Deutsche Akkreditierungsstelle

Annex to the Partial Accreditation Certificate D-PL-11082-01-01 according to DIN EN ISO/IEC 17025:2018

Valid from: **12.12.2023**

Date of issue: 12.12.2023

This annex is a part of the accreditation certificate D-PL-11082-01-00.

Holder of partial accreditation certificate:

APL Automobil-Prüftechnik Landau GmbH
Am Hölzel 11, 76829 Landau

with the location

APL Automobil-Prüftechnik Landau GmbH
Am Hölzel 11, 76829 Landau

The testing laboratory meets the requirements of DIN EN ISO/IEC 17025:2018 to carry out the conformity assessment activities listed in this annex. The testing laboratory meets additional legal and normative requirements, if applicable, including those in relevant sectoral schemes, provided that these are explicitly confirmed below.

The management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of testing laboratories and they conform to the general with the principles of DIN EN ISO 9001.

Tests in the fields:
Chemical and physical-chemical analysis and engine tests of mineral oil and related products; selected properties of fuels (diesel fuels, FAME, rapeseed oil fuels) and lubricants (engine oils, gear oils); properties and behaviour of elastomers on exposure to engine oils

This certificate annex is only valid together with the written accreditation certificate and reflects the status as indicated by the date of issue. The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH at https://www.dakks.de.

Within the scope of accreditation marked with *, the testing laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, the following: usage of different versions of standard test methods granted here.
The testing laboratory maintains a current list of all testing methods within the flexible scope of accreditation.

1. Engine test methods *

Methods of test	Description	Process-Matrix-Number[+)]
CEC L-54-96 2020-01	Fuel Economy Effects of Engine Lubricants (Mercedes-Benz M111 E20)	5.3.143
CEC L-99-08 2020-10	The evaluation of engine crankcase lubricants with respect to low temperature lubricant thickening and wear under severe operating Conditions (Mercedes Benz OM646 DE22LA)	5.3.153
CEC L-101-09 2019-02	Evaluation of Performance of Heavy Duty Engine Oils (Mercedes Benz OM 501 LA Euro V)	5.3.135
CEC L-104-16 2021-09	Engine Oil Performance Test to Measure the Effects of Biodiesel, using the DC OM646 DE22 LA Engine (Mercedes-Benz OM646 DE22LA)	
CEC L-106-14 2021-11	Oil Dispersion Test at Medium Temperature for Passenger Car Direct Injection Diesel Engines (PSA DV6C)	5.1.232
CEC L-107-19 2021-01	The evaluation of engine crankcase lubricants with respect to sludge behavior (Mercedes-Benz M 271 EVO)	
CEC L-111-16 2021-12	Gasoline Engine Cleanliness Test (PSA EP6CDT)	
CEC L-114-19 2021-07	The evaluation of engine crankcase lubricants with respect to turbocharger deposit formation under severe operating conditions (Toyota 1KD-FTV)	
CEC F-05-93 2019-09	Intake Valve Cleanliness in the MB M102E Engine	5.3.129

Methods of test	Description	Process-Matrix-Number[+)]
CEC F-16-96 2021-07	Valve Sticking of Gasoline Fuels (VW Waterboxer)	5.3.130
CEC F-20-98 2022-03	Deposit Forming Tendency on Intake Valves (Mercedes M111)	5.3.131
CEC F-23-01 2018-07	Procedure for Indirect Injector Nozzle Coking Test (PSA XUD9A/L, 1.9 litre 4 cylinder indirect injection Diesel engine)	5.3.132
CEC F-98-08 2021-02	Direct Injection, Common Rail Diesel Engine Nozzle Coking Test (PSA DW 10)	5.3.133
CEC F-110-23 2023-01	Internal Diesel Injector Deposits (IDID) Test for Direct Injection, Common Rail Engines (PSA DW10C)	
CEC L-117-20 2022-03	The evaluation of engine oils in direct injection turbo diesel engines with respect to piston cleanliness (VW EA288, engine code CUNA)	
CEC L-118-21 2022-03	Evaluation of engine oils in a heavy duty application with respect to piston cleanliness	
JASO M 366 2019-03	Automobile Gasoline Engine Oils –Firing Fuel Economy Test Procedure	

