Physical & Chemical Property Standards for Analytical Characterization

High-Quality Certified Reference Materials (CRMs) for Accurate Calibration of Your Equipment

Supelco®
Analytical Products

PHYSICAL AND CHEMICAL PROPERTY STANDARDS

Your quest for consistent and reliable analytical test data in your results has a perfect match in our portfolio of physical and chemical property standards. Whether you are ascertaining the identity or purity of the analyte or verifying the accuracy of your calibration equipment, you will need to employ high-quality standards for reproducible and accurate measurements.

Discover a wide array of high-quality standards and certified reference materials (CRMs) for the precise calibration of your instruments. Our standards cover a broad range of determinations, including pH buffer standards, volumetric standards, color standards, Karl Fischer (KF) standards, Total Acid Number (TAN), Total Base Number (TBN), melting point standards, and UV/VIS standards, among others. Choose our CRMs for your next calibration and experience the difference quality makes.

Never compromise on the quality of your analyses.

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The Need for Physical and Chemical Property Standards is Everywhere

Physical and Chemical property standards, as the name suggests, are used to calibrate instruments used in the analyses of various physical and chemical properties such as melting point instruments, density meters, turbidimeters, spectrophotometers, color measuring instruments and colorimeters.

Almost all laboratories in chemical research involve in the measurement of physical and chemical properties. And the measurement of these properties is key to the determination of identity and purity of substances and materials. For example, color determination is very important in statistical quality control (SQC) and statistical process control (SPC). Karl Fischer titration is the gold standard for water determination in Pharma, Food & Beverage, Cosmetics, Petrochemicals and Polymer industries. Various types of titrations are employed for estimations of assay, impurity, acidity/alkalinity, fatty acid content in oils as well as water hardness. UV-Vis spectroscopic measurements are used in environmental water testing, food testing & pharmaceutical research. When a new compound is synthesized, its melting point determination is one of the key parameters to ascertain the chemical structure.

We offer a vast portfolio of Physical & Chemical Property Standards with applications in almost every industry segment ranging from Pharma, Industrial testing, Environmental, Food & Beverage and Material Sciences.

Find more information on Quality Grades, check out: How to Choose the Correct Reference Material Quality Grade

Explore the flyer detailing key features of our physical and chemical property standards, their quality grades, and their positioning in different industries.

This brochure mainly focuses on physical and chemical property standards. However, we also offer accessories to support your daily calibration requirements. Explore our up-to-date portfolio by visiting **SigmaAldrich.com/physicalproperties**

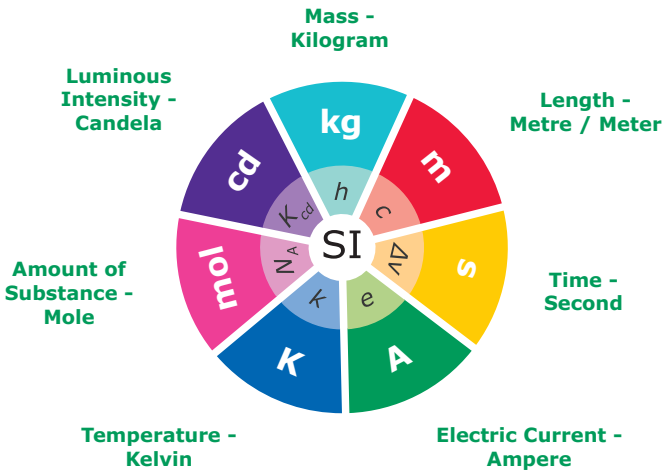

Figure 1. Metrological Traceability – SI Unit of Measurement

Our Certified Reference Material-grade Physical & Chemical Property Standards are analyzed in our ISO / IEC 17205 accredited laboratories

Achieve consistently reliable results in your laboratory using our CRM standards analyzed by our ISO/IEC 17025 laboratory according to ISO 17034 specifications. Laboratories that either work in regulated environments, or are ISO/IEC 17025 accredited, are better prepared for audits. ISO/IEC 17025 is a recognized international accreditation for laboratories and is accepted worldwide through the International Laboratory Accreditation Organization (ILAC), and every country has its own accreditation bodies that are members of the ILAC.

DAkkS
Deutsche
Akkreditierungsstelle

Accreditation

The Deutsche Akkreditierungsstelle attests with this **Accreditation Certificate** that the calibration laboratory

Merck KGaA
Kalibrierlaboratorium für chemische Messgrößen
Frankfurter Straße 250, 64293 Darmstadt

meets the minimum requirements according to DIN EN ISO/IEC 17025:2018 for the conformity assessment listed in the annex to this certificate. This includes additional existing legal and normative requirements, including those in relevant sectoral schemes.

The management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of calibration laboratories and confirm generally with the principles of DIN EN ISO 9001.

This accreditation was issued in accordance with Art. 5 Para. 1 Sentence 2 of Regulation (EC) 765/2008, after an accreditation procedure was carried out in compliance with the minimum requirements of DIN EN ISO/IEC 17011 and on the basis of a review and decision of the appointed accreditation committees.

This accreditation certificate only applies in connection with the notices of 07.02.2023 with accreditation number D-K-15185-01.
It consists of this cover sheet, the reverse side of the cover sheet and the following annex with a total of 4 pages.

Registration number of the accreditation certificate: **D-K-15185-01-00**

Berlin, 07.02.2023

Translation issued:
14.02.2023

Dipl.-Wirtsch.-Ing. (BA) Tim Harnisch
Head of Technical Unit

The certificate together with the annex reflects the status as indicated by the date of issue. The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH (www.dakks.de).

This document is a translation. The definitive version is the original German accreditation certificate.

See notes overleaf

1. pH Buffer Standards

Buffer solutions are essential for maintaining proper calibration of pH instruments. The accuracy of pH measurements is directly affected by the buffer reference materials used during calibration.

Features & Benefits

- **Secure:** Certified under ISO 17034 and ISO/IEC 17025 accreditations to ensure consistently reliable results
- **Trusted:** Traceable to SI units via NIST (National Institute of Standards and Technology, USA) and PTB (Physical Technical Institute, National Metrological Institute of Germany)
- **Ready for Audits:** Detailed CoA for every product
- **Always Fresh:** Available as ready-to-use, single-use sachets
- Offered with certified pH values at both 20 °C and 25 °C
- Available in innovative & eco-friendly packaging Titripac® format with ensured stability

Certipur® buffer solutions in small & handy single-use sachets: Preparation effort reduced to a minimum - Just open the sachet and start calibrating.

Innovative Titripac® Format- Reducing environmental impact through sustainable design

Table 1. Buffer Standards

Product Number	Product Name
1.01962	Sodium hydrogen carbonate/sodium carbonate, certified reference material, traceable to NIST SRM, traceable to PTB
1.01963	Potassium hydrogen tartrate, certified secondary standard reference material for pH measurement; directly traceable to primary SRM from NIST/PTB pH(S) = 3.63_9 / pH(S) = 3.55_7 (25 °C) Certipur®
1.01964	di-Sodium tetraborate decahydrate, certified secondary standard reference material for pH measurement; directly traceable to primary SRM from NIST/PTB pH(S)=9.18_0 (25 °C) Certipur®
1.01965	Potassium hydrogen phthalate, certified secondary standard reference material for pH measurement; directly traceable to primary SRM from NIST/PTB pH(S) = 4.00_5 (25 °C) Certipur®
1.01961	Potassium tetraoxalate dihydrate, certified secondary standard reference material for pH measurement; directly traceable to primary reference material from NIST/PTB pH (S) = 1.67_9 (25 °C) Certipur®
1.01960	Potassium dihydrogen phosphate/ di-sodium hydrogen phosphate, certified reference material, traceable to NIST (SRM), traceable to PTB
1.09888	Buffer concentrate (borate/hydrochloric acid), traceable to SRM of NIST and PTB for 500 mL buffer solution, pH 8.00 ± 0.02 (20 °C) Titrisol®
1.09885	Buffer concentrate (citrate/sodium hydroxide), traceable to SRM of NIST and PTB for 500 mL buffer solution, pH 5.00 ± 0.02 (20 °C) Titrisol®
1.09893	Buffer concentrate (potassium chloride/sodium hydroxide), traceable to SRM of NIST and PTB for 500 mL buffer solution, pH 13.00 ± 0.05 (20 °C) Titrisol®
1.09892	Buffer concentrate (phosphate/sodium hydroxide), traceable to SRM of NIST and PTB for 500 mL buffer solution, pH 12.00 ± 0.05 (20 °C) Titrisol®
1.09879	Buffer concentrate for buffer solution acc. to WEISE, for 1000 mL of solution (phosphate), pH 7.20 Titrisol®
1.09880	Buffer concentrate (boric acid/potassium chloride/ sodium hydroxide), traceable to SRM of NIST and PTB for 500 mL buffer solution, pH 11.00 ± 0.05 (20 °C) Titrisol®
1.09881	Buffer concentrate (glycine/hydrochloric acid), traceable to SRM of NIST and PTB for 500 mL buffer solution, pH 1.00 ± 0.02 (20 °C) Titrisol®
1.09882	Buffer concentrate (citrate/hydrochloric acid), traceable to SRM of NIST and PTB for 500 mL buffer solution, pH 2.00 ±0.02 (20 °C) Titrisol®
1.09883	Buffer concentrate (citrate/hydrochloric acid), traceable to SRM of NIST and PTB for 500 mL buffer solution, pH 3.00 ±0.02 (20 °C) Titrisol®
1.09884	Buffer concentrate (citrate/hydrochloric acid), traceable to SRM of NIST and PTB for 500 mL buffer solution, pH 4.00 ±0.02 (20 °C) Titrisol®
1.09886	Buffer concentrate, (citrate/sodium hydroxide), traceable to SRM of NIST and PTB for 500 mL buffer solution, pH 6.00 ±0.02 (20 °C) Titrisol®
1.09887	Buffer concentrate (phosphate), traceable to SRM of NIST and PTB for 500 mL buffer solution, pH 7.00 ±0.02 (20 °C) Titrisol®
1.09889	Buffer concentrate (boric acid/potassium chloride/ sodium hydroxide), traceable to SRM of NIST and PTB for 500 mL buffer solution, pH 9.00 ±0.02 (20 °C) Titrisol®
1.09890	Buffer concentrate (boric acid/potassium chloride/ sodium hydroxide), traceable to SRM of NIST and PTB for 500 mL buffer solution, pH 10.00 ±0.05 (20 °C) Titrisol®

