Technical Data Set

Description

Turbonycoil 600 is a lubricating oil with a viscosity of 5 cSt at 100°C. It is based on polyol esters with high thermal stability, fortified with carefully selected anti-oxidant, anti-wear and anti-corrosion additives.
Turbonycoil 600 features a much lower volatility at high temperature and high flash point than competitor oils. It has excellent resistance to foaming and a superior lubricity.

Application

Turbonycoil 600 is designed for use in gas turbine engines in military and civil aircraft as well as in stationary industrial applications.

Turbonycoil 600 is validated by all major engine manufacturers (General Electric, Pratt and Whitney, Allison, Rolls-Royce, Allied Signal, Snecma, Klimov, Turbomeca, PZL-Rzeszow) for use in 38 different military engines powering a wide range of combat, transport or surveillance airplanes or helicopters.

TURBONYCOIL 600 is also validated for use on the following civil engines:

• CFM International	CFM56-2, -3, -5A, -5B, -5C and -7
• International Aero Engines	V 2500 series
• Turbomeca	Artouste II, Artouste III, Astazou II, Astazou IV M, Astazou XIV, Astazou XVI, Bastan VI, Bastan VII, AST. 600, Arriel, Arrius, Makila, Larzac, Turmo IV, TM 319, TM 333
• Allison/Rolls Royce	Allison 250, Allison 501 K AE 3007
• Pratt & Whitney Canada	PT6A
• Rolls-Royce	All marks of RB 211 and AVON, Olympus, Tyne, Spey for Industrial & Marine application RB 211 for Aircraft application
• Hamilton Sundstrand/APIC	All APU models
• Honeywell	APU 85, 131-9, 331 models
• General Electric	LM ground gas turbines (all models)

Turbonycoil 600 has logged over 20 million hours operation since 1985, of which 10 million in industrial gas turbines.

Turbonycoil 600 performances

Engine cleanliness (excellent non-coking performance)
Low volatility and high flash point
Low foaming tendency
Superior lubricity

Qualifications

O-156
MIL-PRF-23699 F class STD
DCSEA 299/A
DEF STAN 91-101 Iss. 3
OX-27 / OX-28
AS 5780 class SPC

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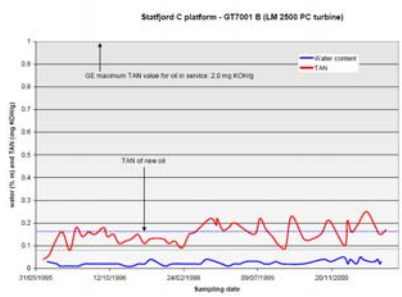
Field experience

Turbonycoil 600 has demonstrated outstanding field experience data.

Enclosed are examples of bearings that have been in use with Turbonycoil 600 for a long period, showing no coking and/or deposits.

RB211-24C
26000 hrs with Turbonycoil 600

STATOIL Stadtfjord - LM2500
24000 hrs with Turbonycoil 600



LM5000 / 24000 hrs with Turbonycoil 600

Turbonycoil 600 has logged over 20 million hours operation and has been acknowledged by both engine makers and users as a top performer in the Standard (STD) oil class.

MIL-PRF-23699 F Data

Characteristic	Unit	Result	Limit *	Test method
- Kinematic viscosity at 100°C 40°C - 40°C	mm²/s	5.12 25.6 9468	4.90 - 5.40 min. 23.0 max. 13000	ASTM D 445
- Low temperature stability 72 h at - 40°C	%	- 0.7	max. +/- 6	FTM-S-791-3458
- Flash point, COC	°C	270	min. 246	ASTM D 92
- Pour point	°C	- 57	max. - 54	ASTM D 97
- Total Acid Number	mg KOH/g	0.16	max. 1.00	SAE ARP 5088
- Evaporation loss 6 h 30 at 204°C	% mass fraction	3.4	max. 10.0	ASTM D 972
- Foaming volume / Vol @ 1 min settling Seq 1 : 24°C Seq 2 : 94°C Seq 3 : 24°C	ml	 10 / 0 5 / 0 10 / 0	 max. 25 / 0 max. 25 / 0 max. 25 / 0	ASTM D 892
- Thermal stability & Corrosivity 96 h at 274°C Viscosity change at 40°C Acid number change (pH = 11) Steel weight change	 % mg KOH/g mg/cm²	 - 0.3 0.80 - 0.05	 max. +/- 5.0 max. 6.00 max. +/- 4.00	FTM-S-791-3411
- Sediments, filtered through 1.2 micrometer porosity	mg/dm3	0.1	max. 10.0	FTM-S-791-3010
- Corrosion & oxidative stability 72 h at 204°C Viscosity change at 40°C Acid number change (pH = 11) Steel weight change Silver weight change Aluminium weight change Magnesium weight change Copper weight change Sludge content through 10 micrometers	 % mg KOH/g mg/cm² mg/cm² mg/cm² mg/cm² mg/cm² mg/100 cm3	 17.0 1.20 0.0 0.0 0.0 0.0 0.0 0.1	 - 5.0 to + 25.0 max. 3.00 max. +/- 0.2 max. +/- 0.2 max. +/- 0.2 max. +/- 0.2 max. +/- 0.4 max. 50.0	FTM-S-791-5308