2. Diesel fuels *

Methods of test	Description	Process-Matrix-Number[+)]
Determination of density		
DIN 51757 2011-01	Testing of mineral oils and related materials - Determination of density, method 3	1.2.22
DIN EN ISO 12185 1997-11	Crude oil and petroleum products - Determination of density - Oscillating U-tube method	1.2.22
Determination of distillation characteristics		
DIN EN ISO 3405 2019-09	Petroleum and related products from natural or synthetic sources - Determination of distillation characteristics at atmospheric pressure	1.2.21
ASTM D 86 2020	Standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure	1.2.21
Measurement of viscosity at 40 °C		
DIN 51562-1 1999-01	Viscometry - Measurement of kinematic viscosity by means of the Ubbelohde viscometer - Part 1: Viscometer specification and measurement procedure	
DIN EN ISO 3104 1999-12	Petroleum products - Transparent and opaque liquids - Determination of kinematic viscosity and calculation of dynamic viscosity	1.2.62
ISO 3105 1994-12	Glass capillary kinematic viscometers - Specifications and operating instructions	
ASTM D 445 2019	Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)	1.2.62
ASTM D 446 2012 reapproval: 2017	Standard Specifications and Operating Instructions for Glass Capillary Kinematic Viscometers	1.2.62

Methods of test	Description	Process-Matrix-Number[+)]
Determination of flash point		
DIN EN ISO 2719 2016-11	Determination of flash point - Pensky-Martens closed cup method	1.2.28
ASTM D 93 2019	Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester	1.2.28
Determination of sulphur content		
DIN EN ISO 20884 2019-12	Petroleum products - Determination of sulphur content of automotive fuels - Wavelength-dispersive X-ray fluorescence spectrometry	1.2.89
DIN EN ISO 14596 2007-12	Petroleum products - Determination of sulfur content - Wavelength-dispersive X-ray fluorescence spectrometry	1.2.89
ASTM D 2622 2016	Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry	
Determination of cloudpoint		
DIN EN 23015 1994-05	Petroleum products - Determination of cloudpoint *(withdrawn standard)*	1.2.19
DIN EN ISO 3015 2019-09	Petroleum and related products from natural or synthetic sources - Determination of cloud point	1.2.19
Determination of pourpoint		
DIN EN ISO 3016 2019-09	Petroleum and related products from natural or synthetic sources - Determination of pourpoint	1.2.79

Methods of test	Description	Process-Matrix-Number[+)]
Determination of oxide ash		
DIN EN ISO 6245 2003-01	Petroleum products - Determination of ash	1.2.74
ASTM D 482 2019	Standard Test Method for Ash from Petroleum Products	1.2.74
Water content		
DIN EN ISO 12937 2002-03	Petroleum products - Determination of water - Coulometric Karl Fischer titration method	1.2.106
ASTM D 6304 2016e1	Standard Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration	1.2.106
Determination of neutralisation number		
DIN 51558-1 1979-07	Testing of mineral oils - Determination of neutralisation number - colour-indicator titration, insulating oils *(standard withdrawn)*	1.2.70
ASTM D 664 2018e2	Standard Test Method for Acid Number of Petroleum Products by Potentiometric Titration	1.2.70
Calculation of cetane index		
DIN EN ISO 4264 2018-10	Petroleum products - Calculation of cetane index of middle-distillate fuels by the four variable equation	1.2.12
Corrosiveness to copper		
DIN EN ISO 2160 1999-04	Petroleum products - Corrosiveness to copper - Copper strip test	1.2.60
ASTM D 130 2019	Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test	1.2.60

Methods of test	Description	Process-Matrix-Number[+)]
Determination of total contamination		
DIN EN 12662 2014-07	Liquid petroleum products - Determination of total contamination in middle distillates, diesel fuels and fatty acid methyl esters	1.2.48
Determination of oxidation stability		
DIN EN ISO 12205 1996-11	Petroleum products - Determination of the oxidation stability of middle-distillate fuels	1.2.75
DIN EN 15751 2014-06	Automotive fuels - Fatty acid methyl ester (FAME) fuel and blends with diesel fuel - Determination of oxidation stability by accelerated oxidation method	
DIN EN 16091 2012-02	Liquid petroleum products - Middle distillates and fatty acid methyl ester (FAME) fuels and blends - Determination of oxidation stability by rapid small-scale oxidation method	
ASTM D 2274 2014 Reapproval: 2019	Standard Test Method for Oxidation Stability of Distillate Fuel Oil (Accelerated Method)	1.2.75
Determination of fatty acid methyl ester (FAME) content		
DIN EN 14078 2014-09	Liquid petroleum products - Determination of fatty acid methyl ester (FAME) content in middle distillates - Infrared spectrometry method	1.2.27
ASTM D7111 2016	Standard Test Method for Determination of Trace Elements in Middle Distillate Fuels by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)	
DIN EN 16476 2014-07	Liquid petroleum products - Determination of Sodium, Potassium, Calcium, Phosphorus, Copper and Zinc contents in diesel fuel - Method via Inductively Coupled Plasma Optical Emission Spectrometry (ICP OES)	