Product Number	Product Name
40-0101*	pH standard solution, pH 1.68 25 °C
40-0102*	pH standard solution, pH 4.01 25 °C
40-0103*	pH standard solution, pH 6.86 25 °C
40-0104*	pH standard solution, pH 9.18 25 °C
40-0105*	pH standard solution, pH 10.01 25 °C
40-0115*	pH standard solution, pH 4.01 25 °C, JCSS
40-0116*	pH standard solution, pH 6.86 25 °C, JCSS
40-0117*	pH standard solution, pH 9.18 25 °C, JCSS
BX1627**	Buffer Concentrate, pH 7.0
BX1632**	Buffer pH 7.0 Yellow
BX1633**	Buffer pH 10.0 Blue
BX1634**	Buffer pH 4.0 Clear
BX1635**	Buffer pH 7.0 Clear
BX1636**	Buffer pH 10.0 Clear
BX1641**	Buffer pH 10.0 Blue
BX1642**	Buffer pH 10.0 Clear
BX1651**	Buffer pH 1.0 Clear
BX1652**	Buffer pH 2.0 Clear
BX1657**	Buffer pH 8.0 Clear
BX1658**	Buffer pH 9.0 Clear
BX1628**	Buffer pH 4.0 Red
BX1656**	Buffer pH 6.0 Clear
EM0180	Buffer pH 12.45
BX1653**	Buffer pH 3.0 Clear
BX1626**	Buffer Variety Pack, Kit
BX1655**	Buffer pH 5.0 Clear
EM0182	Buffer pH 1.68
EM0186	Buffer pH 6.86
B5020	Buffer, reference standard, pH 4.00 +/- 0.01 25 °C
B4895	Buffer, reference standard, pH 10.00 +/- 0.01 25 °C
1.01645	Buffer solution, (di-sodium tetraborate), traceable to SRM from NIST and PTB pH 9.22 (20 °C), Certipur®
1.02111	Calcium hydroxide, for the preparation of DIN 19266 pH standard buffer solutions
1.04875	Potassium dihydrogen phosphate solution, (buffer stock solution) 1/15 mol/L
1.06587	di-Sodium hydrogen phosphate solution, (buffer stock solution) 1/15 mol/L
1.07200	Certified sec. standard reference buffer solution
1.07202	Certified sec. standard reference buffer solution, potassium dihydrogen phosphate/di-sodium hydrogen phosphate, traceable to PTB SRM, traceable to PTB SRM, pH 6.86 25 °C, Certipur®, traceable to NIST SRM
1.07203	Certified sec. standard reference buffer solution, di-sodium tetraborate decahydrate, directly traceable to primary SRM from NIST/PTB pH(S) = 9.18_0 (25 °C), Certipur®
1.07204	Certified sec. standard reference buffer solution, potassium tetraoxalate dihydrate, directly traceable to primary SRM from NIST/PTB pH(S) = 1.67_9 (25 °C), Certipur®
1.07205	Certified sec. standard reference buffer solution, potassium dihydrogen phosphate/di-sodium hydrogen phosphate, traceable to NIST SRM, traceable to PTB SRM, pH 7.41 25 °C, Certipur®

Product Number	Product Name
1.07294	Buffer solution, di-sodium hydrogen phosphate/ potassium dihydrogen phosphate, traceable to NIST, traceable to PTB, pH 6.88 20 °C, Certipur®
1.07827	Buffer solution, (acetic acid/sodium acetate), traceable to SRM from NIST and PTB pH 4.66 (20 °C), Certipur®
1.09400	Buffer Solution, (boric acid/potassium chloride/sodium hydroxide), colour coded: yellow, traceable to NIST and PTB pH 10.00 (20 °C), Certipur®
1.09406	Buffer solution (potassium hydrogen phthalate), traceable to SRM from NIST and PTB, pH 4.01 (25 °C), Certipur®
1.09407	Buffer solution (potassium dihydrogen phosphate/ disodium hydrogen phosphate), traceable to SRM from NIST and PTB, pH 7.00 (25 °C) Certipur®
1.09408	Buffer solution (boric acid/potassium chloride/sodium hydroxide), traceable to SRM from NIST and PTB, pH 9.00 (25 °C), Certipur®
1.09409	Buffer solution (boric acid/potassium chloride/sodium hydroxide), traceable to SRM from NIST and PTB, pH 10.00 (25 °C), Certipur®
1.09432	Buffer solution (glycine/sodium chloride/hydrogen chloride), traceable to SRM from NIST and PTB, pH 1.00 (20 °C), Certipur®
1.09433	Buffer solution (citric acid/sodium hydroxide/hydrogen chloride), traceable to SRM from NIST and PTB, pH 2.00 (20 °C), Certipur®
1.09434	Buffer solution (citric acid/sodium hydroxide/hydrogen chloride), traceable to SRM from NIST and PTB, pH 3.00 (20 °C), Certipur®
1.09435	Buffer solution (citric acid/sodium hydroxide/hydrogen chloride), traceable to SRM from NIST and PTB, pH 4.00 (20 °C), Certipur®
1.09436	Buffer solution (citric acid/sodium hydroxide), traceable to SRM from NIST and PTB, pH 5.00 (20 °C), Certipur®
1.09437	Buffer solution (citric acid/sodium hydroxide), traceable to SRM from NIST and PTB, pH 6.00 (20 °C), Certipur®
1.09438	Buffer solution (boric acid/potassium chloride/sodium hydroxide), traceable to SRM from NIST and PTB, pH 10.00 (20 °C), Certipur®
1.09439	Buffer solution (di-sodium hydrogen phosphate/ potassium dihydrogen phosphate), traceable to SRM from NIST and PTB, pH 7.00 (20 °C), Certipur®
1.09441	Buffer solution (glycine/sodium chloride/hydrogen chloride), traceable to SRM from NIST and PTB, pH 1.00 (25 °C), Certipur®
1.09442	Buffer solution (citric acid/sodium hydroxide/hydrogen chloride), traceable to SRM from NIST and PTB, pH 2.00 (25 °C) Certipur®
1.09444	Buffer solution (citric acid/sodium hydroxide/hydrogen chloride), traceable to SRM from NIST and PTB, pH 3.00 (25 °C), Certipur®

Product Number	Product Name
1.09445	Buffer solution (citric acid/sodium hydroxide/hydrogen chloride), traceable to SRM from NIST and PTB, pH 4.00 (25 °C), Certipur®
1.09446	Buffer solution (citric acid/sodium hydroxide), traceable to SRM from NIST and PTB, pH 5.00 (25 °C), Certipur®
1.09460	Buffer solution (boric acid/sodium hydroxide/hydrogen chloride), traceable to SRM from NIST and PTB, pH 8.00 (20 °C), Certipur®
1.09461	Buffer solution (boric acid/potassium chloride/sodium hydroxide), traceable to SRM from NIST and PTB, pH 9.00 (20 °C), Certipur®
1.09462	Buffer solution (boric acid/potassium chloride/sodium hydroxide), traceable to SRM from NIST and PTB, pH 11.00 (20 °C), Certipur®
1.09475	Buffer solution (citric acid/sodium hydroxide/hydrogen chloride), colour: red, traceable to SRM from NIST and PTB, pH 4.00 (20 °C), Certipur®
1.09476	Buffer solution (boric acid/potassium chloride/sodium hydroxide), coloured: blue, traceable to SRM from NIST and PTB, pH 9.00 (20 °C), Certipur®
1.09477	Buffer solution (di-sodium hydrogen phosphate/ potassium dihydrogen phosphate), colour: green, traceable to SRM from NIST and PTB, pH 7.00 (20 °C), Certipur®
1.99001	Buffer solution (potassium hydrogen phthalate), traceable to SRM from NIST and PTB, pH 4.01 (25 °C), Certipur®
1.99002	Buffer solution (potassium dihydrogen phosphate/di-sodium hydrogen phosphate), traceable to SRM from NIST and PTB pH, 7.00 (25 °C), Certipur®
1.99003	Buffer solution (boric acid/potassium chloride/sodium hydroxide solution), traceable to SRM from NIST and PTB, pH 9.00 (25 °C), Certipur®
1.99004	Buffer solution (boric acid/potassium chloride/sodium hydroxide), traceable to SRM from NIST and PTB, pH 10.00 (25 °C), Certipur®
1.99005	Buffer solutions, traceable to NIST, traceable to PTB, pH 4.01 (25 °C), phthalate, pH 7.00, 25 °C, phosphate, pH 9.00, borate, Certipur®
1.99006	Buffer solutions, traceable to NIST, traceable to PTB, pH 4.01 (25 °C), phthalate, pH 7.00 (25 °C), phosphate, pH 9.00, borate, Certipur®
1.99011	Buffer solution (Potassium tetraoxalate), traceable to SRM from NIST and PTB, pH 1.68 (25 °C), Certipur®
1.99012	Buffer Solution (citric acid, sodium hydroxide, hydrogen chloride), traceable to SRM from NIST and PTB, pH 2.00 (25 °C), Certipur®
1.99015	Buffer solution (Potassium tetraoxalate), traceable to SRM from NIST and PTB, pH 1.68 (25 °C), Certipur®
1.99016	Buffer Solution (citric acid/sodium hydroxide), traceable to SRM from NIST and PTB, pH 6.00 (25 °C), Certipur®

Product Number	Product Name
1.99019	Buffer solution (di-sodium tetraborate), traceable to SRM from NIST and PTB, pH 9.18 (25 °C), Certipur®
1.99021	Buffer Solution (boric acid, sodium hydroxide, potassium chloride), traceable to SRM from NIST and PTB, pH 11.00 (25 °C), Certipur®
1.99022	Buffer Solution (di-sodium hydrogen phosphate/sodium hydroxide), traceable to SRM from NIST und PTB, pH 12.00 (25 °C), Certipur®
1.99036	Buffer solution (citric acid/sodium hydroxide), traceable to SRM from NIST and PTB, pH 6.00 (25 °C), Certipur®
1.99038	Buffer solution (boric acid/sodium hydroxide/hydrogen chloride), traceable to SRM from NIST and PTB, pH 8.00 (25 °C), Certipur®
1.99041	Buffer solutions (boric acid/potassium chloride/sodium hydroxide), traceable to SRM from NIST and PTB, pH 11.00 (25 °C), Certipur®

