



NATIONAL PHYSICAL LABORATORY

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Certificate of Calibration



4002

NPL PRIMARY REFERENCE MATERIAL

Cylinder Number: D933522

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. 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.

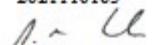
CUSTOMER: CNRS
ADDRESS: CNRS – OPGC, Campus Univ. Cezestuz, 4 avenue Blaise Pascal, TSA/CS 60026, 63178 Aubiere Cedex, France
CALIBRATION DATE: 20 January 2022
AMOUNT FRACTIONS:

Component	Amount fraction / (nmol/mol)	Component	Amount fraction / (nmol/mol)
Ethane	4.22 ± 0.13	Isoprene	4.24 ± 0.09
Ethane	4.13 ± 0.09	n-heptane	4.27 ± 0.09
Propane	4.16 ± 0.09	Benzene	4.15 ± 0.09
Propene	4.14 ± 0.09	2,2,4-trimethylpentane	4.01 ± 0.09
2-methylpropane	4.24 ± 0.11	n-octane	4.02 ± 0.09
n-butane	4.20 ± 0.09	Toluene	4.03 ± 0.11
Ethylene	4.35 ± 0.22	Ethylbenzene	4.36 ± 0.11
trans-but-2-ene	4.22 ± 0.09	m-xylene + p-xylene	3.49 ± 0.22
But-1-ene	4.20 ± 0.09	o-xylene	4.17 ± 0.11
cis-but-2-ene	4.21 ± 0.09	1,3,5-trimethylbenzene	4.10 ± 0.11
2-methylbutane	4.04 ± 0.09	1,2,4-trimethylbenzene	4.23 ± 0.11
n-pentane	4.06 ± 0.09	1,2,3-trimethylbenzene	4.13 ± 0.11
1,3-butadiene	4.23 ± 0.09	(+/-)-α-pinene	4.18 ± 0.13
trans-pent-2-ene	4.14 ± 0.09	(+/-)-β-pinene	4.07 ± 0.14
Pent-1-ene	4.13 ± 0.09	Limonene	4.07 ± 0.13
2-methylpentane	4.26 ± 0.09	Nitrogen	Balance
n-hexane	4.26 ± 0.09	-	-

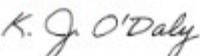
The reported expanded uncertainties are based on standard uncertainties multiplied by a coverage factor $k = 2$, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

METHODS: Preparation: gravimetry; Analysis: gas chromatography (FID)
TRACEABILITY: The values on this certificate are traceable to NPL Primary Standards
EXPIRY: Certificate valid for 5 years for hydrocarbon components and 1 year for terpene components from the date of issue
PRESSURE: Fill pressure: 106 bar; Minimum utilisation pressure: 10 bar
STORAGE: No special precautions are required
HANDLING: Refer to ISO 16664
OUTLET: DIN 477 No. 1 valve
INTENDED USE: Calibration standard

Reference: 2021110163 **Date of issue:** 28 January 2022

Signed:  (Authorised Signatory)

Name: Dr D R Worton (on behalf of NPLML)

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