



## Certificate of Calibration



4002

## NPL PRIMARY REFERENCE MATERIAL

Cylinder Number: D982551

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**CUSTOMER:** IMT Nord Europe  
**ADDRESS:** Département Sciences de l'Atmosphère et Génie de l'Environnement,  
Site de Douai: 941 rue Charles Bourseul, CS10838 - 59508 Douai  
Cedex, France

**CALIBRATION DATE:** 07 June 2022

**AMOUNT FRACTIONS:**

Component	Amount fraction / (nmol/mol)	Component	Amount fraction / (nmol/mol)
Ethane	4.23 ± 0.13	Isoprene	4.25 ± 0.09
Ethene	4.14 ± 0.13	n-heptane	4.28 ± 0.09
Propene	4.17 ± 0.09	Benzene	4.15 ± 0.09
Propene	4.15 ± 0.09	2,2,4-trimethylpentane	4.02 ± 0.11
2-methylpropane	4.25 ± 0.11	n-octane	4.03 ± 0.09
n-butane	4.21 ± 0.09	Toluene	4.03 ± 0.11
Ethyne	4.37 ± 0.22	Ethylbenzene	4.36 ± 0.11
trans-but-2-ene	4.23 ± 0.09	m-xylene + p-xylene	8.49 ± 0.22
But-1-ene	4.21 ± 0.09	o-xylene	4.18 ± 0.11
cis-but-2-ene	4.22 ± 0.09	1,3,5-trimethylbenzene	4.11 ± 0.11
2-methylbutane	4.05 ± 0.09	1,2,4-trimethylbenzene	4.18 ± 0.11
n-pentane	4.07 ± 0.09	1,2,3-trimethylbenzene	4.09 ± 0.11
1,3-butadiene	4.26 ± 0.09	(-)-α-pinene	4.00 ± 0.19
trans-pent-2-ene	4.15 ± 0.09	(-)-β-pinene	3.98 ± 0.16
Pent-1-ene	4.16 ± 0.09	Limonene	3.97 ± 0.16
2-methylpentane	4.28 ± 0.09	Nitrogen	Balance
n-hexane	4.28 ± 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:** 5 years for all components other than the monoterpenes ((+/-)-alpha-pinene, (+/-)-beta-pinene and R-limonene) which are stable for 1 year  
**PRESSURE:** Fill pressure: 100 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:** 2022030104

**Date of issue:** 10 June 2022

**Signed:**

(Authorised Signatory)

**Name:**

Dr D R Worton

(on behalf of NPLML)

**Checked by:**

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