NATIONAL PHYSICAL LABORATORY
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NPL Management Ltd – Registered in England and Wales No 2937881

Certificate of Calibration

UKAS REFERENCE MATERIALS 4002

NPL PRIMARY REFERENCE MATERIAL

Cylinder Number: D217056

CUSTOMER: **Deutscher Wetterdienst**

ADDRESS: Meteorologisches Observatorium Hohenpeissenberg, Albin-Schwaiger-Weg 10, Hohenpeissenberg, 82383, Germany

CALIBRATION DATE: 05 July 2024

AMOUNT FRACTIONS:

Component	Amount fraction / (nmol/mol)	Component	Amount fraction / (nmol/mol)
Ethane	3.93 ± 0.12	2-methylpentane	3.99 ± 0.12
Ethene	4.04 ± 0.13	*n*-hexane	4.04 ± 0.13
Propane	3.99 ± 0.12	Isoprene	3.92 ± 0.12
Propene	4.02 ± 0.13	*n*-heptane	3.95 ± 0.12
2-methylpropane	4.05 ± 0.13	Benzene	3.92 ± 0.12
n-butane	3.94 ± 0.12	2,2,4-trimethylpentane	3.99 ± 0.12
Ethyne	4.09 ± 0.21	*n*-octane	4.04 ± 0.13
trans-but-2-ene	3.99 ± 0.12	Toluene	3.92 ± 0.12
But-1-ene	3.96 ± 0.12	Ethylbenzene	3.91 ± 0.12
cis-but-2-ene	4.05 ± 0.13	*m*-xylene + *p*-xylene	7.83 ± 0.24
2-methylbutane	3.98 ± 0.12	*o*-xylene	3.93 ± 0.12
n-pentane	3.99 ± 0.12	1,3,5-trimethylbenzene	4.00 ± 0.13
1,3-butadiene	3.99 ± 0.12	1,2,4-trimethylbenzene	3.98 ± 0.12
trans-2-pentene	3.92 ± 0.12	1,2,3-trimethylbenzene	4.01 ± 0.13
Pent-1-ene	4.02 ± 0.13	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 valid for 5 years from the date of issue

PRESSURE: Fill pressure: 109 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: 2024080297-1 **Date of issue:** 07 October 2024

Signed: (Authorised Signatory)

Name: Dr P K Petrov (on behalf of NPLML)

Checked by: fred farrow-f