

Mass and Related Quantities, France, LNE (Laboratoire national de métrologie et d'essais)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | | | |
|------------------------------------|------------------------|---------------------------|--------------------------|---------------|-------|---|----------------|----------------------|-------|-----------------|---------------------|---|-----------------------------|---|------------------------|
| Class | Instrument or Artifact | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | Service provider | Comments | NMI Service Identifier |
| Mass | Mass standards | Comparison in air | 1 | 100 | mg | | | 0.4 to 0.8 | µg | 2 | 95% | No | Service provided by the LNE | Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 11 October 2005 | |
| Mass | Mass standards | Comparison in air | 0.1 | 1 | g | | | 0.8 to 1.6 | µg | 2 | 95% | No | Service provided by the LNE | Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 11 October 2005 | |
| Mass | Mass standards | Comparison in air | 1 | 10 | g | | | 1.6 to 3 | µg | 2 | 95% | No | Service provided by the LNE | Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 09 September 2011 | |
| Mass | Mass standards | Comparison in air | 10 | 100 | g | | | 3 to 7 | µg | 2 | 95% | No | Service provided by the LNE | Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 09 September 2011 | |
| Mass | Mass standards | Comparison in air | 0.1 | 1 | kg | | | 7 to 30 | µg | 2 | 95% | No | Service provided by the LNE | Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 09 September 2011 | |
| Mass | Mass standards | Comparison in air | 1 | 10 | kg | | | 30 to 800 | µg | 2 | 95% | No | Service provided by the LNE | Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 11 October 2005 | |
| Mass | Mass standards | Comparison in air | 10 | 50 | kg | | | 0.8 to 10 | mg | 2 | 95% | No | Service provided by the LNE | Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 11 October 2005 | |

Mass and Related Quantities, France, LNE (Laboratoire national de métrologie et d'essais)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | | | |
|------------------------------------|--|---------------------------|--------------------------|---------------|-------------------|---|----------------|--|-------------------|-----------------|---------------------|---|-----------------------------|---|------------------------|
| Class | Instrument or Artifact | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | Service provider | Comments | NMI Service Identifier |
| Mass | Mass standards | Comparison in air | 50 | 100 | kg | | | 10 to 60 | mg | 2 | 95% | No | Service provided by the LNE | Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 11 October 2005 | |
| Mass | Mass standards | Comparison in air | 100 | 1000 | kg | | | 0.06 to 1.5 | g | 2 | 95% | No | Service provided by the LNE | Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 11 October 2005 | |
| Mass | Mass standards | Comparison in air | 1000 | 5000 | kg | | | 1.5 to 7 | g | 2 | 95% | No | Service provided by the LNE | Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 11 October 2005 | |
| Density of solid | Mass standard (Pt/Ir) | Hydrostatic weighing | 21500 | 21600 | kg/m ³ | Reference temperature | 20 °C | 0.6 | kg/m ³ | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Density of solid | Mass standard: 0.001 kg to 0.05 kg | Hydrostatic weighing | 7000 | 9500 | kg/m ³ | Reference temperature | 20 °C | $(0.408 + 0.0396/m)$, m mass in kg | kg/m ³ | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Density of solid | Mass standard: 0.05 kg to 0.5 kg | Hydrostatic weighing | 7000 | 9500 | kg/m ³ | Reference temperature | 20 °C | $(0.1444 + 0.0528/m)$, m mass in kg | kg/m ³ | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Density of solid | Mass standard: 0.5 kg to 5 kg | Hydrostatic weighing | 7000 | 9500 | kg/m ³ | Reference temperature | 20 °C | 0.25 | kg/m ³ | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Density of solid | Solid sample 100 g | Hydrostatic weighing | 2000 | 9500 | kg/m ³ | Reference temperature | 20 °C | 0.4 | kg/m ³ | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Volume of solid | Solid density standard, mass: 0.2 kg to 1 kg | Hydrostatic weighing | 50 | 150 | cm ³ | Reference temperature | 20 °C | 0.6 | mm ³ | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Volume of solid | Solid density standard, mass: 0.2 kg to 1 kg | Hydrostatic weighing | 50 | 150 | cm ³ | Reference temperature | 10 °C to 30 °C | 2 | mm ³ | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |

