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SHELL TURBO® T OILS

Premium quality turbine and general purpose R and O inhibited circulating oils

Product Description

Shell Turbo® T Oils are premium quality lubricating oils designed to provide excellent lubrication of precision turbines and in many other industrial lubrication applications. These oils are made from highly refined base oils which have been carefully selected to provide satisfactory viscosity/temperature characteristics, low foaming tendencies and good water separation properties. In addition, they contain proven additives to protect equipment against rusting and to resist oxidation for long service life.

Turbo T Oils are available in three ISO viscosity grades, ranging from 32 to 68 cSt at 40°C. Grade nomenclature conforms to the ASTM/ISO viscosity system.

Turbine Applications

Turbo T Oils have a long and successful record of providing dependable turbine lubrication with trouble-free performance. The appropriate grade of Turbo T should be in accordance with the viscosity recommendation of the manufacturer for the turbine being lubricated. General recommendations for the various kinds of turbines are shown in Table 1.

Standards for machine tool lubrication are established by the Society of Tribologists and Lubrication Engineers (STLE). Appropriate grades of Turbo T Oils for these standards are shown in Table 2. The American Gear Manufacturer Association standard specifications for lubrication of industrial enclosed gear drives (AGMA 250.04, dated November 1981) includes a classification for rust and oxidation inhibited oils for applications that do not require EP properties. Recommended Shell Turbo T Oil grades are shown in Table 3.

General Applications

The high quality of Shell Turbo T Oils makes them suitable for a wide range of lubrication applications. These include general purpose plant lubrication, non-antiwear hydraulic and circulating oil systems, and as non-EP gear oils. Standards for machine tool lubrication established by the STLE include a classification for Hydraulic Fluid and General Purpose Lubricants.

Significant Features of Shell Turbo T Oils

Shell Turbo T Oils have achieved a long record of reliable performance because of four significant features:

Superior Oxidation Stability

A laboratory test method widely used for evaluating the oxidation stability of inhibited turbine oils is ASTM D 943, Turbine Oil Stability Test (TOST). In this procedure, pure oxygen is bubbled through a mixture of turbine oil and water in the presence of copper and iron wire catalysts at 95°C. The TOST life is reported as the time in hours for the oil to reach an acidity (TAN-C) of 2.0. A modification of the TOST used by the Navy (MIL TOST) is terminated at 1000 hours, and oil condition is evaluated, especially sludge content.

Shell Turbo T Oils resist oxidation so well that they require considerably longer than 2,500 hours under the severe conditions of the TOST to reach a TAN-C of 2.0. In the MIL TOST, sludging is held to an extremely low level, no more than 10 mg for the ISO 32 grade. This high

resistance to deterioration means long service life for the oil. It also helps to minimize deposits which could cause malfunction of governor mechanisms and reduced efficiency of oil coolers.

Non-Corrosivity to Metals

Corrosivity toward copper and copper alloys is evaluated by the ASTM D130 test. In this test, Turbo T Oils give a rating of 1, representing a practically unchanged copper strip.

The ASTM D 665 Rust Test is an industry laboratory procedure designed to measure the rust preventing characteristics of turbine oil in the presence of water. In this test, Turbo T Oils not only prevent corrosion of a steel specimen in the presence of distilled water, but also in the presence of synthetic seawater, which is intended to simulate the more severe rusting conditions existing in marine vessels.

Contamination with water is a frequent occurrence in circulating oil systems, particularly in steam turbines. Water in the presence of air may cause rust in such areas as bearing housings and governor mechanisms. Turbo T Oils effectively inhibit corrosion of these critical parts, thus contributing to increased machine life and system reliability.

Fast Separation of Water

The rapid separation of water from oil is of paramount importance in turbine oil circulating systems to minimize opportunity for rusting and to prevent possible cavitation in critical areas such as sleeve bearings.

An accepted laboratory test to measure water separation is the ASTM D 1401 Emulsion Test, which measures the time required for oil and water to separate after being mixed under prescribed conditions at 130°F (54°C). Turbo T Oils, because of their careful refining, blending, and selection of additives, all accomplish complete separation of water in less than 30 minutes. By this test, the oils' demulsibility is considered very good to excellent.