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MIL-PRF-23699 F Data

Characteristic	Unit	Result	Limit *	Test method
- Viscosity change after 72 hrs @ 40°C	%	- 0.34	+/- 6	ASTM D 2532
- Rubber compatibility (AMS No. 3217/4, 72 hrs @ 204°C)	% swell	12	5 to 25	FTM-S-791-3604
- Compatibility, Sediment	mg/l	pass	max. 10	FTM-S-791-3403
- Storage Stability, low temp., 6 weeks @ -18°C	-	pass	No crystallisation, separation, gelling	MIL-PRF-23699 Part 4.4.2
- Corrosion & oxidative stability 72 h at 175°C				FTM-S-791-5308
Viscosity change at 40°C	%	6.25	- 5.0 to + 15.0	
Acid number change (pH = 11)	mg KOH/g	0.06	max. 2.00	
Steel weight change	mg/cm²	0.02	max. +/- 0.2	
Silver weight change	mg/cm²	0.02	max. +/- 0.2	
Aluminium weight change	mg/cm²	0.03	max. +/- 0.2	
Magnesium weight change	mg/cm²	0.01	max. +/- 0.2	
Copper weight change	mg/cm²	0.07	max. +/- 0.4	
Sludge content through 10 micrometers	mg/100 cm3	0.1	max. 50.0	
- Corrosion & oxidative stability 72 h at 218°C				FTM-S-791-5308
Viscosity change at 40°C	%	4.1	Report	
Acid number change (pH = 11)	mg KOH/g	7.20	Report	
Steel weight change	mg/cm²	0.04	max. +/- 0.2	
Silver weight change	mg/cm²	0.03	max. +/- 0.2	
Aluminium weight change	mg/cm²	0.00	max. +/- 0.2	
Titanium weight change	mg/cm²	0.02	max. +/- 0.2	
Sludge content through 10 micrometers	mg/100 cm3	8.8	max. 50.0	
- Ryder Gear Test – Average Result				FTM-S-791-6508
% of Hercolube A reference	%	114	min. 106	
# of Determinations	-	4 sides	4 sides	
- Metal content				ICP
Zinc	mg/kg	0	max. 2	
Silicon		2	max. 10	
Tin		0	max. 11	
Titanium		0	max. 2	
Nickel		0	max. 2	
Lead		0	max. 2	
Iron		0	max. 2	
Magnesium		0	max. 2	
Aluminium		0	max. 2	
Copper		0	max. 1	
Silver		0	max. 1	
Chromium		0	max. 2	
Molybdenum		0	max. 3	

Turbonycoil 600 is providing, since 20 years, effective performances to :

- Armies & Air Forces (90 countries)
- Aerospace OEMs (Airbus, Eurocopter, Dassault, BF Goodrich, General Dynamics...)
- Airlines companies
- Operators of aero-derivative gas turbines (Off-shore, Industrial plants, Powergen)

