

Code Product Unit

**Microscopy**

NIST-2800 Microscope magnification standard Each

This Standard Reference Material® (SRM®) is intended primarily for use in calibrating the magnification or scale of microscopes used to make dimensional measurements. These microscopes include optical and scanning electron microscopes, imaging in either transmission or reflection modes, and scanning probe microscopes. NIST-2800 consists of a pattern of parallel lines whose nominal distances from the centerline range from ± 1 µm to ± 5 mm. Certified values are given for the centre-to-centre distance of each line from the centreline; the linewidths are not certified. The pattern is printed in chrome on a fused-quartz substrate with nominal dimensions of 25 mm × 75 mm × 2.3 mm (1 in × 3 in × 0.09 in) using photomask production techniques.

**Ion activity**

**pH calibration**

Code Product Unit

NIST-185h Potassium hydrogen phthalate 60 g

This Standard Reference Material (SRM) is intended for use in preparing solutions for calibrating electrodes for pH measuring systems.

Certified value

pH (25 °C)..... 4.003

Certified values of the pH at other temperatures are given in the CoA.

NIST-186g pH Standards set

Potassium dihydrogen phosphate (186-I-g)  
Disodium hydrogen phosphate (186-II-g)

NIST-186g is intended for use in preparing solutions for calibrating electrodes for pH measuring systems. NIST-186 g consists of two components, each prepared to ensure high purity and uniformity: KH<sub>2</sub>PO<sub>4</sub>, potassium dihydrogen phosphate (186-I-g) and Na<sub>2</sub>HPO<sub>4</sub>, disodium hydrogen phosphate (186-II-g). A unit of NIST-186g consists of 30 g of potassium dihydrogen phosphate (186-I-g) and 45 g of disodium hydrogen phosphate (186-II-g), each contained in its respective clear glass bottle.

**New** NIST-189C Potassium tetroxalate dihydrate pH buffer 65 g

This Standard Reference Material (SRM) is intended for use in preparing solutions for calibrating electrodes for pH measuring systems.

Certified value

Temperature (°C)	pH(S)	Temperature (°C)	pH(S)	Temperature (°C)	pH(S)
5.....	1.666	25.....	1.677	45.....	1.700
10.....	1.667	30.....	1.682	50.....	1.707
15.....	1.669	37.....	1.690		
20.....	1.672	40.....	1.694		

NIST-187e Sodium tetraborate decahydrate (Borax) 30 g

This Standard Reference Material (SRM) is intended for use in preparing solutions for calibrating electrodes for pH measuring systems.

NIST-2193a Calcium carbonate pH standard 30 g

This Standard Reference Material® (SRM®) is intended for use in preparing solutions for calibrating electrodes for pH measuring systems at pH values above 11.0. This lot of calcium carbonate (CaCO<sub>3</sub>) was selected for its low level of alkali metal impurities. However, this SRM® is certified ONLY as a pH standard, NOT as a pure substance. Before use for pH calibrations, a freshly filtered, saturated (at 25 °C) solution of Ca(OH)<sub>2</sub> must be prepared from NIST-2193a. The certified pH(S) and U of this solution as a function of temperature are given below.

t/°C	pH(S)	uc(measurement)	uc(y)	k	U
5.....	13.232	0.0030	0.0058	2.0	0.011
10.....	13.026	0.0025	0.0056	2.0	0.011
15.....	12.830	0.0025	0.0056	2.0	0.011
20.....	12.645	0.0024	0.0056	2.0	0.011
25.....	12.469	0.0024	0.0055	2.0	0.011
30.....	12.303	0.0071	0.0087	2.0	0.017
35.....	12.145	0.0071	0.0087	2.0	0.017
37.....	12.084	0.0071	0.0087	2.0	0.017
40.....	11.995	0.0071	0.0087	2.0	0.017
45.....	11.853	0.0072	0.0087	2.0	0.017
50.....	11.717	0.0074	0.0089	2.0	0.017

NIST-188 Potassium hydrogen tartrate 60 g

Certified value

pH (25 °C)..... 3.557

Other certified values of pH at different temperatures are given in the CoA.

## Ion activity

Code	Product	Unit
<b>New</b> NIST-191D	<p>pH Standard</p> <p>This Standard Reference Material® (SRM®) is intended for use in preparing solutions for calibrating electrodes for pH measuring systems. NIST-191d consists of two components, each prepared to ensure high purity and uniformity: sodium bicarbonate, NaHCO<sub>3</sub> (191d-I); and sodium carbonate, Na<sub>2</sub>CO<sub>3</sub> (191d-II). A unit of NIST-191d consists of 25 g of sodium bicarbonate (191d-I) and 30 g of sodium carbonate (191d-II), each contained in its respective clear glass bottle.</p> <p>Certified value</p> <p>pH (25 °C)..... 10.014</p> <p>Certified values of pH at 10 °C, 15 °C, 20 °C and 35 °C are given in the CoA.</p>	set (2)
NIST-RM 8040	<p>Sodium oxalate - Reductometric</p> <p>This Reference Material (RM) was prepared to provide material of uniform, high purity for use as a working standard for oxidation-reduction reactions.</p> <p>Reference value</p> <p>Reductometric assay (mass fraction) .....99.951 % ± 0.038 %</p>	60 g

## Biological buffer systems

<p>NIST-2181 - NIST-2184</p> <p>These materials are intended for use in preparing a standard solution for calibrating clinical instruments (e.g. blood pH measurements), in the physiologically important range of pH 7-8. They are based on a biological buffer system for clinical pH measurements and are certified for use as an admixture only. The pH values for the buffer solutions are certified at 0.05 and 0.08 M with respect to the free acid and the sodium salt admixture as a function of temperature. The certified temperature range is from 0-50 °C.</p>		
<p>NIST-2181 - NIST-2184</p> <p>Both materials are required to prepare a standard solution.</p>		
NIST-2181	<p>HEPES free acid</p> <p>Certified values</p> <p><u>0.05M</u></p> <p>pH (0-50 °C)..... 7.832-7.216</p> <p><u>0.08M</u></p> <p>pH (0-50 °C)..... 7.853-7.222</p>	60 g
NIST-2182	<p>HEPES Sodium Salt</p> <p>Certified values</p> <p><u>0.05M</u></p> <p>pH (0-50 °C)..... 7.832-7.216</p> <p><u>0.08M</u></p> <p>pH (0-50 °C)..... 7.853-7.222</p>	60 g
<p>NIST-2183 and NIST-2184</p> <p>Both materials are required to prepare a standard solution.</p>		
NIST-2183	<p>MOPSO free acid</p> <p>Certified values</p> <p><u>0.05M</u></p> <p>pH (0-50 °C)..... 7.260-6.528</p> <p><u>0.08M</u></p> <p>pH (0-50 °C)..... 7.268-6.528</p>	50 g
NIST-2184	<p>NaMOPSOate</p> <p>Certified values</p> <p><u>0.05M</u></p> <p>pH (0-50 °C)..... 7.260-6.528</p> <p><u>0.08M</u></p> <p>pH (0-50 °C)..... 7.268-6.524</p>	50 g

## pD calibration

NIST-2185	<p>Potassium hydrogen phthalate</p> <p>Certified value</p> <p>pD (25 °C)..... 4.518</p>	60 g
<b>New</b> NIST-2186II	<p>Disodium Hydrogen Phosphate</p> <p>Required to prepare a standard solution.</p> <p>Certified value</p> <p>pD (25 °C)..... 7.428</p> <p>Other certified values at different temperatures are given in the CoA.</p>	30 g

Code	Product	Unit
NIST-2191A	Sodium bicarbonate Required to prepare a standard solution. Certified value pD (25 °C)..... 10.73 Other certified values at different temperatures are given in the CoA.	30 g
NIST-2192A	Sodium carbonate Required to prepare a standard solution. Certified value pD (25 °C)..... 10.732 Other certified values at different temperatures are given in the CoA.	30 g

### Ion-selective electrode calibration

NIST-2201	Sodium chloride Certified values for activity coefficients, at 25°C, of the sodium and chloride ions at various concentrations and the related values of pNa and pCl.	125 g
NIST-2202	Potassium chloride Certified values for activity coefficients, at 25°C, of the potassium and chloride ions at various concentrations and the related values of pK and pCl.	160 g
NIST-2203	Potassium fluoride Certified values for activity coefficients, at 25°C, of the potassium and fluoride ions at various concentrations and the related value of pF.	125 g

### Electrolytic conductivity

<b>New</b> NIST-3198	KCl in n-propanol/de-ionised water Certified value Electrolytic conductivity (25 °C) ..... 5.31 µS/cm	500 mL
<b>New</b> NIST-3190	HCl in de-ionised water Certified value Electrolytic conductivity (25 °C) ..... 25.32 µS/cm	500 mL
<b>New</b> NIST-3191	KCl in de-ionised water Certified value Electrolytic conductivity (25 °C) ..... 98.64 µS/cm	500 mL
NIST-3193	KCl in de-ionised water Certified value Electrolytic conductivity (25°C) ..... 996.70 µS/cm	8 x 50 mL
<p>GUM 5.1 - GUM 5.6</p> <p>These Reference Materials have been certified by the Physical Chemistry Division of the Central Office of Measures in Poland. They are intended for calibration of conductivity cells or use in electrolytic conductivity measurement as a control sample. These RMs are certified in conformity with standard reference data published by the International Organisation of Legal Metrology (OIML). All Reference Materials are supplied with a certificate.</p>		
GUM 5.1	KCl solution Certified value Electrolytic conductivity..... 11.13 S/m at 25 °C	100 mL
GUM 5.2	KCl Solution Certified value Electrolytic conductivity..... 1.285 S/m at 25 °C	100 mL
GUM 5.3	KCl solution Certified value Electrolytic conductivity..... 0.1410 S/m at 25 °C	100 mL
GUM 5.4	KCl solution Certified value Electrolytic conductivity..... 0.01483 S/m at 25 °C	100 mL
GUM 5.5	KCl solution Certified value Electrolytic conductivity..... 0.0720 S/m 25 °C	100 mL
GUM 5.6	KCl solution Certified value Electrolytic conductivity..... 0.0293 S/m at 25 °C	100 mL