3. FAME *

Methods of test	Description	Process-Matrix-Number[+)]
Determination of density		
DIN 51757 2011-01	Testing of mineral oils and related materials - Determination of density, method 3	1.6.22
DIN EN ISO 12185 1997-11	Crude petroleum and petroleum products - Determination of density - Oscillating U-tube method	1.6.22
Measurement of viscosity at 40 °C		
DIN 51562-1 1999-01	Viscometry - Measurement of kinematic viscosity by means of the Ubbelohde viscometer - Part 1: Viscometer specification and measurement procedure	
DIN EN ISO 3104 1999-12	Petroleum products - Transparent and opaque liquids - Determination of kinematic viscosity and calculation of dynamic viscosity	1.6.54
ISO 3105 1994-12	Glass capillary kinematic viscometers - Specifications and operating instructions	
ASTM D 445 2019	Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)	
ASTM D 446 2012 reapproval: 2017	Standard Specifications and Operating Instructions for Glass Capillary Kinematic Viscometers	
Determination of flash point		
DIN EN ISO 2719 2016-11	Determination of flash point - Pensky-Martens closed cup method	1.6.28
ASTM D 93 2019	Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester	

Methods of test	Description	Process-Matrix-Number[+)]
Determination of sulphur content		
DIN EN ISO 20884 2019-12	Petroleum products - Determination of sulphur content of automotive fuels - Wavelength-dispersive X-ray fluorescence spectrometry	1.6.89
Ash content		
DIN 51575 2016-06	Testing of mineral oils - Determination of sulphated ash	
ISO 3987 2010-11	Petroleum Products - Determination of sulphated ash in lubricating oils and additives	1.6.93
ISO 3987 Technical Corrigendum 1 2011-02	Petroleum products - Determination of sulphated ash in lubricating oils and additives - Corrigendum 1	
ASTM D 874 2013 (reapproval 2018)	Standard Test for Sulfated Ash from Lubricating Oils and Additives	
Water content		
DIN EN ISO 12937 2002-03	Petroleum products - Determination of water - Coulometric Karl Fischer titration method	1.6.106
Determination of total contamination		
DIN EN 12662 2014-07	Liquid petroleum products - Determination of total contamination in middle distillates, diesel fuels and fatty acid methyl esters	1.6.48

Methods of test	Description	Process-Matrix-Number[+)]
Corrosiveness to copper – Copper strip test (3 h at 50 °C)		
DIN EN ISO 2160 1999-04	Petroleum products - Corrosiveness to copper - Copper strip test	1.6.60
ASTM D 130 2019	Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test	
Determination of oxidation stability at 110 °C		
DIN EN 14112 2016-12	Fat and oil derivatives - Fatty acid methyl esters (FAME) - Determination of oxidation stability (accelerated oxidation test)	1.6.75
DIN EN 15751 2014-06	Automotive fuels - Fatty acid methyl ester (FAME) fuel and blends with diesel fuel - Determination of oxidation stability by accelerated oxidation method	
Determination of acid value, indicator: Phenolphthalein		
DIN EN 14104 2003-10	Fat and oil derivatives - Fatty acid methyl esters (FAME) - Determination of acid value	1.6.87
Determination of iodine value using Wijs solution		
DIN EN 14111 2003-10	Fat and oil derivatives - Fatty acid methyl esters (FAME) - Determination of iodine value	1.6.53
DIN 53241-1 1995-05	Determination of iodine value - Part 1: Methods using Wijs solution *(standard withdrawn)*	1.6.53

Methods of test	Description	Process-Matrix-Number[+)]
Alkali metals		
DIN EN 14538 2006-09	Fat and oil derivatives - Fatty acid methyl esters (FAME) - Determination of Ca, K, Mg and Na content by optical emission spectral analysis with inductively coupled plasma (ICP OES)	1.6.35
Alkaline earth metals		
DIN EN 14538 2006-09	Fat and oil derivatives - Fatty acid methyl esters (FAME) - Determination of Ca, K, Mg and Na content by optical emission spectral analysis with inductively coupled plasma (ICP OES)	1.6.37
Phosphorus content		
DIN EN 14107 2003-10	Fat and oil derivatives - Fatty acid methyl esters (FAME) - Determination of phosphorus content by inductively coupled plasma (ICP) emission spectrometry	1.6.77