Product Number	Product Name
1.99050	Buffer solution (boric acid/potassium chloride/sodium hydroxide), colour coded: blue, traceable to NIST and PTB, pH 10.00 (25 °C), Certipur®
1.99054	Buffer solution (citric acid/sodium hydroxide/hydrogen chloride), colour: red, traceable to SRM from NIST and PTB, pH 4.00 (25 °C)
1.99057	Buffer solution (di-sodium hydrogen phosphate/ potassium dihydrogen phosphate), colour:yellow, traceable to SRM from NIST and PTB, pH 7.00 (25 °C), Certipur®
1.99064	Buffer solution (citric acid/sodium hydroxide/hydrogen chloride), traceable to SRM from NIST and PTB, pH 4.00 (25 °C), Certipur®
1.99068	Buffer solution (di-sodium hydrogen phosphate/ potassium dihydrogen phosphate), traceable to NIST, traceable to PTB, pH 6.86 25 °C, Certipur®
1.99091	Buffer solution (di-sodium tetraborate), traceable to SRM from NIST and PTB, pH 9.18 (25 °C), Certipur®

*Sold in Japan only

**Sold in US only

- Explore our extensive list of buffer standards: Buffer Standards
- Explore technical datasheet for stability data of Titripac® packaging (also available on respective Product Description Pages)
- Find more information about these products in our newly launched brochure: Buffer Calibration standards for pH Measurements
- Find detailed information about sustainable packaging solution " Titripac®: Analytix Reporter Journal Issue 13/2022

2. Titration – Volumetric Reference Materials

Accurate titer determination is an important criterion for precise and comparable titration analysis. Our offering of Certipur® volumetric standards include high-purity secondary reference materials for acidimetry, alkalimetry, argentometry, complexometric, iodometry and redox titration.

Features & Benefits

- Highly pure materials traceable to NIST
- In accordance with the reagents part of major Pharmacopoeias
- Measured in ISO 17025 accredited laboratory
- Branded as CRMs in accordance with ISO 17034

Table 2. Volumetric Standards

Product Number	Product Name	Applications
1.02400	Potassium hydrogen phthalate, Volumetric standard, secondary reference material for alkalimetry, traceable to NIST Standard Reference Material (SRM), Certipur® Reag. Ph. Eur., Reag. USP[1,2]	Alkalimetry
1.02401	Benzoic acid, volumetric standard, secondary reference material for alkalimetry, traceable to NIST, Standard Reference Material (SRM), Certipur® Reag. Ph. Eur., Reag. USP[1,2]	
1.02405	Sodium carbonate, volumetric standard, secondary reference material for acidimetry, traceable to NIST SRM, Certipur®[1]	Acidimetry
1.02408	Tris(hydroxymethyl)aminomethane, volumetric standard, secondary reference material for acidimetry, traceable to NIST, Standard Reference Material (SRM), Certipur® Reag. Ph. Eur., Reag. USP[2]	
1.02406	Sodium chloride, volumetric standard, secondary reference material for argentometry, traceable to NIST SRM, Certipur® Reag. Ph. Eur. ,Reag. USP[1,2]	Argentometry
1.02407	di-Sodium oxalate, volumetric standard, secondary reference material for redox titration, traceable to NIST, Standard Reference Material (SRM), Certipur® Reag. USP[2]	Redox Titration
1.02402	Iron (II) ethylenediammonium sulfate, Volumetric standard, secondary reference material for redox titration, traceable to NIST, Standard Reference Material (SRM), Certipur® Reag. Ph. Eur.1	
1.02403	Potassium dichromate, volumetric standard, secondary reference material for redox titration, traceable to NIST, SRM Certipur® Reag. USP[2]	
1.02410	Calcium carbonate, volumetric standard, secondary reference material for complexometry, traceable to NIST, Standard Reference Material (SRM), Certipur® Reag. USP[2]	Complexometry
1.02409	Zinc, volumetric standard, secondary reference material for complexometry, traceable to NIST, SRM Certipur® Reag. Ph. Eur.[1]	
1.02404	Potassium iodate, volumetric standard, secondary reference material for iodometry, traceable to NIST SRM, Certipur®	Iodometry
94119	Glycine, analytical standard, for Nitrogen Determination according to Kjeldahl Method[3]	Kjeldahl Method
TKN1000	Kjeldahl Nitrogen, Total (TKN) 1000 mg/L Calibration Standard, certified reference material[3]	

[1] Solution according to Reag. Ph. Eur

[2] Solution according to the reagents chapter of USP

[3] BAM Certification

Explore our Volumetric Reference Materials

Our broad portfolio of volumetric reference materials is available in different concentrations and packaging.

Please find more information on our Titripur® Volumetric Solutions, Titripac® Packaging for Volumetric Solutions, Titrisol® Volumetric Concentrates, SmartChemicals for Digitalized Titration & 3S Reagents for Digitalized Volumetric Titration by clicking the link:

SigmaAldrich.com/titration-reagents

Find detailed information about these products in the Volumetric Titration Brochure: Volumetric Solutions and Standards for Titration

3. Karl Fischer Standards

Aquastar® Karl Fischer reagents and standards ensure rapid, precise, and consistent results for water determination in solid, liquid, and gas samples. Our Aquastar® product portfolio includes reagents for volumetric and coulometric methods. Aquastar® water standards are available as certified reference materials according to ISO 17034 for a precise titer determination, instrument check, and the verification of titration results.

Features & Benefits

- Batch-specific Certificate of Analysis for QM documentation
- Reliable and correct results
- Manufactured and analyzed by an ISO/IEC 17025 accredited calibration lab
- Quality Grade: CRM according to ISO 17034
- Comprehensive datasheets available now on PDP's: Explaining Karl Fischer titration parameters and procedure under handling recommendations

Table 3. Karl Fischer Standards

Product Number	Product Name
1.12939	Lactose Standard 5%, solid water standard for coulometric/volumetric Karl Fischer Titration and Karl Fischer oven method, Aquastar®
1.09259	Water standard 5 mg/mL, (1 mL contains 5 mg H_2O) Aquastar®
1.06664	Sodium tartrate dihydrate, Water standard for volumetric Karl Fischer Titration (volumetric standard), Aquastar®
1.88050	Water Standard 0.01%, Standard for coulometric Karl Fischer Titration, 1 g ≙ 0.1 mg H_2O, Aquastar®
1.88052	Water standard 1%, Standard for volumetric Karl Fischer Titration, 1 g ≙ 10 mg H_2O, Aquastar®
1.88055	Water standard oil, standard for oil samples for coulometric Karl Fischer Titration (15-30 ppm), Aquastar®
1.88054	Water Standard Oven, 1%, solid standard for KF oven method, Aquastar®
1.88051	Water standard 0.1%, Standard for coulometric Karl Fischer Titration, 1 g ≙ 1 mg H_2O, Aquastar®

Explore our extensive portfolio of Karl Fisher Titration products here:

- **Aquastar® Reagents for Volumetric & Coulometric Karl Fischer Titration**
- **Aquastar® Karl Fischer Standards**

Learn more on handling & usage of our standards: Karl Fischer Titration Video

Explore the comprehensive brochure on our Karl Fischer portfolio: **Accurate Water Determination, Aquastar® reagents and standards for precise Karl Fischer titration results**

4. Color Reference Standards

Color reference standards are ideal for routine validation of instruments used for color measurements/colorimeters. These standards also assure comparison of results between different laboratories or between different instruments and hence ensure the accuracy of test data. They are also widely used in statistical quality control (SQC) and statistical process control (SPC).

Features & Benefits

- Certipur® reference solutions available in B, BY, Y, GY, and R colors as a single, ready-to-use kit
- Supplied with full traceability to internationally recognized standards, either UKAS to ISO 17025 / ISO 17034 (ASTM, Gardner & Saybolt Color) or the ISO 9001 quality system (AOCS-Tintometer, Lovibond RYBN and Pt-Co Color)
- Accompanied with a detailed certificate of analysis for an effective quality management system

Table 4. Color standards

Product Number	ASTM Color Reference Standards
ASTM05	ASTM Colour Reference Standard, ASTM D 6045, D1500 (ASTM colour <0.5)
ASTM10	ASTM Colour Reference Standard, ASTM D 6045, D1500 (ASTM colour 1)
ASTM30	ASTM Colour Reference Standard, ASTM D 6045, D1500 (ASTM colour 3)
ASTM50	ASTM Colour Reference Standard, ASTM D 6045, D1500 (ASTM colour 5)
ASTM70	ASTM Colour Reference Standard, ASTM D 6045, D1500 (ASTM colour 7)
Product Number	**AOCS-Tintometer Color Reference Standards**
134240	AOCS-Tintometer Colour Reference Standard, 0.3R 1.7Y (5¼")
134250	AOCS-Tintometer Colour Reference Standard, 1.3R 8.8Y (5¼")
134260	AOCS-Tintometer Colour Reference Standard, 1.7R 12Y
134270	AOCS-Tintometer Colour Reference Standard, 3.0R 22Y (5 ¼")
Product Number	**Gardner Color Reference Standards**
GARD02	Gardner Colour Reference Standard, ASTM D 1544, D 6166 (ASTM colour 2)
GARD05	Gardner Colour Reference Standard, ASTM D 1544, D 6166 (ASTM colour 5)
GARD08	Gardner Colour Reference Standard, ASTM D 1544, D 6166 (ASTM colour 8)
Product Number	**Color Reference Solutions according to Ph. Eur., APHA and USP**
1.00265	Colour Reference Solutions B, according to Ph. Eur color intensity testing B1-B9, Certipur
1.00266	Colour Reference Solutions BY, according to Ph. Eur color intensity testing BY1-BY7, Certipur
1.00267	Colour Reference Solutions Y, according to Ph. Eur color intensity testing Y1-Y7, Certipur
1.00268	Colour Reference Solutions GY, according to Ph. Eur. color intensity testing GY1-GY7, Certipur®
1.00269	Colour Reference Solutions R, according to Ph. Eur. color intensity testing R1-R7, Certipur®
72599	Color Reference Solution acc. to APHA, set 20 2mL 20 standard solutions
72666	Color Reference Solutions acc. to Ph. Eur, Set of colors BY
83883	Color Reference Solutions acc. to Ph. Eur, Set of colors Y
83951	Color Reference Solutions acc. to Ph. Eur, Set of colors B
83952	Color Reference Solutions acc. to Ph. Eur, Set of colors B, BY, Y, GY, R
83967	Color Reference Solutions acc. to Ph Eur, Set of colors Y
86293	Color Reference Solutions acc. to Ph Eur, Set of colors BY
87448	Color Reference Solutions acc. to Ph Eur, Set of colors R
87574	Color Reference Solutions acc. to USP, set 20x10 mL 20 standard solutions
87576	Color Reference Solutions acc. to USP, set 20x2 mL 20 standard solution
90232	Color Reference Solutions acc. to Ph. Eur, Set of colors B, BY, Y, GY, R
90269	Color Reference Solutions acc. to Ph. Eur, Set of colors GY
92936	Color Reference Solutions acc. to Ph. Eur, Set of colors B
95872	Color Reference Solutions acc. to Ph Eur, Set of colors R
77147	Color Reference Solution acc. to APHA, set 20x10 mL 20 standard solutions
82995	Color Reference Solutions acc. to Ph. Eur, Set of colors GY
Product Number	**Lovibond RYBN Colour Reference Standards**
134110	Lovibond RYBN Colour Reference Standard, 1.6R 11.0Y 0.1N (5 ¼")
134120	Lovibond RYBN Colour Reference Standard, 2.0R 14.0Y 0.1N (5¼")
134130	Lovibond RYBN Colour Reference Standard, 2.9R 22.0Y 0.5N (5 ¼")
Product Number	**Pt-Co/Hazen/APHA Colour Reference Standards**
PTCO000	Pt-Co/Hazen/APHA Colour Reference Standard, ASTM D 1209 (ASTM color 0)
PTCO005	Pt-Co/Hazen/APHA Colour Reference Standard, ASTM D 1209 (ASTM colour 5)
PTCO010	Pt-Co/Hazen/APHA Colour Reference Standard, ASTM D 1209 (ASTM colour 10)
PTCO015	Pt-Co/Hazen/APHA Colour Reference Standard, ASTM D 1209 (ASTM colour 15)

