



## Transformer Oil

Starfire Transformer Oil is an electrical insulating oil produced from severely hydrotreated naphthenic base oils to meet the specifications defined in ASTM D 3487. It is formulated with an oxidation inhibitor to minimize formation of acids and sludge in service to minimize oil deterioration and extend the operating life of the immersed components.

### FEATURES/BENEFITS

- Excellent oxidation stability - Formulated with oxidation inhibitors which minimize the formation of sludge, acids, esters, peroxides and moisture which are the major cause of deterioration of the insulating oil. This allows components to operate at higher temperatures for longer periods, increasing component life.
- Low pour point and low viscosity - Allows oil to penetrate solid insulation to help convey heat from core materials to reduce operating temperature and increase component life under a wide range of operating conditions.
- High dielectric strength and low power factor provide excellent insulating properties.
- Noncorrosive to copper and copper alloys
- Does not contain any PCBs

### APPLICATIONS

Oil-immersed transformers and electrical components

Circuit breakers and electrical fuses

Switches

Tap changers

Any application requiring a low viscosity, low pour point, high quality naphthenic base oil.

### Starfire Transformer Oil meets the requirements of:

ANSI/ ASTM D 3487 Type II Inhibited Oil

Federal VV-I-530A, Class II Specification

NATO symbol S-756, British Standard BS148:1972

GE A13A3A2 (10CA) Specification IEC 296 Class IIA Specification NEMA Type II TR-P8-1975

IEEE

IEC 60296

Westinghouse Specification PDS 55822AG

**PHYSICAL PROPERTIES**

property		MIN	MAX	Typical
Viscosity, SUS @ 37.8 °C	ASTM D 445		66	59.2
Viscosity, SUS @ 98.9 °C	ASTM D 445		36	34.0
Viscosity, cSt @ 0°C	ASTM D 445		76	64.2
Viscosity, cSt @ 40°C	ASTM D 341		12	9.3
Viscosity, cSt @ 100°C	ASTM D 341		3	2.3
Specific Gravity, 15.6°C	ASTM D 4052		0.91	0.8862
Flash Point, COC, °C	ASTM D 92	145		155
Color, ASTM	ASTM D 6045		0.5	L0.5
Pour Point, °C	ASTM D 5949		-40	-64
Interfacial Tension, 25°, dynes/cm	ASTM D 971	40		51
Visual Examination	ASTM D 1524	Clear & Bright		Clear & Bright

**ELECTRICAL PROPERTIES**

property		MIN	MAX	Typical
Dielectric Breakdown @ 60 Hz, Disk electrodes, kV	ASTM D 877	30		40
Dielectric Breakdown @ 60 Hz, VDE, kV (2.03-mm) gap	ASTM D 1816	35		47
Power Factor @ 60 Hz, 25°C, %	ASTM D 924		0.05	0.005
Power Factor @ 60 Hz, 100°C, %	ASTM D 924		0.3	0.075
Gassing Tendency, µL,/min	ASTM D 2300		30	12

**CHEMICAL PROPERTIES**

property		MIN	MAX	Typical
Oxidation Stability	ASTM D 2440			
72 hr: Sludge, % by mass			0.1	<0.01
Total Acid Number, mg KOH/g			0.3	<0.01
164 hr: Sludge, % by mass			0.2	<0.01
Total Acid Number, mg KOH/g			0.4	<0.01
Oxidation Stability (Rotating Bomb Test), minutes	ASTM D 2112	195		248
Oxidation Inhibitor Content, wt %	ASTM D 2668	0.15	0.3	0.26
Corrosive Sulfur	ASTM D 1275 (B)	Noncorrosive		Noncorrosive
Water Content, ppm	ASTM D 1533		35	9
Neutralization Number, mg KOH/g	ASTM D 974		0.03	<0.01
Aniline Point, °C	ASTM D 611	63	84	74.7
PCB Content, ppm	ASTM D 4059		Not detected	Not detected