## Ion activity

Code	Product	Unit
<b>Reagecon electrolytic conductivity standards</b>		
<b>Standard values</b>		
REACSKC84	Conductivity standard 84 uS/cm Electrolytic conductivity..... 84 µS/cm at 25°C	500 mL
REACSKCS	Conductivity standard 147 uS/cm Electrolytic conductivity..... 147 µS/cm at 25°C	500 mL
REACSKCL	Conductivity standard 1413 Microsiemens/cm 25°C Electrolytic conductivity..... 1413 µS/cm at 25°C	500 mL
REACSKC12880	Conductivity standard Electrolytic conductivity..... 12880 µS/cm at 25°C	500 mL
REACSKC13	Conductivity standard 1.3 uS/cm Electrolytic conductivity..... 1.30 µS/cm at 25°C	250 mL
REACSKC136	Conductivity standard Electrolytic conductivity..... 1.30 µS/cm at 25°C	6 x 250 mL
REACSKC5	Conductivity standard Electrolytic conductivity..... 5 µS/cm at 25°C	500 mL
REACSKC10	Conductivity standard Electrolytic conductivity..... 10 µS/cm at 25°C	500 mL
REACSKC20	Conductivity standard 20 Microsiemens/cm 25°C Electrolytic conductivity..... 20 µS/cm at 25°C	500 mL
REACSKC50	Conductivity standard Electrolytic conductivity..... 50 µS/cm at 25°C	500 mL
REACSKC100	Conductivity standard Electrolytic conductivity..... 100 µS/cm at 25°C	500 mL
REACSKC200	Conductivity standard Electrolytic conductivity..... 200 µS/cm at 25°C	500 mL
REACSKC500	Conductivity standard 500 µS/cm at 25°C Electrolytic conductivity..... 500 µS/cm at 25°C	500 mL
REACSKC1000	Conductivity standard 1000 µS/cm at 25°C Electrolytic conductivity..... 1000 µS/cm at 25°C	500 mL
REACSKC5M	Conductivity standard 5000 uS/cm Electrolytic conductivity..... 5000 µS/cm at 25°C	500 mL
REACSKC10M	Conductivity standard Electrolytic conductivity..... 10000 µS/cm at 25°C	500 mL
REACSKC20M	Conductivity standard Electrolytic conductivity..... 20000 µS/cm at 25°C	500 mL
REACSKC50M	Conductivity standard Electrolytic conductivity..... 50000 µS/cm at 25°C	500 mL
REACSKC100M	Conductivity standard Electrolytic conductivity..... 100000 µS/cm at 25°C	500 mL
REACSKC150M	Conductivity standard Electrolytic conductivity..... 150000 µS/cm at 25°C	500 mL
REACSKC200M	Conductivity standard Electrolytic conductivity..... 200000 µS/cm at 25°C	500 mL
REACSKC300M	Conductivity standard Electrolytic conductivity..... 300000 µS/cm at 25°C	500 mL
REACSKC350M	Conductivity standard Electrolytic conductivity..... 350.000 µS/cm at 25°C	500 mL
REACSKC450M	Conductivity standard Electrolytic conductivity..... 450000 µS/cm at 25°C	500 mL
REACSKC500M	Conductivity standard Electrolytic conductivity..... 500000 µS/cm at 25°C	500 mL

Code	Product	Unit
<b>Conductivity standards according to the European Pharmacopoeia (Chapter 2)</b>		
REAEP1330	Conductivity standard Electrolytic conductivity..... 1330 $\mu\text{S}/\text{cm}$ at 20°C Resistivity..... 752 $\Omega\text{-cm}$	500 mL
REAEP133	Conductivity standard Electrolytic conductivity..... 133 $\mu\text{S}/\text{cm}$ at 20°C Resistivity..... 7519 $\Omega\text{-cm}$	500 mL
REAEP266	Conductivity standard 26.6 $\mu\text{S}/\text{cm}$ at 20°C Electrolytic conductivity..... 26.6 $\mu\text{S}/\text{cm}$ at 20°C Resistivity..... 37594 $\Omega\text{-cm}$	500 mL

## Electrical properties

### Electrical resistivity and conductivity

Code	Product	Unit
NIST-624	Lead-silica - dc Resistivity Intended for checking test methods and for calibrating equipment used to determine the dc volume resistivity of glass per ASTM C 657. Certified value: Resistivity            Temperature $\log_{10}\rho$ 11.07 $\Omega\text{-cm}$ ..... 250°C $\log_{10}\rho$ 9.9 $\Omega\text{-cm}$ ..... 300°C $\log_{10}\rho$ 8.88 $\Omega\text{-cm}$ ..... 350°C	200 g
NIST-2541 - NIST-2547 Single wafers intended for use as reference standards for sheet resistance and resistivity measurements utilising the four-point probe method.		
NIST-2541	Silicon chip - Resistivity 100 mm (D) x 0.625 mm Czochralski-grown, boron-doped silicon wafer with (100) crystallographic orientation. Certified value Resistivity..... 0.1 $\Omega\text{-cm}$	unit
NIST-2546	Silicon chip - Resistivity 100 mm (D) x 0.625 mm Float zone silicon with (111) orientation and phosphorus-doped by the neutron transmutation doping process. Certified value Resistivity..... 100 $\Omega\text{-cm}$	unit
NIST-RM 8420	Electrolytic iron rod 0.64 cm (D) x 5.0 cm Thermal conductivity and electrical resistivity as a function of temperature (2-1000 K)	rod

### Superconducting critical current

NIST-1457	Niobium-titanium wire - Critical current 8.7 cm diameter spool Intended for checking the performance of measurement systems used in superconductor technology. It consists of 2.2 m of a multifilamentary niobium titanium, copper-stabilised superconducting wire wound in a single layer onto a spool with a core diameter of 8.7 cm. Certified values for critical current at 4.2 k and 0.2 $\mu\text{V}/\text{cm}$	Each
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### Dielectric constant

NIST-774	Lead-silica - Dielectric constant 5 cm x 5 cm x 2.5 cm Intended for checking methods used to determine dielectric constant and ac loss characteristics of insulating materials per ASTM D 150. Certified value: K ~7.47 at 100 Hz	Each
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# Viscosity

## Viscosity of glass

Code	Product	Unit
	NIST-717A Intended for checking the performance of high temperature viscosity equipment (rotating cylinders) and low temperature viscosity equipment (fibre elongation, beam bending, parallel plates, etc).	
NIST-717a	Borosilicate Certified log <sub>10</sub> viscosity values (1.00-4.50) versus temperature (1555-880 °C) Indicative values for softening point, annealing point, strain point	450 g

## Viscosity fixpoints

	NIST-709 - NIST-717A Intended for calibration of equipment for the determination of the softening, annealing and strain points of glass.	
NIST-709	Extra dense lead Certified values Softening point..... 384 °C      Annealing point.....328 °C      Strain point..... 311 °C	500 g
NIST-714	Alkaline earth alumina silicate Certified values Softening point..... 908 °C      Annealing point.....710 °C      Strain point..... 662 °C	225 g
NIST-717a	Borosilicate Certified log <sub>10</sub> viscosity values (1.00-4.50) versus temperature (1555-880 °C) Indicative values for softening point, annealing point, strain point	450 g

## Viscosity oil standards

	PSL2700V01 - PSL2700V19 These standards are calibrated by the PSL Calibration ISO 17025 Accredited Laboratory. The standards will be supplied complete with UKAS calibration certificates and have direct traceability to NIST and other international laboratories. Uncertainties of measurement are stated on the calibration certificates. Long shelf lives are provided by using stable base oils. The viscosity oil standards are suitable for the calibration and verification of the following: <ul style="list-style-type: none"> <li>• Glass Capillary viscometers</li> <li>• Automated Kinematic Viscometer Systems</li> <li>• Rotational/Cone &amp; Plate Viscometers</li> <li>• Low Temperature Viscometer Systems</li> <li>• Cold Cranking Simulators</li> <li>• Flow Cups</li> </ul>	
PSL2700V01	N4 - Viscosity oil standard <u>Kinematic viscosity (nominal)</u> 0.47 mm <sup>2</sup> /s,cSt (20 °C)      0.45 mm <sup>2</sup> /s,cSt (25 °C)      0.40 mm <sup>2</sup> /s,cSt (40 °C) <u>Dynamic viscosity (nominal)</u> 0.31 mPa.s,cP (20 °C)      0.29 mPa.s,cP (25 °C)      0.26 mPa.s,cP (40 °C)	500 mL
PSL2700V02	N8 - Viscosity oil standard <u>Kinematic viscosity (nominal)</u> 1. mm <sup>2</sup> /s,cSt (20 °C)      0.89 mm <sup>2</sup> /s,cSt (25 °C)      0.75 mm <sup>2</sup> /s,cSt (40 °C) <u>Dynamic viscosity (nominal)</u> 0.77 mPa.s,cP (20 °C)      0.72 mPa.s,cP (25 °C)      0.56 mPa.s,cP (40 °C)	500 mL
PSL2700V03	N1.0 - Viscosity oil standard <u>Kinematic viscosity (nominal)</u> 1.3 mm <sup>2</sup> /s,cSt (20 °C)      1.2 mm <sup>2</sup> /s,cSt (25 °C)      0.97 mm <sup>2</sup> /s,cSt (40 °C) <u>Dynamic viscosity (nominal)</u> 1.0 mPa.s,cP (20 °C)      0.93 mPa.s,cP (25 °C)      0.76 mPa.s,cP (40 °C)	500 mL
PSL2700V04	S3 - Viscosity oil standard <u>Kinematic viscosity (nominal)</u> 5.0 mm <sup>2</sup> /s,cSt (20 °C)      2.9 mm <sup>2</sup> /s,cSt (40 °C)      1.3 mm <sup>2</sup> /s,cSt (100 °C) 4.4 mm <sup>2</sup> /s,cSt (25 °C)      2.6 mm <sup>2</sup> /s,cSt (50 °C) <u>Dynamic viscosity (nominal)</u> 4.1 mPa.s,cP (20 °C)      2.4 mPa.s,cP (40 °C)      0.98 mPa.s,cP (100 °C) 3.6 mPa.s,cP (25 °C)      2.1 mPa.s,cP (50 °C)	500 mL

