



## LUMINOL™ TR/TRI HIGH-EFFICIENCY ELECTRICAL INSULATION FLUIDS

### Introduction

#### LUMINOL™ Outperforms Naphthenic Electrical Insulating Oils

Petro-Canada's LUMINOL family of electrical insulating fluids represents a breakthrough in electrical insulating fluids technology. Unlike naphthenic mineral oils, LUMINOL uses Petro-Canada's ultra-pure severely hydrotreated iso-paraffin base fluids to help minimize power loss and maximize productivity. These fluids contain no corrosive sulphur that may lead to transformer breakdown.

LUMINOL fluids withstand energy spikes and hot and cold weather extremes, better than naphthenic electrical insulating oils. Thanks to a naturally high oxidation stability, LUMINOL fluids resist breakdown longer and help provide extended service life. So less money is spent on routine transformer maintenance and fluid top-up, and less time worrying about transformer efficiency.

LUMINOL delivers worry-free, corrosive sulphur-free performance.

#### Environmental, Health & Safety Benefits

LUMINOL fluids can help reduce disposal costs and the potential impact of spills, as well as answer possible community concerns about transformer oil toxicity. Petro-Canada produces LUMINOL fluids using the HT Purity Process combined with Hydroisomerization. These ultra-pure fluids are inherently biodegradable in natural environments, free of carcinogenic polynuclear aromatics (PNAs) and virtually non-toxic. As well, LUMINOL's negative gassing tendency and higher flash point help reduce the risk of fire and explosion.

#### Facts about LUMINOL TR/TRI

LUMINOL TR and LUMINOL TRI are ideal for use in large power and distribution transformers operating at peak capacity as well as free-breathing units, pad mount, and pole mount transformers; for commercial, industrial and institutional applications:

- LUMINOL TR is designed for Type I applications.
- LUMINOL TRI is designed for Type II applications.

- LUMINOL TR and TRI meet or exceed the performance requirements of CSA C50 (Class A and B), ASTM D3487 standards, and DOBLE TOPS specifications.
- LUMINOL TR and TRI meet the CSA C50-08 upgraded oxidation stability Special Requirements for Type III and Type IV fluids respectively.
- LUMINOL is approved for applications requiring Hydro One M-104
- LUMINOL TR meets International Electrotechnical Commission, IEC 60296 General specifications for trace inhibited transformer oil.
- LUMINOL TRI meets IEC 60296 General specifications for inhibited transformer oil.

#### Demonstrated Characteristics Include:

- Outstanding oxidation stability to help extend the service life of circuit breakers and LTCs.
- Excellent heat transfer capability to help enhance transformer performance.
- High dielectric impulse strength to improve performance in the presence of overvoltage conditions.
- Low power-factor (dielectric loss) to reduce thermal runaway under conditions of high electric stress.
- Negative gassing to reduce the risk of failure from hydrogen gas bubbles.
- Full compatibility with existing naphthenic insulating oils, which enhances the performance of the combined fluids.
- LUMINOL TR and TRI contain no corrosive sulphur compounds and do not require passivators.
- LUMINOL TR and TRI are colourless.
- Outstanding cold weather performance.

#### Dependable Supply Today And Tomorrow:

- Available in bulk, 1,040L (275 USG) totes (TRI only - minimum order required) and 205L (55 USG) drums.
- Initial delivery can be arranged within two weeks, and ongoing supply is then tailored to meet individual requirements.
- Available only from Petro-Canada, one of the world's most dependable producers of advanced fluids.

#### What is the HT difference?

Petro-Canada starts with the HT purity process to produce water-white, 99.9% pure base oils. The result is a range of lubricants, specialty fluids and greases that deliver maximum performance for our customers.