PTCO030	Pt-Co/Hazen/APHA Colour Reference Standard, ASTM D 1209 (ASTM colour 30)
PTCO050	Pt-Co/Hazen/APHA Colour Reference Standard, ASTM D 1209 (ASTM colour 50)
PTCO100	Pt-Co/Hazen/APHA Colour Reference Standard, ASTM D 1209 (ASTM colour 100)
PTCO500	Pt-Co/Hazen/APHA Colour Reference Standard, stock solution, ASTM D 1209 (ASTM colour 500)
1.00246	Platinum Cobalt Color Standard Solution (HAZEN 500), Pt 500 mg/L Certipur®
	Saybolt Colour Reference Standard
SAYB02	Saybolt Colour Reference Standard, ASTM D 6045, D 156 (ASTM colour 25)
SAYB06	Saybolt Colour Reference Standard, ASTM D 6045, D 156 (ASTM colour 12)
SAYB07	Saybolt Colour Reference Standard, ASTM D 6045, D 156 (ASTM colour 0)
SAYB08	Saybolt Colour Reference Standard, ASTM D 6045, D 156 (ASTM colour 10)
	Additional Color Standards & Ampoules
91711	Sigma-Aldrich Color Chart
CLR100	Color 100 Pt-Co Units Calibration Standard
CLR500	Color 500 Pt-Co Units Calibration Standard
42174	Ampoules 2 mL, for color reference solutions
72671	Ampoules 10 mL, for color reference solutions
1.14724	Empty cells with screw cap

The complete range of our color standards and accessories can be found at: Color Standards

5. UV/Vis Standards

Our UV/Vis standards are ideal for spectrophotometer calibration according to Ph. Eur specifications. They are suitable for general use following GLP, GMP, USP, ASTM and DIN ISO 9001:2008 method protocols.

Features & Benefits

- CRMs and analytical standard grade conforming to internationally recognized standards
- Traceability to NIST
- Manufactured according to USP & Ph.Eur
- Double-certified solutions according to ISO/IEC 17025 and ISO 17034
- Following parameters can be determined using UV-VIS standards according to Ph Eur:
  - Absorbance
  - Stray light
  - Spectral resolution power
  - Wavelength accuracy

Use our UV/Vis standards during:

- The qualification process:
  - At instrument installation (new, old, or existing unqualified instrument
  - After installation or major repair of an instrument
  - Periodically at specified intervals for each instrument
- The operation:
  - For quality control checks
  - For system suitability tests

Table 5 UV-Vis Standards

Product Number	Product Name
1.04660	UV-VIS Standard 1a: Potassium dichromate solution (600 mg/L), according to Ph. Eur. absorbance at 430 nm, Certipur®
1.08158	Potassium dichromate standard solutions in sulfuric acid (0.01N), test set for calibrating the absorbance of spectrophotometers
1.08159	Holmium perchlorate standard solution, for the calibration of spectrophotometers
1.08160	UV-VIS Standard 1: Potassium dichromate solution, according to Ph. Eur. absorbance, Certipur®
1.08161	UV-VIS Standard 2: Sodium nitrite solution, according to Ph. Eur. stray light testing, Certipur®
1.08163	UV-VIS Standard 3: Sodium iodide solution, according to Ph. Eur. stray light testing, Certipur®
1.08164	UV-VIS Standard 4: Potassium chloride solution, according to Ph. Eur. stray light testing, Certipur®
1.08165	UV-VIS Standard 5: Toluene solution in n-hexane, according to Ph. Eur. resolution power testing, Certipur®
1.08166	UV-VIS Standard 6: holmium oxide solution, reference material, according to Ph. Eur.

5.1. Color Measurement and Photometry according to DIN 5033, Part 9

Color measurement according to DIN 5033, part 9 specifications is possible using our primary reference material, Barium sulfate white standard. This has been certified by the PTB, National Metrological Institute of Germany.

Table 6. Certipur® white standard

Product Number	Product Name
1.01748	Barium sulfate white standard acc. to DIN 5033

6. Conductivity Standards

Our Certipur® reference materials for conductivity measurement are tested and certified by our own calibration lab, accredited according to ISO/IEC 17025. Additionally, we also have the ISO 17034 accreditation as reference material producer for conductivity standards.

Features & Benefits

- Fresh and ready-to-use solutions
- No risk of contamination or residues
- Includes batch-specific, detailed Certificate of Analysis (COA)
- Traceable to PTB and NIST. Traceability procedures included in the COA for Certipur® reference materials.

Certipur® Certified Conductivity Standards available in Practical Sachets

These conductivity sachets are designed for direct application into the field sample during environmental analysis (at the river or similar places). They are ideal for mobile analysis. In principle, you do not even need a beaker. To measure, the electrode can simply be inserted into the sachet.

Table 7. Conductivity Standards

Product Number	Product Name
60136	Potassium chloride solution, conductance standard B acc. to ISO 7888, KCl 0.01M
60138	Potassium chloride solution, conductance standard C acc. to ISO 7888, KCl 0.001M
60134	Potassium chloride solution, conductance standard C acc. to ISO 7888, KCl 0.1M
06811	Conductivity Standard, 200 µS/cm at 25 °C
56890	Conductivity Standard, 300 µS/cm at 25 °C
41303	Conductivity Standard, 400 µS/cm at 25 °C
06999	Conductivity Standard, 500 µS/cm at 25 °C, KCl <= 2.5 % T
06949	Conductivity Standard, 1000 µS/cm at 25 °C
51795	Conductivity Standard, 2000 µS/cm at 25 °C
44348	Conductivity Standard, 3000 µS/cm at 25 °C
59962	Conductivity Standard, 5000 µS/cm at 25 °C
51715	Conductivity Standard, 20000 µS/cm at 25 °C
03729	Conductivity Standard, 200000 µS/cm at 25 °C
56255	Conductivity Standard, 50000 µS/cm at 25 °C
59777	Conductivity Standard, 100000 µS/cm at 25 °C
66337	Conductivity Standard, 300000 µS/cm at 25 °C
67233	Conductivity Standard, 10000 µS/cm at 25 °C
91916	Conductivity Standard, 30000 µS/cm at 25 °C
COND25	Conductivity Standard - 25 µmhos/cm, certified reference material

Product Number	Product Name
COND50	Conductivity Standard - 50 µmhos/cm, certified reference material
COND600	Conductivity Standard - 600 µmhos/cm, certified reference material
COND75	Conductivity Standard - 75 µmhos/cm, certified reference material
COND1412	Conductivity Standard - 1412 µmhos/cm, certified reference material
COND147	Conductivity Standard - 147 µmhos/cm, certified reference material
COND2060	Conductivity Standard - 2060 µmhos/cm, certified reference material
COND12800	Conductivity Standard - 12800 mhos/cm, certified reference material
1.01810	Conductivity water (nominal 0 mS/cm), Test solution for measurement of electrolytic conductivity, traceable to PTB and NIST Certipur®
1.01811	Potassium chloride solution (0.0001 mol/L)
1.01557	Potassium chloride solution (0.001 mol/L)
1.01203	Potassium chloride solution (0.01 mol/L)
1.01254	Potassium chloride solution (0.1 mol/L)
1.01255	Potassium chloride solution (1 mol/L)
1.01586	Potassium chloride solution (0.001 mol/L), sachets
1.01553	Potassium chloride solution (0.01 mol/L), sachets
1.01554	Potassium chloride solution (0.1 mol/L), sachets

Discover our collection of conductivity standards:
Conductivity Standards

7. Particle Size Standards

Particle size standards are widely used in industrial, pharmaceutical, clinical, and scientific laboratories. They are used to calibrate a wide variety of particle measuring devices such as flow cytometers, coulter counters, disc centrifuges, electron microscopes, optical particle counters and fully automatic, image-based cell analysis devices.

Features & Benefits

- All products are traceable to the US NIST and/or the European Institute for Reference Materials and Measurements (IRMM).
- Only NIST and/or Bureau of Certified References (BCR) traceable reference materials are used for accurate sizing
- A certificate is supplied for each particle size, containing important particle data.

Explore the range of polydisperse particle size standards and sieve calibration standards from Whitehouse Scientific:

7.1. Polydisperse particle size standards

These NIST and NPL (National Physical Laboratory, UK) traceable standards are commissioned by the BCR. For certification of glass particles, several unambiguous primary methods such as microscopy, sieving, sedimentation, and coulter counter are used.

7.2. Sieve calibration standards

The sieve calibration standards from Whitehouse Scientific are used to calibrate sieves with traceabilities to NIST and NPL.

