



TURBOFLO™ TURBINE FLUIDS

Introduction

Petro-Canada's TURBOFLO™ Fluids are specifically designed to lubricate and cool steam and gas turbines and deliver excellent lubrication to bearings. They are exclusive blends of ultra pure Petro-Canada HT Severely Hydrocracked base oils and a unique Petro-Canada additive system.

TURBOFLO Fluids demonstrate exceptional oxidative and thermal stability.

Features and Benefits

- **Exceptional resistance to fluid breakdown caused by air and high temperatures**

For example:

Turbine Oxidation Stability Test result exceeds **10,000 hours** - much higher than the industry standard.

Rotating Pressure Vessel Oxidation Test (RPVOT) result exceeds **1,000 minutes**

- Significantly extends oil life particularly after a complete fluid change-out.
- Topping-up an existing turbine oil system, provides an immediate and marked improvement in oil performance
- Lowers operating costs by extending intervals between oil top-ups or complete change-outs
- **Excellent water separability**
 - Drainage of condensed water from oil coalescers and purifiers is greatly facilitated
 - Condensed water meets environmental guidelines
- **Extremely rapid air and gas separation**
 - Less fluid break down
 - Improves equipment reliability

Applications

TURBOFLO Fluids are designed to significantly exceed the demanding service requirements of steam and gas turbine operators. They also provide extended, corrosion-free lubrication of bearings operating at temperatures above 260°C or 500°F.

Steam Turbines

TURBOFLO Fluids are recommended for lubricating steam turbines used for electric power generation and other industrial applications.

TURBOFLO Fluids deliver excellent performance over the entire life of the fluid. In large power generation plants, turbine oil is used for several years until degradation of the oil causes poor water separability and low oxidation resistance (low RPVOT values). Because of TURBOFLO's high oxidation resistance (high RPVOT values) and fast water separability, **even a partial oil replacement with TURBOFLO can return an entire oil system to acceptable standards.**

TURBOFLO 32 is recommended for use in large turbines (100 -1300 megawatts) coupled directly to an electric generator.

TURBOFLO 32 and 46 are approved by Ontario Hydro against their M-332M specification.

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.



TURBOFLO 46 and 68 are recommended for use in smaller steam turbines (up to 50 mega-watts), which drive an electric generator through a reduction gear-drive.

TURBOFLO Fluids are suitable for use in steam turbines requiring the following manufacturer specifications:

General Electric	GEK 28143A, GEK 46506D
Siemens	TLV 9013 04 (non-EP)
ABB	K 110 812101

Gas Turbines

TURBOFLO Fluids are recommended for the lubrication of the high-speed bearings in stationary gas turbines. Major utility, pipeline and gas field recovery and co-generation operators have recognized the performance of TURBOFLO compared to conventional mineral oil turbine fluids.

TURBOFLO Fluids are suitable for use in gas turbines requiring the following manufacturer and industry specifications:

General Electric	GEK 32568F
Westinghouse	1500 00 20
Solar	ES 9224
Cooper	SE 1144
Siemens	TLV 9013 04 (non EP)
ALSTOM (ABB)	HTGD 90117
ASTM	D4304 Type I (non-EP)

High Temperature Bearings

TURBOFLO Fluids exceed General Electric specifications for bearings operating at temperatures above 260°C or 500°F. This demonstrates the fluids are ideal for use in high temperature applications, requiring a lubricant with high thermal and oxidative stability.

Typical Performance Data

PROPERTY	ASTM TEST METHOD	TURBOFLO		
		32	46	68
Viscosity cSt @ 40°C / SUS @ 100°F cSt @ 100°C / SUS @ 212°F	D445	33.4/175 5.6/45	46.6/240 7.0/50	68.4/354 8.9/56
Viscosity Index	D2270	110	107	103
Flash Point, °C / °F	D92	220/428	216/421	232/450
Pour Point, °C / °F	D5950	-30/-22	-24/-11	-21/-6
Total Acid Number	D974	0.04	0.05	0.05
Steam Emulsion Number, sec	D1935	105	110	100
Water Separability 54°C	D1401	40-40-0(10)	42-38-0(10)	41-39-0(10)
Air Release, minutes	D3427	2	4	7
Five Metals Test	MIL-5308-6	Pass	Pass	Pass
Oxidation, TAN Insolubles, mg Colour Fe/Cu Catalyst	D4310	0.03 7 1.0 Bright	0.07 13 1.5 Bright	0.04 12 1.5 Bright
CIGRE Oxidation, % TOPS % Sludge	IP 280 —	0.07 0.03	0.1 0.05	0.15 0.07
Rotating Pressure Vessel Oxidation Test, mins	D2272	1,000+	1,000+	1,000+
Turbine Oil Oxidation Stability Test, hours	D943	10,000+	10,000+	10,000+
Rust Procedure A&B, 48 hr	D665	Pass	Pass	Pass
Copper Corrosion, 3h @ 100°C	D130	1a	1a	1a

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

Health and Safety

To obtain Material Health and Safety Data Sheets, contact one of our Petro Canada's TechData Info Lines.



TechData Info Lines

To place an order, please call a Customer Order Management Representative at :

Canada (English) Phone 1-800-268-5850
(French) Phone 1-800-576-1686
United States Phone 1-877-730-2369
Latin America Phone +1-416-730-2369
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You can also e-mail us at lubecsr@suncor.com

To learn more about how Petro-Canada lubricants, specialty fluids, oils and greases can help maximize your equipment performance, savings and productivity, please contact us at :

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Beyond today's standards.