Mass and Related Quantities, France, LNE (Laboratoire national de métrologie et d'essais)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | | | |
|------------------------------------|-------------------------------|--------------------------------------|--------------------------|---------------|-------------------|---|----------------|--|-------------------|-----------------|---------------------|---|-----------------------------|---|------------------------|
| Class | Instrument or Artifact | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | Service provider | Comments | NMI Service Identifier |
| Volume of solid | Mass standard: 1 g to 50 g | Hydrostatic weighing | 0.1 | 6.5 | cm ³ | Reference temperature | 20 °C | 0.6 | mm ³ | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Volume of solid | Mass standard: 50 g to 500 g | Hydrostatic weighing | 6.5 | 65 | cm ³ | Reference temperature | 20 °C | 0.6 to 2 | mm ³ | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Volume of solid | Mass standard: 0.5 kg to 5 kg | Hydrostatic weighing | 65 | 650 | cm ³ | Reference temperature | 20 °C | 2 to 20 | mm ³ | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Density of liquid | Hydrometer | Cuckow method (Hydrostatic weighing) | 500 | 1100 | kg/m ³ | Liquid temperature | 20 °C | 0.020 | kg/m ³ | 2 | 95% | No | Service provided by the LNE | Approved on 02 July 2008 | CMSI |
| | | | | | | Pressure | 101 kPa | | | | | | | | |
| Density of liquid | Hydrometer | Cuckow method | 1100 | 2000 | kg/m ³ | Liquid temperature | 20 °C | (0.0035 + 1.5E-05d), d density in kg/m ³ | kg/m ³ | 2 | 95% | No | Service provided by the LNE | Approved on 02 July 2008 | CMSI |
| | | | | | | Pressure | 101 kPa | | | | | | | | |
| Absolute pressure | Vacuum gauges | Gas medium | 1E-06 | 1E-03 | Pa | | | (1E-07 + 5E-02p), p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 1.5E-07 Pa to 5E-05 Pa Approved on 11 October 2005 | |
| Absolute pressure | Vacuum gauges | Gas medium | 1E-03 | 1 | Pa | | | (7E-06 + 5E-03p), p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 1.2E-05 Pa to 5E-03 Pa Approved on 11 October 2005 | |
| Absolute pressure | Vacuum gauges | Gas medium | 1 | 1E+03 | Pa | | | (4E-03 + 1.3E-03p), p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 5.3E-03 Pa to 1.3 Pa Approved on 11 October 2005 | |
| Absolute pressure | Vacuum gauges | Gas medium | 1E+03 | 3.5E+03 | Pa | | | (1 + 1.3E-03p), p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 2.3 Pa to 5.6 Pa Approved on 11 October 2005 | |
| Gauge pressure | Pressure gauge | Gas medium | 0 | 1E+03 | Pa | | | (4E-03 + 1.3E-03p), p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 4.0E-03 Pa to 1.3 Pa Approved on 11 October 2005 | |
| Gauge pressure | Pressure gauge | Gas medium | 1E+03 | 1E+04 | Pa | | | (1 + 1.3E-03p), p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 2.3 Pa to 14 Pa Approved on 11 October 2005 | |

Mass and Related Quantities, France, LNE (Laboratoire national de métrologie et d'essais)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | | | |
|------------------------------------|------------------------|---------------------------|--------------------------|---------------|-------|---|----------------|--|-------|-----------------|---------------------|---|-----------------------------|---|------------------------|
| Class | Instrument or Artifact | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | Service provider | Comments | NMI Service Identifier |