The calibration requires only about 2 minutes following a simple procedure: The glass microspheres are placed into the sieve which is shaken either manually or mechanically until an equilibrium has been reached and no particles pass through the sieve.

By weighing the sieve and the single-shot bottle before and after the calibration, the percentage of microspheres passing the sieve can be calculated and the mean aperture size of the sieve can thus be determined using the calibration graph supplied with the test certificate.

Table 8. Micro particle Size, Polydisperse and Sieve Standards

Product Number	Product Name
77006	Micro particles based on polymethacrylate, analytical standard, size: 60 µm
80177	Micro particle size standard based on polystyrene monodisperse, analytical standard, size: 2.0 µm
80304	Micro particle size standard based on polystyrene monodisperse, analytical standard, size: 3.0 µm
81494	Micro particle size standard based on polystyrene monodisperse, analytical standard, size: 4.0 µm
84192	Micro particle size standard based on polystyrene monodisperse, analytical standard, size: 8.0 µm
87466	Micro particle size standard based on polystyrene monodisperse, size: 9.0 µm
87896	Micro particle size standard based on polystyrene monodisperse, analytical standard, size: 20.0 µm
88511	Micro particle size standard based on polystyrene monodisperse, analytical standard, size: 12.0 µm
89756	Micro particle size standard based on polystyrene monodisperse, analytical standard, size: 6.0 µm
90515	Micro particles based on polymethacrylate, analytical standard, size: 8 µm
90875	Micro particles based on polymethacrylate, analytical standard, size: 1 µm
91329	Micro particles based on melamine resin, analytical standard, size: 3 µm
95523	Micro particles based on melamine resin, analytical standard, size: 8 µm
95531	Micro particle size standard based on polystyrene monodisperse, analytical standard, size: 30.0 µm
95538	Micro particles based on melamine resin, analytical standard, size: 12 µm
72822	Micro particle size standard based on polystyrene monodisperse, size: 10.0 µm
72938	Micro particle size standard based on polystyrene monodisperse, analytical standard, size: 1.0 µm
95581	Micro particle size standard based on polystyrene monodisperse, size: 0.2 µm
95585	Micro particle size standard based on polystyrene monodisperse, analytical standard, size: 0.5 µm
95611	Micro particles based on melamine resin, nile blue-marked, analytical standard, size: 10 µm
96003	Micro particles based on melamine resin, rhodamine B-marked, size: 10 µm
96062	Micro particles based on melamine resin, analytical standard, size: 10 µm
74161	Micro particles based on polymethacrylate, analytical standard, size: 50 µm
74214	Micro particles based on polymethacrylate, analytical standard, size: 100 µm
79807	Micro particles based on polystyrene, analytical standard, size: 25 µm
84135	Micro particles based on polystyrene, analytical standard, size: 30 µm
75776	Micro particles based on melamine resin, carboxylate-modified, size: 6 µm
74491	Micro particles based on polystyrene, analytical standard, size: 20 µm
74964	Micro particles based on polystyrene, analytical standard, size: 15 µm
56796	Micro particles based on silicon dioxide, size: 0.5 µm
56798	Micro particles based on silicon dioxide, size: 1.0 µm
56799	Micro particles based on silicon dioxide, size: 0.15 µm
66373	Micro particles based on silicon dioxide, size: 3 µm

Product Number	Product Name
55463	Micro particles based on polystyrene, dark blue, size: 10 µm
56314	Micro particles based on polystyrene, dark red, size: 1 µm
61946	Micro particles based on polystyrene, dark red, size: 10 µm
68553	Micro particles based on polystyrene, dark blue, size: 3 µm
90938	Micro particles based on polystyrene, dark blue, size: 100 µm
81715	Micro particles based on melamine resin, rhodamine B-marked, size: 8 µm
41295	Micro particles based on melamine resin, size: 2 µm
44054	Micro particles based on silicon dioxide, size: 5 µm
54375	Micro particles based on silicon dioxide, size: 4 µm
81108	Micro particles based on silicon dioxide, size: 2 µm

Product Number	Product Name
07091	Micro particle size standard based on polystyrene monodisperse, size: 200 µm
59336	Micro particle size standard based on polystyrene monodisperse, size: 100 µm
00239	Micro particles, magnetic, carboxy functionalized
53572	Micro particles, magnetic, amino functionalized
73371	Micro particles based on polymethacrylate, analytical standard, size: 4 µm
75845	Micro particles based on melamine resin, carboxylate-modified, size: 3 µm
77523	Micro particles based on polymethacrylate, analytical standard, size: 30 µm
49532	Micro particles, magnetic, streptavidin coated, particle size 1 µm < 0.1 µm
79195	Micro particles, magnetic, biotin coated, particle size 1 µm

8. Viscosity Standards

Accurate viscosity measurements are key to reliable calibration and validation of viscometers employed in various industries such as Food & Beverage, Paint & Coatings, Pharmaceutical and Petroleum.

Our viscosity standards from Paragon Scientific Ltd are appropriate to measure kinematic and dynamic viscosity values of viscometers. CRMs are traceable to international standards BS EN ISO / IEC 17025 and ISO 17034 according to UKAS accreditation.

We offer different types of viscosity standards:

1. **CCS Viscosity Standards (Cold Cranking Simulator):** Paragon ISO 17025 / ISO 17034 dual certified CCS Viscosity Standards are for the calibration and verification of analytical equipment used in Cold Cranking Simulator (CCS) oil testing to ASTM D5293 and SAE Specification J300.
2. **Cone & Plate Viscosity Standards (CAP):** Paragon ISO 17025 / ISO 17034 dual certified Cone and Plate Viscosity Standards are specifically formulated for the paint and coatings industry and represent the most comprehensive range of standards available for this application.
3. **General Purpose Viscosity Standards:** Paragon ISO 17025 / ISO 17034 dual certified General Purpose Viscosity Standards are tested in strict accordance with ASTM D2162, ("Standard Practice for basic calibration of master viscometers and viscosity standard oils").
4. **Flow Cup Viscosity Standards:** Paragon ISO 17025 / ISO 17034 dual certified flow cup standards are especially designed for use in DIN, Ford, ISO, Shell and Zahn flow cups. Certified at 20°C and 25°C, each value is tested to ASTM D2162 for viscosity measurement and ASTM D1480 for density measurement.
5. **High Temperature Viscosity Standards:** Paragon ISO 17025 / ISO 17034 dual certified High Temperature Viscosity Standards are manufactured for temperatures between 20 °C and 150 °C and provide data for kinematic viscosity, dynamic viscosity and density.
6. **High Temperature Viscosity Standards, 100 to 150 °C:** We also manufacture a range of High Temperature Viscosity Standards specifically for temperatures between 100 and 150 °C. These are dual certified to ISO 17034 and ISO 17025 and are specially formulated to provide values for kinematic viscosity, dynamic viscosity and density.
7. **Low Temperature Viscosity Standards:** These standards are widely used for the verification of viscometers at sub-zero temperatures on routine basis. The use of Paragon ISO 17025 / ISO 17034 dual certified, low temperature standards can help provide confidence in overall system functionality including bath uniformity, bath stability, temperature measurement, timer accuracy and viscometer calibration.

Product Number	Product Name
05724	Polydisperse Particle Standard, Particle Size Standard, PS201, 10 x 0.05 g, 3-30 µm
08718	Polydisperse Particle Standard, Particle Size Standard, PS315, 10 x 1.0 g, 10-100 µm
12655	Sieve Standard, traceable to NIST SRM, 45 µm (325 mesh)
40579	Polydisperse Particle Standard, Particle Size Standard, PS314, 10 x 0.50 g, 10-100 µm
42459	Polydisperse Particle Standard, Particle Size Standard, PS192, 10 x 0.10 g, 1-10 µm
42696	Sieve Standard, traceable to NIST SRM, 75 µm (200 mesh)
49500	Sieve Standard, traceable to NIST SRM, 63 µm (230 mesh)
57563	Polydisperse Particle Standard, Particle Size Standard, PS224, 10 x 0.50 g, 50-350 µm

Product Number	Product Name
78456	Polydisperse Particle Standard, Particle Size Standard, PS226, 10 x 2.5 g, 50-350 µm
78900	Sieve Standard, traceable to NIST SRM, 500 µm (35 mesh)
80847	Polydisperse Particle Standard, Particle Size Standard, PS213, 10 x 0.25 g, 10-100 µm
94078	Polydisperse Particle Standard, Particle Size Standard, PS202, 10 x 0.10 g, 3-30 µm
94773	Polydisperse Particle Standard, Particle Size Standard, PS235, 10 x 2.5 g, 150-650 µm

View our diverse list of particle size standards:
Particle Size Standards

8. **Medical Viscosity Standards:** Tested in strict accordance with ASTM D2162, the primary method for viscosity standards calibration. These medical grade viscosity standards are fully traceable to national standards and are also test equipment compatible. Typically used, but not limited to, the calibration and verification of viscosity measuring equipment.
9. **Mineral Oil Rotational Viscosity Standards:** Paragon Scientific's Mineral Oil Rotational Viscosity Standards are the first-choice option where end users are unable to have silicone in their process. Dual certified to both ISO 17025 and ISO 17034 under UKAS accreditation, they provide both calibration and verification options for rotational viscometer test equipment. The dynamic viscosity at 20 & 25 °C is derived from the kinematic viscosity measured in strict accordance with ASTM D2162 and the density measured in strict accordance with ASTM D1480. Dynamic viscosity at intermediate temperatures is derived from the kinematic viscosity calculated in strict accordance with ASTM D341 and interpolated density measurements by calculation.
10. **Small Sample Viscosity Standards - ASTM D7279:** These standards are certified in strict accordance with ASTM D2162 at 40 °C and 100 °C under our ISO 17025 and ISO 17034 accreditation and have been manufactured specifically for the users of ASTM D7279, Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids by Automated Houillon Viscometer and other similar type test equipment.
11. **Silicone Rotational Viscosity Standards:** Paragon ISO 17025 / ISO 17034 dual certified Silicone Rotational Viscosity Standards are specifically formulated for use with rotational viscometers.

