



Specialty Insulating Oils Worldwide

(903) 526-7577

FAX: (903) 526-0021

www.dsiventures.com

DSI INHIBIT

Product Specifications

Use and Safety Guide

Contents

DSI Ventures - A History of Innovation

An Introduction to DSI Ventures, Inc.

DSI Quality Policy

Insulating Oil Product Line

DSI Inhibit Data Sheet

DSI Inhibit MSDS

Receipt and Handling of DSI Inhibit Fluid

Adding DSI Inhibit into Equipment

Maintenance of Equipment with DSI Inhibit

Spill Control Information

DSI Ventures

A History of Developments in Specialty Insulating Fluids

1992 Alpha-1 Fluid: First in a New Generation of Insulating Fluids

- First Available Synthetic Hydrocarbon (PAO) Fluid
- Used in retrofill and OEM applications for fire resistant fluids
- Factory Mutual Listed

1994 Alpha-2 Fluid: The First Specialty Oil for High Operating Temperatures

- Non-Sludging
- Superior Equipment Protection

1995 Beta Fluid: Improved Fire Resistant Petroleum Oil

- Meets International Standards for Fire Resistant Fluids
- Factory Mutual Listed for use indoors

1996 ECO Fluids: Super Biodegradable Dielectric Fluids

- The Most Highly Biodegradable Insulating Fluids Made
- Applications in Transformers, Fire Resistant sites and in Oil-Filled Cables

1997 OptiCool Fluid: Allows your transformers to run cooler

- Reduce Operating Temperatures with OptiCool
- Upgrade transformer designs to higher KVA ratings

2000 DSI Ventures receives ISO 9002 Certification

2003 DSI Inhibit – Concentrated Inhibitor Mixture

- Premixed Oxidation Inhibitor for field application
- Powerful blend of antioxidants stops oil and paper ageing

2006 DSI Sulfur Inhibit – Stops Corrosive Sulfur Damage

- A Multi-faceted approach to stop Corrosive Sulfur in Transformers
- Powerful blend of antioxidants stops oil and paper ageing, a blend of metal passivators and compounds that change the nature of sulfur molecules

DSI Ventures – An Introduction

DSI Ventures is a manufacturer and marketer of electrical insulating products. Our product line includes dielectric fluids for all applications. We specialize in fire resistant oils used to reduce the risk of fire and explosion in equipment.

Our Tradition of Innovation and Commitment to the Future

In 1992, DSI Ventures introduced the newest generation of electrical insulating fluids by developing synthetic products to replace petroleum and silicone based fluids. Since then, we have worked with customers and suppliers, and have been the leader in development and introduction of improved insulating products. We develop products which surpass the world's highest safety requirements. Our fluids set new standards.

DSI's products can be used by all electrical equipment manufacturers with no change in manufacturing techniques or materials. Our insulating fluids have been widely specified and accepted by commercial, utility and military customers worldwide.

Meeting higher safety standards and more rigorous performance requirements without sacrificing ease of use and economy present new challenges. DSI is prepared to meet those challenges with our commitment to research and innovation, by developing new materials and expanding our selection of electrical insulators.

Our dedication to understanding the growing requirements of the power distribution industry is vital to our continued leadership as a supplier of high quality products. We have an international network of marketing and sales professionals with extensive experience and knowledge of the dielectric fluids market. We can help you with all areas of service, including appropriate product selection, specialized design optimization, materials advice, and technical performance standards.

Our Quality Policy

It is the objective of DSI Ventures, Inc. to provide our customers with products that meet or exceed our guaranteed characteristics and all statutory and regulatory requirements. We will deliver these products good condition by the date that we have agreed upon, with no surprises.



