



INSTITUTO DE  
PESQUISAS  
TECNOLÓGICAS

CERTIFICATE OF REFERENCE MATERIAL N° 2 395-103

VISCOSITY STANDARD

SYNTHETIC OIL OP 4 000

IPT 91

This certified reference material is composed of oils mixture without additives, homogenized and certified at IPT, using standard methods. It can be used for calibration, verification of accuracy and precision and for demonstrating traceability of results of viscosity measuring methods.

Temperature (°C)	Kinematic Viscosity (mm <sup>2</sup> /s)		Dinamic Viscosity (mPa.s)		Density (g/cm <sup>3</sup> )	
	Certified Values	Expanded Uncertainties	Certified Values	Expanded Uncertainties	Certified Values	Expanded Uncertainties
20,0	21197	70	18718	62	0,8830	0,0001
25,0	13475	45	11862	39	0,8803	0,0001
30,0	8806	29	7727	26	0,8775	0,0001
37,8	4769	16	4164	14	0,8732	0,0001
40,0	4052	13	3534	12	0,8720	0,0001
50,0	1988	7	1723	6	0,8665	0,0001
60,0	1057	3	909,8	3,0	0,8610	0,0001
70,0	601,6	2,0	514,6	1,7	0,8555	0,0001
80,0	363,5	1,2	309,0	1,0	0,8500	0,0001
90,0	231,3	0,8	195,3	0,6	0,8445	0,0001
98,9	160,6	0,5	134,9	0,4	0,8396	0,0001
100,0	153,9	0,5	129,1	0,4	0,8390	0,0001

Lot Number : 17  
Package Volume : 500 mL

Certification Date: 07/20/2022  
Valid until : 07/31/2024

The certified values and uncertainties are assured by the validity period, considering that the material is handled and stored in accordance with the given instructions, except in case of damage or contamination. IPT will monitor periodically the properties of this reference material during its validity period, and any observed significant change will be reported to the user.

São Paulo, July 25th, 2022.

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**Uncertainties**

The expanded uncertainties of the certified values of viscosity were estimated by the combination of uncertainties of characterization, homogeneity and stability, according to ISO Guide 35/2017 - Reference materials - Guidance for characterization and assessment of homogeneity and stability. Was used the coverage factor  $k=2$ , giving a confidence level of approximately 95 %.

**Metrological Traceability**

The certified values are traceable to the International System of Units (SI) through calibration of the instruments used in measurements. The viscometers were calibrated at National Institute of Metrology, Quality and Technology - INMETRO and auxiliary instruments were calibrated at Brazilian Calibration Network - RBC.

**Methods**

This material was certified in compliance with the requirements of ABNT NBR ISO 17034/2017 - General requirements for the competence of reference material producers. The measurements were performed in accordance with ASTM D445/2021e1 - Standard test method for kinematic viscosity of transparent and opaque liquids (and calculation of dynamic viscosity) and DIN EN ISO 3838/2004 - Crude petroleum and liquid or solid petroleum products - Determination of density or relative density - Capillary stoppered pycnometer and graduated bicapillary pycnometer methods.

**Handling and Storage**

Keep the material in its original bottle, tightly closed.

It is not recommended to return samples of the product to the original bottle.

Store the material at room temperature, protected against incident light and away from heat sources.

**Safety Informations**

This material is non-flammable, according to ABNT NBR 14725-2/2019 - Chemicals - Information about safety, health and environment - Part 2: Hazard classification system. The MSDS - Material Safety Data Sheet of this material is available for consultation (Portuguese) in <http://www.ipt.br/nmr.htm>.

**Certification Team**

Leandro Kazuto Ogata and Patricia Mayumi Hinata.

The latest version of the Certificates of IPT Reference Materials are available for download at: [www.iptirm.com](http://www.iptirm.com).