Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

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Accredited to ISO/IEC 17025:2017

Lubrizol Limited

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The Knowle
Hazelwood
PO Box 88
Belper
Derby
DE56 1QN

Contact: No Commercial Enquiries

Testing performed at the above address only

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ENGINE TESTING: PETROLEUM AND PETROLEUM PRODUCTS, FUEL AND LUBRICANTS including additives	<u>Performance Tests</u>	Flexible scope enabling new versions of existing accredited standard test methods to be introduced in accordance with documented Lubrizol corporate procedure MT 511 (Updating External Test Methods) Documented In-House Procedures in brackets ( ), as listed below in support of standard methods
	Load carrying capacity test for transmission lubricants (FZG Rig)	CEC-L-07-95 (HNR.022 L-07_90C)
	Viscosity shear stability of transmission lubricants (Taper Roller Bearing Rig)	CEC-L-45-99 (HVWS.216 KRL_20H_CEC)
	FZG Scuffing Load Carrying Capacity Test for High EP Oils	CEC-L-84-02 (HNR.474 L-84_120C, HNR.381 L-84_90C)
	Direct Injection Common Rail Diesel Engine Coking Test using the Peugeot DW10 engine	CEC F-98-08 (HPDW.528)
	Engine Oil Performance Test to Measure the Effects of Biodiesel Fuel (OM646LA engine)	CEC L-104-16 (HBDD.632)
	Light Duty Diesel Piston Cleanliness & Ring Stacking Test VW TDI3 (EA288 Engine)	CEC L-117-20 (HTDI.719 PV1808)

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ENGINE TESTING: PETROLEUM AND PETROLEUM PRODUCTS, FUEL AND LUBRICANTS including additives (cont'd)	<u>Performance Tests</u> (cont'd)	Flexible scope enabling new versions of existing accredited standard test methods to be introduced in accordance with documented Lubrizol corporate procedure MT 511 (Updating External Test Methods) Documented In-House Procedures in brackets ( ), as listed below in support of standard methods
	Engine Performanace Test to Quantify the Performanace of Heavy-Duty Cracnkcase Oils With Respect to Piston Cleanliness (Merceded Benz OM471 FE1 Engine)	CEC L-118-21 (HFSO.727, OM471_600HR)
PETROLEUM AND PETROLEUM PRODUCTS, FUEL AND LUBRICANTS including additives	<u>Chemical and Physical Tests</u>	Flexible scope enabling new versions of existing accredited standard test methods to be introduced in accordance with documented Lubrizol corporate procedure BTS 050 (Updating External Test Methods) Documented In-House Procedures in brackets ( ), as listed below in support of standard methods
	Apparent viscosity of engine oils between - 10 °C and - 35 °C	ASTM D5293 (BTS-H136) Using the cold cranking simulator
	Base number determination	ASTM D4739 (BTS-H290) Potentiometric titration
	Base number of petroleum products	ASTM D2896 (BTS-H087) Potentiometric perchloric acid titration

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
PETROLEUM AND PETROLEUM PRODUCTS, FUEL AND LUBRICANTS including additives (cont'd)	<u>Chemical and Physical Tests</u> (cont'd)	Flexible scope enabling new versions of existing accredited standard test methods to be introduced in accordance with documented Lubrizol corporate procedure BTS 050 (Updating External Test Methods) Documented In-House Procedures in brackets ( ), as listed below in support of standard methods
	Determination of the dynamic viscosity and density of lubricating oils (and the calculation of kinematic viscosity) at set temperatures between -40°C and 100°C	ASTM D7042 (BTS-H460)
	Base number of petroleum products	ISO3771 (BTS-H408) Potentiometric perchloric acid titration
	Density	ASTM D4052 (BTS-H120)
	Determination of oxidation and nitration of used motor oils	DIN51453 (BTS-H359) Infra Red Spectrometry
	Determination of the soot content in used Diesel engine oils	DIN 51452 (BTS-H370) Infra Red Spectrometry
	Elemental Analysis : New Oils (B, Ba, Ca, Cu, Mg, Mo, Na, P, S, Si, Ti Zn)	ASTM D4951 (BTS-H401) ICP-AES
	Elemental Analysis : Old Oils (Ag, Al, Ba, B, Ca, Cd, Cr, Cu, Fe, K, Pb, Mg, Mn, Mo, Na, Ni, P, S, Si, Sn, Ti, V, Zn)	ASTM D5185 (BTS-H400) ICP-AES