Insulating Oil Product Line

Dielectric Fluids:

Beta Fluid	Low Cost Fire resistant insulating oil for new transformers and switchgear.
Alpha-1 Fluid	Synthetic hydrocarbon fire resistant oil for refilling existing equipment originally filled with conventional transformer oil or PCB fluids.
ECO Fluid	Environmentally friendly, highly biodegradable oil for use in sensitive locations.
ECO-FR Fluid	Fire Resistant, highly biodegradable dielectric fluid
Alpha-2 Fluid	Specialty low temperature insulating oil Pours down to -70 degrees.
Silicone Fluid	DC 561 ® electrical grade silicone fluid from Dow Corning Corporation.
Omega Fluid	Conventional transformer oil meeting ASTM D3487 specs.
OptiCool Fluid	Cools better than conventional transformer oil For temperature-sensitive applications.
Alpha-Cool Fluid	Synthetic based dielectric heat transfer fluid for extreme wide temperature range service in military and civilian electronics cooling applications Meets requirements of MIL-87252C.

Transformer Maintenance Products:

DSI Inhibit	Concentrated oxidation inhibitor solution for adding directly to transformer oil in the field or factory.
DSI Sulfur Inhibit	A solution for corrosive sulfur problems in transformer oil

DSI INHIBIT[®]

Concentrated Antioxidant Additive for Insulating Oil

DSI Inhibit[®] is a concentrated blend of advanced antioxidants and metal passivators that is used to treat transformer oil with metal ionization and oxidation problems. Because it is a liquid, DSI Inhibit can be added directly into a transformer, without premixing.

Made with a mixture of petroleum oils and advanced antioxidants, DSI Inhibit slows transformer oil aging and the formation of aging byproducts, including sludge and acids.

The Metal passivators in DSI Inhibit prevent the dissolution of copper, bronze, iron, and other metals into conventional transformer oil. As metal ions will catalyze the oxidation of hydrocarbons, DSI Inhibit slows the reaction mechanism.

Applications:

Use DSI Inhibit in any application for transformer oil. DSI Inhibit can be used with conventional transformer oil or fire resistant hydrocarbon fluids, such as Beta Fluid. Fifty five gallons of DSI Inhibit will treat 2000 gallons of transformer oil.

Typical Properties:

Appearance	Yellow liquid
Fire Point, D92, °C.	308
Viscosity, D88, cSt. @ 100 °C	11.4
Density @ 20 °C, g/cc	0.86
Pour Point, D97, °C.	-21
Dielectric Breakdown, D1816, kV	56

For technical or ordering information on Inhibit fluid and DSI's full line of electrical insulating oils, contact:

DSI Ventures, Inc.
1320 Commerce St.
Tyler, TX 75710 USA
Telephone: (903) 526-7577
FAX: (903) 526-0021

Material Safety Data Sheet

DSI Inhibit Fluid

MANUFACTURER: DSI Ventures, Inc. 1320 Commerce St. Tyler, TX 75702 903-526-7577

PRODUCT IDENTIFICATION **Synonyms:** Hydrocarbon dielectric Fluid additive
Chemical Family Hydrocarbon Oil + hindered phenolic and aminic antioxidants

INGREDIENTS

<u>CAS Registry No.</u> <u>NTP, IARC, OSHA</u>	<u>%W</u>	<u>%V</u>	<u>Identification</u>	<u>Carcinogen per</u>
68037-01-4	>80	>80	fire resistant transformer oil	not listed
128-37-0	<20	<20	hindered phenol antioxidant	not listed

PHYSICAL DATA

Boiling Point: wide range **Specific Gravity:** 0.79
Vapor Pressure: <0.001 psi @ 20 C.
Percent Solid by wt.: 0.0 **Vapor Density (air = 1):** 18 **pH:** 7.0
Solubility in water: very low **Percent Volatile (v/v):** nil **Appearance:** clear liquid

FIRE AND EXPLOSION DATA

ASTM D-92 Flash point: Typically, 270 degrees Celsius
Recommended fire extinguishing medium: Dry chemical or CO₂ foam. Use precautions as with any fire involving petroleum-based materials. Firefighters should wear apparatus with full face mask and full protective equipment to protect from toxic vapors.

REACTIVITY DATA

DSI Inhibit is stable under normal conditions of use. Products of complete combustion of DSI Inhibit are phenolic oxides, carbon dioxide and water. Products of incomplete combustion of any hydrocarbon product include these compounds plus volatile hydrocarbons and carbon monoxide.

HEALTH HAZARD DATA

Routes of Exposure:

ORAL: slightly toxic. Ingestion may cause gastrointestinal distress. Symptoms may include nausea, vomiting and diarrhea.

