



Certificate of Calibration

NPL PRIMARY REFERENCE MATERIAL

Cylinder Number: D982550

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: Umweltbundesamt - Federal Environment Agency

ADDRESS: Paul-Ehrlich-Strasse 29, Langen, 63225, Germany

CALIBRATION DATE: 25 January 2023

AMOUNT FRACTIONS:

Component	Amount fraction / (nmol/mol)	Component	Amount fraction / (nmol/mol)
Ethane	3.96 ± 0.10	2-methylpentane	4.00 ± 0.09
Ethene	3.88 ± 0.10	<i>n</i> -hexane	4.00 ± 0.09
Propane	3.90 ± 0.10	Isoprene	3.98 ± 0.08
Propene	3.88 ± 0.08	<i>n</i> -heptane	4.01 ± 0.09
2-methylpropane	3.98 ± 0.10	Benzene	3.89 ± 0.08
<i>n</i> -butane	3.94 ± 0.08	2,2,4-trimethylpentane	3.76 ± 0.08
Ethyne	4.09 ± 0.21	<i>n</i> -octane	3.77 ± 0.08
<i>trans</i> -but-2-ene	3.96 ± 0.08	Toluene	3.78 ± 0.10
But-1-ene	3.94 ± 0.08	Ethylbenzene	4.09 ± 0.11
<i>cis</i> -but-2-ene	3.95 ± 0.08	<i>m</i> -xylene + <i>p</i> -xylene	7.96 ± 0.20
2-methylbutane	3.79 ± 0.08	<i>o</i> -xylene	3.92 ± 0.10
<i>n</i> -pentane	3.81 ± 0.08	1,3,5-trimethylbenzene	3.84 ± 0.10
1,3-butadiene	3.99 ± 0.08	1,2,4-trimethylbenzene	3.97 ± 0.10
<i>trans</i> -pent-2-ene	3.88 ± 0.08	1,2,3-trimethylbenzene	3.87 ± 0.10
Pent-1-ene	3.89 ± 0.08	Nitrogen	Balance

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 is valid for 5 years after date of issue

PRESSURE: Fill pressure: 107 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: 2022100071

Date of issue: 03 February 2023

Signed:  (Authorised Signatory)

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

Checked by: 

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This certificate is consistent with the capabilities that are included in Appendix C of the MRA drawn up by the CIPM. Under the MRA, all participating institutes recognise the validity of each other's calibration and measurement certificates for the quantities, ranges and measurement uncertainties specified in Appendix C (for details see <http://www.bipm.org>).