Global Network of Fluid and Lubricant Laboratories

A Rolls-Royce solution

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In addition to the existing support services provided by the Fluids and Lubricants Laboratory at the Rolls-Royce Solutions headquarters in Friedrichshafen, Germany, this document describes local options for analyzing fluids and lubricants in accordance with internal standards.

These third-party laboratories are certified in accordance with the MTL5120 delivery standard to ensure consistent analysis quality as per ***mtu*** specifications.

Depending on customer requirements and the complexity of the analysis, these laboratories are classified in three different analysis levels (see Figure 1 and Annex A).

- Basic analysis (Level 1)
    - May be outsourced independently by first-level service partners to laboratories linked in the list.

- Advanced analysis (Level 2)
    - May only be conducted following prior consultation with Service Level 2.

- Special analysis (Level 3)
    - May only be conducted following prior consultation with Service Level 2.
    - OQM must be notified.

Contact the CCC for assistance in interpreting findings which appear unusual or ambiguous.

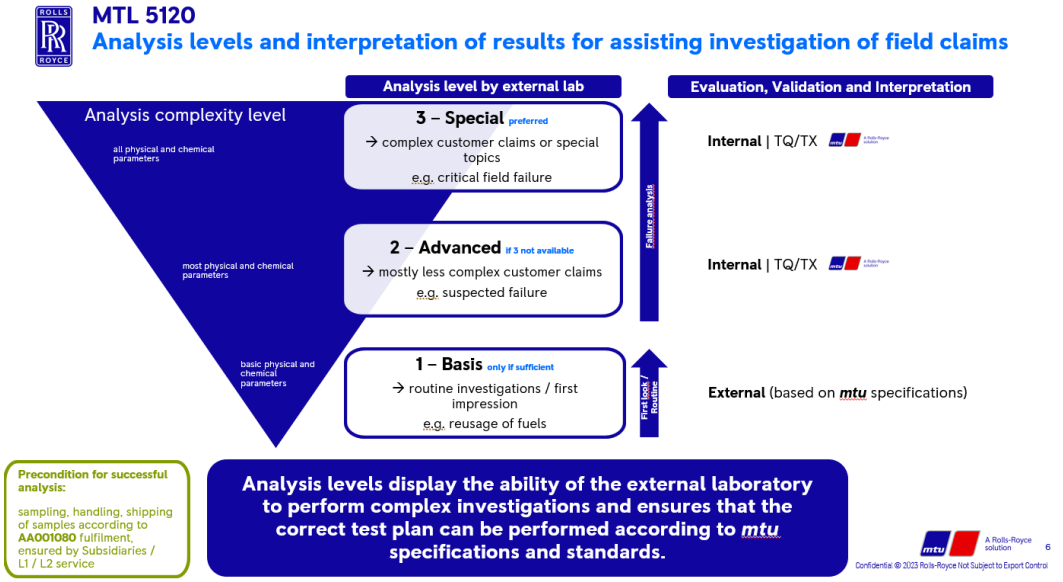
The approved laboratories are listed in Tables A (Europe), B (EMEA excluding Europe), C (APAC), and D (NALA).

Other external laboratories which satisfy ***mtu*** delivery standard MTL 5120 can seek approval by registering in the user database.

Please refer to document AA01080 for additional guidance on sample preparation, handling, transport, and labeling to meet global shipping requirements for regulated fluids.

Please note that all the findings determined for data analysis by external laboratories must be submitted to the central laboratory in Friedrichshafen via the email workflow **wf_chemistry_lab@ps.rolls-royce.com** .

Figure 1: Analysis levels and interpretation of results for assisting investigation of field claims



For more information, or in case of any queries, please contact us at the following workflow email address:

wf_chemistry_lab@ps.rolls-royce.com

Table 1a: Definition of analysis levels for diesel engine oil properties at Rolls-Royce Solutions

Properties [Unit]	**Level 1 Basic**	**Level 2 Advanced**	**Level 3 Special**
Kinematic viscosity at 40 °C and 100 °C	✓	✓	✓
Flashpoint COC [°C] Flashpoint PM [°C]	✓	✓	✓
Soot content [wt–%]	✓	✓	✓
Oxidation [A/cm]	✓	✓	✓
Nitration [A/cm]	✓	✓	✓
Viscosity index [/]	✓	✓	✓
Total base number (TBN) [mgKOH/g]	✓	✓	✓
Additive elements [mg/kg] (Ca, Mg, P, Zn, S, Mo)		✓	✓
Wear elements [mg/kg] (e.g. Al, Fe, Cu, Pb, Sn, and Si	✓	✓	✓
Contaminants [mg/kg] (e.g. Na, K)		✓	✓
Water content [mg/kg]		✓	✓
Ethylene glycol content []		✓	✓
Total acid number (TAN) [mg KOH/g]			✓

