Date of Shipment: Xxxxxx XX, 20XX

4076a00 No. +++-210225-240315

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Report

NMIJ RM 4076-a
No. +++

Short-chain Chlorinated Paraffin

This reference material (RM) is produced in accordance with the NMIJ's management system and is in compliance with ISO 17034 and ISO/IEC 17025. This RM is intended for use in the calibration of instruments and the validation of analytical methods or instruments, for quantification of short-chain chlorinated paraffin (SCCP).

Indicative Value

The indicative value of this RM is mass fraction of chloroalkanes given in the table below. The uncertainty of the indicative value is the expanded uncertainty obtained by multiplying the combined standard uncertainty by a coverage factor (k) of 2, and it is the half-width of an interval of confidence estimated to have a level of confidence of approximately 95 %.

Substance	CAS No.	Indicative value Mass fraction (kg/kg)	Expanded uncertainty Mass fraction (kg/kg)
Chloroalkanes (chloroalkanes represent those composing with 10 to 13 carbon atoms, and their mixture)	85535-84-8	0.9996	0.0013

Analysis

The indicative value of this RM was determined by subtracting mass fraction of impurities measured by a gas chromatograph with a flame ionization detector, a Karl-Fischer titrator, a headspace - gas chromatograph - mass spectrometer and a thermal gravimetric analyzer.

Expiration of Report

This report is valid for one year from the date of shipment, provided that this RM is stored in accordance with the instructions given in this report.

Description of the Material

This RM is mixture of SCCP consisting of carbon number C10 to C13. The RM is in the form of colorless and viscous liquid at room temperature. This RM of 100 mg is bottled in a two-milliliter amber glass ampoule.

Instructions for Storage

This RM should be stored at temperature of 15 °C to 25 °C and protected from light.

Instructions for Use

This RM is for laboratory use only. This RM should be used promptly once an ampoule is opened. Considering the homogeneity, a minimum sample mass of 20 mg should be used to ensure valid results.

Precautions for Handling

Keep away from heat and ignition sources. Wear personal protective equipment, such as a safety mask and gloves when handling. The use, handling and storage of this RM should be performed while observing the laws regulating the components

of this RM. Refer to the safety data sheet (SDS) on this RM before use.

Preparation

This RM is short-chain chlorinated paraffin prepared by mixing commercially-available reagents (decane, undecane, dodecane, and tridecane) as raw materials and spiking chlorine to induce synthetic reaction. The prepared SCCP was divided into ampoules. The synthesizing process was conducted by Tokyo Chemical Industry Co., Ltd.

Technical Information

Mass fraction of chlorine in this RM was 560 g/kg when the indicative value was determined. This mass fraction was estimated by the combustion ion chromatograph. The analysis was carried out at a laboratory mentioned in Note of this report.

The homologue profile (%) in this RM at the time of determination of the indicative value is given in the table below. The homologue composition was obtained from the analyses using mass spectrometers, and the analyses were carried out at the 18 laboratories mentioned in Note of this report.

Homologue profiles (%)				
Chlorine number	Carbon number			
	10	11	12	13
3	0.35	0.48	0.24	0.12
4	2.58	5.67	5.09	0.92
5	3.85	12.50	12.40	6.69
6	2.01	8.30	8.51	5.93
7	0.74	3.35	5.36	5.29
8	0.42	1.05	1.59	2.49
9	0.10	0.19	0.35	0.77
10	0.05	0.10	0.12	0.13
11	-	0.04	0.04	0.04

NMIJ Analysts

The technical manager and the production managers for this RM are HANARI N., and the analysts are HANARI N, AOYAGI Y., ORIHARA Y., BAO X., SHIMIZU Y. and ITOH N.

Information

If substantive technical changes occur that affect the value assignment before the expiration of this report, NMIJ will notify the registered customers. Customer registration on the NMIJ Website (given below) will facilitate notification. Technical reports regarding this RM can be obtained from the contact details given below.

Reproduction of Report

In reproducing this report, it should be clearly indicated that the document is a copy.

Note

The analytical measurement of the mass fraction of chlorine was performed by Tokyo Metropolitan Industrial Technology Research Institute.

The homologue profile was obtained through the joint analysis participated by the following 18 laboratories: Tohoku Ryokka Kankyohozen; Shimadzu Techno-Research; National Institute for Environmental Studies; Idea Consultants; Chubu University; Environmental Control Center; Agilent Technologies; Chiba University; Kyoto University; Tosoh; Nippon Steel Technology; Miura; Thermo Fisher Scientific; Nippon Steel Eco-Tech; Center for Environmental Science in Saitama; Waters; Yamato Environmental Analysis; and Hyogo Environmental Advancement Association.

February 25, 2021

ISHIMURA Kazuhiko
President
National Institute of Advanced Industrial Science and Technology

If you have any questions about this RM, please contact:
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