

The parent batch for this sample was manufactured, tested, packaged and stored on our behalf in accordance with the requirements of ISO 17034 by Paragon Scientific Ltd. The calibration certificate issued by Paragon Scientific Ltd for this product is reproduced below.

## CERTIFICATE OF CALIBRATION

ISSUED BY PARAGON SCIENTIFIC LIMITED

Date of Issue: **13-Jun-23** Certificate No. **SA4583**



UKAS accredited calibration laboratory No. 0649 accredited to ISO/IEC 17025  
 UKAS accredited reference material producer No. 4589 accredited to ISO 17034  
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 Approved Signatory  
 Name Mr P. Whitehurst  
 Technical Director  
 Signature

### ISO 17025 / ISO 17034 Diesel Multi-Parameter Certified Reference Material

Part Number: **CRMU-MPGO** Lot No: **5222206124** Expiry Date: **12-Dec-24**

Characteristic	Certified Value	Expanded Uncertainties, 95% Level of Confidence	Test Method Employed	Alternative Test Methods	Certification Procedure
Kinematic Viscosity @ 40 °C	2.923 mm <sup>2</sup> /s (cSt)	+/- 0.07%	ASTM D2162	-	Single laboratory, primary methods
Dynamic Viscosity @ 40 °C	2.386 mPa·s (cP)	+/- 0.07%	ASTM D2162	-	
Density @ 15 °C, Digital Density Meter	0.83373 g/mL	+/- 0.00007 g/mL	ASTM D4052	IP 365, ISO 12185	Method specific inter-laboratory study
Cloud Point	-3.1 °C	+/- 1.4 °C	IP 219	ASTM D2500, ISO 3015	
CFPP	-10.3 °C	+/- 1.5 °C	IP 309	ASTM D6371	
Distillation IBP	170.2 °C	+/- 1.9 °C	ASTM D86	IP 123, ISO 3405	
5% v/v recovered	196.7 °C	+/- 1.0 °C			
10% v/v recovered	209.6 °C	+/- 0.6 °C			
20% v/v recovered	231.2 °C	+/- 0.4 °C			
30% v/v recovered	248.4 °C	+/- 0.2 °C			
40% v/v recovered	262.6 °C	+/- 0.3 °C			
50% v/v recovered	275.2 °C	+/- 0.3 °C			
60% v/v recovered	287.3 °C	+/- 0.4 °C			
70% v/v recovered	299.9 °C	+/- 0.4 °C			
80% v/v recovered	314.6 °C	+/- 0.5 °C			
90% v/v recovered	334.7 °C	+/- 0.6 °C			
95% v/v recovered	351.0 °C	+/- 1.1 °C			
FBP	360.5 °C	+/- 1.0 °C			
Flash Point, PMCC	68.2 °C	+/- 1.3 °C	ASTM D93 Procedure A	IP 34, ISO 2719	
*CRM Limit	3.4 °C	-			

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service (UKAS). It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. UKAS is one of the signatories to the Multilateral Agreement of European co-operation for Accreditation (EA) for the mutual recognition of calibration certificates issued by accredited laboratories.



### **Certification Procedure**

The standard has been tested and certified in accordance with ISO 17034 and ISO Guide 35 by one of the following methods as indicated above:

- Measurement by a single primary method in a single laboratory.
- Method specific inter-laboratory study involving a statistically significant number of laboratories with ISO 17025 accreditation for the relevant test method.

### **Recommended Use**

This product is intended to confirm the accuracy of an instrument and / or procedure for an analytical method. Samples should be prepared and thermally conditioned in accordance with the relevant standard before use. The shelf life of this product is guaranteed until the expiry date, provided the bottle is unopened and stored at +5 °C to +30 °C. The guarantee is void if the bottle seal is broken. This product has been produced according to in-house procedures and its homogeneity is guaranteed to be fit for purpose when used with a sample size appropriate for the intended measurement method.

### **Characterisation Procedures**

#### **Single Laboratory, Primary Methods**

The certified values quoted for kinematic and dynamic viscosity are derived from tests carried out by Paragon Scientific Ltd in accordance with ASTM D2162, ASTM D1480 and the requirements of the laboratory accreditation to ISO 17025. The viscosity data reported is based on the primary standard of pure water at 20 °C (ITS-90) having a value of 1.0034 mm<sup>2</sup>/s (cSt) ± 0.17%, as adopted by NIST, ASTM, IP and ISO (ISO 3666). Temperature measurements were made using thermometers specified in ASTM D2162 which have a current calibration traceable to the National Physical Laboratory (NPL), National Institute Standards and Technology (NIST) and other recognised national standards laboratories. The calibrations of this product are traceable to NIST.

#### **Inter-laboratory Studies**

The certified values and tolerances quoted for density by digital density meter, flash point, cloud point, CFPP and distillation are derived from inter-laboratory studies involving a statistically significant number of laboratories. The competence of the laboratories involved in the studies was assured by only using laboratories accredited to ISO 17025 for the tests concerned by the appropriate national body.

#### **Uncertainties**

The uncertainty quoted for each test is calculated at a level of confidence of approximately 95%. When using this material to evaluate test procedures and / or instrument performance, the results obtained should be compared to the certified value with reference to the test reproducibility or other calculated protocols relevant to the test method employed.

#### **\*PMCC Flash Point, ASTM D93**

The CRM Limit quoted for the flash point standard has been calculated in accordance with ASTM D93.