## Viscosity

Code	Product	Unit
PSL2700V05	S6 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	11 mm <sup>2</sup> /s,cSt (20 °C)	5.7 mm <sup>2</sup> /s,cSt (40 °C)      1.9 mm <sup>2</sup> /s,cSt (100 °C)
	8.9 mm <sup>2</sup> /s,cSt (25 °C)	4.6 mm <sup>2</sup> /s,cSt (50 °C)
	<u>Dynamic viscosity (nominal)</u>	
8.8 mPa.s,cP (20 °C)	4.8 mPa.s,cP (40 °C)      1.5 mPa.s,cP (100 °C)	
7.4 mPa.s,cP (25 °C)	3.7 mPa.s,cP (50 °C)	
PSL2700V06	N10 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	21 mm <sup>2</sup> /s,cSt (20 °C)	10 mm <sup>2</sup> /s,cSt (40 °C)      2.7 mm <sup>2</sup> /s,cSt (100 °C)
	17 mm <sup>2</sup> /s,cSt (25 °C)	7.5 mm <sup>2</sup> /s,cSt (50 °C)
	<u>Dynamic viscosity (nominal)</u>	
17 mPa.s,cP (20 °C)	9.0 mPa.s,cP (40 °C)      2.1 mPa.s,cP (100 °C)	
14 mPa.s,cP (25 °C)	6.2 mPa.s,cP (50 °C)	
PSL2700V07	S20 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	47 mm <sup>2</sup> /s,cSt (20 °C)	18 mm <sup>2</sup> /s,cSt (40 °C)      4.0 mm <sup>2</sup> /s,cSt (100 °C)
	37 mm <sup>2</sup> /s,cSt (25 °C)	13 mm <sup>2</sup> /s,cSt (50 °C)
	<u>Dynamic viscosity (nominal)</u>	
40 mPa.s,cP (20 °C)	16 mPa.s,cP (40 °C)      3.2 mPa.s,cP (100 °C)	
31 mPa.s,cP (25 °C)	11 mPa.s,cP (50 °C)	
PSL2700V08	N35 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	95 mm <sup>2</sup> /s,cSt (20 °C)	32 mm <sup>2</sup> /s,cSt (40 °C)      5.8 mm <sup>2</sup> /s,cSt (100 °C)
	72 mm <sup>2</sup> /s,cSt (25 °C)	23 mm <sup>2</sup> /s,cSt (50 °C)
	<u>Dynamic viscosity (nominal)</u>	
82 mPa.s,cP (20 °C)	27 mPa.s,cP (40 °C)      4.7 mPa.s,cP (100 °C)	
62 mPa.s,cP (25 °C)	19 mPa.s,cP (50 °C)	
PSL2700V09	S60 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	160 mm <sup>2</sup> /s,cSt (20 °C)	54 mm <sup>2</sup> /s,cSt (40 °C)      7.7 mm <sup>2</sup> /s,cSt (100 °C)
	120 mm <sup>2</sup> /s,cSt (25 °C)	35 mm <sup>2</sup> /s,cSt (50 °C)
	<u>Dynamic viscosity (nominal)</u>	
140 mPa.s,cP (20 °C)	47 mPa.s,cP (40 °C)      6.3 mPa.s,cP (100 °C)	
104 mPa.s,cP (25 °C)	30 mPa.s,cP (50 °C)	
PSL2700V10	N100 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	320 mm <sup>2</sup> /s,cSt (20 °C)	97 mm <sup>2</sup> /s,cSt (40 °C)      11.0 mm <sup>2</sup> /s,cSt (100 °C)
	230 mm <sup>2</sup> /s,cSt (25 °C)	59 mm <sup>2</sup> /s,cSt (50 °C)
	<u>Dynamic viscosity (nominal)</u>	
280 mPa.s,cP (20 °C)	84 mPa.s,cP (40 °C)      9.1 mPa.s,cP (100 °C)	
200 mPa.s,cP (25 °C)	51 mPa.s,cP (50 °C)	
PSLN140	N140 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	400 mm <sup>2</sup> /s,cSt (20 °C)	140 mm <sup>2</sup> /s,cSt (40 °C)      18.0 mm <sup>2</sup> /s,cSt (100 °C)
	300 mm <sup>2</sup> /s,cSt (25 °C)	90 mm <sup>2</sup> /s,cSt (50 °C)
	<u>Dynamic viscosity (nominal)</u>	
350 mPa.s,cP (20 °C)	120 mPa.s,cP (40 °C)      15.0 mPa.s,cP (100 °C)	
260 mPa.s,cP (25 °C)	77 mPa.s,cP (50 °C)	
PSL2700V11	S200 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	660 mm <sup>2</sup> /s,cSt (20 °C)	180 mm <sup>2</sup> /s,cSt (40 °C)      17 mm <sup>2</sup> /s,cSt (100 °C)
	460 mm <sup>2</sup> /s,cSt (25 °C)	110 mm <sup>2</sup> /s,cSt (50 °C)
	<u>Dynamic viscosity (nominal)</u>	
590 mPa.s,cP (20 °C)	150 mPa.s,cP (40 °C)      14 mPa.s,cP (100 °C)	
410 mPa.s,cP (25 °C)	91 mPa.s,cP (50 °C)	
PSL2700V12	N350 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	1400 mm <sup>2</sup> /s,cSt (20 °C)	310 mm <sup>2</sup> /s,cSt (40 °C)      24 mm <sup>2</sup> /s,cSt (100 °C)
	920 mm <sup>2</sup> /s,cSt (25 °C)	180 mm <sup>2</sup> /s,cSt (50 °C)
	<u>Dynamic viscosity (nominal)</u>	
1200 mPa.s,cP (20 °C)	270 mPa.s,cP (40 °C)      20 mPa.s,cP (100 °C)	
790 mPa.s,cP (25 °C)	150 mPa.s,cP (50 °C)	

## Viscosity

Code	Product	Unit
PSL2700V12A	N415 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	1900 mm <sup>2</sup> /s,cSt (20 °C)    415 mm <sup>2</sup> /s,cSt (40 °C)    34 mm <sup>2</sup> /s,cSt (100 °C)	
	1240 mm <sup>2</sup> /s,cSt (25 °C)    240 mm <sup>2</sup> /s,cSt (50 °C)	
	<u>Dynamic viscosity (nominal)</u>	
1630 mPa.s,cP (20 °C)    360 mPa.s,cP (40 °C)    28.0 mPa.s,cP (100 °C)		
1065 mPa.s,cP (25 °C)    200 mPa.s,cP (50 °C)		
PSL2700V13	S600 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	2400 mm <sup>2</sup> /s,cSt (20 °C)    520 mm <sup>2</sup> /s,cSt (40 °C)    35 mm <sup>2</sup> /s,cSt (100 °C)	
	1600 mm <sup>2</sup> /s,cSt (25 °C)    290 mm <sup>2</sup> /s,cSt (50 °C)	
	<u>Dynamic viscosity (nominal)</u>	
2100 mPa.s,cP (20 °C)    450 mPa.s,cP (40 °C)    29 mPa.s,cP (100 °C)		
1400 mPa.s,cP (25 °C)    240 mPa.s,cP (50 °C)		
PSL2700V14	N1000 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	4800 mm <sup>2</sup> /s,cSt (20 °C)    940 mm <sup>2</sup> /s,cSt (40 °C)    55 mm <sup>2</sup> /s,cSt (100 °C)	
	3100 mm <sup>2</sup> /s,cSt (25 °C)    520 mm <sup>2</sup> /s,cSt (50 °C)	
	<u>Dynamic viscosity (nominal)</u>	
4100 mPa.s,cP (20 °C)    800 mPa.s,cP (40 °C)    45 mPa.s,cP (100 °C)		
2700 mPa.s,cP (25 °C)    450 mPa.s,cP (50 °C)		
PSLN1300	N1300 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	6760 mm <sup>2</sup> /s,cSt (20 °C)    1320 mm <sup>2</sup> /s,cSt (40 °C)    77 mm <sup>2</sup> /s,cSt (100 °C)	
	4365 mm <sup>2</sup> /s,cSt (25 °C)    730 mm <sup>2</sup> /s,cSt (50 °C)	
	<u>Dynamic viscosity (nominal)</u>	
5775 mPa.s,cP (20 °C)    1120 mPa.s,cP (40 °C)    63.0 mPa.s,cP (100 °C)		
3800 mPa.s,cP (25 °C)    630 mPa.s,cP (50 °C)		
PSL2700V15	S2000 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	8600 mm <sup>2</sup> /s,cSt (20 °C)    1700 mm <sup>2</sup> /s,cSt (40 °C)    81 mm <sup>2</sup> /s,cSt (100 °C)	
	5600 mm <sup>2</sup> /s,cSt (25 °C)    880 mm <sup>2</sup> /s,cSt (50 °C)	
	<u>Dynamic viscosity (nominal)</u>	
7500 mPa.s,cP (20 °C)    1500 mPa.s,cP (40 °C)    68 mPa.s,cP (100 °C)		
4800 mPa.s,cP (25 °C)    760 mPa.s,cP (50 °C)		
PSL2700V16	N4000 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	18000 mm <sup>2</sup> /s,cSt (20 °C)    3400 mm <sup>2</sup> /s,cSt (40 °C)    130 mm <sup>2</sup> /s,cSt (100 °C)	
	11000 mm <sup>2</sup> /s,cSt (25 °C)    1700 mm <sup>2</sup> /s,cSt (50 °C)	
	<u>Dynamic viscosity (nominal)</u>	
16000 mPa.s,cP (20 °C)    2900 mPa.s,cP (40 °C)    112 mPa.s,cP (100 °C)		
10000 mPa.s,cP (25 °C)    1500 mPa.s,cP (50 °C)		
PSL2700V17	S8000 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	35000 mm <sup>2</sup> /s,cSt (20 °C)    6700 mm <sup>2</sup> /s,cSt (40 °C)    220 mm <sup>2</sup> /s,cSt (100 °C)	
	22000 mm <sup>2</sup> /s,cSt (25 °C)    3200 mm <sup>2</sup> /s,cSt (50 °C)	
	<u>Dynamic viscosity (nominal)</u>	
31000 mPa.s,cP (20 °C)    5900 mPa.s,cP (40 °C)    190 mPa.s,cP (100 °C)		
20000 mPa.s,cP (25 °C)    2700 mPa.s,cP (50 °C)		
PSL2700V18	N15000 - Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	65000 mm <sup>2</sup> /s,cSt (20 °C)    13000 mm <sup>2</sup> /s,cSt (40 °C)    370 mm <sup>2</sup> /s,cSt (100 °C)	
	41000 mm <sup>2</sup> /s,cSt (25 °C)    5800 mm <sup>2</sup> /s,cSt (50 °C)	
	<u>Dynamic viscosity (nominal)</u>	
58000 mPa.s,cP (20 °C)    11000 mPa.s,cP (40 °C)    320 mPa.s,cP (100 °C)		
37000 mPa.s,cP (25 °C)    5100 mPa.s,cP (50 °C)		
PSL2700V19	S30000-Viscosity oil standard	500 mL
	<u>Kinematic viscosity (nominal)</u>	
	82000 mm <sup>2</sup> /s,cSt (25 °C)    23000 mm <sup>2</sup> /s,cSt (40 °C)    11000 mm <sup>2</sup> /s,cSt (50 °C)    670 mm <sup>2</sup> /s,cSt (100 °C)	
	<u>Dynamic viscosity (nominal)</u>	
	74000 mPa.s,cP (25 °C)    21000 mPa.s,cP (40 °C)    9900 mPa.s,cP (50 °C)    580 mPa.s,cP (100 °C)	

