvent market is not limited to the replacement of conventional solvents by methyl soyate. New applications and product opportunities are being developed by creative entrepreneurs who utilize the flexibility of soy chemistry.

Methyl soyate can be used as a shoreline cleaner to remove and recover spilled oil and petroleum products from beaches and streams. It is listed by the U.S. EPA on the National Contingency Plan product schedule for oil spills, and it is the only shoreline cleaner licensed by the state of California.

Another creative new use for soy solvents is the safe disposal of waste plastic products. Methyl soyate can dissolve 20 to 25 times its own volume of plastic waste, such as Styrofoam flotation billets or shredded tire rubber. Dissolved scrap plastics have many use potentials such as paving product sealers and binders.

Other new emerging applications for soy-based solvent products and processes include paper pulp cleaning and recycling, bioremediation, highway paving and patching materials and crude oil solvent extraction and processing.

ABOUT USB

The 69 farmer-directors of USB oversee the investments of the soy checkoff to maximize profit opportunities for all U.S. soybean farmers. These volunteers invest and leverage checkoff funds to increase the value of U.S. soy meal and oil, to ensure U.S. soybean farmers and their customers have the freedom and infrastructure to operate, and to meet the needs of U.S. soy's customers. As stipulated in the federal Soybean Promotion, Research and Consumer Information Act, the USDA Agricultural Marketing Service has oversight responsibilities for USB and the soy checkoff.

FOR MORE INFORMATION, VISIT: SOYNEWUSES.ORG