4. Fuel from rapeseed oil as per DIN 51605 *

Methods of test	Description	Process-Matrix-Number[+)]
Determination of Density at 15 °C		
DIN EN ISO 12185 1997-11	Crude petroleum and petroleum products - Determination of density - Oscillating U-tube method	1.9.22
Viscosity at 40 °C		
DIN EN ISO 3104 1999-12	Petroleum products - Transparent and opaque liquids - Determination of kinematic viscosity and calculation of dynamic viscosity	1.9.54
Determination of flash point		
DIN EN ISO 2719 2016-11	Determination of flash point - Pensky-Martens closed cup method	1.9.28
Determination of the iodine value with Wijs solution		
DIN EN 14111 2003-10	Fat and oil derivatives - Fatty Acid Methyl Esters (FAME) - Determination of iodine value	1.9.53
Sulphur content		
DIN EN ISO 20884 2019-12	Petroleum products - Determination of sulphur content of automotive fuels - Wavelength-dispersive X-ray fluorescence spectrometry	1.9.89
Determination of total contamination		
DIN EN 12662 2014-07	Liquid petroleum products - Determination of total contamination in middle distillates, diesel fuels and fatty acid methyl esters	1.9.48

Methods of test	Description	Process-Matrix-Number[+)]
Determination of acid value, indicator: Phenolphthalein		
DIN EN 14104 2003-10	Fat and oil derivatives - Fatty acid methyl esters (FAME) - Determination of acid value	1.9.87
Determination of oxidation stability at 110 °C		
DIN EN 14112 2016-12	Fat and oil derivatives - Fatty acid methyl esters (FAME) - Determination of oxidation stability (accelerated oxidation test)	1.9.75
Determination of Phosphorus content		
DIN EN 14107 2003-10	Fat and oil derivatives - Fatty acid methyl esters (FAME) - Determination of phosphorus content by inductively coupled plasma (ICP) emission spectrometry	
DIN 51627-6 2011-03	Automotive fuels - Test methods - Part 6: Direct determination of trace elements in vegetable oils by inductively coupled plasma optical emission spectroscopy (ICP OES)	
Alkaline earth metals		
DIN EN 14538 2006-09	Fat and oil derivatives - Fatty acid methyl esters (FAME) - Determination of Ca, K, Mg and Na content by optical emission spectral analysis with inductively coupled plasma (ICP OES)	1.9.37
DIN 51627-6 2011-03	Automotive fuels - Test methods - Part 6: Direct determination of trace elements in vegetable oils by inductively coupled plasma optical emission spectroscopy (ICP OES)	

Methods of test	Description	Process-Matrix-Number[+)]
Ash content (oxide ash)		
DIN EN ISO 6245 2003-01	Petroleum products - Determination of ash	1.9.74
Water content		
DIN EN ISO 12937 2002-03	Petroleum products - Determination of water - Coulometric Karl Fischer titration method	1.9.106

5. Engine oils *

Methods of test	Description	Process-Matrix-Number[+)]
Kinematic viscosity (40 °C and 100 °C)		
DIN 51562-1 1999-01	Viscometry - Measurement of kinematic viscosity by means of the Ubbelohde viscometer - Part 1: Viscometer specification and measurement procedure	5.1.54
DIN EN ISO 3104 1999-12	Petroleum products - Transparent and opaque liquids - Determination of kinematic viscosity and calculation of dynamic viscosity	5.1.54
ISO 3105 1994-12	Glass capillary kinematic viscometers - Specifications and operating instructions	
ASTM D 445 2019	Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)	5.1.54
ASTM D 446 2012 reapproval: 2017	Standard Specifications and Operating Instructions for Glass Capillary Kinematic Viscometers	
DIN 51659-1 2017-02	Lubricants-test methods-Part 1: Determination of the kinematic viscosity of used lubricating oils by glass capillary viscometer	
DIN 51659-2 2017-02	Lubricants-test methods-Part 2: Determination of the kinematic viscosity of used lubricating oils by Stabinger viscometer	
DIN 51659-3 2017-02	Lubricants-test methods-Part 3: Determination of the kinematic viscosity of used lubricating oils by Houillon viscometer	
ASTM D 7042 2019e1	Standard Test Method for Dynamic Viscosity and Density of Liquids by Stabinger Viscosimeter (and the Calculation of Kinematic Viscosity)	