SKIN mild irritant. Repeated or prolonged contact may result in localized irritation of the skin. May cause allergic reactions in some individuals.

EYES: severe eye irritant. Avoid contact.

INHALATION: Inhalation of oil mist may cause respiratory irritation. Prolonged exposure may lead to respiratory problems.

SPECIAL TOXIC EFFECTS: None

CARCINOGENIC/MUTAGENIC POTENTIAL: no ingredients are classified as a human carcinogen.

FIRST AID

INGESTION: Induce vomiting. Get immediate medical attention.

SKIN CONTACT: Remove contaminated clothing. Wash area of contact thoroughly with soap and water. If irritation is present, get medical attention.

EYE CONTACT: Flush the eyes immediately with large amounts of water to ensure thorough rinsing. If irritation persists, get medical attention.

INHALATION: Remove affected person from source of exposure. Get medical attention if irritation persists.

PERSONAL PROTECTION INFORMATION

EYE PROTECTION: Wear safety glasses or goggles to prevent eye contact. Eye baths should be readily available in the area of handling DSI Inhibit.

SKIN PROTECTION: Oil-impervious clothing is recommended to prevent skin contact.

RESPIRATORY PROTECTION: Use MSHA/NIOSH approved equipment when working in areas of heavy oil mist. Ventilation can be used to control or reduce airborne concentrations of oil.

ENVIRONMENTAL AND DISPOSAL INFORMATION

SPILL OR RELEASE TO THE ENVIRONMENT: Combine and recover any free liquid. There is no CERCLA reportable quantity of DSI Inhibit. With small spills, absorb the fluid with sand or clay absorbent, then flush the area with water. With large spills, contain its flow. A spill of any hydrocarbon fluid to navigable waters that causes a sheen upon the water's surface must be reported immediately to the Coast Guard National Response Center (800-424-8802). Failure to report may result in civil or criminal penalties.

WASTE DISPOSAL: DSI Inhibit, when discarded or disposed, is not listed as a hazardous waste per 40 CFR 261.33.

HANDLING AND STORAGE: This material is not regulated as a hazardous material by the DOT or IMO. Avoid extremes of temperature in storage. Store DSI Inhibit in tightly closed containers in cool, dry, isolated and well ventilated areas, away from sources of ignition or heat. Store drums on their sides so that bungs are below internal liquid level. Do not store in unlabeled containers.

This Material Safety Data Sheet has been prepared in order to help the users of DSI Inhibit. The data contained herein is believed to be accurate, but no guarantees are given with regard to fitness of use in a particular situation.

Effective Date: June 1, 2006

Completed by David Sundin, Ph.D.

® Registered trademark of DSI Ventures, Inc. Copyright © 2005 DSI Ventures, Inc. All rights reserved. DSI Ventures makes no representations regarding the suitability of any product for a given application. Warranties are limited to product characteristics only.

RECEIPT AND HANDLING OF DSI INHIBIT

DSI Inhibit is a viscous yellow fluid – a blend of petroleum oil with powerful antioxidants.

Shipping Containers

DSI Ventures' fluids are available in five gallon containers, 55 gallon drums, 330 gallon "tote" containers, or tank trailers. Each type of shipping container should be handled according to standard industry practice in order to ensure that the fluid will retain its original characteristics.

All containers should be examined for mechanical integrity when they are accepted – there should be no leaks, punctures, or loose caps or seals. If any of these are noticed when the product arrives, the customer should refuse delivery of the product and contact DSI immediately.

Receipt and Inspection of Shipments

The receipt and inspection of fire resistant fluids should follow similar procedures to those used for conventional transformer oil

For recommendations regarding types of hoses or pumps to be used with our insulating oils, please contact DSI Ventures, Inc.

Fluid Storage and Drum Handling:

When drums of insulating oils or additives are to be stored for a long period of time, store them in a dry, heated building. Outdoors, drums should be stored horizontally, with the bungs below the internal oil level. A drip pan or curb around the storage area should be used to contain any fluid from a ruptured or leaking container.