| Absolute pressure | Pressure balance | Gas medium | 3.5E+03 | 1E+05 | Pa | | | $(0.2 + 1.9E-05p)$, p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 2.7E-01 Pa to 2.1 Pa Approved on 11 October 2005 | |
| Absolute pressure | Pressure balance | Gas medium | 1E+05 | 1E+06 | Pa | | | $(0.2 + 7E-06p)$, p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 9E-01 Pa to 7.2 Pa Approved on 11 October 2005 | |
| Gauge pressure | Pressure balance | Gas medium | 1E+04 | 1E+06 | Pa | | | $(0.1 + 7E-06p)$, p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 1.7E-01 Pa to 7.1 Pa Approved on 11 October 2005 | |
| Gauge pressure | Pressure balance | Gas medium | 1E+06 | 1E+07 | Pa | | | $(2.9 + 8E-06p + 9E-14p^2)$, p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 1.1E+01 Pa to 9.2E+01 Pa Approved on 11 October 2005 | |
| Gauge pressure | Pressure balance | Gas medium | 1E+07 | 2E+07 | Pa | | | $(10 + 2.1E-05p)$, p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 2.1E+02 Pa to 4.1E+02 Pa Approved on 11 October 2005 | |
| Gauge pressure | Pressure balance | Gas medium | 2E+07 | 4E+07 | Pa | | | $(60 + 3.6E-05p)$, p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 7.8E+02 Pa to 1.5E+03 Pa Approved on 11 October 2005 | |
| Gauge pressure | Pressure balance | Gas medium | 4E+07 | 8E+07 | Pa | | | $(100 + 3.1E-05p)$, p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 1.3E+03 Pa to 2.5E+03 Pa Approved on 11 October 2005 | |
| Gauge pressure | Pressure balance | Oil medium | 2E+05 | 1E+07 | Pa | | | $(5.7 + 8E-06p + 9E-14p^2)$, p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 7.3 Pa to 9.6E+01 Pa Approved on 11 October 2005 | |
| Gauge pressure | Pressure balance | Oil medium | 1E+07 | 2E+08 | Pa | | | $(50 + 1E-05p + 1E-13p^2)$, p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 1.6E+02 Pa to 6.1E+03 Pa Approved on 11 October 2005 | |

Mass and Related Quantities, France, LNE (Laboratoire national de métrologie et d'essais)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | | | |
|------------------------------------|------------------------|---------------------------|--------------------------|---------------|-------|--|--------------------------------------|---|-------|-----------------|---------------------|---|-----------------------------|---|------------------------|
| Class | Instrument or Artifact | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | Service provider | Comments | NMI Service Identifier |
| Gauge pressure | Pressure balance | Oil medium | 2E+08 | 1E+09 | Pa | | | $(120 + 1.5E-05p + 1E-13p^2)$, p pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Uncertainty values range from 7.3E+03 Pa to 1.2E+05 Pa Approved on 11 October 2005 | |
| Differential pressure | Pressure gauge | Gas medium | 0 | 4E+06 | Pa | Line pressure, p_{line} and differential pressure, p | $2E+05 Pa < p_{line} + p < 4E+06 Pa$ | $(6 + 1.5E-06p_{line} + 2.5E-05p)$, p_{line} and p in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Differential pressure | Pressure gauge | Gas medium | 0 | 2E+07 | Pa | Line pressure, p_{line} and differential pressure, p | $6E+05 Pa < p_{line} + p < 2E+07 Pa$ | $(10 + 1.5E-06p_{line} + 2E-05p)$, p_{line} and p in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Differential pressure | Pressure gauge | Gas medium | 0 | 5E+05 | Pa | Line pressure, p_{line} | $1E+05 Pa < p_{line} < 4E+07 Pa$ | $[1.1 + (1E-11p_{line} + 4E-05)p]$, p_{line} and p differential pressure in Pa | Pa | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Force: tension | Force measuring device | Build-up system | 50 | 1500 | kN | | | 0.02 | % | 2 | 95% | Yes | Service provided by the LNE | Approved on 11 October 2005 | |
| Force: compression | Force measuring device | Build-up system | 50 | 1000 | kN | | | 0.02 | % | 2 | 95% | Yes | Service provided by the LNE | Approved on 11 October 2005 | |
| Force: tension and compression | Force measuring device | Deadweight | 5 | 2000 | N | | | 0.0025 | % | 2 | 95% | Yes | Service provided by the LNE | Approved on 11 October 2005 | |