We also offer Certified Viscosity Check Oils & Bath Media:

- **Certified Viscosity Check Oils:** Paragon Scientific's range of Certified Viscosity Check Oils are manufactured and certified in accordance with the requirements of ISO 17025 and ISO 17034. Kinematic viscosity measurements have been made in accordance with ASTM D445, using Reference Viscometers certified in accordance with ASTM D446 and ASTM D2162. Density, Cold-Crank Simulator (CCS) and Viscosity Index measurements have been made in accordance with ASTM D4052, ASTM D5293 and ASTM D2270 respectively.
- **Bath Media:** Paragon bath fluids are formulated using high quality raw materials that facilitate optimum visibility, maximum heat stability and efficiency of thermostatic baths. The low viscosity aids dissipation of air bubbles which can lead to detection problems in automatic systems and ensures bath stability and uniformity are optimised.
- **Silicone Fluid Bath Media:**
- Silicone Fluid Bath Media available for use at range of temperatures: 20 to 60 °C, 50 to 100 °C, 90 to 135 °C, and 120 to 150 °C
- Kinematic viscosity (cSt) values at 25 °C

Browse our extensive portfolio of viscosity standards:
Viscosity Standards

9. Turbidimetry Standards

The measurement of turbidity is an important method in water quality testing. Simply stated, turbidity is the measure of relative sample clarity. Turbidity can be expressed in nephelometric turbidity units (NTU).

Check out our turbidity standards for use in calibration and in checking the accuracy of your turbidity measurement instruments.

Features & Benefits

- Analysis range: 0.5-4000 NTU
- Quality grade: CRM
- Traceable to the SI and higher order standards from NIST

Explore our turbidity standards: Turbidity Standards

Table 9. Turbidimetry Standards

Product Number	Product Name
TURB500	Turbidity 500 NTU Calibration Standard - Formazin
TURB50	Turbidity 50 NTU Calibration Standard - Formazin
TURB5	Turbidity 5 NTU Calibration Standard - Formazin
TURB05	Turbidity 0.5 NTU Calibration Standard - Formazin
TURB1000	Turbidity 1000 NTU Calibration Standard - Formazin
TURB100	Turbidity 100 NTU Calibration Standard - Formazin
TURB10	Turbidity 10 NTU Calibration Standard - Formazin
TURB1	Turbidity 1 NTU Calibration Standard - Formazin
TURB20	Turbidity 20 NTU Calibration Standard - Formazin
TURB2	Turbidity 2 NTU Calibration Standard - Formazin
TURB4000	Turbidity 4000 NTU Calibration Standard - Formazin
TURB4	Turbidity 4 NTU Calibration Standard - Formazin

10. Melting Point Standards

Melting point is a useful property for identification of compounds and estimation of purity. We have a range of melting point standards that guarantee reliable performance of melting point equipment.

Features & Benefits

- Traceable to primary standards (LGC, London)
- Grade: Analytical Standard
- Provided with Certificates of Analysis and Safety Data Sheet
- Two modes for melting point evaluation:
  - The Pharmacopeia mode
  - The Thermodynamic mode

Explore our melting point standards: Melting Point Standards

Learn about the two popular modes of melting point evaluation, along with the European Pharmacopoeia's approved method from this extensive technical flyer: The Melting Point Standards Technical Flyer

Table 10. Melting Point Standards

Product Number	Product Name
73664	Mettler-Toledo Calibration substance ME 18870, Benzophenone for the calibration of the thermosystem 900, traceable to primary standards (LGC)
73983	Mettler-Toledo Calibration substance ME 18555, Benzoic acid analytical standard, for the calibration of the thermosystem 900, traceable to primary standards (LGC)
75035	Mettler-Toledo Calibration substance ME 18872, Caffeine analytical standard, for the calibration of the thermosystem 900, traceable to primary standards (LGC)
76170	Melting point standard 121-123 °C, analytical standard
01422	Melting point standard 79-81 °C, analytical standard
41019	Melting point standard 235-237 °C, analytical standard
42183	Melting point standard 182-184 °C, analytical standard
50296	Melting point standard 47-49 °C, analytical standard
67372	Melting point standard 283-286 °C, analytical standard

Product Number	Product Name
41131	Mettler-Toledo Calibration substance ME 51143091, Saccharin, traceable to primary standards (LGC)
49143	Mettler-Toledo Calibration substance ME 51143095, Potassium nitrate, traceable to primary standards (LGC)
77634	Mettler-Toledo Calibration substance ME 51143093, Vanillin, traceable to primary standards (LGC)
44770	Mettler-Toledo Calibration substance ME 30034252, Phenyl salicylate, traceable to primary standards

Product Number	Product Name
15809	Mettler-Toledo Calibration substance ME 30130597, p-Toluamide, traceable to primary standards (LGC)
04229	Mettler-Toledo Calibration substance ME 30130610, Sodium methanesulfonate, traceable to primary standards LGC
42123	Mettler-Toledo Calibration substance ME 30130599, Sodium acetate anhydrous, traceable to primary standards (LGC)
94993	Mettler-Toledo Calibration substance ME 30130598, Methyltriphenylphosphoniumbromide, traceable to primary standards (LGC)

11. Density standards

The use of density reference standards to calibrate density meters assures good laboratory practices (GLP) compliance and traceability to recognized national standards of mass, temperature, and pressure. Along with high-quality CRMs from Paragon Scientific Ltd., we also offer a collection of liquid density analytical standards from the respected density metrologists, H&D Fitzgerald Ltd.

Features & Benefits

- Manufactured using UKAS-accredited hydrostatic weighing system
- Used to determine the accuracy of instrument and / or procedure of an analytical method
- CRMs and Analytical standard grade, tested following ASTM D4052 and ISO 12185 guidelines
- Certified according to ISO 17025 / 17034 specifications under UKAS between 15 °C to 150 °C

Table 11. Density standards

Product Number	Product Name
CRMDEGO	Density Standard, ASTM D 4052; ISO 12185 (0.83294 g/mL, 15 °C)
CRMUDEGO	Density Standard, ASTM D 4052; IP 365 / ISO 12185 (0.8355 g/mL, 15 °C)
CRMDEGA	Density Standard, ASTM D 4052; ISO 12185 (0.73576 g/mL, 15 °C)
CRMDEKR	Density Standard, ASTM D 4052; ISO 12185 (0.7933 g/mL, 15 °C)
DEN10001	Density Standard (100 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.768 g/mL, 100 °C
DEN10003	Density Standard (100 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8541 g/mL, 100 °C
DEN15001	Density Standard (150 °C), UKAS ISO/IEC17025 and ISO Guide 34 certified, 0.7324 g/mL at 150 °C
DEN15002	Density Standard (150 °C), UKAS ISO/IEC17025 and ISO Guide 34 certified, 0.7795 g/mL at 150 °C
DEN15003	Density Standard (150 °C), UKAS ISO/IEC17025 and ISO Guide 34 certified, 0.8277 g/mL at 150 °C
DEN1501	Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.6643 g/mL at 15 °C
DEN1503	Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8118 g/mL at 15 °C
DEN1504	Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8118 g/mL at 15 °C
DEN1507	Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8782 g/mL at 15 °C
DEN1508	Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.9413 g/mL at 15 °C
DEN1509	Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.9829 g/mL at 15 °C
DEN1510	Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.0269 g/mL at 15 °C
DEN1511	Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.0695 g/mL at 15 °C
DEN1513	Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.1963 g/mL at 15 °C
DEN1514	Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.2878 g/mL at 15 °C
DEN2001	Density Standard (20 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.6597 g/mL at 20 °C
DEN2002	Density Standard (20 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.7264 g/mL at 20 °C
DEN2003	Density Standard (20 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.7788 g/mL at 20 °C
DEN2004	Density Standard (20 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8383 g/mL at 20 °C
DEN2005	Density Standard (20 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8556 g/mL at 20 °C
DEN2006	Density Standard (20 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8708 g/mL at 20 °C
DEN2007	Density Standard (20 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.9376 g/mL at 20 °C
DEN2008	Density Standard (20 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.9817 g/mL at 20 °C
DEN2009	Density Standard (20 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.0257 g/mL at 20 °C
DEN2010	Density Standard (20 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.0677 g/mL at 20 °C
DEN2507	Density Standard (25 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.9803 g/mL at 25 °C
DEN2508	Density Standard (25 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.0242 g/mL at 25 °C

Product Number	Product Name
DEN2509	Density Standard (25 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.0657 g/mL at 25 °C
DEN2510	Density Standard (25 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.1233 g/mL at 25 °C
DEN2012	Density Standard (20 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.1917 g/mL at 20 °C
DEN2013	Density Standard (20 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.2849 g/mL at 20 °C
DEN2014	Density Standard (20 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.6226 g/mL at 20 °C
DEN2502	Density Standard (25 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.7223 g/mL at 25 °C
DEN2503	Density Standard (25 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.775 g/mL at 25 °C
DEN2504	Density Standard (25 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8349 g/mL at 25 °C
DEN2512	Density Standard (25 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.2819 g/mL at 25 °C
DEN4001	Density Standard (40 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.6415 g/mL at 40 °C
DEN4003	Density Standard (40 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.794 g/mL at 40 °C
DEN4004	Density Standard (40 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8247 g/mL at 40 °C
DEN4005	Density Standard (40 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8706 g/mL at 40 °C
DEN5001	Density Standard (50 °C), UKAS ISO/IEC17025 and ISO Guide 34 certified, 0.787 g/mL at 50 °C
DEN5002	Density Standard (50 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8269 g/mL at 50 °C
DEN5003	Density Standard (50 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8649 g/mL at 50 °C
DEN6001	Density Standard (60 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.796 g/mL at 60 °C
DEN6003	Density Standard (60 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8675 g/mL at 60 °C
DEN8001	Density Standard (80 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.7823 g/mL at 80 °C
DEN8002	Density Standard (80 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8227 g/mL at 80 °C
DEN8003	Density Standard (80 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8568 g/mL at 80 °C
DENWAT	Pure Water Density Standard, UKAS ISO/IEC17025 and ISO Guide 34 certified, 0.9982 g/mL at 20 °C, 0.9970 g/mL at 25 °C
DENWAT3	Pure Water Density Standard, UKAS ISO/IEC17025 and ISO Guide 34 certified, 0.9982 g/mL at 20 °C, 0.9970 g/mL at 25 °C
CRMUDEGA	Density Standard, ASTM D 4052; IP 365 / ISO 12185 (0.7377 g/mL, 15 °C)
CRMUDEKR	Density Standard, ASTM D4052; ISO 12185 (0.79672 g/mL, 15 °C)
DEN10002	Density Standard (100 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8103 g/mL at 100 °C
DEN4002	Density Standard (40 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.7097 g/mL at 40 °C
DEN1506	Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8628 g/mL at 15 °C
DEN1512	Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.1283 g/mL at 15 °C
DEN2011	Density Standard (20 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 1.1258 g/mL at 20 °C

Product Number	Product Name
DEN6002	Density Standard (60 °C), UKAS ISO/IEC17025 and ISO 17034 certified, 0.8243 g/mL at 60 °C
DEN2511	Density Standard (25 °C)UKAS ISO/IEC17025 and ISO 17034 certified, 1.1869 g/mL at 25 °C
76081	Density Standard 749 kg/m3, H&D Fitzgerald Ltd. Quality
76731	Density Standard 870 kg/m3, H&D Fitzgerald Ltd. Quality
89353	Density Standard 1191 kg/m3, H&D Fitzgerald Ltd. Quality
12156	Density Standard 998 kg/m3, H&D Fitzgerald Ltd. Quality
15889	Density Standard 1623 kg/m3, H&D Fitzgerald Ltd. Quality
44964	Density Standard 692 kg/m3, H&D Fitzgerald Ltd. Quality
36232	Density Standard 1251 kg/m3, H&D Fitzgerald Ltd. Quality

11.1 Relative Density Standards

Paragon ISO 17025 / ISO 17034 Relative Density Standards are designed for the calibration or verification of instruments used to measure density and relative density of materials at the desired test temperature within the range of 15 °C to 25 °C. All density measurements are made in accordance with ASTM D1480, for density and relative density (specific gravity).