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
PETROLEUM AND PETROLEUM PRODUCTS, FUEL AND LUBRICANTS including additives (cont'd)	<u>Chemical and Physical Tests</u> (cont'd)	Flexible scope enabling new versions of existing accredited standard test methods to be introduced in accordance with documented Lubrizol corporate procedure BTS 050 (Updating External Test Methods) Documented In-House Procedures in brackets ( ), as listed below in support of standard methods
	Evaluation of hot surface oxidation	CEC L-85-99 (BTS-H329) Pressure differential scanning calorimetry
	Evaluation of oil elastomer compatibility	CEC-L-112-16 (BTS-H432, L-112_)
	Evaluation of the mechanical shear stability of lubrication oils containing polymers (Fuel injection pump)	CEC-L-14-93 (BTS-H117)
	Evaporation loss of lubricating oils (Noack Evaporative Tester)	CEC-L-40-93 (BTS-H059)
	Flash and fire points by Cleveland Open Cup	ASTM D92 (BTS-H065)
	Flash point by Pensky-Martens Closed Cup	ASTM D93 (BTS-H066)
	Foaming characteristics of lubricating oils	ASTM D892 (BTS-H069) Air bath procedure
	Heptane insolubles in used lubricating oils	IP 316 (BTS-H076)
	High temperature foaming characteristics of lubricating oils	ASTM D6082 (BTS-H319) Air bath procedure

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ENGINE TESTING: PETROLEUM AND PETROLEUM PRODUCTS, FUEL AND LUBRICANTS including additives (cont'd)	<u>Chemical and Physical Tests</u> (cont'd)	Flexible scope enabling new versions of existing accredited standard test methods to be introduced in accordance with documented Lubrizol corporate procedure BTS 050 (Updating External Test Methods) Documented In-House Procedures in brackets ( ), as listed below in support of standard methods
	Kinematic viscosity	ASTM D445 - automatic viscometer (BTS-H311)
	Low temperature pumpability Yield Stress and Apparent Viscosity	CEC-L-105-12(s) (BTS H414, L-105_) with ASTM D4684 (BTS-H139) Mini rotary viscometer
	Low temperature Viscosity of Lubricants measured	ASTM D2983 Method B (BTS-H135) Rotational Viscometer
	Oxidation stability of lubricating oils used in Automotive Transmissions by artificial ageing (Laboratory Test)	CEC-L-48-00 Method B (BTS-H330) ASTM D7214 Sub-Test (BTS-H328) by IR Spectrometer referencing
	Oxidation test for Engine Oils operating in the presence of Biodiesel	CEC-L-109-14 (BTS H418, L-109_)
	Spectrophotometric determination of soot in used engine oil	CEC-L-82-97 (BTS-H303) UV Spectrometry
	Sulphated ash	ASTM D874 (BTS-H004)

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ENGINE TESTING: PETROLEUM AND PETROLEUM PRODUCTS, FUEL AND LUBRICANTS including additives (cont'd)	<u>Chemical and Physical Tests</u> (cont'd)	Flexible scope enabling new versions of existing accredited standard test methods to be introduced in accordance with documented Lubrizol corporate procedure BTS 050 (Updating External Test Methods) Documented In-House Procedures in brackets ( ), as listed below in support of standard methods
	The measurement of lubricant dynamic viscosity under conditions of high shear	CEC-L-36-90 (BTS-H 176)
	Weak and strong acid number	ASTM D664 (BTS-H086)
END		