| Force: tension and compression | Force measuring device | Deadweight | 100 | 5000 | N | | | 0.001 | % | 2 | 95% | Yes | Service provided by the LNE | Approved on 11 October 2005 | |
| Force: tension and compression | Force measuring device | Deadweight | 1 | 50 | kN | | | 0.001 | % | 2 | 95% | Yes | Service provided by the LNE | Approved on 11 October 2005 | |
| Force: tension and compression | Force measuring device | Deadweight | 10 | 500 | kN | | | 0.002 | % | 2 | 95% | Yes | Service provided by the LNE | Approved on 11 October 2005 | |
| Force: tension and compression | Force measuring device | Build-up system | 100 | 3000 | kN | | | 0.03 | % | 2 | 95% | Yes | Service provided by the LNE | Approved on 11 October 2005 | |
| Force: tension and compression | Force measuring device | Build-up system | 300 | 9000 | kN | | | 0.05 | % | 2 | 95% | Yes | Service provided by the LNE | Approved on 11 October 2005 | |

Mass and Related Quantities, France, LNE (Laboratoire national de métrologie et d'essais)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | | | |
|------------------------------------|-------------------------|---------------------------|--------------------------|---------------|--------------------|---|--------------------------|--|-------|-----------------|---------------------|---|-----------------------------|--|------------------------|
| Class | Instrument or Artifact | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | Service provider | Comments | NMI Service Identifier |
| Torque | Torque measuring device | | 1 | 40 | Nm | Mode | clockwise, anticlockwise | $(2.0E-04M + 0.005)$, <i>M</i> torque in Nm | Nm | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Torque | Torque measuring device | | 5 | 300 | Nm | Mode | clockwise, anticlockwise | $(2.0E-04M + 0.015)$, <i>M</i> torque in Nm | Nm | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Torque | Torque measuring device | | 5 | 2 000 | Nm | Mode | clockwise, anticlockwise | $(2.0E-04M + 0.04)$, <i>M</i> torque in Nm | Nm | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Torque | Torque measuring device | | 2 | 10 | kNm | Mode | clockwise, anticlockwise | $(2.0E-03M + 2.0)$, <i>M</i> torque in kNm | Nm | 2 | 95% | No | Service provided by the LNE | Approved on 11 October 2005 | |
| Torque | Torque measuring device | | 10 | 200 | kNm | Mode | clockwise, anticlockwise | 2.0E-03 | | 2 | 95% | Yes | Service provided by the LNE | Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Reference liquid | 0.9 | 3 | mm ² /s | Temperature | 40 °C to 20 °C | 0.15 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Dynamic viscosity | Newtonian liquids | Reference liquid | 0.8 | 2.7 | mPa s | Temperature | 40 °C to 20 °C | 0.15 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Reference liquid | 3 | 18 | mm ² /s | Temperature | 100 °C to 20 °C | 0.30 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Dynamic viscosity | Newtonian liquids | Reference liquid | 2.7 | 16 | mPa s | Temperature | 100 °C to 20 °C | 0.30 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |

Mass and Related Quantities, France, LNE (Laboratoire national de métrologie et d'essais)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | | | |
|------------------------------------|------------------------|---------------------------|--------------------------|---------------|--------------------|---|-----------------|----------------------|-------|-----------------|---------------------|---|-----------------------------|--|------------------------|
| Class | Instrument or Artifact | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | Service provider | Comments | NMI Service Identifier |
