Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

4589

Accredited to ISO 17034:2016

Paragon Scientific Ltd

Issue No: 032 **Issue date:** 09 December 2019

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Reference material production at the above address

DETAIL OF ACCREDITATION

Matrix / Artefact	Property Value(s) / Identity / Characterisation Range	Characterisation Procedure / Technique	Type* (CRM / RM)
<u>Reference Materials with Viscosity Properties</u>			
Base, blended oils, hydrocarbons and aqueous blends	Kinematic viscosity	Measurement by a single, primary, method at Paragon ASTM D2162 Viscosity values at intermediate temperatures can be determined in accordance with ASTM D341 Viscosity index can be calculated in accordance with ASTM D2270	CRM
Base, blended oils, hydrocarbons and aqueous blends	Kinematic viscosity	Measurement by a single, primary, method at Paragon ASTM D445 Viscosity values at intermediate temperatures can be determined in accordance with ASTM D341 Viscosity index can be calculated in accordance with ASTM D2270	CRM
Silicon Oils	Kinematic viscosity	Measurement by a single, primary, method at Paragon ASTM D445	CRM

Matrix / Artefact	Property Value(s) / Identity / Characterisation Range	Characterisation Procedure / Technique	Type* (CRM / RM)
Reference Materials with Viscosity Properties (cont'd)			
Base, blended oils, hydrocarbons and aqueous blends	Dynamic viscosity	Measurement by a single, primary, method at Paragon ASTM D2162 Viscosity values at intermediate temperatures can be determined in accordance with ASTM D341	CRM
Reference Materials with Density Properties and Calculation of Relative Density (Specific Gravity)			
Base, blended oils and hydrocarbons	0.6 g/ml to 1.2 g/ml	Measurement by a single, primary, method at Paragon ASTM D1480 ASTM D4052 Calculation of Relative Density (Specific Gravity) from ASTM D1480 Density by division of Density by the Density of Water at the Specified Water Reference Temperature. Note: Relative Density (Specific Gravity) has no units by definition.	CRM
Aqueous blends	0.90 g/ml to 1.16 g/ml		
Salt solutions	1.25 g/ml to 1.30 g/ml		
Solvents	1.17 g/ml to 1.65 g/ml		
Blended oils	0.6 g/ml to 1.2 g/ml	Measurement by a method specific, interlaboratory study ASTM D4052 IP365 ISO12185	CRM
Silicon Oils	0.9 g/ml to 1.0 g/ml	Measurement by a single, primary, method at Paragon ASTM D1480	CRM

Matrix / Artefact	Property Value(s) / Identity / Characterisation Range	Characterisation Procedure / Technique	Type* (CRM / RM)
Ethanol/Water Reference Standards. Density kg/m3 at 20C in air / Alcoholic Strength (%ABV)	0.8857 to 0.9912 g/ml at 20C kg/m3 in air corresponding to 70% to 5% Ethanol by Volume.	Measurement by a single, primary method at Paragon - ASTM D1480 (modified) Taken as the % alcohol by volume corresponding to that density in air from the Official Laboratory Alcohol Table (RDC80/264/04), Issued under the authority of the UK HM Customs & Excise	CRM
Reference Materials with Refractive Index Properties			
Sucrose solution	Sucrose in water wt/wt 0 % to 60 % (0 °Brix to 60 °Brix) Corresponding to refractive index values of 1.332986 to 1.441928	Gravimetric preparation Calculated from ICUMSA Specification and Standard SPS-3 (2000)	CRM
Base and Blended Hydrocarbons	Refractive index values of 1.33 to 1.65 at 15, 20,25 and 30 °C	Measurement by a single, primary, method at Paragon Measurement using digital refractometer	CRM
Certified Reference Materials with Flash Point Properties			
Blended oils	Flash point, Pensky Marten closed cup	Measurement by a method specific, interlaboratory study ASTM D93 Procedure A & B IP 34 ISO 2719	CRM
Blended oils	Flash point, Cleveland open cup	Measurement by a method specific, interlaboratory study ASTM D92 IP36 ISO 2592 EN 2592	CRM