Methods of test	Description	Process-Matrix-Number[+)]
ASTM D 7279 2020	Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids by Automated Houillon Viscosimeter	
Apparent viscosity		
DIN 51377 2003-10	Testing of lubricants – Determination of the apparent viscosity of motor oils at low temperature from -5 °C to -35 °C – Using the cold-cranking simulator *(withdrawn standard)*	5.1.159
ASTM D 5293 2020	Standard Test Method for Apparent Viscosity of Engine and Base Stocks Oils Between -10 and -35°C Using Cold-Cranking Simulator	5.1.173
Shear stability		
CEC L-36-90 2019-09	High Shear High Temperature Viscosity Measurement	5.1.173
ASTM D 4683 2020	Standard Test Method for Measuring Viscosity of New and Used Engine Oils at High Shear Rate and High Temperature by Tapered Bearing Simulator Viscometer at 150 °C	
CEC L-14-93 2019-07	Evaluation of the Mechanical Shear Stability of Lubricating Oils Containing Polymers	5.1.128
DIN EN ISO 20844 2015-12	Petroleum and related products - Determination of the shear stability of polymer-containing oils using a diesel injector nozzle	5.1.136
Viscosity index		
DIN ISO 2909 2004-08	Petroleum products - Calculation of viscosity index from kinematic viscosity	5.1.171
DIN ISO 2909 2005-01 Corrigenda	Petroleum products - Calculation of viscosity index from kinematic viscosity	5.1.171

Methods of test	Description	Process-Matrix-Number[+)]
Evaporation loss		
CEC L-40-93 2016-10	Evaporation loss of Lubricating Oils using the Noack Evaporative Tester	5.1.141
Determination of pourpoint		
DIN EN ISO 3016 2019-09	Petroleum and related products from natural or synthetic sources - Determination of pourpoint	5.1.79
ASTM D 97 2017b	Standard Test Method for Pour Point of Petroleum Products	5.1.79
Flash point		
DIN EN ISO 2592 2018-01	Petroleum and related products - Determination of flash and fire points - Cleveland open cup method	5.1.28
ASTM D 92 2018	Test Method for Flash and Fire Points by Cleveland Open Cup Tester	5.1.28
Total base number		
DIN ISO 3771 1985-04	Petroleum products - Total base number - Perchloric acid potentiometric titration method *(withdrawn standard)*	5.1.70
ISO 3771 2011-09	Petroleum Products - Determination of base number - Perchloric acid potentiometric titration method	
ASTM D 2896 2015	Standard Test Method for Base Number of Petroleum Products by Potentiometric Perchloric Acid Titration	5.1.70
DIN 51639-1 2014-11	Testing of lubricants - Test methods - Part 1: Determination of total base number	

Methods of test	Description	Process-Matrix-Number[+)]
Determination of density		
DIN 51757 2011-01	Testing of mineral oils and related materials - Determination of density, method 3	5.1.110
DIN EN ISO 12185 1997-11	Crude petroleum and petroleum products - Determination of density - Oscillating U-tube method	5.1.22
Additive elements		
DIN 51391-2 1994-03	Testing of lubricants - Determination of the content of additive elements - Analysis by wavelength dispersive X-ray spectrometry (XRS)	5.1.161
DIN 51431-2 2004-06	Testing of lubricants - Determination of the magnesium content - Part 2: Analysis by wavelength dispersive X-ray spectrometry (XRS) *(withdrawn standard)*	5.1.161
DIN 51391-3 2004-12	Testing of lubricants – Determination of the content of additive elements – Part 3: Direct determination of Ca, Mg, Zn and Ba by optical emission spectral analysis with inductively coupled plasma (ICP OES) *(withdrawn standard)*	5.1.161
Determination of phosphorus content		
DIN 51363-2 2003-02	Testing of mineral oils - Determination of phosphorus content of lubricating oils and additives Part 2: Analysis by wavelength dispersive X-ray spectrometry (XRS)	5.1.156
DIN 51363-3 2008-08	Testing of mineral oils - Determination of phosphorus content of lubricating oils and additives Part 3: Direct determination by optical emission spectral analysis with inductively coupled plasma (ICP OES)	5.1.156

Methods of test	Description	Process-Matrix-Number[+)]
Determination of chlorine and bromine content		
DIN ISO 15597 2006-01	Petroleum and related products - Determination of chlorine and bromine content - Wavelength-dispersive X-ray fluorescence spectrometry	
Infrared spectrometric analysis		
DIN 51451 2020-02	Testing of petroleum products and related products - Analysis by infrared spectrometry - General working principles	5.1.166
Sulphated ash		
DIN 51575 2016-06	Testing of mineral oils - Determination of sulphated ash	5.1.93
ISO 3987 2010-11	Petroleum products - Determination of sulfated ash in lubricating oils and additives	5.1.93
ISO 3987 Technical Corrigendum 1 2011-02	Petroleum products - Determination of sulphated ash in lubricating oils and additives - Corrigendum 1	5.1.93
ASTM D 874 2013a (reapproval 2018)	Standard Test for Sulfated Ash from Lubricating Oils and Additives	
Foaming Characteristics		
ASTM D 892 2018	Standard Test Method for Foaming Characteristics of Lubricating Oils	5.1.124
ASTM D 4684 2018	Standard Test Method for Determination of Yield Stress and Apparent Viscosity of Engine Oils at Low Temperature	5.1.120