## Certified liquids for viscosity measurements in the European Pharmacopoeia

Newtonian liquids with a certified viscosity are supplied by Van Swinden Laboratorium BV and are distributed by LGC Standards.

Liquids are available with kinematic viscosities up to 48000 mm<sup>2</sup>·s<sup>-1</sup> and certified at temperatures between 15°C and 140°C.

Viscosities are certified in mm<sup>2</sup>·s<sup>-1</sup> (kinematic viscosity,  $\nu$ ) or in mPa·s (dynamic viscosity,  $\eta$ )

1 mPa·s = 1 cps (centipoise) 1 mm<sup>2</sup>·s<sup>-1</sup> = 1 cst (centistoke)

Standard liquids are available from stock, in 250 ml packs and certified at 20°C to following viscosities:

$\nu$  = 0,6 ; 1,0 ; 2,2; 4,9 ; 1; 20 ; 31 ; 56 ; 67 ; 85 ; 100 ; 132 ; 167 ; 217 ; 262; 340 ; 423 ; 537 ; 644 ; 783 ; 1000 ; 1260 ; 1800 ; 3650 ; 5075 ; 10175 ; 18400 ; 46500

$\eta$  = 0,4 ; 1,0 ; 1,8; 4,0 ; 8,9 ; 17,0 ; 26,0 ; 48,0 ; 58,0 ; 74,0 ; 87,0 ; 116,0 ; 146,0 ; 191,0 ; 230,0 ; 300,0 ; 375,0 ; 474,0 ; 572,0 ; 700,0 ; 862,0 ; 1085 ; 1560 ; 3175 ; 4430 ; 8935 ; 16300 ; 41300

All viscosities are calibrated relative to the viscosity of pure water. Stated values are nominal values, certified values will not deviate more than 10% from the nominal value.

The uncertainty of the certified viscosities is at least 0.3% at the lowest viscosity, increasing up to 0.5% at 48000 mm<sup>2</sup>·s<sup>-1</sup>.

### Shelf life

Standards up to 500 mPa·s are mineral oil based, and have a shelf life of 12 months from date of certification. Above 500 mPa·s Polyisobutylene is used; these materials have a shorter shelf life, and should be ordered as needed.

Liquids can be prepared and certified to any viscosity between 0.6 mm<sup>2</sup>·s<sup>-1</sup> and 80,000 mm<sup>2</sup>·s<sup>-1</sup>.

The price depends on the viscosity required, the degree of precision between nominal viscosity required and certified viscosity achieved, and temperature of certification.

Additional charges are applied for extra certification temperatures and for certification of dynamic viscosity. Please ask for a quotation.

Liquids supplied by customers may be certified for viscosity, charges vary: please ask for a quotation.

## Polymeric properties

### Individual molecular weight polymer standards

Code	Product	Unit
<b>New</b> NIST-2881	Polystyrene - Absolute molecular mass distribution standard This Standard Reference Material® (SRM®) is intended for the calibration and the performance evaluation of instruments used to determine the average molecular mass and molecular mass distribution of synthetic polymers (where mass is taken to be relative to the mass of 12C). These methods include size exclusion chromatography (SEC) and mass spectrometry (MS). The fractional contribution of each oligomer from 1 % to 99 % of the cumulative molecular mass distribution (MMD) was certified. Please ask for details.	0.3 g
NIST-2885	Polyethylene Certified value Molar Mass ..... 6.28 x 10 <sup>3</sup> g/mol Intrinsic viscosity in 1,2,4-Trichlorobenzene at 130 °C ..... 22.3 mL/g	300 mg
NIST-2886	Polyethylene Certified value Molar Mass ..... 87.0 x 10 <sup>3</sup> g/mol Intrinsic viscosity in 1,2,4-Trichlorobenzene at 130 °C ..... 157.8 mL/g	300 mg
NIST-2887	Polyethylene Certified value Molar Mass ..... 196.4 x 10 <sup>3</sup> g/mol Intrinsic viscosity in 1,2,4-Trichlorobenzene at 130 °C ..... 279.9 mL/g	300 mg
NIST-1482a	Polyethylene Certified values Mass-average molar mass ..... 13,600 g/mol Number-average molar mass ..... 11,400 g/mol Intrinsic viscosity ..... 40.1 mL/g	0.3 g

## Polymeric properties

Code	Product	Unit
<b>Molecular weight and melt flow</b>		
<b>New</b> ERM-FA001	Polystyrene (amorphous) (originally certified as BAM-P01) Certified values Weight-average molecular weight (M <sub>w</sub> ) <sup>1)</sup> ..... 87600 ± 2245 g/mol Intrinsic viscosity <sup>2)</sup> ..... 42.37 ± 0.83 mL/g Indicative values for molar masses (M <sub>w</sub> , M <sub>n</sub> , M <sub>z</sub> , M <sub>p</sub> ) <sup>1)</sup> obtained by laser light scattering <sup>2)</sup> obtained by viscometry using an UBBELOHDE viscometer according to DIN 51562-1	Each
<b>New</b> ERM-FA002	Polystyrene (pellets) (originally certified as BAM-P02) Certified values Weight-average molecular weight (M <sub>w</sub> ) <sup>1)</sup> ..... 205600 ± 3075 g/mol Intrinsic viscosity <sup>2)</sup> ..... 68.38 ± 0.79 mL/g Indicative values for molar masses (M <sub>w</sub> , M <sub>n</sub> , M <sub>z</sub> , M <sub>p</sub> ) <sup>1)</sup> obtained by laser light scattering <sup>2)</sup> obtained by viscometry using an UBBELOHDE viscometer according to DIN 51562-1	Each
<b>New</b> ERM-FA003	PMMA (crystalline) (originally certified as BAM-P03) Certified values Weight-average molecular weight (M <sub>w</sub> ) <sup>1)</sup> ..... 107050 ± 2500 g/mol Intrinsic viscosity <sup>2)</sup> ..... 31.48 ± 1.21 mL/g Indicative values for molar masses (M <sub>w</sub> , M <sub>n</sub> , M <sub>z</sub> , M <sub>p</sub> ) <sup>1)</sup> obtained by laser light scattering <sup>2)</sup> obtained by viscometry using an UBBELOHDE viscometer according to DIN 51562-1	Each
<b>New</b> ERM-FA004	PEO (crystalline) (originally certified as BAM-P04) Certified values Weight-average molecular weight (M <sub>w</sub> ) <sup>1)</sup> ..... 6065x ± 90 g/mol Intrinsic viscosity <sup>2)</sup> ..... 14.28 ± 0.54 mL/g Indicative values for molar masses (M <sub>w</sub> , M <sub>n</sub> , M <sub>z</sub> , M <sub>p</sub> ) <sup>1)</sup> obtained by laser light scattering <sup>2)</sup> obtained by viscometry using an UBBELOHDE viscometer according to DIN 51562-1	Each
<b>New</b> ERM-FA005	Polystyrene (pellets) (originally certified as BAM-P05) Certified values Weight-average molecular weight (M <sub>w</sub> ) <sup>1)</sup> ..... 349800 ± 9700 g/mol Intrinsic viscosity <sup>2)</sup> ..... 104.28 ± 2.30 mL/g Indicative values for molar masses (M <sub>w</sub> , M <sub>n</sub> , M <sub>z</sub> , M <sub>p</sub> ) <sup>1)</sup> obtained by laser light scattering <sup>2)</sup> obtained by viscometry using an UBBELOHDE viscometer according to DIN 51562-1	Each
<b>New</b> ERM-FA006	PMMA (amorphous) (originally certified as BAM-P06) Certified values Weight-average molecular weight (M <sub>w</sub> ) <sup>1)</sup> ..... 365500 ± 10800 g/mol Intrinsic viscosity <sup>2)</sup> ..... 90.63 ± 1.05 mL/g Indicative values for molar masses (M <sub>w</sub> , M <sub>n</sub> , M <sub>z</sub> , M <sub>p</sub> ) <sup>1)</sup> obtained by laser light scattering <sup>2)</sup> obtained by viscometry using an UBBELOHDE viscometer according to DIN 51562-1	Each
<b>New</b> ERM-FA007	PMMA (crystalline) (originally certified as BAM-P07) Certified values Weight-average molecular weight (M <sub>w</sub> ) <sup>1)</sup> ..... 360200 ± 9800 g/mol Intrinsic viscosity <sup>2)</sup> ..... 84.80 ± 1.82 mL/g Indicative values for molar masses (M <sub>w</sub> , M <sub>n</sub> , M <sub>z</sub> , M <sub>p</sub> ) <sup>1)</sup> obtained by laser light scattering <sup>2)</sup> obtained by viscometry using an UBBELOHDE viscometer according to DIN 51562-1	Each
<b>New</b> ERM-FA008	PEO (crystalline) (originally certified as BAM-P08) Certified values Weight-average molecular weight (M <sub>w</sub> ) <sup>1)</sup> ..... 11400 ± 150 g/mol Intrinsic viscosity <sup>2)</sup> ..... 20.91 ± 1.12 mL/g Indicative values for molar masses (M <sub>w</sub> , M <sub>n</sub> , M <sub>z</sub> , M <sub>p</sub> ) <sup>1)</sup> obtained by laser light scattering <sup>2)</sup> obtained by viscometry using an UBBELOHDE viscometer according to DIN 51562-1	Each
NIST-705A	Polystyrene - Heat capacity and molecular weight Molecular weight (MW) values, measured using various techniques, and limiting viscosity (LV) numbers. Certified values M <sub>n</sub> by membrane osmometry ..... 170,900 g/mol      LV in benzene (25 °C) ..... 74.3 mL/g M <sub>w</sub> by light scattering ..... 179,300 g/mol      LV in benzene (25 °C) ..... 74.5 mL/g M <sub>w</sub> by sedimentation equilibrium ..... 189,800 g/mol      LV in cyclohexane (25 °C) ..... 35.4 mL/g For heat capacity please ask for our detailed list	5 g

