



A CALIBRE SCIENTIFIC COMPANY



ISO 17034 Certified
Reference Materials (CRMs)

Conductivity Standards

pH Buffer Solutions

Sucrose in Water (Brix) Standards



## **About Reagecon**

Reagecon, part of the Calibre Scientific Group of companies is one of the largest producers of Physical and Chemical Standards. The company is based in an 8,000 sq. metre facility that includes a large suite of manufacturing, Quality Control and Research and Development laboratories in Shannon, Ireland with sales offices in Shanghai and North America, Europe and the UK through our Calibre Scientific sister companies. Reagecon employs 100 people, 50% are chemistry or science graduates and most are involved in the Development, Production, Testing, Quality Control and Sales & Marketing of over 10,000 product references that we currently produce. We have a very active R&D programme and develop and bring to market many hundreds of new standards, every year.

All Reagecon manufactured products are underpinned by and demonstrate our position as a centre of excellence in the science of Metrology. Product is manufactured, tested, and certified under the applicable ISO/IEC 17025 (A2LA Ref: 6739.03) or ISO/IEC 17034 (A2LA Ref: 6739.01) accreditation or ISO/IEC 17025 (A2LA Ref: 6739.02) for Calibration, in one of our 20 specially equipped laboratories.

The resulting product is classified within one of 54 product families, these families are then grouped and promoted under 7 main product headings, as listed below:-

- **✓** Electrochemistry Standards
- Cation and Anion Standards
- **✓** Pharmacopoeia Reagents and Standards
- Physicochemical Standards
- **✓** Total Organic and Inorganic Carbon Standards
- ✓ Volumetric Solutions for Titration
- **✓** Customised Standards and Reagents



## The Reagecon Hierarchy of Standards

Traditionally, Reagecon's manufactured products were on the lower end of the value chain and fitted into the classification of working and secondary standards. The development and production of such standards was consistent with our main technical competence (method validation/accreditation).



In recent years, we have escalated dramatically the range of working and secondary standards that we offer. Because of our recently developed ability to perform raw material characterisation we are now also producing primary standards and certified reference materials. In the past the production of standards at the higher end of the value chain such as Primary Standards and Certified Reference Materials was the preserve of government funded agencies such as the National Institute of Science and Technology (NIST) in Washington, DC. Now, due to affordable technology, a number of privately funded companies have developed and are marketing primary standards and Certified Reference Materials. These companies generally have well-developed characterisation, purification and synthesis capability. Reagecon has grasped these opportunities with enthusiasm and are a leading producer of such materials.

As a producer of Metrological Standards we are concerned with enabling the end user (analyst) to achieve an analytical result that is fit for purpose and to provide proof of the correctness of that result. These two objectives are achieved through the following:

- ✓ Accreditation
- Traceability
- Accuracy
- Precision
- ✓ Sensitivity
- Limit of Detection (LOD)
- ✓ Reproducibility
- Measurement Uncertainty
- ✓ Comparability

Calibration Standards are critical to ensuring that an analysers sample measurements have the accuracy, traceability and comparability required so that actions taken based upon these sample measurements have validity. Reagecon's metrological expertise enables us to consistently produce Certified Reference Materials and Calibration Standards that gives their users confidence in the generated sample measurements.

# Conductivity Standards ISO 17034 Certified Reference Materials



Reagecon manufacture a range of Conductivity Certified Reference Materials (CRMs), which are manufactured and certified in accordance with the requirements of ISO 17034.

Our ISO 17034 Conductivity CRM range covers 20 μS/cm to 10,000  $\mu$ S/cm and are accurate to a specification of ± 1%.

All are manufactured to exacting specifications with an extended shelf life and stability, even after opening the bottle.

Reagecon is the largest producer of Conductivity Standards and is credited with the invention of low level aqueous standards. The company is still the only producer worldwide with the capability to manufacture and stabilise these products at such low levels (1.3 µS/cm) of conductivity.

#### **Summary of Features & Benefits**

- Manufactured and certified in accordance with the requirements of ISO 17034 and ISO 17025
- ✓ All directly traceable to NIST standard reference materials. These products meet the specification requirements of all the major Pharmacopoeias
- Accurate to  $\pm$  1%  $\mu$ S/cm of target value
- Manufactured to exacting specifications with an extended shelf life and stability, even after opening the bottle.
- Fully characterised temperature coefficient of variation available via product labels.
- ✓ No shipping, storage or disposal issues
- ✓ Consistency of product Independent, Traceable, Certified
- ✓ Certificates of Analysis and Safety Data Sheets available online

#### Non-Hazardous

As Reagecon's Conductivity Standards are aqueous, they are non-hazardous. They offer the following benefits over solvent-based Conductivity Standards

- Ease and cost of shipping, without the need to provide hazardous goods' paperwork
- Reduced Health & Safety requirements for storage and use
- ✓ Ease and cost of disposal solvent-based Conductivity Standards require expensive, specialised disposal to comply with environmental regulations.

