

JOINT RESEARCH CENTRE  
Directorate F – Health, Consumers and Reference Materials

# REFERENCE MATERIAL CERTIFICATE

ERM®- EF002

BIODIESEL (B100 RAPESEED)		
	Certified value <sup>3)</sup> [°C]	Uncertainty <sup>4)</sup> [°C]
Cold filter plugging point (CFPP) <sup>1)</sup>	-15.2	1.3
Cloud point (CP) <sup>2)</sup>	-4.5	1.0
<p>1) As defined by EN 116:2015 or ASTM D6371-05:2010 using the automatic procedure</p> <p>2) As defined by ISO 3015:2019, EN 23015:1994, or ASTM D2500-09:2011 using the automatic or manual procedure</p> <p>3) Certified values are values that fulfil the highest standards of accuracy. The given values represent the unweighted mean value of the means of accepted sets of data, each set being obtained in a different laboratory and/or with a different method of determination. The certified value and its uncertainty are traceable to the International System of Units (SI).</p> <p>4) The uncertainty of the certified value is the expanded uncertainty with a coverage factor <math>k = 2</math> corresponding to a level of confidence of about 95 % estimated in accordance with ISO 17034:2016 and ISO Guide 35:2017.</p>		

This certificate is valid for one year after purchase.

Sales date:

The minimum amount of sample to be used is 50 mL.

Geel, February 2016  
Latest revision June 2022

**INFORMATION ONLY**

Signed:

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<b>Additional Material Information</b>		
<b>Parameter / measurement procedure</b>	<b>Value <sup>1)</sup></b>	<b>Unit</b>
Ester content / EN 14103:2011	98.5	% (m/m)
Density at 15 °C / EN 12185:1999	883	kg/m <sup>3</sup>
Viscosity at 40 °C / ISO 3104	4.44	mm <sup>2</sup> /s
Flash point / EN 3679:2004	> 101	°C
Cetane number / EN 15195	52.5	-
Copper strip corrosion / EN 2160	1	Corrosion degree
Oxidation stability at 110 °C / EN 14112:2003	12.2	h
Acid value / EN 14104	0.49	mg KOH/g
Iodine value / EN 14111:2003	111	g iodine/100g
Linolenic acid methyl ester content / EN 14103:2011	9.7	% (m/m)
Methyl esters ≥ 4 double bonds / EN 15779	< 0.6	% (m/m)
Methanol content / EN 14110:2003	0.03	% (m/m)
Free glycerol content / EN 14105:2011	0.002	% (m/m)
Monoglyceride content / EN 14105:2011	0.39	% (m/m)
Diglyceride content / EN 14105:2011	< 0.1	% (m/m)
Triglyceride content / EN 14105:2011	< 0.1	% (m/m)
Total glycerol content / EN 14105:2011	0.112	% (m/m)
Total contamination / EN 12662:1998	5	mg/kg
Sulfated ash / ISO 3987	< 0.01	% (m/m)
Sulfur content / EN 20884	1.8	mg/kg
Metals I (Na + K) / EN 14538	< 1	mg/kg
Metals II (Ca + Mg) / EN 14538	< 1	mg/kg
Phosphorus content / EN 14107	< 0.5	mg/kg
1) These values refer to values that were obtained in the course of the study. They are usually derived from single measurements only, are stated without an uncertainty, and merely give information about other material properties that may be of interest to the user.		

## DESCRIPTION OF THE MATERIAL

ERM-EF002 is a rapeseed oil methyl ester without flow improving additives. BHT as antioxidant was added at a mass fraction of 1 g/kg. Each unit of reference material consists of a set of two amber glass ampoules, each containing 27 mL of biodiesel.

## ANALYTICAL METHODS USED FOR CHARACTERISATION

Cold filter plugging point EN 116:2015 or ASTM D6371-05:2010 (only automated procedures)

Cloud point: ISO 3015:2019, EN 23015:1994, or ASTM D2500-09:2011 (manual as well as automated procedures)

## PARTICIPANTS

The following laboratories performed measurements in the scope of the homogeneity, stability and or characterisation study.