Table 12. Relative Density standards

Product Number	Product Name
RDEN2501	Relative Density Standard (25 °C), UKAS ISO/IEC17025 and ISO 17034 certified, Relative Density 25/4 0.6552 at 25 °C
RDEN2505	Relative Density Standard (25 °C), UKAS ISO/IEC17025 and ISO 17034 certified, Relative Density 25/4 0.8693 at 25 °C
RDEN2503	Relative Density Standard (25 °C), UKAS ISO/IEC17025 and ISO 17034 certified, Relative Density 25/4 0.7730 at 25 °C
RDEN2504	Relative Density Standard (25 °C), UKAS ISO/IEC17025 and ISO 17034 certified, Relative Density 25/4 0.8366 at 25 °C
RDEN2501	Relative Density Standard (25 °C), UKAS ISO/IEC17025 and ISO 17034 certified, Relative Density 25/4 0.6552 at 25 °C
RDEN1501	Relative Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, Relative Density 15/4 0.6643 at 15 °C
RDEN1502	Relative Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, Relative Density 15/4 0.7186 at 15 °C
RDEN1503	Relative Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, Relative Density 15/4 0.7807 at 15 °C
RDEN1504	Relative Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, Relative Density 15/4 0.8163 at 15 °C
RDEN1505	Relative Density Standard (15 °C), UKAS ISO/IEC17025 and ISO 17034 certified, Relative Density 15/4 0.8494 at 15 °C

Product Number	Product Name
RDEN1506	Relative Density Standard (15 °C), UKAS ISO/ IEC17025 and ISO 17034 certified, Relative Density 15/4 0.8642 at 15 °C
RDEN1507	Relative Density Standard (15 °C), UKAS ISO/ IEC17025 and ISO 17034 certified, Relative Density 15/4 0.8797 at 15 °C
RDEN2006	Relative Density Standard (20 °C), UKAS ISO/ IEC17025 and ISO 17034 certified, Relative Density 20/4 0.8723 at 20 °C
RDEN2001	Relative Density Standard (20 °C), UKAS ISO/ IEC17025 and ISO 17034 certified, Relative Density 20/4 0.6597 at 20 °C

Product Number	Product Name
RDEN2002	Relative Density Standard (20 °C), UKAS ISO/ IEC17025 and ISO 17034 certified, Relative Density 20/4 0.7145 at 20 °C
RDEN2003	Relative Density Standard (20 °C), UKAS ISO/ IEC17025 and ISO 17034 certified, Relative Density 20/4 0.7769 at 20 °C
RDEN2004	Relative Density Standard (20 °C), UKAS ISO/ IEC17025 and ISO 17034 certified, Relative Density 20/4 0.8400 at 20 °C
RDEN2005	Relative Density Standard (20 °C), UKAS ISO/ IEC17025 and ISO 17034 certified, Relative Density 20/4 0.8452 at 20 °C

Explore more on our density and relative density standards: Density and Relative Density Standards

12. Total Suspended Solids (TSS)

TSS standards are used to measure total suspended solids or total dissolved salts in aqueous solution. We supply standards for measurements in the range of 5 mg/L to 1000 mg/L.

Features & Benefits

- CRMs certified following ISO/IEC 17025 and ISO 17034
- Traceable to SI and higher order standards from NIST
- Delivered with a certificate of analysis including all information on use of the CRM
- Assigned value based on a purity determination by mass balance and gravimetrically prepared value

See our complete list of total suspended solids: Total Suspended Solids

Table 13. Total Suspended Solids

Product Number	Product Name
TDS1000	Total Dissolved Solids 1000 mg/L Calibration Standard
TDS1500	TDS 1500 mg/L Calibration Std
TSS1000	Total Suspended Solids 1000 mg/L Calibration Standard
TSS100	Total Suspended Solids 100 mg/L Calibration Standard
TSS10	Total Suspended Solids 10 mg/L Calibration Standard
TSS5	Total Suspended Solids 5 mg/L

13. Additional Physical Properties

We have a wide array of physical property standards in our offering that enable measurements including water hardness, distillation, and fuel testing—namely, aniline point and freezing point.

Fuel testing and distillation CRMs are suitable to standardize laboratory instruments used to analyze petroleum and derivatives. Distillation standards are applicable for distillation at atmospheric pressure following ASTM D86, IP 123, ISO 3405 and other similar international guidelines. Water hardness standards are employed in the testing and performance monitoring of hardness instruments.

Features & Benefits

- Certified in accordance with ISO 17034 under accreditation by UKAS
- Fully traceable to the SI and higher order standards from NIST
- Guaranteed inter-laboratory correlation
- Low uncertainty values ensuring highest data accuracy
- Quality grades: CRM and analytical standard grade

Table 14. Additional physical property standards

Product Number	Product Name
Z804185	Polystyrene calibration films for IR, NIST traceable
Z804290	Polystyrene calibration films for IR, Ph.Eur. certified
HARD1000	Hardness, Calcium 1000 mg/L Calibration Standard
THRD1000	Hardness, Total 1000 mg/L Calibration Standard
CRMUDIGO	Distillation Standard, ASTM D 86; IP 23 / ISO 3405 (168.5-360.1 °C)
CRMDIGO	Distillation Standard
CRMDIGA	Distillation Standard, ASTM D 86; NF EN ISO 3405 (30-178.6 °C)
CRMUDIKR	Distillation Standard, ASTM D 86; NF EN ISO 3405 (148.1 - 260.3 °C)
CRMUMPGO	Diesel, Multi-Parameter Certified Reference Material
CRMAPKR	Aniline Point Standard, ASTM D 611 (62.30 °C)
CRMUAPKR	Aniline Point Standard, ASTM D 611 (58.90 °C)
CRMUPPGO	Pour Point Standard, IP15, ASTM D97, ISO 3016, BS 2000, Pt 15 (-34 °C)
CRMUPPLU	Pour Point Standard, IP15, ASTM D97, ISO 3016, BS 2000, Pt 15
CRMUCFGO1	CFPP Standard, CFPP ASTM D 6371; EN 116 / IP 309 (-17.4 °C)
CRMUFRKR	Freezing Point Standard, ASTM D 2386 (-54.1 °C)
CRMUCPGO	Cloud Point Standard
CRMCNGO	Cetane Number Standard
CRMADKR	Acidity Standard, ASTM D 3242 (0.0021 mg KOH/g)- move to “Certified Reference Materials “ under fuels testing
CRMUADKR	Acidity Standard, ASTM D 3242 (0.0083 mg KOH/g))- move to “Certified Reference Materials “ under fuels testing

14. Flash Point Standards

We offer certified flash point standards from Paragon Scientific Ltd for verification of laboratory instruments and routine monitoring of quality of your petroleum-based products.

Features & Benefits

Based on the flash point method where these standards are used, they are categorized into 2 types:

ASTM D92 Cleveland Open Cup Flash Point CRM	ASTM D93 (Procedure A) Pensky- Martens Closed Cup Flash Point CRM
CRM for annual verification	CRM for annual verification
checks in accordance with ASTM D92	checks in accordance with ASTM D93
Certified in strict accordance with ISO 17025 / ISO 17034 under our UKAS accreditations by a means of a method specific inter-laboratory study	Certified in strict accordance with ISO 17025 / ISO 17034 under our UKAS accreditations by a means of a method specific inter-laboratory study
Fully traceable to international standards	Fully traceable to international standards

Some other common standardized test methods for measuring flash point are Pensky-Martens closed cup (ASTM D93; IP 34), Cleveland Open Cup (ASTM D92; IP 36), TAG (ASTM D56) and Abel (IP 170, IP 304) closed cup methods.

