**What This Means for You**

SI Group's ETHANOX lubricant antioxidants help our customers differentiate and optimize their total formulation cost-effectiveness while meeting rigorous regulations, standards and specifications.

Choosing ETHANOX products helps you make and sell top-quality lubricant products confidently and efficiently. To learn more about our ETHANOX antioxidant product lines, please contact your local SI Group sales representative.

**Global Locations**

![Map of global locations with red markers indicating various countries including Brazil, China, Korea, Singapore, South Africa, Switzerland, and others.](image)

**ETHANOX® Lubricant Antioxidants**

**ENHANCING PERFORMANCE AND EXTENDING USEFUL LIFE OF LUBRICANTS**

The information presented herein is believed to be accurate and reliable, but is presented without guarantee or responsibility on the part of SI Group, Inc. and its subsidiaries to ensure the accuracy or reliability of the information. It is the responsibility of the user to comply with all applicable laws and regulations and to provide for a safe workplace. The user should consider all information contained herein only as a guide, and should take precautions that the user considers necessary or prudent to promote a safe work environment, such as considering all applicable health and safety hazards, developing safe work practice procedures and properly instructing employees. Further, nothing contained herein shall be taken as an inducement or recommendation to manufacture or use any of the materials or processes mentioned herein in violation of existing or pending patents.

ETHANOX is a trademark of SI Group, Inc.
ETHANOX® Lubricant Antioxidants

Si Group’s broad portfolio of ETHANOX® antioxidants enhance thermal stability, improve lubricant performance and reduce sludge formation, extending the useful life of lubricants in a wide variety of lubricant applications. ETHANOX antioxidants improve engine oils, industrial oils, as well as compressor oil and gear and hydraulic oils.

ETHANOX antioxidants reduce thickening and inhibit acid formation. Formulators and lubricant marketers worldwide rely on ETHANOX antioxidants to meet the most demanding specifications and OEM requirements. Si Group is dedicated to the development of new additive technology and products tailored for lubricant oil applications to meet the evolving needs of both the industrial and engine lubricant industries.

Products for a More Stringent Market

Engine oil specifications, such as ILSAC GF-6 and PC-11, evolved to accommodate more severe engine operating conditions due to more stringent emissions regulations and fuel economy mandates. Specifications for industrial oils are also changing to withstand more severe service. Engines are operating at higher temperatures and drain intervals are being extended. As a result, improved performance and stability of lubricating oils are required to prevent degradation.

ETHANOX Prevents Oil Deterioration

Si Group’s ETHANOX lubricant antioxidants play an important role in engine oils and industrial lubricants. They have been performance tested and proven to reduce the formation of harmful acidic and insoluble by-products resulting from the oxidation of the oil. Oxidation contributes to formation of sludge in the oil and an overall breakdown of the viscosity characteristics of the lubricant.

ETHANOX antioxidants prevent oil degradation and deposit formation in lubricating fluids. This extends the useful life of the oils and lubricants, thus helping to reduce dependence of these non-renewable petroleum-based products. Increased oil stability leads to reduced costs, better performance, and longer useful life.

ETHANOX Antioxidant Applications

Engine Applications
- Passenger car motor oil
- Diesel engine oil
- Natural gas engines
- Aviation fluid
- Two-stroke oil
- Marine motor oil
- Automatic transmission fluids

Industrial Applications
- Turbines
- Transformer oils for power generation

Other Applications
- Compressor oil
- Hydraulic fluids
- Gear oils
- Metalworking fluids
- Slideway
- Greases

Leading High-Quality Antioxidant Development

Si Group is a leading global developer and manufacturer of chemical intermediates, specialty resins, and solutions that are critical to the quality and performance of countless industries. Our 110-year history includes the development and production of antioxidants for various industries, including lubricants.

Si Group’s acquisition of Albemarle Corporation’s ETHANOX product lines in 2014 has accelerated our growth globally in antioxidants. Si Group manufactures high-performance antioxidants in ISO-9001 certified facilities. Today, our unique back-integration from lubricant-based phenolics improves our global supply chain and reliability.

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Description</th>
<th>Crankcase Applications</th>
<th>Specification Applications</th>
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<tr>
<td></td>
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<td>PCMO</td>
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<td>Single-Ring Hindered Phenolic</td>
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<td>Hindered Phenolic Ester</td>
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