Methods of test	Description	Process-Matrix-Number[+)]
Water content		
DIN EN ISO 12937 2002-03	Petroleum products - Determination of water - Coulometric Karl Fischer titration method	5.1.106
ASTM D 6304 2016e1	Standard Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration	5.1.106
DIN 51380 2019-04	Testing of lubricants - Test for fuel diluent in used automotive engine oils - Gas chromatographic method	5.1.160
Total dirt		
DIN 51365 1988-03	Testing of lubricants - Determination of total dirt in used engine oils - Separation by centrifuging *(withdrawn standard)*	5.1.228
DIN 51399-1 2017-02	Testing of lubricants - Determination of elements content in additives, wear and other contaminations - Part 1: Direct determination by optical emission spectral analysis with inductively coupled plasma (ICP OES)	
DIN 51396-2 2008-11	Testing of lubricants - Determination of wear elements - Part 2: Analysis by wavelength dispersive X-ray spectrometry (XRS)	5.1.161
ASTM D 6082 2012 (reapproval 2017)	Standard Test Method for High Temperature Foaming Characteristics of Lubricating Oils	5.1.179
ASTM D 4739 2018	Standard Test Method for Base Number Determination by Potentiometric Hydrochloric Acid Titration	5.1.70

Methods of test	Description	Process-Matrix-Number[+)]
Sulphur content		
DIN EN ISO 14596 2007-12	Petroleum products - Determination of sulfur content - Wavelength-dispersive X-ray fluorescence spectrometry	
ASTM D 2622 2016	Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry	
Carbon black content		
CEC L-82-97 2018-01	Spectrophotometric Detection of Soot in Used Engine Oil Samples	
DIN 51452 1994-01	Testing of lubricants; determination of the soot content in used Diesel engine oils - infrared spectrometry	
Kinematic viscosity		
CEC L-83-97 2018-01	Procedure for Measuring the Kinematic Viscosity at 100 °C of used Oil Samples	
Additive elements		
ASTM D 5185 2018	Standard Test Method for Multielement Determination of Used and Unused Lubricating Oils and Base Oils by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)	
ASTM D 6443 2014 (2019e1)	Test Method for Determination of Calcium, Chlorine, Copper, Magnesium, Phosphorus, Sulfur, and Zinc in Unused Lubricating Oils and Additives by Wavelength Dispersive X-ray Fluorescence Spectrometry (Mathematical Correction Procedure)	
DIN 51443-2 2012-01	Determination of the boron content - Direct determination by optical emission spectral analysis with inductively coupled plasma (ICP OES)	

Methods of test	Description	Process-Matrix-Number[+)]
DIN 51453 2004-10	Testing of lubricants - Determination of oxidation and nitration of used engine oils - Infrared spectrometry method	
DIN 51535 2013-10	Testing of petroleum products – Determination of deposition forming tendency in exhaust turbochargers and intercoolers of supercharged diesel engines	
ISO 4406 2017-08	Hydraulic fluid power - Fluids - Method for coding the level of contamination by solid particles	
CEC L-105-12 2020-01	Low Temperature Pumpability	
ASTM D 6594 2020	Standard Test Method for Evaluation of Corrosiveness of Diesel Engine Oil at 135°C	
CEC L-109-14 2019-08	Oxidation Test for Engine Oils operating in the Presence of Biodiesel Fuel	
DIN 51454 2015-10	Testing of lubricants - Determination of low boiling components in used engine oils - Gas chromatographic method	
ASTM D 7097 2019	Standard Test Method for Determination of Moderately High Temperature Piston Deposits by Thermo-Oxidation Engine Oil Simulation Test - TEOST MHT	
CEC L-85-99 2018-06	Hot Surface Oxidation	

6. Gear oils *

Methods of test	Description	Process-Matrix-Number[+)]
Kinematic viscosity (40 °C and 100 °C)		
DIN 51562-1 1999-01	Viscometry - Measurement of kinematic viscosity by means of the Ubbelohde viscometer - Part 1: Viscometer specification and measurement procedure	5.2.54
DIN EN ISO 3104 1999-12	Petroleum products - Transparent and opaque liquids - Determination of kinematic viscosity and calculation of dynamic viscosity	
ISO 3105 1994-12	Glass capillary kinematic viscometers - Specifications and operating instructions	
ASTM D 445 2018	Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)	5.2.54
ASTM D 446 2012 reapproval: 2017	Standard Specifications and Operating Instructions for Glass Capillary Kinematic Viscometers	
DIN 51659-1 2017-02	Lubricants-test methods-Part 1: Determination of the kinematic viscosity of used lubricating oils by glass capillary viscometer	
DIN 51659-2 2017-02	Lubricants-test methods-Part 2: Determination of the kinematic viscosity of used lubricating oils by Stabinger viscometer	
DIN 51659-3 2017-02	Lubricants-test methods-Part 3: Determination of the kinematic viscosity of used lubricating oils by Houillon viscometer	
ASTM D7042 2019e1	Standard Test Method for Dynamic Viscosity and Density of Liquids by Stabinger Viscosimeter (and the Calculation of Kinematic Viscosity)	