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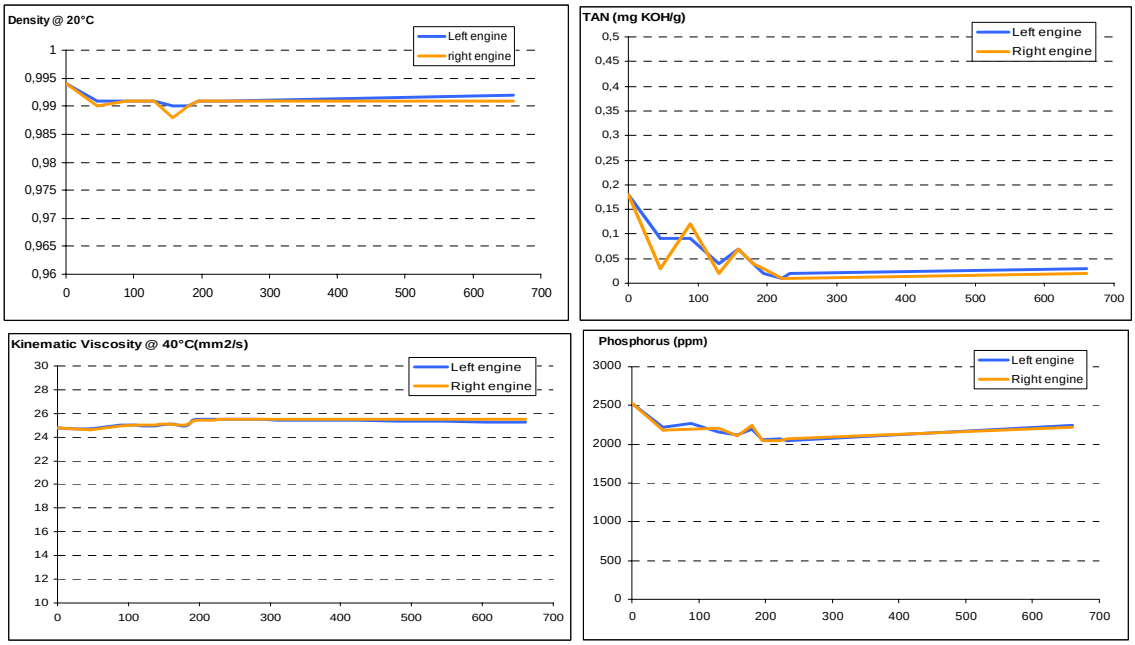
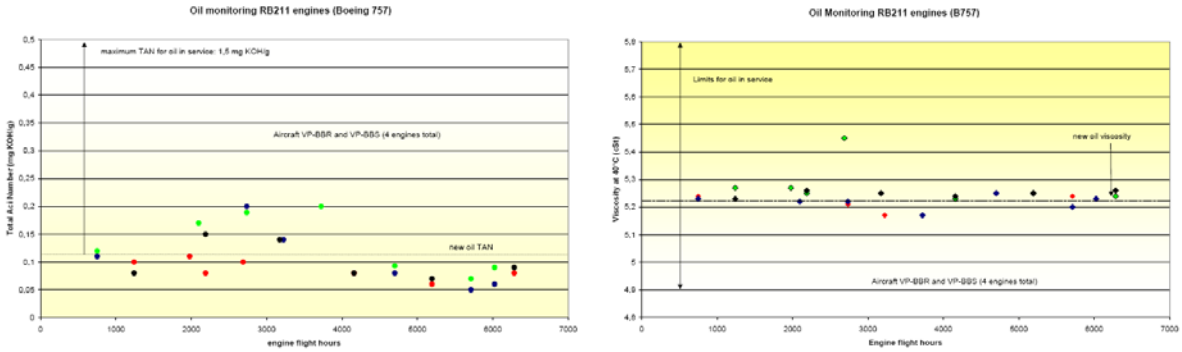
Turbonycoil 600 in Civil Aviation

Example of oil monitoring on CFM56-3C (Boeing 737)



Example of oil monitoring on RB211 (Boeing 757)



As shown on these graphs, Turbonycoil 600 has been designed to withstand long time performance in Civil Aviation conditions.

Other info

Shelf life : The shelf life of Turbonycoil 600 can extend beyond 10 years when stored in original, unopened packaging under acceptable conditions, such as away from extreme heat and moisture.

Change-over best practice : No known incompatibility between Turbonycoil 600 and the other approved oil brands. Change-over is performed by “Top-up”

Average oil consumption on CFM56 : 0,2 litres/hr

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