Fluid Analysis Laboratory
Conwy
LL32 8FA
United Kingdom
Tel: 01492 574750
Fax: 01492 574778

Make:	LIEBHERR	Sample No:	7568807
Model:	R922	Location:	DENBIGHSHIRE
Serial No:	1486/49965	Client:	JOHN KELLY
System:	LEFT TRAVEL	Kit Ref/Bottle No:	LIE425621
Brand:	NOT GIVEN	Job No.:	12105912
Grade:		Sampled:	06/05/21
Unique No.:	5248885	Received:	10/05/21

Diagnosis Key: Normal | Caution | Serious — Diagnostician: Peter Foy

Wear appears satisfactory. No significant contamination. Advice : Monitor at the recommended sampling period.

Results		Current Sample	Historical Samples	Reference Oil
Sample No		7568807		
Status		✓		
Sampled		06/05/21		
Received		10/05/21		
Fluid Age				
Unit Age		1050		
Fluid Condition				
Viscosity @ 40 °C	mm²/s	195.6		
Appearance	-	Dark		N/A
Neut No.	mg KOH/g	3.47		
Additives				
B (Boron)	mg/kg	0.5		
Ba (Barium)	mg/kg	5.0		
Ca (Calcium)	mg/kg	68		
Mg (Magnesium)	mg/kg	6.8		
P (Phosphorus)	mg/kg	>2000		
Zn (Zinc)	mg/kg	20		
Contamination				
Water	%	<0.1		
Na (Sodium)	mg/kg	7.6		
K (Potassium)	mg/kg	11		
Si (Silicon)	mg/kg	118		
Li (Lithium)	mg/kg	1.8		
Wear Metals				
Ferrous Debris (PQ)	-	44		
Al (Aluminium)	mg/kg	48		
Sn (Tin)	mg/kg	0.0		
Pb (Lead)	mg/kg	0.4		
Cu (Copper)	mg/kg	0.3		
Fe (Iron)	mg/kg	292		
Cr (Chromium)	mg/kg	7.6		
Mo (Molybdenum)	mg/kg	0.3		
Ag (Silver)	mg/kg	0.0		
Ni (Nickel)	mg/kg	0.7		
Mn (Manganese)	mg/kg	3.4		

FLUID ANALYSIS REPORT
SYMBOLS & DEFINITIONS

	Normal
	Abnormal value. Monitor as advised
	Change oil
	Action required as indicated
	Oil requires cleaning or changing

Appearance	All Systems (excl. Engines)
10	Clear & Bright
20	Dark
30	Hazy
40	Cloudy
50	Emulsified
60	Free Water
70	Solid Debris
80	Solid Debris and water

VISCOSITY - the resistance to flow in a capillary tube under gravity.
FUEL DILUTION - by flash point & viscosity to detect rich mixtures & faulty injectors etc.
OIL CONDITION (OC) - arbitrary scale to measure soot, water and metals etc.
APPEARANCE (App) - arbitrary visual assessment of non-engine oils to identify visible contamination.
SOOT - by infra red light absorption indicates poor combustion, worn upper cylinders, rings.
SOOT residues to prevent blockages.
FERROUS DEBRIS (P.Q.) - arbitrary scale to detect small and large magnetic particles.
FERROGRAPHY - a microscopic study of wear particles to establish failure mode: available on request.

WATER - essential to detect coolant leaks or contamination by sea or fresh water.
BN - a measure of reserve alkalinity to protect the crankcase from acidic combustion gases.
SULPHATION - a measure of deterioration of the oil additives by sulphuric acid contamination.
AN - a measure of corrosive acidic materials in oxidised overheated oils.
OXIDATION & NITRATION - a measure of deterioration of the oil by reaction with air.
ISO CLEANLINESS CODE - a scale to indicate amount of particles in oils >4, >6 and >14 microns.
WEAR METALS- debris in oil from worn components.
ADDITIVE METALS - elements added by manufacturer to give particular properties to the oil.
CONTAMINATION METALS - elements indicative of dirt, coal & abrasive coolant residues etc.

ABBREVIATIONS

Ag - Silver	Na - Sodium
Al - Aluminium	Ni - Nickel
B - Boron	P - Phosphorus
Ba - Barium	Pb - Lead
Ca - Calcium	S = Sulphur
Cd - Cadmium	Si = Silicon
Cl - Chlorine	Sn - Tin
Cr - Chromium	Ti - Titanium
Cu - Copper	V - Vanadium
Fe - Iron	VI - Viscosity Index
K - Potassium	Zn - Zinc
Li - Lithium	RI - Refractive Index
Mg - Manganese	FAME - Fatty Acid Methyl Ester (Biofuel)
Mo - Molybdenum	

TEST	Units
Kinematic Viscosity (KV) followed by temperature in °C	Centistoke (cSt)
Fuel	Normal Caution Serious
Oil Condition (OC)	Arbitrary scale 0-100
Appearance (App)	Arbitrary scale 0-100
Soot	%
Ferrous Debris / P.Q.	Arbitrary Scale 0-10000
Water	% or ppm. 0.1% = 1000ppm
Glycol	Normal Caution Serious, or % in mg KOH / grm
Base Number (TBN)	
Acid Number (TAN)	mg KOH / grm
Strong Acid Number (SAN)	mg KOH / grm
Particle Count (ISO Code)	No. Particles / ml >4, >6, >14 microns
Initial PH	Scale 0-14 , 7 = Neutral