| Kinematic viscosity | Newtonian liquids | Reference liquid | 18 | 230 | mm ² /s | Temperature | 100 °C to 20 °C | 0.40 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Dynamic viscosity | Newtonian liquids | Reference liquid | 16 | 200 | mPa s | Temperature | 100 °C to 20 °C | 0.40 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Reference liquid | 230 | 1260 | mm ² /s | Temperature | 100 °C to 20 °C | 0.50 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Dynamic viscosity | Newtonian liquids | Reference liquid | 200 | 1140 | mPa s | Temperature | 100 °C to 20 °C | 0.50 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Reference liquid | 1260 | 14100 | mm ² /s | Temperature | 100 °C to 20 °C | 0.55 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Dynamic viscosity | Newtonian liquids | Reference liquid | 1140 | 12500 | mPa s | Temperature | 100 °C to 20 °C | 0.55 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Reference liquid | 14100 | 138000 | mm ² /s | Temperature | 100 °C to 20 °C | 0.65 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |

Mass and Related Quantities, France, LNE (Laboratoire national de métrologie et d'essais)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | | | |
|------------------------------------|------------------------|---------------------------|--------------------------|---------------|---------------------------------|---|-----------------|----------------------|-------|-----------------|---------------------|---|-----------------------------|--|------------------------|
| Class | Instrument or Artifact | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | Service provider | Comments | NMI Service Identifier |
| Dynamic viscosity | Newtonian liquids | Reference liquid | 12500 | 123300 | mPa s | Temperature | 100 °C to 20 °C | 0.65 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Capillary viscometer | 0.001 | 0.005 | mm ² /s ² | Temperature | 20 °C | 0.15 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Capillary viscometer | 0.005 | 0.03 | mm ² /s ² | Temperature | 20 °C | 0.20 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Capillary viscometer | 0.03 | 0.1 | mm ² /s ² | Temperature | 20 °C | 0.30 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Capillary viscometer | 0.1 | 0.3 | mm ² /s ² | Temperature | 20 °C | 0.40 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Capillary viscometer | 0.3 | 0.8 | mm ² /s ² | Temperature | 20 °C | 0.50 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Capillary viscometer | 0.8 | 3 | mm ² /s ² | Temperature | 20 °C | 0.60 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |

Mass and Related Quantities, France, LNE (Laboratoire national de métrologie et d'essais)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | | | |
|------------------------------------|------------------------|---------------------------|--------------------------|---------------|---------------------------------|---|-----------------|----------------------|-------|-----------------|---------------------|---|-----------------------------|--|------------------------|
| Class | Instrument or Artifact | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | Service provider | Comments | NMI Service Identifier |
| Kinematic viscosity | Newtonian liquids | Capillary viscometer | 3 | 100 | mm ² /s ² | Temperature | 20 °C | 0.70 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Viscosity measurement | 0.9 | 3 | mm ² /s | Temperature | 100 °C to 20 °C | 0.15 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Viscosity measurement | 3 | 18 | mm ² /s | Temperature | 100 °C to 20 °C | 0.30 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Viscosity measurement | 18 | 230 | mm ² /s | Temperature | 100 °C to 20 °C | 0.40 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Viscosity measurement | 230 | 1260 | mm ² /s | Temperature | 100 °C to 20 °C | 0.50 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Viscosity measurement | 1260 | 14100 | mm ² /s | Temperature | 100 °C to 20 °C | 0.55 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Kinematic viscosity | Newtonian liquids | Viscosity measurement | 14100 | 138000 | mm ² /s | Temperature | 100 °C to 20 °C | 0.65 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |

Mass and Related Quantities, France, LNE (Laboratoire national de métrologie et d'essais)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | | | |
