



# Certificate of Calibration

## PRIMARY REFERENCE GAS MIXTURE

Cylinder Number: D91 0379

This certificate provides traceability of measurement to recognised national standards, and to the units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, unless permission for the publication of an approved extract has been obtained in writing from the Managing Director. It does not of itself impute to the subject of calibration any attributes beyond those shown by the data contained herein.

**CUSTOMER:** Deutscher Wetterdienst

**ADDRESS:** Meteorologisches Observatorium, Albin-Schwaiger-Weg 10,  
Hohenpeißenberg, D-82383, Germany

**CALIBRATION DATE:** 6 November 2012

**DESCRIPTION:** 30 hydrocarbon species (ozone precursors) and 3 terpene species in nitrogen

### AMOUNT FRACTIONS:

Species	Amount Fraction (nmol/mol)	Species	Amount Fraction (nmol/mol)
ethane	2.03 ± 0.04	isoprene	2.01 ± 0.04
ethene	1.95 ± 0.04	heptane	2.01 ± 0.04
propane	2.04 ± 0.04	benzene	2.03 ± 0.04
propene	2.01 ± 0.04	2,2,4-trimethylpentane	1.99 ± 0.04
2-methylpropane	2.10 ± 0.04	octane	2.02 ± 0.04
butane	1.99 ± 0.04	toluene	2.03 ± 0.04
ethyne	2.08 ± 0.10	ethylbenzene	1.97 ± 0.04
trans-but-2-ene	1.98 ± 0.04	m-xylene	1.99 ± 0.04
but-1-ene	1.99 ± 0.04	p-xylene	2.00 ± 0.04
cis-but-2-ene	2.01 ± 0.04	o-xylene	2.02 ± 0.04
2-methylbutane	2.02 ± 0.04	1,3,5-trimethylbenzene	2.02 ± 0.04
pentane	2.02 ± 0.04	1,2,4-trimethylbenzene	2.05 ± 0.04
1,3-butadiene	1.98 ± 0.04	1,2,3-trimethylbenzene	1.95 ± 0.04
trans-pent-2-ene	1.99 ± 0.04	(+/-)-α-pinene	2.07 ± 0.04
pent-1-ene	1.99 ± 0.04	(+/-)-β-pinene	2.00 ± 0.10
2-methylpentane	2.03 ± 0.04	limonene	2.06 ± 0.04
hexane	2.00 ± 0.04		

The reported uncertainties of the results are based on standard uncertainties multiplied by a coverage factor of  $k = 2$ , providing a level of confidence of approximately 95%.

**METHODS:** Preparation: gravimetry Analysis: gas chromatography (FID)

**TRACEABILITY:** The values on this certificate are traceable to NPL Primary Standards

**EXPIRY:** Certificate valid for 2 years from date of issue, excluding terpenes

**PRESSURE:** Fill pressure: 100 bar; minimum utilisation pressure: 10 bar

**STORAGE:** No special precautions are required

**HANDLING:** Refer to ISO 16664:2008

**OUTLET:** DIN477 No.1 valve

**INTENDED USE:** Calibration standard

**Reference:** 2012050194-2

**Date of issue:** 14 November 2012

**Signed:**

(Authorised Signatory)

**Name:**

Dr P J Brewer

(on behalf of NPLML)

**Checked by:**

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