Methods of test	Description	Process-Matrix-Number[+)]
ASTM D7279 2020	Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids by Automated Houillon Viscosimeter	
Viscosity index		
DIN ISO 2909 2004-08	Petroleum products – Calculation of viscosity index from kinematic viscosity	5.2.171
DIN ISO 2909 2005-01 Corrigenda	Petroleum products – Calculation of viscosity index from kinematic viscosity	5.2.171
Determination of pour point		
DIN EN ISO 3016 2019-09	Petroleum and related products from natural or synthetic sources - Determination of pour point	5.2.79
ASTM D 97 2017b	Standard Test Method for Pour Point of Petroleum Products	5.2.79
Flash point		
DIN EN ISO 2592 2018-01	Petroleum and related products - Determination of flash and fire points - Cleveland open cup method	5.2.28
ASTM D 92 2018	Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester	5.2.28
Density		
DIN 51757 2011-01	Testing of mineral oils and related materials - Determination of density, method 3	5.2.110
DIN EN ISO 12185 1997-11	Crude petroleum and petroleum products - Determination of density - Oscillating U-tube method	5.2.22
Foaming Characteristics		
ASTM D 892 2018	Standard Test Method for Foaming Characteristics of Lubricating Oils	5.2.124

Methods of test	Description	Process-Matrix-Number[+)]
Determination of neutralisation number		
DIN 51558-1 1979-07	Testing of mineral oils - Determination of the Neutralization Number, Colour-indicator titration *(withdrawn standard)*	5.2.70
ASTM D 974 2014e2	Standard Test Method for Acid and Base Number by Color-Indicator Titration	5.2.70
Sulphur content		
DIN EN ISO 14596 2007-12	Petroleum products - Determination of sulfur content - Wavelength-dispersive X-ray fluorescence spectrometry	5.2.89
ASTM D 2622 2016	Standard Test method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry	
Determination of chlorine content		
DIN ISO 15597 2006-01	Petroleum and related products - Determination of chlorine and bromine content - Wavelength-dispersive X-ray fluorescence spectrometry	
Sulphated ash		
DIN 51575 2016-06	Testing of mineral oils - Determination of sulphated ash	5.2.93
ISO 3987 2010-11	Petroleum products - Determination of sulfated ash in lubricating oils and additives	5.2.93
ISO 3987 Technical Corrigendum 1 2010-11	Petroleum products - Determination of sulfated ash in lubricating oils and additives – Corrigendum 1	5.2.93

Methods of test	Description	Process-Matrix-Number[+)]
Additive elements		
DIN 51391-2 1994-03	Testing of lubricants - Determination of the content of additive elements - Analysis by wavelength dispersive X-ray spectrometry (XRS)	5.2.161
DIN 51431-2 2004-06	Testing of lubricants - Determination of the magnesium content - Part 2: Analysis by wavelength dispersive X-ray spectrometry (XRS) *(withdrawn standard)*	5.2.161
DIN 51391-3 2004-12	Testing of lubricants - Determination of the content of additive elements - Part 3: Direct determination of Ca, Mg, Zn and Ba by optical emission spectral analysis with inductively coupled plasma (ICP OES) *(withdrawn standard)*	5.2.161
Determination of water content		
DIN EN ISO 12937 2002-03	Petroleum products - Determination of water content - Coulometric Karl Fischer titration method	5.2.106
ASTM D 6304 2016e1	Standard Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration	5.2.106
Corrosion protection		
DIN ISO 7120 2000-05 Corrigendum 1 2007-06	Petroleum products and lubricants - Petroleum oils and other liquids - Determination of rust-preventing characteristics in the presence of water	5.2.174
DIN EN ISO 2160 1999-04	Petroleum products - Corrosiveness to copper - Copper strip test	5.2.60
ASTM D 130 2019	Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test	