## Typical Performance Data

PROPERTY	TEST	CSA-C50 CLASS A		ASTM D3487		LUMINOL	
		Type I/III	Type II/IV	Type I	Type II	TR	TRi
<b>PHYSICAL PROPERTIES</b>							
Appearance	Visual	N/A		Clear & Bright		Clear & Bright	
Colour	ASTM D1500	0.5 max		0.5 max		<0.5	
Specific Gravity @ 15°C	ASTM D4052	0.906 max		0.91 max		0.835	
Kinematic Viscosity, cSt @ 100°C	ASTM D445	N/A		3.0 max		2.8	
Kinematic Viscosity, cSt @ 40°C	ASTM D445	10 max		12.0 max		9.2	
Kinematic Viscosity, cSt @ 0°C	ASTM D445	75 max		76.0 max		53	
Kinematic Viscosity, cSt @ -40°C	ASTM D445	2500 max		N/A		1230	
Pour Point, °C	ASTM D5950	-46 max		-40 max		-60	
Interfacial Tension @ 25°C, dynes/cm	ASTM D971	40 min		40 min		48	
Flash Point, °C	ASTM D92	145 min		145 min		170	
<b>CHEMICAL PROPERTIES</b>							
Neutralization Number, mg KOH/g	ASTM D974	0.03 max		0.03 max		<0.01	
Water Content, ppm	ASTM D6304	35 max		35 max		<25	
Corrosive Sulphur	ASTM D1275B	Not corrosive		Not corrosive		Not corrosive	
Corrosive Sulphur	IEC 62535					Not corrosive	
PCB Content, ppm	ASTM D4059	2 max		Not detectable		Nil	
Oxid. Stability, wt.% Sludge @ 72h	ASTM D2440	0.1 max	N/A	0.15 max	0.1 max	<0.01	<0.01
Oxid. Stability, Neut # mg KOH/g @ 72h	ASTM D2440	0.4 max	N/A	0.5 max	0.3 max	<0.01	<0.01
Oxid. Stability, wt.% Sludge @ 164h	ASTM D2440	0.2 max	0.05 max	0.3 max	0.2 max	<0.01	<0.01
Oxid. Stability, Neut # mg KOH/g @ 164h	ASTM D2440	0.5 max	0.2 max	0.6 max	0.4 max	<0.01	<0.01
Oxid. Stability, wt% Sludge	IEC 61125 C	Types III & IV: 0.08 max		N/A		<0.02 <sup>†</sup>	
Oxid. Stability, Neut # mg KOH/g	IEC 61125 C	Types III & IV: 1.2 max		N/A		<0.02 <sup>†</sup>	
Oxid. Stability, Power Factor @ 90°C	IEC 61125 C	Types III & IV: 0.5 max		N/A		<0.001 <sup>†</sup>	
Inhibitor Content, wt.%	ASTM D2668	≤ 0.08	> 0.08 -0.40	≤ 0.08	≤ 0.08 -0.30	0.08	0.20
Rotary Pressure Vessel Oxidation Test, minutes	ASTM D2112	N/A	195 min	N/A	195 min	400	600
<b>ELECTRICAL PROPERTIES</b>							
Dielectric Breakdown Voltage, @ 60 Hz Disk Electrode, min, kV	ASTM D877	30 min		30 min		55	
Dielectric Breakdown Voltage @ 60 Hz VDE Electrode, 2.03 mm gap, min, kV	ASTM D1816	24 min <sup>††</sup>		35 min <sup>††</sup>		44 <sup>††</sup>	
		56 min <sup>†††</sup>		56 min <sup>†††</sup>		65 <sup>†††</sup>	
Dielectric Breakdown Impulse, kV	ASTM D3300	145 min		145 min		>300	
Gassing Tendency, µL/min	ASTM D2300	N/A		+30 max		-10	
Power Factor @ 60 Hz, 100°C	ASTM D924	0.005 max		0.003 max		0.001	
Power Factor @ 60 Hz, 25°C	ASTM D924	0.0005 max		0.0005 max		<0.0001	

The values quoted above are typical of normal production. They do not constitute a specification.

<sup>†</sup> Test duration: Type III (332 h); Type IV (500 h).

<sup>††</sup> Following transport (unprocessed oil).

<sup>†††</sup> After filtering, drying and degassification (new processed oil).

To order product or to learn more about how Petro-Canada Lubricants can help your business visit: [lubricants.petro-canada.com](http://lubricants.petro-canada.com) or contact us at: [lubecsr@petrocanadalsp.com](mailto:lubecsr@petrocanadalsp.com)



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