Code	Product	Unit
NIST-706A	Polystyrene - Broad molecular weight distribution Certified values Mass-average molar mass ( $M_w$ ) .....285,000 g/mol Indicative values for intrinsic viscosity in benzene at 25 °C and cyclohexane at 35 °C	18 g
NIST-1473b	Low density polyethylene resin This material is certified for melt flow rate using ASTM D 1238-00, Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer Standard Test Condition 190/2.16. The flow rate of the melt was determined at 190.0 °C $\pm$ 0.1 °C and a load of 2.16 kg by procedure A of the ASTM method. A manually operated extrusion plastometer was used. Certified value Melt flow rate (FR) ..... 1.13 g/10 min	60 g
NIST-1474A	Polyethylene resin - Melt flow rate Certified for melt flow rate, FR-190/2.16, using ASTM Method D 1238-86 at 190 °C. Certified value Melt flow rate (FR) .....5.10 g/10 min	60 g
NIST-1475a	Polyethylene, linear - Melt flow rate Certified for melt flow rate, FR-190/2.16, using ASTM Method D 1238-90b, and Limiting viscosity (LV). Certified values Melt flow rate ..... 2.02 g/10 min Weight average MW (light scattering) ..... 52,000 g/mol Number average MW (size exclusion chromatography)..... 18,310 g/mol Weight average MW (size exclusion chromatography) ..... 53,070 g/mol Z-average MW (size exclusion chromatography) ..... 138,000 g/mol LV in 1-chloronaphthalene (130 °C) ..... 89.0 mL/g LV in 1,2,4-trichlorobenzene (130 °C) ..... 101.0 mL/g LV in decahydronaphthalene (130 °C)..... 118.0 mL/g density ..... 0.97844 g/cm <sup>3</sup>	50 g
NIST-1476a	Branched polyethylene resin - Melt flow rate This Standard Reference Material <sup>®</sup> (SRM <sup>®</sup> ) is intended for use in calibration and performance evaluation of instruments used in polymer technology and science for the determination of the melt flow rate using ASTM Method D1238-00. It is supplied as white pellets of polyethylene. This material is certified for melt flow rate using ASTM Method D1238-00 condition 190/2.16. Under this condition the melt flow rate is 1.23 g/10 min with a standard deviation of 0.036 g/10 min and with 29 degrees of freedom. The certified measurement uncertainty is found to be 0.110 g/10 min and is expressed as a combined expanded uncertainty with a coverage factor $k = 2$ , calculated in accordance with ISO and NIST Guides procedure.	12 g
NIST-1478	Polystyrene - narrow molecular weight distribution Certified values Number average MW (membrane osmometry) ..... 35,800 g/mol Weight average MW (sedimentation equilibrium ultracentrifugation) ..... 37,400 g/mol Limiting viscosity in toluene (25 °C) ..... 23.06 mL/g	2 g
NIST-1479	Polystyrene - narrow molecular weight distribution Certified value Weight average MW (light scattering) ..... 1,050,000 g/mol	2 g
NIST-1484a	Polyethylene, linear - narrow molecular weight distribution Certified values Number-average MW (membrane osmometry) ..... 100,500 g/mol Weight average MW (light scattering) ..... 119,600 g/mol Limiting viscosity in 1,2,4-trichlorobenzene (130 °C) ..... 197.9 mL/g Limiting viscosity in 1-chloronaphthalene (130 °C) ..... 169.4 mL/g	300 mg
NIST-1487	Poly(methylmethacrylate) Certified values Weight-average molecular weight (sedimentation equilibrium ultracentrifugation) ..... 63,000 g/mol Limiting viscosity number in tetrahydrofuran (25 °C) ..... 7.9 mL/g	2 g
NIST-1488	Poly(methylmethacrylate) Certified values Number-average molecular weight (membrane osmometry) ..... 29,300 g/mol Limiting viscosity in tetrahydrofuran (25 °C) ..... 15.8 mL/g	2 g
NIST-1489	Poly(methylmethacrylate) Certified values Number-average molecular weight (membrane osmometry) ..... 115,000 g/mol Limiting viscosity in tetrahydrofuran (25 °C) ..... 37.4 mL/g	2 g
NIST-1496	Polyethylene gas pipe resin (unpigmented) Certified values Melt flow rate (FR-190/2.16, using ASTM Method D 1238-82) ..... 0.26 g/10 min Intrinsic viscosity in 1,2,4-trichlorobenzene (140 °C) ..... 210 mL/g	900 g

## Miscellaneous

Code	Product	Unit
NIST-2491	<p>Non-Newtonian polymer melt for rheology</p> <p>This Standard Reference Material<sup>®</sup> (SRM<sup>®</sup>) is intended primarily for use in calibration and performance evaluation of instruments used to determine the viscosity and first normal stress difference in steady shear, or to determine the dynamic mechanical storage and loss moduli and shift factors through time-temperature superposition. NIST-2491 consists of polydimethylsiloxane. The supplier identifies the polydimethylsiloxane as having a number average molecular mass of 308,000 g/mol. Certified values of the viscosity and first normal stress difference as functions of shear rate are given in the certificate at temperatures of 0 °C, 25 °C, and 50 °C, respectively. The expanded combined uncertainties in the certified values of the viscosity and first normal stress difference are also listed. The certified values of the storage modulus G' and loss modulus G'' as functions of frequency at 0 °C, 10 °C, 20 °C, 30 °C, 40 °C, and 50 °C, respectively are also given in the certificate.</p>	100 mL

## Miscellaneous

### Relative humidity

HM11 - HM90

Please specify the type of hygrometer to be used to enable the appropriate adapter to be supplied.

Code	Product	Unit
HM11	<p>Relative humidity standard</p> <p>Nominal relative humidity..... 11 %</p>	unit
HM22	<p>Relative humidity standard</p> <p>Nominal relative humidity..... 22 %</p>	unit
HM33	<p>Relative humidity standard</p> <p>Nominal relative humidity..... 33 %</p>	unit
HM54	<p>Relative humidity standard</p> <p>Nominal relative humidity..... 54 %</p>	unit
HM75	<p>Relative humidity standard</p> <p>Nominal relative humidity..... 75 %</p>	unit
HM80	<p>Relative humidity standard</p> <p>Nominal relative humidity..... 80 %</p>	unit
HM90	<p>Relative humidity standard</p> <p>Nominal relative humidity..... 90 %</p>	unit

### Scanning electron microscope

NIST-2069b	<p>SEM Performance Standard</p> <p>Graphitised rayon fibres with smooth and uniform edges on a 12.5 mm diameter SEM specimen mount with a 3 mm peg. One edge of a single fibre is used as a clearly defined boundary across which the electron beam is scanned. The slope of the resultant detector signal waveform is a measure of the SEM performance that can be related to the resolution capability of the SEM.</p>	Each
NIST-RM 8091	<p>Scanning Electron Microscope Sharpness Standard</p> <p>This Reference Material (RM) is intended primarily for use in checking the sharpness of scanning electron microscopes. It is supplied as a small (3mm x 2 mm) diced semiconductor chip. Please ask for further details.</p>	Each
<b>New</b> NIST-RM 8820	<p>Scanning electron microscope scale calibration artifact</p> <p>Reference Material (RM) 8820 is primarily intended to be used for X and Y scale (or magnification) calibrations from less than 10 times magnifications to more than 100 000 times magnifications in scanning electron microscopes (SEMs). It was designed to provide good contrast at low and high electron landing energies (accelerating voltages). Beyond testing scale calibration, it can be used for non-linearity measurements, especially at lower than 10 000 times magnifications. It can also be used for optical and scanning probe and other types of microscopes. Most SEMs require a set of calibration structures of different sizes to cover the full range of possible magnifications. This Reference Material (in part using the ideas implemented in earlier NIST scale calibration artifacts) is designed to meet that need. A unit of RM 8820 consists of a 20 mm × 20 mm lithographically patterned silicon chip.</p>	35-40 g