|------------------------------------|-----------------------------------|----------------------------|--------------------------|---------------|-------|---|-------------------------|----------------------|-------|-----------------|---------------------|---|-----------------------------|--|------------------------|
| Class | Instrument or Artifact | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | Service provider | Comments | NMI Service Identifier |
| Dynamic viscosity | Newtonian liquids | Viscosity measurement | 0.8 | 2.7 | mPa s | Temperature | 20 °C to 70 °C | 0.10 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Dynamic viscosity | Newtonian liquids | Viscosity measurement | 2.7 | 16 | mPa s | Temperature | 20 °C to 70 °C | 0.30 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Dynamic viscosity | Newtonian liquids | Viscosity measurement | 16 | 200 | mPa s | Temperature | 20 °C to 70 °C | 0.40 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Dynamic viscosity | Newtonian liquids | Viscosity measurement | 200 | 1140 | mPa s | Temperature | 20 °C to 70 °C | 0.50 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Dynamic viscosity | Newtonian liquids | Viscosity measurement | 1140 | 12500 | mPa s | Temperature | 20 °C to 70 °C | 0.55 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Dynamic viscosity | Newtonian liquids | Viscosity measurement | 12500 | 123300 | mPa s | Temperature | 20 °C to 70 °C | 0.65 | % | 2 | 95% | Yes | Service provided by the LNE | The uncertainty of the viscosity of water (ISO/TR 3666 (1998), 0.17%) is not taken into account Approved on 11 October 2005 | |
| Mass flowrate | Flowmeter (MFM, MFC, LFE), nozzle | Dynamic gravimetric method | 700 | 2300 | mg/s | Gas | nitrogen, synthetic air | 0.35 to 0.40 | % | 2 | 95% | Yes | Service provided by the LNE | Approved on 16 November 2012 | LNE1 |
| | | | | | | Pressure | 100 kPa to 500 kPa | | | | | | | | |
| | | | | | | Temperature | ambient | | | | | | | | |

Mass and Related Quantities, France, LNE (Laboratoire national de métrologie et d'essais)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | | | |
|------------------------------------|-----------------------------------|---|--------------------------|---------------|-------|---|---|----------------------|-------------------|-----------------|---------------------|---|------------------------------------|------------------------------|------------------------|
| Class | Instrument or Artifact | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | Service provider | Comments | NMI Service Identifier |
| Mass flowrate | Molbloc-L, Molbloc-S | Dynamic gravimetric method | 0.2 | 200 | mg/s | Gas | nitrogen, synthetic air | 0.06 to 0.20 | % | 2 | 95% | Yes | Service provided by the LNE | Approved on 16 November 2012 | LNE2 |
| | | | | | | Pressure | 100 kPa to 500 kPa | | | | | | | | |
| | | | | | | Temperature | ambient | | | | | | | | |
| Mass flowrate | Flowmeter (MFM, MFC, LFE), nozzle | Dynamic gravimetric method | 0.03 | 700 | mg/s | Gas | nitrogen, synthetic air, argon, helium, oxygen, carbon dioxide, nitrous oxide | 0.22 to 0.4 | % | 2 | 95% | Yes | Service provided by the LNE | Approved on 16 November 2012 | LNE3 |
| | | | | | | Temperature | ambient temperature | | | | | | | | |
| | | | | | | Pressure | 0.1 MPa to 0.5 MPa | | | | | | | | |
| | | | | | | Pipe size | DN 2 to DN 100 | | | | | | | | |
| Gas flow speed | Air speed anemometers | Any type of device (Prandtl tubes, fan type, thermal, ultrasonic, Vortex, Laser Doppler anemometers...) | 0.15 | 40 | m/s | Gas | air | 0.009 to 0.28 | m s ⁻¹ | 2 | 95% | No | Service provided by the LNE-CETIAT | Approved on 16 November 2012 | CETIAT1 |
| | | | | | | Temperature | 10 °C to 40 °C | | | | | | | | |
| | | | | | | Pressure | ambient | | | | | | | | |
| | | | | | | Humidity | ambient | | | | | | | | |
| | | | | | | Flow direction | horizontal | | | | | | | | |
| | | | | | | Test section | test section 500 mm x 500 mm | | | | | | | | |