Sometimes, it's necessary to heat the drum before emptying it. This can be done in a warm room, or an oven or with electric drum or pail heaters. Open flames should never be used to warm drums. Before heating a drum, at least one of the bung plugs must be loosened to vent air pressure.

Equipment to use with DSI Inhibit

The same equipment can be used for handling and processing DSI Inhibit as is used for conventional transformer oil. Although dedicated processing equipment is best, no foaming or adverse reactions will be experienced if equipment is shared between these oils.

ADDING DSI INHIBIT INTO EQUIPMENT

DSI Inhibit can be added directly to de-energized equipment without premixing. DSI Inhibit has a high dielectric strength and is very dry. Therefore, it can be added directly into a transformer via pump or by pouring the correct amount, and the transformer then re-energized. The circulation of transformer oil via convection or pumps will thoroughly mix the two fluids.

DSI Inhibit should be added to 40 times its volume of transformer oil. Therefore, 5 gallons of DSI Inhibit will treat 200 gallons of transformer oil. 55 gallons of DSI Inhibit will treat 2200 gallons of transformer oil.

Transformer oil that has been properly treated with DSI Inhibit will contain 0.30% phenolic antioxidant after the two fluids have had time to mix.

MAINTENANCE OF DSI INHIBIT IN EQUIPMENT

Maintenance Schedules

Periodic maintenance testing on transformers treated with DSI Inhibit should be performed on the same schedule as used for other equipment in a similar application. Refer to ASTM Standard Method D923 for the correct methods of sampling fluid from transformers and other electrical equipment.

Dissolved Gas Analysis

Solid and liquid insulation decompose when exposed to high temperatures. The types of gases produced in this decomposition depend upon the temperatures that are experienced. Analysis of the gases that are dissolved in the insulating oil can help the equipment operator detect and identify problems in the equipment. Hot spots in a transformer's windings, for example, produce different gases than arcing from a loose internal connection. The analysis of dissolved gases in Alpha and Beta Fluid uses the same procedures that are used with conventional mineral oil.

The application is described in ANSI-IEEE Guide C57.104, "Guide for the Detection and Determination of Generated Gases in Oil-Immersed Transformers and Their Relation to the Serviceability of the Equipment". Use C57.104 with Alpha or Beta Fluid. It is important to note that dissolved gas analysis provides only guidelines; it is only able to provide advice with respect to transformer problems and diagnostic direction.

Processing Transformer Oil That Contains DSI Inhibit

Transformer Oil that has been treated with DSI Inhibit can be reconditioned in the same manner as conventional transformer oil. This process cleans an oil that has been oxidized or contaminated with water, arc decomposition products or other matter

Water can be removed from insulating oils with a centrifuge, vacuum dehydrators or moisture absorbing filters. Particulate matter may be removed by filtration through a filter with a small pore size (0.5 micron). For specific recommendations regarding reclamation processes for hydrocarbon-based dielectric fluids, consult IEEE Standard 637-1985, "Guide for Reclamation of Insulating Oil and Criteria for Its Use".

Spill Control Information

If a spill of any fluid occurs on land, contain the spilled material with dikes of earth, sand or commercially available spill control pillows. Scoop up excess oil and dispose of it properly. (Put the saturated pillows or sand into drums and have them taken away by a firm licensed to dispose Toxicity

DSI Inhibit is virtually non-toxic. It is neither mutagenic or carcinogenic. Testing effects indicate that it poses little risk to personnel when handled with normal handling procedures. LD50 values are over 40 grams per kilogram of bodyweight.

Skin contact testing has shown that DSI Inhibit has little effect on intact or abraded skin. Some people experience a slight allergic irritation to oils, which makes their skin redden.

Inhalation of oil mist can irritate your lungs. We advise you to take conventional industry precautions against inhalation of mist or vapors, just as you would be with any oil product.

Spills of DSI Inhibit Fluid fluid are not required to be reported to CERCLA.

A spill of any oil on water should be contained with floating dikes and removed with oil-skimmers and wringing equipment. If enough oil is spilled that is visible on the surface of a navigable waterway, the U.S. Coast Guard must be notified. Carbon-ingesting microbes can help to speed the cleaning of an oil spill site. To report a spill, call the National Response Center (a Federally funded office) at 1-800-424-8802.