Table 1b: Definition of analysis levels for gas engine oil properties at Rolls-Royce Solutions

Properties [Unit]	**Level 1 Basic**	**Level 2 Advanced**	**Level 3 Special**
Kinematic viscosity at 40 °C and 100 °C	✓	✓	✓
Flashpoint COC [°C] Flashpoint PM [°C]	✓	✓	✓
Soot content [wt–%]	✓	✓	✓
Oxidation [A/cm]	✓	✓	✓
Nitration [A/cm]	✓	✓	✓
Viscosity index [/]	✓	✓	✓
Total base number (TBN) [mgKOH/g]	✓	✓	✓
Additive elements [mg/kg] (Ca, Mg, P, Zn, S, Mo)		✓	✓
Wear elements [mg/kg] (e.g. Al, Fe, Cu, Pb, Sn, and Si	✓	✓	✓
Contaminants [mg/kg] (e.g. Na, K)		✓	✓
Water content [mg/kg]		✓	✓
Ethylene glycol content []		✓	✓
Total acid number (TAN) [mg KOH/g]	✓	✓	✓
i-pH Wert [/]	✓	✓	✓

Table 2: Definition of analysis levels for diesel fuel properties at Rolls-Royce Solutions

Properties [Unit]	Level 1 Basic	Level 2 Advanced	Level 3 Special
Visible water [/]	✓	✓	✓
Sediment [/]	✓	✓	✓
Density at 15 °C [g/mL]	✓	✓	✓
Viscosity at 40 °C [mm²/s]	✓	✓	✓
Initial boiling point [°C]	✓	✓	✓
Temperature at 10% volume [°C]	✓	✓	✓
Temperature at 50% volume [°C]	✓	✓	✓
Temperature at 90% volume [°C]	✓	✓	✓
Residue and loss [%]	✓	✓	✓
Residue volume at 250 °C [% v/v]	✓	✓	✓
Residue volume at 350 °C [% v/v]	✓	✓	✓
Content of fatty acid methyl esters (FAME) [% v/v]	✓	✓	✓
Sulfur content [mg/kg]	✓	✓	✓
Cetane index [/]	✓	✓	✓
Water content [mg/kg]	✓	✓	✓
Total contamination [mg/kg]		✓	✓
Particle size distribution [µm]		✓	✓
Flashpoint [°C]		✓	✓
Carbon content at 10% distillation residue [wt-%]		✓	✓
Oxide ash [mg/kg]		✓	✓
Cetane number [/]		✓	✓
Oxidation stability (Rancimat) [h]		✓	✓
Oxidation stability [g/m³]		✓	✓
Lubricity at 60 °C (HFFR) [µm]		✓	✓
Elements [mg/kg]		✓	✓
API gravity at 60 °F [/]			✓
Copper corrosion: 3 hours at 50 °C [/]			✓
Neutralization number [mg KOH/g]			✓
Cold filter plugging point (CFFP) [°C]			✓
Cloud point [°C]			✓

Table 3: Definition of analysis levels for coolant properties at Rolls-Royce Solutions

Properties [Unit]	Test methods (MTL 5120, 2022)	Level 1 Basic	Level 2 Advanced	Level 3 Special
Appearance [/]	Visual	✓	✓	✓
Precipitation [/]	Visual	✓	✓	✓
Refractive index	DIN 51423	✓	✓	✓
Brix	DIN 51423	✓	✓	✓
Coolant concentration [% v/v]	Calculation based on refractive index or Brix	✓	✓	✓
pH value [/]	DIN 51369	✓	✓	✓
Conductivity [mS/m]	DIN EN 27888	✓	✓	✓
Anion content (chloride, nitrite, nitrate, phosphate, sulfate) [mg/L]	IC	✓	✓	✓
Oxidation products (glycolate, oxalate, acetate, formate) [mg/L]	IC	✓	✓	✓
Elements (Si, Al, Cu, Fe, Pb, Zn, Ca, Mg, Mn, Na, K, S, B, Sn) [mg/L]	ICP	✓	✓	✓
Density [g/cm³]	EN ISO 12185		✓	✓
Anion content (fluoride, bromide, benzoate) [mg/L]	IC		✓	✓
Alkalinity [mL 0.1 N HCl]	ASTM D1121 (Deviation: Antifreeze diluted to 10% by volume / Water-soluble corrosion inhibitors diluted to 1% by volume)		✓	✓
Organic inhibitors [mg/L]	HPLC		✓	✓
Bacteria, fungi, yeasts [/]	Dipslides e.g. VWR Prolabo No. 535112D		✓	✓
Residue analysis [/]	XRF analysis SEM-EDX analysis			✓

Table A: Fluid and lubricant laboratories in the UK, the EU, and Switzerland.