Good De-aeration Properties

Intimate mixing of air and oil not only accelerates oil oxidation and deterioration but also may cause distress in bearings, gears and pumps if foam is circulated through these systems. In turbines, this is more of a problem with geared units than with direct drive units. This detrimental effect may be minimized by allowing sufficient residence time in oil reservoirs to permit air release. Turbo T Oils contain an antifoam agent to eliminate the build-up of stable foam and to facilitate the quick release of air.

Typical properties of Shell Turbo T Oils are shown in Table 4.

Product Approvals

The following are Cincinnati Milacron approvals for Shell Turbo T Oils:

P-38 -- Turbo T Oil 32

P-55 -- Turbo T Oil 46

P-54 -- Turbo T Oil 68

All grades of Turbo T Oils are approved for USDA H-2 use where there is no contact between lubricants and edible products.

HANDLING & SAFETY INFORMATION

Refer to Shell's Material Safety Data Sheet (MSDS) and Environmental Data Sheet (EDS). The MSDS and EDS should be available from your Shell supplier or you may call Shell's general MSDS assistance number, 1-800-240-6737.

Table 1/ Lubricants Recommended for Turbines

	Turbine Oil Viscosity cSt at 40°C	Recommended Shell Lubricant
Steam Turbines:		
Direct Drive - ring oiled w/ water cooling	54-75	Turbo T Oil 68
Direct Drive - forced feed	30-38	Turbo T Oil 32
Gear Drive - forced feed	54-75	Turbo T Oil 68
Hydraulic Turbines:		
Large Vertical Machines	54-75	Turbo T Oil 68
Small Vertical Machines	30-38	Turbo T Oil 32
Horizontal Machines	30-38	Turbo T Oil 32

Table 2/ Shell Turbo T Oils for Hydraulic Fluid and General Purpose Lubricants

Standard No.	STLE Identifying No.	Recommended Shell Lubricant
ASLE 64-1	H-150	Turbo T Oil 32
ASLE 64-2	H-215	Turbo T Oil 46
ASLE 64-3	H-315	Turbo T Oil 68

Table 3/ Shell Turbo T Oils for Non- EP Rust and Oxidation Inhibited Gear Oils

AGMA No.	Equivalent Viscosity Range	cSt at 40°C (ISO Grade)	Recommended Shell Lubricant
1	41.4 to 50.6	46	Turbo T Oil 46
2	61.2 to 74.8	68	Turbo T Oil 68

Table 4/ Typical Properties of Shell Turbo® T Oils

	ASTM Method	ISO 32	46	68
Product Code		65602	65603	65605
MSDS Number				
Property				
Gravity, API @ 60°F	D1298	31	30	29
Color	D1500	1.5	1.5	1.5
Pour Point, °F	D97	-20	-10	0
Flash Point, COC, °F	D92	450	480	470
Viscosity: D445				
@ 40°C, cSt		32	46	68
@ 100°C, cSt		5.7	6.8	8.6
Viscosity Index	D2270	99	100	96
Neutralization No.				
TAN-C	D874	0.15	0.15	0.15
Cu Corrosion, 3 hrs @ 212°F	D130			
Rust Test	D665B	Pass	Pass	Pass
Emulsion Test, minutes max 30	D1401	Pass	Pass	
Turbine Oil	D943			
Stability Test, hrs.		>3000	>3000	>3000
AGMA grade			AGMA 1	AGMA 2

NOTE: Product typical properties are current as of the date of publication of this Technical Bulletin. These properties are determined by averaging actual batch data provided by the manufacturing locations over a period of time. These typical data cannot be guaranteed to be identical to the products produced at any specific time. The data provided in this publication are presented as a guide to Shell Lubricants users. Check with your Shell Representative for the latest information.

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Warranty

All products from Shell are subject to terms and conditions set out in the contract, order acknowledgment and/or bill of lading. Shell warrants only that this product will meet those specifications designated as such herein or in other publications. All other information supplied by Shell is considered accurate but is furnished upon the express condition that the customer shall make its own assessment to determine the product's suitability for a particular purpose. No warranty is expressed or implied regarding such other information, the data upon which the same is based, or the results to be obtained from the use thereof; that any product shall be merchantable or fit for any particular purpose; or that the use of such other information or product will not infringe any patent.