### X-ray diffraction

<b>New</b> NIST-640D	<p>Silicon powder line position + line shape standard for powder diffraction</p> <p>This Standard Reference Material (SRM) is intended for use as a standard for calibration of diffraction line positions and line shapes, determined through powder diffractometry. A unit of NIST-640d consists of approximately 7.5 g of silicon powder bottled under argon.</p> <p>The certified lattice parameter for a temperature of 22.5 °C is 0.543 123 nm ± 0.000 008 nm</p>	7.5 g
NIST-656	<p>Silicon nitride</p> <p>This Standard Reference Material (SRM<sup>®</sup>) consists of two powders intended for quantitative analysis of the α and β polymorphs of silicon nitride via powder diffraction methods. The powders are combinations of the α and β polymorphs; one is high in the α phase content (α 656), while the other contains a larger amount of the β polymorph (β 656).</p>	2 x 10 g

Code	Product	Unit												
NIST-674b	<p><b>X-Ray powder diffraction intensity set</b></p> <p>This Standard Reference Material (SRM<sup>®</sup>) consists of four oxide powders intended primarily for use as internal standards for quantitative X-ray diffraction analysis. The powders are ZnO (wurtzite structure), TiO<sub>2</sub> (rutile structure), Cr<sub>2</sub>O<sub>3</sub> (corundum structure), and CeO<sub>2</sub> (fluorite structure). These four oxides offer a range of linear attenuations for Cu-K<math>\alpha</math> radiation: 279 cm<sup>-1</sup>, 536 cm<sup>-1</sup>, 912 cm<sup>-1</sup>, and 2203 cm<sup>-1</sup>, respectively, that allow the user to nominally match that of standard to the unknown in order to minimize the effects of microabsorption. A unit of NIST-674b consists of approximately 10 g of each powder, bottled in an argon atmosphere.</p> <p>Certified values</p> <p>Phase purity and uncertainty</p> <table border="1"> <thead> <tr> <th>Crystalline component</th> <th>Phase Purity</th> <th>Crystalline component</th> <th>Phase Purity</th> </tr> </thead> <tbody> <tr> <td>ZnO</td> <td>95.28 % <math>\pm</math> 0.64 %</td> <td>Cr<sub>2</sub>O<sub>3</sub></td> <td>95.91 % <math>\pm</math> 0.60 %</td> </tr> <tr> <td>TiO<sub>2</sub></td> <td>89.47 % <math>\pm</math> 0.62 %</td> <td>CeO<sub>2</sub></td> <td>91.36 % <math>\pm</math> 0.55 %</td> </tr> </tbody> </table>	Crystalline component	Phase Purity	Crystalline component	Phase Purity	ZnO	95.28 % $\pm$ 0.64 %	Cr <sub>2</sub> O <sub>3</sub>	95.91 % $\pm$ 0.60 %	TiO <sub>2</sub>	89.47 % $\pm$ 0.62 %	CeO <sub>2</sub>	91.36 % $\pm$ 0.55 %	set
Crystalline component	Phase Purity	Crystalline component	Phase Purity											
ZnO	95.28 % $\pm$ 0.64 %	Cr <sub>2</sub> O <sub>3</sub>	95.91 % $\pm$ 0.60 %											
TiO <sub>2</sub>	89.47 % $\pm$ 0.62 %	CeO <sub>2</sub>	91.36 % $\pm$ 0.55 %											
NIST-675	<p><b>Mica x-ray diffraction</b></p> <p>Intended for use as an external or internal low 2 (large d-spacing) calibration standard for powder diffractometry.</p> <p>Certified value.....d(001) 9.98104 Å (based on the average of 28 refined d values at 25 °C uncorrected for refraction)</p>	7.5 g												
NIST-1976a	<p><b>Alumina plate - Instrument response Standard for X-Ray Powder Diffraction</b></p> <p>This Standard Reference Material (SRM<sup>®</sup>) consists of a sintered alumina disc intended for use in calibration of X-ray powder diffraction equipment with respect to line position and intensity as a function of 2<math>\theta</math> angle. The solid form of the SRM eliminates variability imposed by sample loading procedure from intensity measurements. A unit of NIST-1976a consists of a sintered alumina disc approximately 25.6 mm in diameter by 2.2 mm in thickness</p> <p>Please ask for further details</p>	disc												
NIST-1990	<p><b>Single Crystal Diffractometer Alignment Standard - Ruby Sphere</b></p> <p>Standard Reference Material (SRM<sup>®</sup>) 1990 is intended primarily for use as an alignment standard for single crystal diffractometry. One unit consists of three chromium-doped single crystal aluminum oxide (ruby) spheres. The spheres are nominally 152 mm in diameter with 1.3 mm sphericity. The spherical geometry was chosen to facilitate alignment and to avoid corrections for absorption. These spheres produce reflections at high angles for copper and molybdenum radiation. The space group is R3c.</p> <p>Certified lattice parameters of NIST-1990 at 25 °C are:</p> <p>a: 0.476080 nm <math>\pm</math> 0.000029 nm c: 1.299568 nm <math>\pm</math> 0.000087 nm</p>	3 spheres												
NIST-1994	<p><b>Standard silicon single crystal wafer for crystalline orientation</b></p> <p>This Standard Reference Material (SRM<sup>®</sup>) is intended for use in the calibration of instruments (X-ray diffractometers) used to measure the crystal orientation of wafers relative to the crystal surface. The SRM unit consists of a 100-mm diameter silicon wafer. The crystal orientation of the (001) silicon crystal planes relative to the surface normal has been measured both parallel and perpendicular to an edge flat that is manufactured into the wafer.</p>	unit												
<b>New</b> NIST-1995	<p><b>Standard sapphire single crystal wafer for crystalline orientation</b></p> <p>This Standard Reference Material<sup>®</sup> (SRM<sup>®</sup>) is intended for use in the calibration of instruments (X-ray diffractometers) used to measure the crystal orientation of wafers relative to the crystal surface. NIST-1995 consists of a 50 mm diameter sapphire wafer. Certified values for crystal orientation. Please ask for details.</p>	50-mm wafer												
<b>New</b> NIST-2000	<p><b>Calibration standard for high-resolution X-Ray Diffraction</b></p> <p>This Standard Reference Material<sup>®</sup> (SRM<sup>®</sup>) provides the high-resolution X-ray diffraction (HRXRD) community with International System of Units (SI) traceable Si (220) d-spacing in transmission, surface-to-crystal-plane wafer miscut, and surface-to-Si (004) Bragg angle in reflection for our reference wavelength. A unit of NIST-2000 consists of 25 mm <math>\times</math> 25 mm <math>\times</math> 0.725 mm double-polished (100)-oriented, single-crystal Si specimens with a nominal 50 nm Si<sub>0.85</sub>Ge<sub>0.15</sub> epitaxial layer and 25 nm Si cap. These certified values can be used to calibrate HRXRD instrumentation.</p> <p>Certified values for d<sub>SRM</sub>, <math>\xi</math><sub>SRM</sub>, <math>\Phi</math><sub>SRM</sub>, <math>\chi</math><sub>SRM</sub>, <math>\psi</math><sub>SRM</sub>, <math>\theta</math><sub>surface,SRM</sub> (004)</p>	block												
<b>New</b> NIST-660B	<p><b>Line position and line shape standard for powder diffraction</b></p> <p>This Standard Reference Material (SRM) is intended for use in calibration of diffraction line positions and line shapes determined through powder diffractometry. A unit of NIST-660b consists of approximately 6 g of lanthanum hexaboride, LaB<sub>6</sub>, powder bottled under argon.</p> <p>Certified lattice parameter for a temperature of 22.5 °C..... 0.415 689 nm <math>\pm</math> 0.000 008 nm</p> <p>Information values for peak positions computed for NIST660b using Cu K<math>\alpha</math> radiation, <math>\lambda</math> = 0.154 059 29 nm</p>	6 g												
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NIST-211d	<p><b>Toluene</b></p> <p>Certified values</p> <table border="1"> <thead> <tr> <th>Temperature [°C]</th> <th>Density [kg/m<sup>3</sup>]</th> </tr> </thead> <tbody> <tr> <td>15</td> <td>871.476 <math>\pm</math> 0.025</td> </tr> <tr> <td>20</td> <td>866.828 <math>\pm</math> 0.025</td> </tr> <tr> <td>25</td> <td>862.170 <math>\pm</math> 0.025</td> </tr> </tbody> </table>	Temperature [°C]	Density [kg/m <sup>3</sup> ]	15	871.476 $\pm$ 0.025	20	866.828 $\pm$ 0.025	25	862.170 $\pm$ 0.025	4 x 5 mL				
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## Miscellaneous

Code	Product	Unit
	HDF01 - HDF-012 Certified densities were determined by means of hydrostatic weighing.	
HDF01	2,2,4-Trimethylpentane Temperature range 15-25 °C Certified value Liquid density (20 °C)..... 692 kg/m <sup>3</sup>	10 mL
HDF02	Dodecane Temperature range 10-50 °C Certified value Liquid density (20 °C)..... 750 kg/m <sup>3</sup>	10 mL
HDF04	Base lubricating oil approx. 8 mPa.s at 40°C Temperature range 15-50 °C Certified value Liquid density (20 °C)..... 868 kg/m <sup>3</sup>	10 mL
HDF05	Base lubricating oil approx. 30 mPa s at 40°C Temperature range 15-50 °C Certified value Liquid density (20 °C)..... 870 kg/m <sup>3</sup>	10 mL
HDF06	Base lubricating oil approx. 110 mPa s at 40°C Temperature range 15-50 °C Certified value Liquid density (20 °C)..... 882 kg/m <sup>3</sup>	10 mL
HDF07	Lubricating oil A90 approx. 160 mPa s at 40°C Temperature range 15-50 °C Certified value Liquid density (20 °C)..... 887 kg/m <sup>3</sup>	10 mL
HDF08	Ethanol in water approx. 41 % ABV Use of this material is not recommended unless required by fiscal authorities. Certified value Liquid density (20 °C)..... 948 kg/m <sup>3</sup>	10 mL
HDF09	Ethanol in water approx. 11 % ABV Use of this material is not recommended unless required by fiscal authorities. Certified value Liquid density (20 °C)..... 985 kg/m <sup>3</sup>	10 mL
HDF15	Water Certified value Liquid density (20°C)..... 998 kg/m <sup>3</sup>	10 mL
HDF10	Dextrose in water approx. 10 % by weight Use of this material is not recommended unless required by fiscal authorities. Certified value Liquid density (20 °C)..... 1037 kg/m <sup>3</sup>	10 mL
HDF13	Sodium bromide in water Temperature range 15-25 °C Certified value Liquid density (20 °C)..... 1264 kg/m <sup>3</sup>	10 mL
HDF14	Caesium chloride in water approx. 47% by weight Certified value Liquid density (20°C)..... 1525 kg/m <sup>3</sup>	10 mL
HDF12	Tetrachloroethylene Temperature range 15-50 °C Certified value Liquid density (20 °C)..... 1623 kg/m <sup>3</sup>	10 mL
	GUM1.1 - GUM1.11 Liquid density standards certified by the Central Office of Measures (GUM). Intended for calibration and checking densimeters used for measuring density of liquids. Supplied with a certificate showing density values at temperatures from 20 °C to 50 °C, with an uncertainty 0.05 kg/m <sup>3</sup> . Values for the first and second decimal place are given in the certificate for particular series.	