Location	Laboratory	Website	Analysis level Oil	Analysis level Fuel	Analysis level Coolant
Germany (Brandenburg)	Oelcheck	https://de.oelcheck.com/	1, 2, 3	1, 2*, 3* *Exception: API grades, cetane number	1, 2* *Exception: LOQ inadequate for fluoride, chloride, nitrite, and bromide; sulfur analysis
UK (Odiham)	Spectro Oil	https://www.spectro-oil.com/	1, 2, 3	0	1
UK (Farnborough)	Intertek UK	https://www.intertek.com/uk/	1	0	0
UK (Teesside)	Intertek UK	https://www.intertek.com/uk/	0	1	0
UK (West Thurrock)	Intertek UK	https://www.intertek.com/uk/	0	1, 2, 3*	0
UK (Chesterfield)	FA-ST	https://www.fa-st.co.uk/	1, 2, 3	1	1
UK (Mochdre)	Oil-Analysis Lab	https://oilanalysislab.com/	1, 2, 3	1	1
Switzerland (Kaiseraugst)	Spectro Oil	https://www.spectro-oil.com/	1, 2, 3	0	1
Germany (Speyer)	SGS Germany	https://www.sgs.com/de-de/unternehmen/uber-sgs/sgs-in-deutschland	1, 2, 3	1, 2, 3	1, 2
Germany (Hamburg)	SGS Germany	https://www.sgs.com/de-de/unternehmen/uber-sgs/sgs-in-deutschland	0	1, 2* *Exception: Cetane number, elements via ICP	0

Table B: Fluid and lubricant laboratories in EMEA (outside Europe)

Location	Laboratory	Website	Analysis level Oil	Analysis level Fuel	Analysis level Coolant
VAE, (Sharjah)	Intertek VAE	https://www.intertek.com/contact/ema/uae/	1, 2, 3* *Exception: Ethylene glycol analysis	1, 2, 3* *Exception: API grades	0
Dubai	GeoChem MiddleEast	https://www.geochemglobal.com/	1, 2, 3* *Exception: Ethylene glycol analysis	1, 2, 3	0
South Africa (Johannesburg)	Wearcheck SA	https://www.wearcheck.co.za/	1, 2* *Exception: Sulfur analysis	1* *Exception: Sulfur analysis	1* *Exception: Oxidation products

Table C: Fluid and lubricant laboratories in APAC

Location	Laboratory	Website	Analysis level Oil	Analysis level Fuel	Analysis level Coolant
China (Shanghai)	SGS China	https://www.sgsgroup.com.cn/en-cn	1, 2, 3* *Exception: Ethylene glycol analysis	1, 2, 3	1
China (all locations)	Intertek China	https://www.intertek.com/contact/asiapacific/china/	1, 2, 3	1, 2, 3	0
India	Wearcheck SA	https://www.wearcheck.co.za/	1, 2* *Exception: Sulfur analysis	1* *Exception: Sulfur analysis	1* *Exception: Oxidation products
Pakistan (Karachi)	Intertek Pakistan	https://www.intertek.com/contact/asiapacific/china/	1, 2* *Exception: Ethylene glycol analysis	1* *Exception: FAME analysis	0
Singapore	Intertek Singapore	https://www.intertek.com/contact/asiapacific/singapore/	1, 2, 3* *Exception: Ethylene glycol analysis	1	0

Table D: Fluid and lubricant laboratories in NALA

Location	Laboratory	Website	Analysis level Oil	Analysis level Fuel	Analysis level Coolant
USA, NJ, Cedar Knolls	Jet Care / Spectro Oil	https://www.spectro-oil.com/	1, 2, 3	0	1
USA, IN, Indianapolis **	Polaris	https://polarislabs.com/	1, 2, 3	0	1, 2* *Exception: Fluoride, bromide, and chloride analysis
USA, MI, Livonia	Paragon	https://www.paragonlaboratories.com/	0	1, 2, 3	0
Brazil (Belo Horizonte)	Laboroil Brazil	https://www.laboroil.com.br/	1* *Exception: i-pH value and ethylene glycol analysis for gas engine oils	0	0