| Gas flow speed | Air speed anemometers | Thermal anemometers | 0.05 | 2 | m/s | Gas | air | 0.007 to 0.018 | m s ⁻¹ | 2 | 95% | No | Service provided by the LNE-CETIAT | Approved on 16 November 2012 | CETIAT2 |
| | | | | | | Temperature | 10 °C to 50 °C | | | | | | | | |
| | | | | | | Pressure | ambient | | | | | | | | |
| | | | | | | Humidity | 10% to 90% | | | | | | | | |
| | | | | | | Flow direction | horizontal, vertical upward or vertical downward | | | | | | | | |

Mass and Related Quantities, France, LNE (Laboratoire national de métrologie et d'essais)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | | | |
|------------------------------------|--|--|--------------------------|---------------|-------|---|------------------------------|----------------------|-------|-----------------|---------------------|---|------------------------------------|------------------------------|------------------------|
| Class | Instrument or Artifact | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | Service provider | Comments | NMI Service Identifier |
| | | | | | | Test section | test section 250 mm x 250 mm | | | | | | | | |
| Gas flow speed | Laser Doppler anemometer | Laser Doppler anemometer | 1 | 15 | µm | Particle speed on surface | fringe calibration | 0.05 | % | 2 | 95% | Yes | Service provided by the LNE-CETIAT | Approved on 16 November 2012 | CETIAT3 |
| Volume flowrate | Any flow measurement instrument or flow device | Various type of device, e.g. electromagnetic, ultrasonic and mechanical flowmeters | 0.008 | 36 | m³/h | Liquid | water | 0.1 | % | 2 | 95% | Yes | Service provided by the LNE-CETIAT | Approved on 16 November 2012 | CETIAT4 |
| | | | | | | Temperature | 15 °C to 90 °C | | | | | | | | |
| | | | | | | Gauge pressure | 0.1 MPa to 0.3 MPa | | | | | | | | |
| | | | | | | Pipe size | DN 2 to DN 100 | | | | | | | | |
| Mass flowrate | Any flow measurement instrument or flow device | Various type of device, e.g. Coriolis type flowmeters | 8 | 36000 | kg/h | Liquid | water | 0.05 | % | 2 | 95% | Yes | Service provided by the LNE-CETIAT | Approved on 16 November 2012 | CETIAT6 |
| | | | | | | Temperature | 15 °C to 90 °C | | | | | | | | |
| | | | | | | Gauge pressure | 0.1 MPa to 0.3 MPa | | | | | | | | |
| | | | | | | Pipe size | DN 2 to DN 100 | | | | | | | | |
| Liquid dynamic volume | Any flow measurement instrument or flow device | Various type of device, e.g. electromagnetic, ultrasonic and mechanical meters | 0.008 | 36 | m³/h | Liquid | water | 0.1 | % | 2 | 95% | Yes | Service provided by the LNE-CETIAT | Approved on 16 November 2012 | CETIAT8 |
| | | | | | | Temperature | 15 °C to 90 °C | | | | | | | | |
| | | | | | | Gauge pressure | 0.1 MPa to 0.3 MPa | | | | | | | | |
| | | | | | | Pipe size | DN 2 to DN 100 | | | | | | | | |
| Liquid dynamic mass | Any flow measurement instrument or flow device | Various type of device, e.g. Coriolis type flowmeters | 8 | 36000 | kg/h | Liquid | water | 0.05 | % | 2 | 95% | Yes | Service provided by the LNE-CETIAT | Approved on 16 November 2012 | CETIAT10 |
| | | | | | | Temperature | 15 °C to 90 °C | | | | | | | | |
| | | | | | | Gauge pressure | 0.1 MPa to 0.3 MPa | | | | | | | | |
| | | | | | | Pipe size | DN 2 to DN 100 | | | | | | | | |

Mass and Related Quantities, France, LNE (Laboratoire national de métrologie et d'essais)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | | | |
|------------------------------------|-------------------------|----------------------------|--------------------------|---------------|-------------------|---|---------------------|----------------------|-------|-----------------|---------------------|---|------------------------------------|------------------------------|------------------------|
| Class | Instrument or Artifact | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | Service provider | Comments | NMI Service Identifier |
| Liquid dynamic (flowing) volume | Volumetric meters | Pulses | 10 | 600 | m ³ /h | Refined products | Pipe prover 2500 L | 0.043 | % | 2 | 95% | Yes | Service provided by the LNE-TRAPIL | Approved on 16 November 2012 | TRAPIL1 |