Code	Product	Unit
GUM 1.1	n-Hexane Certified value Density ..... 659 kg/m <sup>3</sup> at 20°C	10 mL
GUM 1.2	n-Heptane Certified value Density ..... 683 kg/m <sup>3</sup> at 20°C	10 mL
GUM 1.3	2,2,4-Trimethylpentane Certified value Density ..... 691 kg/m <sup>3</sup> at 20°C	10 mL
GUM 1.4	n-Nonane Certified value Density ..... 717 kg/m <sup>3</sup> at 20°C	10 mL
GUM 1.5	n-Octane Certified value Density ..... 702 kg/m <sup>3</sup> at 20°C	10 mL
GUM 1.6	Methylcyclohexane Certified value Density ..... 769 kg/m <sup>3</sup> at 20°C	10 mL
GUM 1.7	Cyclohexane Certified value Density ..... 778 kg/m <sup>3</sup> at 20°C	10 mL
GUM 1.8	Toluene Certified value Density ..... 866 kg/m <sup>3</sup> at 20°C	10 mL
GUM 1.10	2,4-Dichlorotoluene Certified value Density ..... 1249 kg/m <sup>3</sup> at 20°C	10 mL
GUM 1.11	Tetrachloroethylene Certified value Density ..... 1623 kg/m <sup>3</sup> at 20°C	10 mL

### Chemical resistance (durability) of glass

NIST-622 and NIST-623

These NIST Standard Reference Materials<sup>®</sup> are for checking test methods and calibrating equipment used to determine the resistance of glass containers to chemical attack. The values given represent the volume of fiftieth-normal sulphuric acid used to titrate to the methyl red end point of the alkaline extract from a crushed sample of glass after exposure to high purity water at 121 °C.

NIST-622	Soda lime silica (durability) Certified value Volume of 0.02N H <sub>2</sub> SO <sub>4</sub> .....7.67 mL	2.2 kg
NIST-623	Borosilicate glass Certified value Volume of 0.02N H <sub>2</sub> SO <sub>4</sub> .....0.34 mL	2.2 kg

### Multi-test verification materials (MTVMs)

The Multi-Test Verification Materials (MTVMs) are unique because they enable a laboratory to use a single sample to validate different tests and instrumentation. Each unit is supplied with data for multiple types of internationally accepted test methods.

SS99850-0	SETA MTVM Kerosine (Jet turbine fuel)	500 mL																																																								
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Pour point	D97-IP15	-49.1 to -33.9 °C	38 mL																																																																			
Flash point	D93-IP34	196-213 °C	75 mL																																																																			
Cold cranking sim.	D5293;IP383	3062-6896 mPa.s	5 mL																																																																			
SS99854-0	SETA MTVM motor gasoline	500 mL																																																																				
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## Mechanical properties

ERM-FA013	Charpy specimens 30 J (bars)	set
	<p>A unit consists of five Charpy V-notch test pieces, which are rectangular steel bars of nominal dimensions 55 mm x 10 mm x 10 mm, with one V-notch, accurately machined to tolerances imposed in EN 10045-1 and ISO 148.</p> <p>Absorbed energy (KV) at 20 ± 2 °C ..... 30J nominal</p>	
ERM-FA014	Charpy specimens 60 J (bars)	set
	<p>A unit consists of five Charpy V-notch test pieces, which are rectangular steel bars of nominal dimensions 55 mm x 10 mm x 10 mm, with one V-notch, accurately machined to tolerances imposed in EN 10045-1 and ISO 148.</p> <p>Absorbed energy (KV) at 20 ± 2 °C ..... 60J nominal</p>	
ERM-FA015	Charpy specimens 80 J (bars)	set
	<p>A unit consists of five Charpy V-notch test pieces, which are rectangular steel bars of nominal dimensions 55 mm x 10 mm x 10 mm, with one V-notch, accurately machined to tolerances imposed in EN 10045-1 and ISO 148.</p> <p>Absorbed energy (KV) at 20 ± 2 °C ..... 80J nominal</p>	
ERM-FA016	Charpy specimens 120 J (bars)	set
	<p>A unit consists of five Charpy V-notch test pieces, which are rectangular steel bars of nominal dimensions 55 mm x 10 mm x 10 mm, with one V-notch, accurately machined to tolerances imposed in EN 10045-1 and ISO 148.</p> <p>Absorbed energy (KV) at 20 ± 2 °C ..... 120J nominal</p>	

Code	Product	Unit
ERM-FA415	Charpy specimens 150 J A unit consists of five Charpy V-notch test pieces, which are rectangular steel bars of nominal dimensions 55 mm x 10 mm x 10 mm, with one V-notch, accurately machined to tolerances imposed in EN 10045-1 and ISO 148. Absorbed energy (KV) at 20 ± 2 °C ..... 150J nominal	set
NIST-2092	Low-Energy Charpy V-Notch NIST-2092 is intended primarily for the verification of Charpy V-Notch machines in accordance with the current ASTM Standard E23.	set
NIST-2096	High Energy Charpy V-Notch NIST-2096 is intended primarily for the verification of Charpy V-Notch machines in accordance with the current ASTM Standard E23. For further details please ask for the current certificate	set
BCR-425	Nimonic 75 - Creep rate 150 mm long 14 mm diameter bars of Nimonic 75. Testing conditions: T = 600 °C, σ = 160 Mpa Certified values Creep rate at 400 h ..... 72 x 10 <sup>-6</sup> /h      time to 4 % strain ..... 557 h time to 2 % strain ..... 278 h	set (3)
BCR-661A	Nimonic 75 for ambient air tensile properties The material is Nimonic 75 nickel base alloy. It will be issued in units of three bars each about 150 mm long x 14 mm diameter, sufficient for the manufacture of three test-pieces. Certified values for tensile properties according to EN10002-1 0.2% Proof stress R <sub>p0.2</sub> ..... 300 ± 7 MPa      Elongation at fracture A ..... 40.9 ± 0.9 % 0.5% Proof stress R <sub>p0.5</sub> ..... 318 ± 7 MPa      Reduction in area at fracture Z ..... 60 ± 4 % Tensile strength R <sub>m</sub> ..... 750 ± 13 MPa	set (3)
BCR-661B	Nimonic 75 for ambient air tensile properties The material is Nimonic 75 nickel base alloy. It will be issued as one bar with about 500 mm long x 14 mm diameter. Certified values for tensile properties according to EN10002-1 0.2% Proof stress R <sub>p0.2</sub> ..... 300 ± 7 MPa      Elongation at fracture A ..... 40.9 ± 0.9 % 0.5% Proof stress R <sub>p0.5</sub> ..... 318 ± 7 MPa      Reduction in area at fracture Z ..... 60 ± 4 % Tensile strength R <sub>m</sub> ..... 750 ± 13 MPa	rod
BCR-692	Scratch test reference material A reference material certified for critical loads for cohesive/adhesive failures during scratch testing (prEN 1071-3). The reference samples are (30x30x5) mm steel coupons coated with a diamond-like carbon coating (DLC) applied by plasma-assisted chemical vapour deposition. The coupons are distributed in a reusable plastic box containing desiccant.	coupons
NIST-2100	Fracture Toughness of Ceramics NIST-2100 is intended for verification of fracture toughness testing procedures and consists of a set of five hot-pressed silicon nitride flexure specimens cut from a single billet (plate) of material. This SRM may be used with any fracture toughness test method, but is optimized for beam bending testing configurations. The SRM may be used in conjunction with American Society of Testing and Materials (ASTM) fracture toughness standard C1421-99 (or the Provisional Standard PS070-97 which preceded it) [1]. This SRM may also be used with two International Organization for Standardization (ISO) standard tests under development by ISO Technical Committee TC 206, Fine Ceramics.	5 bars