Eesti Keskonnauuringute Keskus OÜ, Tallinn, EE  
(measurements under the scope of ISO/IEC 17025 accreditation EAK L008)

Fundación Cetena, Noain, Navarra, ES  
(measurements under the scope of ISO/IEC 17025 accreditation ENAC No 69/LE814)

Hansa Group AG, Duisburg, DE  
(measurements under the scope of ISO/IEC 17025 accreditation DAC-PL-0607-09)

Inspectorate Antwerp NV, Antwerpen, BE  
(measurements under the scope of ISO/IEC 17025 accreditation BELAC No 486-TEST)

Intertek Belgium, Antwerpen, BE  
(measurements under the scope of ISO/IEC 17025 accreditation BELAC No 105-TEST)

Intertek Ibérica Spain, Bilbao, ES  
(measurements under the scope of ISO/IEC 17025 accreditation DAC-Nº 40/LE911)

Intertek OCA France, Donges, FR  
(measurements under the scope of ISO/IEC 17025 accreditation Cofrac No 1-2158)

ITS Testing Services (UK) Ltd (West Thurrock Laboratory), West Thurrock, UK  
(measurements under the scope of ISO/IEC 17025 accreditation UKAS No 0102)

Laboratorio de Combustibles, Universidad de A Coruña, Ferrol, ES  
(measurements under the scope of ISO/IEC 17025 accreditation ENAC No 814/LE1688)

SGS Española de Control, Barcelona, ES  
(measurements under the scope of ISO/IEC 17025 accreditation ENAC No 14/LE249)

Stazione Sperimentale per Combustibili, San Donato Milanese, IT  
(measurements under the scope of ISO/IEC 17025 accreditation ACCREDIA No 0173-2)

Vúrup, a.s., Bratislava, SK  
(measurements under the scope of ISO/IEC 17025 accreditation SNAS No. S-119).

## SAFETY INFORMATION

The raw material of this CRM is not classified as hazardous under EC regulation 1272/2008 (CLP).

## INTENDED USE

The main purpose of this material is to assess method performance, i.e. for checking accuracy of analytical results/calibration. As any reference material, it can also be used for control charts or validation studies.

### Comparing an analytical result with the certified value

A result is unbiased if the combined standard uncertainty of measurement and certified value covers the difference between the certified value and the measurement result (see also ERM Application Note 1, [www.erm-crm.org](http://www.erm-crm.org)).

For assessing the method performance, the measured values of the CRMs are compared with the certified values. The procedure is described here in brief:

- Calculate the absolute difference between mean measured value and the certified value ( $\Delta_{\text{meas}}$ ).

- Combine measurement uncertainty ( $u_{\text{meas}}$ ) with the uncertainty of the certified value ( $u_{\text{CRM}}$ ):  

$$u_{\Delta} = \sqrt{u_{\text{meas}}^2 + u_{\text{CRM}}^2}$$
- Calculate the expanded uncertainty ( $U_{\Delta}$ ) from the combined uncertainty ( $u_{\Delta}$ ) using an appropriate coverage factor, corresponding to a level of confidence of approximately 95 %.
- If  $\Delta_{\text{meas}} \leq U_{\Delta}$  no significant difference between the measurement result and the certified value, at a confidence level of about 95 % exists.

#### Use in quality control charts

The materials can be used for quality control charts. Different CRM-units will give the same result as inhomogeneity was included in the uncertainties of the certified values.

### **INSTRUCTIONS FOR USE**

The contents of the two ampoules shall be pooled to obtain one sample of 50 mL. No further sample treatment is necessary.

For general information on handling of reference materials, please see ERM Application Note 6, available on <https://crm.jrc.ec.europa.eu/e/132/User-support-Application-Notes>.

### **STORAGE**

The material shall be stored at  $(18 \pm 5) ^\circ\text{C}$  in the dark.

For more information regarding the shelf life of reference materials please see ERM Application Note 7, available on <https://crm.jrc.ec.europa.eu/e/132/User-support-Application-Notes>.

Please note that the stability of opened samples has not been tested and repeated use of the material occurs under the responsibility of the user. The European Commission cannot be held responsible for changes that happen during storage of the material at the customer's premises, especially of opened samples.

### **LEGAL NOTICE**

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### **NOTE**

A detailed certification report is available at <https://crm.jrc.ec.europa.eu/>.




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