Table 15. Flash Point Standards

Product Number	Product Name
ASTM D92 Cleveland Open Cup Flash Point Certified Reference Material	
FPCOC1	Flash Point Standard - Cleveland Open Cup, ASTM D 92 (85 °C)
FPCOC3	Flash Point Standard - Cleveland Open Cup, ASTM D 92 (148 °C)
FPCOC4	Flash Point Standard - Cleveland Open Cup, ASTM D 92 (188 °C)
FPCOC5	Flash Point Standard - Cleveland Open Cup, ASTM D 92 (257 °C)
FPCOC6	Flash Point Standard - Cleveland Open Cup, ASTM D 92 (112 °C)
CRMCOCHIGH	Flash Point Standard, COC ASTM D 92 (262.0 °C)
CRMCOCLOW	Flash Point Standard, COC ASTM D 92 (85.0 °C)
CRMCOCMID	Flash Point Standard, COC ASTM D 92 (153.0 °C)
ASTM D93 (Procedure A) Pensky- Martens Closed Cup Flash Point CRMs	
CRMUPMLUB	Flash Point Standard, PMCC ASTM D 93 Proc B (105.7 °C)
CRMUPMCCMID	Flash Point Standard, PMCC ASTM D 93 Proc A (141.0 °C)
CRMUPMCCHIGH	Flash Point Standard, PMCC ASTM D 93 Proc A (228.0 °C)
CRMUPMCCLOW	Flash Point Standard, PMCC ASTM D 93 Proc A (77.5 °C)
CRMUPMGO	Flash Point Standard, PMCC ASTM D 93 Proc A (57.3 °C)
FPPMCC2	Flash Point Standard - Pensky Martens, ASTM D 93 Proc. A (76.5 °C)

Product Number	Product Name
ASTM D93 (Procedure A) Pensky- Martens Closed Cup Flash Point CRMs (Continued)	
FPPMCC3	Flash Point Standard - Pensky Martens, ASTM D 93 Proc. A (116.0 °C)
FPPMCC4	Flash Point Standard - Pensky Martens, ASTM D 93 Proc. A (143.0 °C)
FPPMCC5	Flash Point Standard - Pensky Martens, ASTM D 93 Proc. A (184.0 °C)
FPPMCC6	Flash Point Standard - Pensky Martens, ASTM D 93 Proc. A (232.0 °C)
Flash Point Standards for other methods	
FPPMCC1	Flash Point Standard - Pensky Martens
CRMUABKR	Flash Point Standard, Abel IP 170 (41.2 °C)
CRMUFCLU	Flash Point Standard, COC ASTM D 92 (256.8 °C)
CRMUPMLU	Flash Point Standard, PMCC ASTM D 93 Proc B (190.5 °C)
CRMABKR	Flash Point Standard, Abel IP 170 (41.9 °C)
CRMTAKR	Flash Point Standard, TAG ASTM D56 (43.1 °C)

Find a complete list of our flash point reference materials: Flash Point Standards

15. Acidity/Total Acid Number (TAN) Standard

Paragon TAN CRMs are specifically manufactured for the verification of analytical instruments used to determine acid number by potentiometric titration.

Features & Benefits

- Tested and certified in accordance with ASTM D664/IP 177 (Total Acid Number Standards) & ASTM D 3242/IP 354 (Acidity Standards)
- Manufacture and certification processes are carried out in strict accordance with Paragon Scientific's dual UKAS accreditations to ISO 17025 & ISO 17034

Click below to discover the complete list of acidity/total acid number (TAN) reference materials:
Acidity/total acid number (TAN) Standards

Table 16. Acidity/TAN Standards

Product Number	Product Name
TAN030	Total Acid Number Standard, ASTM D664 (2.93 mg KOH/g)
TAN001	Total Acid Number Standard, ASTM D664 (0.10 mg KOH/g)
TAN025	Total Acid Number Standard, ASTM D664 (2.48 mg KOH/g)
TAN005	Total Acid Number Standard, ASTM D664 (0.49 mg KOH/g)
TAN015	Total Acid Number Standard, ASTM D664 (1.54 mg KOH/g)
TAN050	Total Acid Number Standard, ASTM D664 (4.57 mg KOH/g)

16. Alkalinity or Total Base Number (TBN) Standards

Our TBN CRMs from Paragon Scientific Ltd. are specifically manufactured for the verification of TBN by potentiometric titration, a technique used in, but not limited to, the analysis of used oils and lubricants.

Features & Benefits

- Tested and certified in accordance with ASTM D2896/IP 276
- The manufacture and certification processes are carried out in strict accordance with Paragon Scientific's dual UKAS accreditations to ISO 17025 & ISO 17034
- This dual accreditation ensures the highest level of accreditation guarantee and provides the most credible certified data available worldwide.

Table 17. Alkalinity/TBN Standards

Product Number	Product Name
TBN10	Alkalinity Standard, Total Base number Standard ASTM D2896 (10.01 mg KOH/g)
TBN 1	Total Base number Standard ASTM D2896 (0.99 mg KOH/g)
TBN30	Total Base number Standard ASTM D2896 (30.17 mg KOH/g)
TBN 3	Total Base number Standard ASTM D2896 (3.01 mg KOH/g)
TBN6	Total Base number Standard ASTM D2896 (6.06 mg KOH/g)
TBN70	Total Base number Standard ASTM D2896 (70.24 mg KOH/g)
TBN15	Total Base number Standard ASTM D2896 (15.17 mg KOH/g)

Explore our alkalinity/total base number (TAN) standards: Alkalinity/Total Base Number Standards

17. Refractive Index Standards

We offer Refractive Index standards CRMs manufactured by Paragon Scientific Ltd.

Features & Benefits

- All measurements are fully traceable to NIST and international protocols
- CRM grade standards ideal for the verification and calibration of temperature-controlled refractometers
- Certified values for refractive Index measurements at 20 °C, 25 °C and 30 °C.

Table 18. Refractive Index Standards

Product Number	Product Name
PSRI01	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI01K	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI02	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI02K	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI03	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI03K	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI04	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI04K	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI05	Refractive Index Standard at 20 °C,25 °C, and 30 °C
PSRI05K	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI06	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI06K	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI08	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI08K	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI09	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI09K	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI10	Refractive Index Standard at 20 °C, 25 °C, and 30 °C

Product Number	Product Name
PSRI10K	Refractive Index Standard at 20 °C, 25 °C, and 30 °C
PSRI07	Refractive Index Standard at 20 °C 25 °C and 30 °C
PSRI07K	Refractive Index Standard at 20 °C 25 °C and 30 °C
5.00400	Refractive index standard
5.00405	Refractive index standard
5.00410	Refractive index standard
5.00420	Refractive index standard
5.00430	Refractive index standard
5.00440	Refractive index standard
5.00450	Refractive index standard
5.00460	Refractive index standard
1.08962	Refractive index standard Kit 1
1.08961	Refractive index standard Kit 2

Find detailed information about refractive index standards in Analytix Reporter Journal Issue 4/2018 (page no. 28). Subscribe to Analytix Reporter and download all issues at **SigmaAldrich.com/analytix**.

18. Refractive Index and Density Multi-Parameter CRMs

Paragon Scientific manufactured Index and Density Certified Reference Materials provide a flexible, cost-effective and efficient solution for any laboratory calibrating and/or verifying refractive index and density measurements – from a single material.

Table 19 Refractive Index and Density Multi-Parameter CRMs

Product Number	Product Name
PSRVD01	Multi-Parameter Refractive Index Density Certified Reference Material at 15 °C, 20 °C and 25 °C, Single 30 mL
PSRVD02	Multi-Parameter Refractive Index Density Certified Reference Material at 15 °C, 20 °C and 25 °C, Single 30 mL

Product Number	Product Name
PSRVD03	Multi-Parameter Refractive Index Density Certified Reference Material at 15 °C, 20 °C and 25 °C, Single 30 mL
PSRVD04	Multi-Parameter Refractive Index Density Certified Reference Material at 15 °C, 20 °C and 25 °C, Single 30 mL

19. Redox Standards

Our redox standards from Reagecon are employed as control standards rather than calibration standards because redox electrodes do not need calibration. Such standards not only control the functionality of the sensing and reference electrodes but also control the analyst's technique, environmental conditions, and the operation of the measurement meter (pH meter in millivolt (mV) mode).

Features & Benefits

- Broad range of values (124 mV – 650 mV)
- Detailed Safety Data Sheets available online
- Certified with proven verifiable accuracy and uncertainty of measurement

Find our complete collection of redox standards:
Redox Standards

Table 20. Redox Standards

Product Number	Product Name
04887	Redox standard, 124 mV
13198	Redox standard, 250 mV
40661	Redox standard, 200 mV
80138	Redox standard, 600 mV
87783	Redox standard, 650 mV
78855	Redox standard, 465 mV

20. Biological Oxygen Demand (BOD)/ ChemicalOxygen Demand (COD) and Total Organic Carbon (TOC) Standards

BOD is the amount of oxygen consumed by the microorganisms to decompose the organic matter in wastewater. COD is the measure of the amount of oxygen that would be required to oxidize organic pollutants present in water or wastewater. TOC has become an important parameter used to monitor overall levels of organic compounds present in wastewater in terms of total carbon content.

For these analyses, we provide CRMs and analytical grade standards as ready-to-use solutions for calibration purposes and as CRM matrix materials.

Table 21. BOD/COD, TOC Standards

Product Number	Product Name
1.09017	TOC standard solution, according to EN 1484-H3, according to DIN 38409-H3, potassium hydrogen phthalate water 1000 mg/L stabilized, Certipur®
70961	TOC standard, according to ISO/CEN EN1484, 100 mg/L +/- 5 mg/L
76067	TOC standard, according to ISO/CEN EN1484, 1000 mg/L +/- 10 mg/L
76319	TOC standard, according to ISO/CEN EN1484, 500 mg/L +/- 10 mg/L
90326	TOC standard, according to ISO/CEN EN1484, 25 mg/L +/- 2 mg/L
94450	TOC standard, according to ISO/CEN EN1484, 50 mg/L +/- 2 mg/L
95781	TOC standard, according to ISO/CEN EN1484, 250 mg/L +/- 5 mg/L
TOC1000	TOC 1000 mg/L Calibration Standard, certified reference material
TOC100	TOC 100 mg/L Calibration Standard, certified reference material
BOD200	BOD 200 mg/L Calibration Standard, certified reference material
BOD500	BOD 500 mg/L Calibration Standard, certified reference material

Product Number	Product Name
COD500	COD 500 mg/L Calibration Standard, certified reference material
BOD1000	BOD 1000 mg/L Calibration Standard, certified reference material
BOD2000	BOD 2000 mg/L Calibration Standard, certified reference material

Product Number	Product Name
A-2045-040	TOC-Calibration Kit, 25 mg TOC
A-2050-040	TOC-Calibration Kit, 50 mg TOC
1.00718	BOD Standard, EN 1899 analogous, 190-230 mg/L, 10 1L, Spectroquant®

21. Gel Permeation Chromatography (GPC) Standards

We offer a range of GPC standards which are mainly used to calibrate the instrument for the GPC analysis. Gel permeation chromatography/size-exclusion chromatography (GPC/SEC) standards can be used in general to validate a system, a detector, or to verify your own operational procedures. Another important application of these standards is to create a GPC/SEC calibration curve which helps in:

- determine molar mass distributions and averages for unknown samples
- measure pore sizes for porous materials
- quantify the resolution of GPC/SEC columns

Explore our GPC Standards: GPC Standards

Pullulan Standards: Pullulan Standards are certified reference Material grade standards. They are mostly used to obtain molecular mass distribution of cellulosic samples. It mainly consists of polymaltotriose units linked together by α-(1→6) linkages.

Explore our Pullulan Standards: Pullulan Standards

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