Methods of test	Description	Process-Matrix-Number[+)]
Base number		
DIN ISO 3771 1985-04	Petroleum products - Total base number - Perchloric acid potentiometric titration method *(withdrawn standard)*	5.2.70
ISO 3771 2011-09	Petroleum Products - Determination of base number - Perchloric acid potentiometric titration method	
ASTM D 2896 2015	Standard Test Method for Base Number of Petro-leum Products by Potentiometric Perchloric Acid Titration	5.2.70
ASTM D 4739 2018	Standard Test Method for Base Number Determination by Potentiometric Hydrochloric Acid Titration	
Phosphorus content		
DIN 51363-2 2003-02	Testing of mineral oils - Determination of phosphorus content of lubricating oils and additives Part 2: Analysis by wavelength dispersive X-ray spectrometry (XRS)	5.2.156
DIN 51363-3 2008-08	Testing of mineral oils - Determination of phosphorus content of lubricating oils and additives Part 3: Direct determination by optical emission spectral analysis with inductively coupled plasma (ICP OES)	5.2.156
Boron content		
DIN 51443-2 2012-01	Testing of lubricants - Determination of the boron content - Part 2: Direct determination by optical emission spectral analysis with inductively coupled plasma (ICP OES)	5.2.165
Oxidation stability		
CEC L-48-00 2018-06	Oxidation Stability of lubricating oils used in automotive transmissions by artificial ageing	

Methods of test	Description	Process-Matrix-Number[+)]
Determination of scuffing load-carrying capacity in the FZG		
ASTM D 5182 2019	Standard Test method for Evaluating the Scuffing Load Capacity of Oils (FZG Visual Method)	5.2.178
CEC L-07-95 2014-09	Load Carrying Capacity Test for Transmission Lubricants	5.2.128
DIN ISO 14635-1 2006-05 Corrigendum 1 2007-03	Gears - FZG test procedures - Part 1: FZG test method A/8,3/90 for relative scuffing load-carrying capacity of oils	5.2.172
Wear elements		
DIN 51396-2 2008-11	Testing of lubricants - Determination of wear elements - Part 2: Analysis by wavelength dispersive X-ray spectrometry (XRS) *(withdrawn standard)*	5.2.161
DIN 51399-1 2017-02	Testing of lubricants - Determination of elements content in additives, wear and other contaminations - Part 1: Direct determination by optical emission spectral analysis with inductively coupled plasma (ICP OES)	
ASTM D 664 2018e2	Standard Test method for Acid Number of Petroleum Products by Potentiometric Titration	5.2.70
Determination of scuffing load-carrying capacity		
CEC L-84-02 2019-09	FZG Scuffing Load Carrying Capacity Test for High EP Oils	
DIN ISO 14635-2 2010-01	Gears - FZG test procedures - Part 2: FZG step load test A10/16, 6R/120 for relative scuffing load-carrying capacity of high EP oils (ISO 14635-2:2004)	
CEC L-45-99 2019-04	Viscosity Shear Stability of Transmission Lubricants	

Methods of test	Description	Process-Matrix-Number[+)]
ASTM D 5185 2018	Standard Test Method for Multielement Determination of Used and Unused Lubricating Oils and Base Oils by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)	
DIN 51453 2004-10	Testing of lubricants - Determination of oxidation and nitration of used engine oils - Infrared spectrometry method	
CEC L-108-19 2020-01	FZG Pitting Load Carrying Capacity for Gear Oils	

7. Properties and behaviour of elastomers on exposure to engine oils *

CEC L-112-16 2018-06	The Evaluation of Oil - Elastomer Compatibility
ISO 2781 2018-06	Rubber, vulcanized or thermoplastic - Determination of Density
DIN 53504 2017-03	Testing of rubber - Determination of tensile strength at break, tensile stress at yield, elongation at break and stress values in a tensile test
DIN ISO 1817 2016-11	Rubber, vulcanised or thermoplastic - Determination of the effect of liquids
DIN ISO 7619-1 2012-02	Rubber, vulcanised or thermoplastic - Determination of indentation hardness - Part 1: Durometer method (Shore hardness) *(withdrawn standard)*
ISO 37 2017-11	Rubber, vulcanized or thermoplastic - Determination of tensile stress-strain properties
ASTM D7216 2020	Standard Test Method for Determining Automotive Engine Oil Compatibility with typical Seal Elastomers

Abbreviations used:

ASTM	American Society for Testing and Materials
CEC	Coordinating European Council
DIN	Deutsches Institut für Normung e.V. (German Institute for Standardization)
EN	European standard
FAME	Fatty acid methyl ester
ISO	International Organization for Standardization
JASO	Japanese Automobile Standards Organization
Process-Matrix-Number[+)]	Property number of the mineral oil method matrix (FO-Antrag GB_Mineralöl.xlsx, Vers. 1.1, 23rd of March 2022)