| | | | | | | Temperature | 5 °C to 35 °C | | | | | | | | |
| | | | | | | Pressure | 0 MPa to 1.2MPa | | | | | | | | |
| Liquid dynamic (flowing) volume | Volumetric meters | Pulses | 10 | 600 | m ³ /h | Fuels | pipe prover 2500 L | 0.043 | % | 2 | 95% | Yes | Service provided by the LNE-TRAPIL | Approved on 16 November 2012 | TRAPIL2 |
| | | | | | | Temperature | 5 °C to 35 °C | | | | | | | | |
| | | | | | | Pressure | 0 MPa to 1.2MPa | | | | | | | | |
| Liquid dynamic (flowing) volume | Volumetric meters | Pulses | 40 | 2500 | m ³ /h | Refined products | pipe prover 10000 L | 0.043 | % | 2 | 95% | Yes | Service provided by the LNE-TRAPIL | Approved on 16 November 2012 | TRAPIL3 |
| | | | | | | Temperature | 5 °C to 35 °C | | | | | | | | |
| | | | | | | Pressure | 0 MPa to 1.2MPa | | | | | | | | |
| Liquid dynamic (flowing) volume | Volumetric meters | Pulses | 40 | 2500 | m ³ /h | Fuels | pipe prover 10000 L | 0.043 | % | 2 | 95% | Yes | Service provided by the LNE-TRAPIL | Approved on 16 November 2012 | TRAPIL4 |
| | | | | | | Temperature | 5 °C to 35 °C | | | | | | | | |
| | | | | | | Pressure | 0 MPa to 1.2MPa | | | | | | | | |
| Volume flowrate | Flowmeter and gas meter | Pulse or electrical output | 0.0028 | 0.44 | m ³ /s | Gas | natural gas | 0.30 | % | 2 | 95% | Yes | Service provided by the LNE-LADG | Approved on 19 October 2016 | LADG1 |
| | | | | | | Temperature | 20 °C | | | | | | | | |
| | | | | | | Pressure | 0.2 MPa to 3.5 MPa | | | | | | | | |
| Volume flowrate | Flowmeter and gas meter | Pulse or electrical output | 0.0022 | 36 | m ³ /s | Gas | dry air | 0.26 | % | 2 | 95% | Yes | Service provided by the LNE-LADG | Approved on 16 November 2012 | LADG2 |
| | | | | | | Pressure | 0.1 MPa to 4.5 MPa | | | | | | | | |
| | | | | | | Pipe size | DN25 to DN400 | | | | | | | | |

Mass and Related Quantities, France, LNE (Laboratoire national de métrologie et d'essais)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | | | |
|------------------------------------|-------------------------|---------------------------|--------------------------|---------------|-------|---|---------------------|--|-------|-----------------|---------------------|---|----------------------------------|------------------------------|------------------------|
| Class | Instrument or Artifact | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | Service provider | Comments | NMI Service Identifier |
| Mass flowrate | Nozzle | Sonic | 0.003 | 30 | kg/s | Gas | dry air | 0.25 | % | 2 | 95% | Yes | Service provided by the LNE-LADG | Approved on 16 November 2012 | LADG4 |
| | | | | | | Temperature | ambient temperature | | | | | | | | |
| | | | | | | Pressure | 0.1 MPa to 4.5 MPa | | | | | | | | |
| | | | | | | Nozzle diameter | 1.5 mm to 39 mm | | | | | | | | |
| Mass flowrate | Orifice plates, Venturi | Differential pressure | 0.003 | 30 | kg/s | Gas | dry air | 0.31 | % | 2 | 95% | Yes | Service provided by the LNE-LADG | Approved on 16 November 2012 | LADG5 |
| | | | | | | Temperature | ambient temperature | | | | | | | | |
| | | | | | | Pressure | 0.1 MPa to 4.5 MPa | | | | | | | | |
| | | | | | | Pipe size | DN25 to DN400 | | | | | | | | |
| Mass flowrate | Orifice plates, Venturi | Differential pressure | 0.0022 | 10 | kg/s | Gas | natural gas | 0.35 | % | 2 | 95% | Yes | Service provided by the LNE-LADG | Approved on 19 October 2016 | LADG6 |
| | | | | | | Temperature | 20 °C | | | | | | | | |
| | | | | | | Pressure | 0.2 MPa to 3.5 MPa | | | | | | | | |
| | | | | | | Pipe size | DN50 to DN300 | | | | | | | | |
| Mass flowrate | Nozzle | Sonic | 0.001 | 3.5 | kg/s | Gas | dry air | $(-0.233 \cdot p + 0.26)$ with $0.2 \leq p < 0.7$ MPa 0.1% with $0.7 \leq p < 6$ MPa | % | 2 | 95% | Yes | Service provided by the LNE-LADG | Approved on 19 October 2016 | LADG7 |
| | | | | | | Temperature | ambient temperature | | | | | | | | |
| | | | | | | Pressure | 0.2 MPa to 6 MPa | | | | | | | | |
| | | | | | | Nozzle diameter | 1.5 mm to 20 mm | | | | | | | | |