Matrix / Artefact	Property Value(s) / Identity / Characterisation Range	Characterisation Procedure / Technique	Type* (CRM / RM)
Secondary Working Standard Reference Materials with Flash Point Properties			
Blended oils	Flash point, Pensky Marten closed cup	Measurement by a single, primary, method at Paragon ASTM D93 Procedure A & B IP 34 ISO 2719	CRM
Blended oils	Flash Point, Cleveland open cup	Measurement by a single, primary, method at Paragon ASTM D92 IP36 ISO 2592 EN 2592	CRM
Certified Reference Materials with Pour Point Properties			
Blended oils	Pour point	Measurement by a method specific, interlaboratory study ASTM D97 IP 15 ISO 3016 BS 2000: Part 15	CRM
Certified Reference Materials with Cloud Point Properties			
Blended oils	Cloud point	Measurement by a method specific, interlaboratory study ASTM D2500 IP 219 ISO 3015 EN 23015	CRM

Matrix / Artefact	Property Value(s) / Identity / Characterisation Range	Characterisation Procedure / Technique	Type* (CRM / RM)
Certified Reference Materials with Cold Filter Plugging Point Properties			
Blended oils	Cold Filter Plugging Point (CFPP)	Measurement by a method specific, interlaboratory study ASTM D6371 IP 309 EN 116 BS 2000: Pt 309	CRM
Certified Reference Materials with Distillation Properties			
Blended oils	Distillation Properties	Measurement by a method specific, interlaboratory study ASTM D86 IP 123 ISO 3405 EN ISO 3405	CRM
Reference Materials with Colour Properties			
Blended oils and hydrocarbons	ASTM colour	Measurement by a single, primary, method at a laboratory (spectrophotometry) ASTM D6045 ASTM D1500	CRM
Blended oils and hydrocarbons	Saybolt colour	Measurement by a single, primary, definitive method at a laboratory (spectrophotometry) ASTM D6045 ASTM D156	CRM

Matrix / Artefact	Property Value(s) / Identity / Characterisation Range	Characterisation Procedure / Technique	Type* (CRM / RM)
Reference Materials with Colour Properties (cont'd)			
Blended oils and hydrocarbons	Gardner colour	Measurement by a single, primary, definitive method at a laboratory (spectrophotometry) ASTM D6166 ASTM D1544	CRM
Jet A1 Kerosene	Abel Flash Point	Measurement by a method specific, interlaboratory study IP 170 ISO 13736	CRM
	Acidity in Aviation Turbine Fuel	Measurement by a method specific, interlaboratory study ASTM D3242 IP354	CRM
	Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption	Measurement by a method specific, interlaboratory study ASTM D1319	CRM
	Aniline Point of Petroleum Products and Hydrocarbon Solvents	Measurement by a method specific, interlaboratory study ASTM D61 IP2	CRM
	Freezing Point of Aviation Fuels	Measurement by a method specific, interlaboratory study ASTM D2386 IP16	CRM
	Flash Point by Tag Closed Cup Tester	Measurement by a method specific, interlaboratory study ASTM D56	CRM

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Reference material certification performed at main address only

Matrix / Artefact	Property Value(s) / Identity / Characterisation Range	Characterisation Procedure / Technique	Type* (CRM / RM)
Jet A1 Kerosene	Smoke Point of Kerosene and Aviation Turbine Fuel	Measurement by a method specific, interlaboratory study ASTM D1322	CRM
	(Thiol Mercaptan) Sulphur in Gasoline, Kerosene, Aviation Turbine, and Distillate Fuels (Potentiometric Method)	Measurement by a method specific, interlaboratory study ASTM D3227 IP342	CRM
<u>Reference Materials with Other Properties</u>			
Base Oil	Total Acid Number (TAN)	Measurement by single primary method at Paragon in accordance with ASTM D664	CRM
Base Oil	Total Base Number (TBN)	Measurement by single primary method at Paragon in accordance with ASTM D2896	CRM
Hydrocarbons	Sulfur Content	Measurement by Gravimetric Preparation	CRM
<u>Reference Materials with pH properties</u>			
pH buffer solutions	pH4 to pH10	Measurement by single primary method at Paragon in accordance with ASTM E70	CRM
<u>Smoke Point Reference Fuel Blends</u>			
2,2,4Trimethylpentane / Toluene mixtures from 60 % to 100 % v/v 2,2,4-trimethylpentane	Blends corresponding to Smoke Points in the range 14.7mm to 42.8mm at 101.3 kPa. Test methods ASTM D1322 and IP598.	% v/v Blends by Gravimetric Preparation of Blends with confirmatory analysis by ASTM D4052.	CRM
END			

***Type**
CRM = Certified Reference Material(s)
RM = Reference Material(s)
Refer to ISO 17034 for full definitions