## Physico-chemical properties

### Magnetic moment

NIST-762	Magnetic moment standard - Nickel disc This Standard Reference Material <sup>®</sup> (SRM <sup>®</sup> ) is intended for use in the calibration of magnetometers (such as vibrating sample magnetometers) used in the measurement of the magnetic properties of materials. NIST-762 consists of a nickel disc nominally 6 mm in diameter with a thickness of 0.127 mm and a mass of 32 mg ± 1 mg. The NIST-762 lot was produced from rolled nickel sheet with a purity of 99.999 %. Discs were punched from the sheet. Before measurement, the discs were ultrasonically cleaned in acetone, then methyl alcohol. The certified value for specific magnetization, σ at 298 K and in an applied magnetic field of 398 kA/m (5000 oersted, Oe) with the magnetic field aligned parallel to the plane of the disc is: σ = 54.78 A m <sup>2</sup> /kg ± 0.15 A m <sup>2</sup> /kg (54.78 emu/g ± 0.15 emu/g)	6 mm dia.
NIST-764a	Magnetic susceptibility standard - Platinum cylinder This Standard Reference Material (SRM <sup>®</sup> ) is intended for use in the calibration of magnetometers (such as vibrating sample magnetometers) used in the measurement of the magnetic properties of materials. NIST-764a consists of a platinum (Pt) cylinder with a nominal diameter of 3 mm, a nominal length of 3.42 mm, and a nominal mass of 620 mg. NIST-764a lot was produced by slicing a pure (99.99 %) platinum rod into 3.42 mm long pieces.	3 mm dia.
NIST-2853	Magnetic moment standard yttrium iron garnet sphere This Standard Reference Material (SRM <sup>®</sup> ) is intended for use in calibrating of magnetometers (such as vibrating sample magnetometers) used in the measurement of the magnetic properties of materials. NIST-2883 consists of a yttrium iron garnet (YIG) sphere with a nominal diameter of 1 mm and a nominal mass of 2.8 mg.	Each

## Miscellaneous

Code	Product	Unit
NIST-772a	<p><b>Nickel sphere for magnetic moment</b></p> <p>This Standard Reference Material (SRM) is intended for use in the calibration of magnetometers (such as vibrating sample magnetometers) used in the measurement of the magnetic properties of materials. SRM 772a consists of a nickel sphere 2.383 mm in diameter with a mass of 63.16 mg. The SRM 772a lot was produced from annealed nickel wire with a purity of 99.999 %. The wire was ground into spheres. The spheres were then ultrasonically cleaned in acetone and methyl alcohol and annealed at 1220 K in a dry hydrogen atmosphere for 2 h. The microstructure is equiaxed with an average grain size of about 100 µm.</p> <p>The certified value for magnetic moment, m, at 298 K and in an applied field of 398 kA/m (5000 Oe) is</p> $m = 3.47 \text{ mA}\cdot\text{m}^2 \pm 0.01 \text{ mA}\cdot\text{m}^2 (3.47 \text{ emu} \pm 0.01 \text{ emu})$	Each

## Miscellaneous

NIST-953	<p><b>Cobalt in aluminium - Neutron density monitor wire</b></p> <p>The standard is provided as a reference source of cobalt in aluminium alloy to serve as a neutron density monitor wire standard.</p>	1 m						
NIST-963a	<p><b>Fission track glass</b></p> <p>This Standard Reference Material (SRM<sup>®</sup>) was produced and certified for use in uranium fission track analysis and monitoring neutron fluences. The SRM is made up of: four unirradiated glass wafers, two irradiated glass wafers, a muscovite mica and polycarbonate detectors.</p>	set (6)						
NIST-1082	<p><b>Cigarette ignition strength standard</b></p> <p>This Standard Reference Material (SRM<sup>®</sup>) is intended for use by test laboratories to assess and control their testing of cigarette ignition strength in accordance with ASTM Standard Methods E 2187-04 (or ASTM E2187-02b). The SRM unit consists of one carton of cigarettes containing 10 packs of 20 cigarettes each.</p> <p>Certified value</p> <table border="1"> <thead> <tr> <th>Measurand</th> <th>ASTM Method</th> <th>Certified Value and Expanded Uncertainty</th> </tr> </thead> <tbody> <tr> <td>Ignition Strength.....</td> <td>E 2187-04(a).....</td> <td>12.6 % ± 3.3 %</td> </tr> </tbody> </table> <p>(on 10 layers of filter paper)</p>	Measurand	ASTM Method	Certified Value and Expanded Uncertainty	Ignition Strength.....	E 2187-04(a).....	12.6 % ± 3.3 %	10 pck.
Measurand	ASTM Method	Certified Value and Expanded Uncertainty						
Ignition Strength.....	E 2187-04(a).....	12.6 % ± 3.3 %						

<b>New</b> NIST-1196	<p><b>Standard Cigarette for ignition resistance testing</b></p> <p>This Standard Reference Material (SRM) is intended for use by test laboratories to test mattresses, upholstered furniture and its components, and thermal insulation for resistance to cigarette ignition in accordance with 16 CFR 1632 [1], 16 CFR 1634 (proposed) [2], and 16 CFR 1209 [3]. A unit of NIST-1196 consists of one carton of cigarettes containing 10 packs of 20 cigarettes each.</p> <p><b>Certified values</b></p> <table border="1"> <thead> <tr> <th>Measurand</th> <th>Test method</th> <th>Certified value and Expanded uncertainty</th> </tr> </thead> <tbody> <tr> <td>Ignition strength (on 6.35 mm brass plate plus 2 layers of filter paper)</td> <td>ASTM E2187, modified per NIST TN 1627<sup>(a)</sup></td> <td>90.0 % ± 2.1 %</td> </tr> </tbody> </table> <p><sup>(a)</sup> Standard Test Method for Measuring the Ignition Strength of Cigarettes, as modified in NIST Technical Note 1627, Modification of ASTM E 2187 for Measuring the Ignition Propensity of Conventional Cigarettes, June 2009.</p> <p>[1] CPSC 16 CFR 1632; Standard for Flammability of Mattresses and Mattress Pads; Consumer Product Safety Commission Part 1632; Office of the Federal Register.</p> <p>[2] CPSC 16 CFR 1634; Standard for Flammability of Residential Upholstered Furniture; Proposed Rule, Consumer Product Safety Commission Part 1634; Office of the Federal Register.</p> <p>[3] CPSC 16 CFR 1209; Interim Safety Standard for Cellulose Insulation; Consumer Product Safety Commission Part 1209; Office of the Federal Register.</p>	Measurand	Test method	Certified value and Expanded uncertainty	Ignition strength (on 6.35 mm brass plate plus 2 layers of filter paper)	ASTM E2187, modified per NIST TN 1627 <sup>(a)</sup>	90.0 % ± 2.1 %	10 pck.
Measurand	Test method	Certified value and Expanded uncertainty						
Ignition strength (on 6.35 mm brass plate plus 2 layers of filter paper)	ASTM E2187, modified per NIST TN 1627 <sup>(a)</sup>	90.0 % ± 2.1 %						

NIST-1006d	<p><b>Smoke density chamber standard for non-flaming exposure condition</b></p> <p>This Standard Reference Material consists of paper sheets, principally -cellulose, derived from wood chips. The SRM is intended primarily for checking the operation of smoke density chambers under non-flaming exposure conditions in accordance with the prescribed calibration and standardization techniques outlined in the American Society for Testing and Materials (ASTM) Standard Test Method E 662-95 "Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials", and in National Fire Protection Association (NFPA) 258-1998, "Standard Research Test Method for Determining Smoke Generation of Solid Materials". A unit consists of nine single layer sheets, each 172 mm x 254 mm x 1.65 mm thick.</p> <p>The certified value and expanded uncertainty [3] for maximum specific optical density of a single layer thickness is:</p> $D_m = 210 \pm 18 \text{ (without correction for window deposit)}$ $D_m \text{ corr.} = 193 \pm 20$	9 sheets
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NIST-1810a	<p><b>Linerboard - Tape adhesion testing (sheet form)</b></p> <p>This Standard Reference Material (SRM<sup>®</sup>) is intended to provide a uniform source of linerboard for use with ASTM D 2860 Standard Test Method for Adhesion of pressure-sensitive tape to fiberboard at 90 degree angle and constant stress. Each unit consists of fifty 21.6 cm x 28 cm (8.5 in x 11 in) linerboard sheets of Mosinee 696-C paper, sealed in a moisture resistant foil-lined package.</p>	50 each
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NIST-2490	<p><b>Non-Newtonian Polymer Solution for Rheology - Polyisobutylene Dissolved in 2,6,10,14-Tetramethylpentadecane</b></p> <p>Please ask for details</p>	100 mL
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NIST-2811	<p><b>Rockwell C Scale Hardness (High Range)</b></p> <p>This Standard Reference Material (SRM<sup>®</sup>) is a transfer standard intended primarily for use in calibration and verification of the performance of Rockwell hardness equipment using the Rockwell C Hardness Scale (HRC).</p>	Each
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NIST-2812	<p><b>Rockwell C Scale Hardness (High Range)</b></p> <p>This Standard Reference Material (SRM<sup>®</sup>) is a transfer standard intended primarily for use in calibration and verification of the performance of Rockwell hardness equipment using the Rockwell C Hardness Scale (HRC).</p>	Each
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Code	Product	Unit
<b>New</b> NIST-2910A	<p><b>Calcium hydroxyapatite</b></p> <p>This Standard Reference Material is intended primarily for use in evaluating the physical and chemical properties of calcium apatites of biological, geological, and synthetic origin. The Ca/P molar ratio for SRM 2910a is consistent with the theoretical Ca/P molar ratio of 1.667 for calcium hydroxyapatite with a compositional formula of <math>\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2</math>. A unit of NIST-2910a consists of a 2 g bottle of Hydroxyapatite.</p> <p>Certified values</p> <p>Ca ..... 38.89 ± 0.85%      Ca/P Molar Ratio..... 1.667 ± 0.037  P ..... 18.029 ± 0.071 %</p> <p>Reference values for X-ray diffraction measurements</p>	2 g
NIST-RM 8130	<p><b>Coplanar waveguide calibration set</b></p> <p>This Reference Material (RM) is intended for use by industrial laboratories that wish to implement the procedure described in Part 1 of the NIST/Industrial MMIC Consortium's "Proposed Procedures for Verifying Probe Station Integrity and On-wafer Measurement Accuracy" for the measurement of microwave probe station stability and for verifying the ability to repeat on-wafer microwave measurements performed at NIST.</p>	Each
NIST-RM 8458	<p><b>Artificial flaw for eddy current nondestructive evaluation</b></p> <p>This Research Material (RM), the Capobianco, Dube, Fizer (CDF) notch, provides a reproducibility flaw of a known size and geometry that closely resembles an actual fatigue crack. It is intended to produce a response suitable for calibrating an eddy current nondestructive evaluation (NDE) system.</p>	Each