#### Stability

As a result of the extensive R&D that led to our innovative manufacturing process, Reagecon can guarantee the stability of their complete range of Conductivity Standards over their entire shelf life. The stability offered by Reagecon's Conductivity Standards varies from that of their competitors in one vital area. We can guarantee that our Conductivity Standards will remain within specification (up to their expiry date) right through their working life, regardless of when the bottle was first opened provided Good Laboratory Practice is adhered to. This eliminates the need to open a fresh bottle of Standard every time the product is used. The shelf life of our Conductivity CRMs from their date of manufacture are given below.

Conductivity Value (μS/cm)	Shelf Life
20 – 147	12 months
200 – 10,000	18 months

#### Matrix Matched

The matrix of a solution is defined as "the components of the sample other than the analyte". In all analytical measurements, it is of utmost importance that the matrix of the Standard and the sample are the same. As conductivity measurement is, in the main, a water quality measurement, the Standard used should also have an aqueous matrix. Reagecon's Conductivity Standards are all aqueous based, thereby eliminating any errors attributable to matrix mismatch.

#### Accuracy

All Standards have a specification of ± 1% this high level of accuracy enables the Standards to be used as calibrators and/or controls in fulfilment of the most exacting industrial statutory requirements, for example the United States Pharmacopoeia monograph for Water for Injection.

# Conductivity Standards ISO 17034 Certified Reference Materials

#### Accreditation

Reagecon's conductivity measurement is covered in the scope of our accreditation to ISO 17025 "General Requirements for the competence of Calibration and Testing Laboratories" and its predecessor, EN 45001, since 1990. Reagecon is now delighted to also offer Conductivity Certified Reference Materials which are compliant to the requirements of ISO 17034. Achieving accreditation involves fulfilling many highly technical criteria, including fully validating our test methods and instrumentation systems and characterising our measurement uncertainty. Reagecon's accreditation proves the technical competence of our personnel, the technical validity of our test procedures and the traceability of our measurements. Therefore, in purchasing a Conductivity Standard from us, not only do you have transparent traceability to primary standards, but you also have confidence that our standards are of a well-defined and tightly controlled specification.

#### All values are Certified & Traceable

Comprehensive Certificates of Analysis are available for all of Reagecon's Conductivity Standards, including detailed information on:

- Product Number
- Lot Number
- **Expiry Date**
- Mean Specific Conductance
- Date of Measurement
- **Assay Limits**
- Test Method Used
- Uncertainty of Measurement and Traceability Data

The complete range is traceable to primary standards from the United States National Institute for Standards and Technology (NIST). The traceability of these Standards is proven by the inclusion of conductivity testing in our ISO 17025 and ISO 17034 accreditation. It is a fundamental requirement of ISO 17025 and ISO 17034 that traceability is proven.

#### **Characterised Temperature Coefficient of Variation**

Reagecon's Standards are aqueous based and consequently have a very low temperature coefficient of variation. A table of conductivity variation with temperature is available via the product label. This feature provides the user with all the information necessary to use the products across the full range of measurement temperatures encountered for their application. Non-aqueous Standards have a very high coefficient of variation which leads to measurement error and renders the products totally unsuitable for nontemperature controlled conditions, or field work.

### Conductivity Standards at 25°C ISO 17034 Certified Reference Materials (CRMs)

Item No.	Description	UoM
CRMCSKC20	Conductivity Standard 20 μS/cm ± 1% at 25°C	500ml
CRMCSKC50	Conductivity Standard 50 µS/cm ± 1% at 25°C	500ml
CRMCSKC84	Conductivity Standard 84 μS/cm ± 1% at 25°C	500ml
CRMCSKC100	Conductivity Standard 100 μS/cm ± 1% at 25°C	500ml
CRMCSKCS	Conductivity Standard 147 μS/cm ± 1% at 25°C	500ml
CRMCSKC200	Conductivity Standard 200 μS/cm ± 1% at 25°C	500ml
CRMCSKC500	Conductivity Standard 500 μS/cm ± 1% at 25°C	500ml
CRMCSKC1000	Conductivity Standard 1000 μS/cm ± 1% at 25°C	500ml
CRMCSKCL	Conductivity Standard 1413 μS/cm ± 1% at 25°C	500ml
CRMCSKC2M	Conductivity Standard 2000 μS/cm ± 1% at 25°C	500ml
CRMCSKC3M	Conductivity Standard 3000 μS/cm ± 1% at 25°C	500ml
CRMCSKC5M	Conductivity Standard 5000 µS/cm ± 1% at 25°C	500ml
CRMCSKC10M	Conductivity Standard 10,000 μS/cm ± 1% at 25°C	500ml

#### **Extensive Range of Values**

Together with our Conductivity CRM range Reagecon also offer over 45 different values of Conductivity Standards ranging from as low as 1.3  $\mu$ S/cm to as high as 500,000 μS/cm manufactured and tested in accordance with ISO 17025.

#### **Unparalleled Technical Support**

We have been manufacturing Conductivity Standards for over 30 years. In that time, we have built up a vast resource of technical expertise on all aspects of conductivity measurement. The members of Reagecon's Technical Services Department have written a comprehensive series of papers covering all of the practical requirements for accurate conductivity measurement. These papers are available via our website www.reagecon.com

## pH Buffer Standards ISO 17034 Certified Reference Materials



Reagecon produce a range of pH Buffer Certified Reference Materials (CRMs), which are manufactured and certified in accordance with the requirements of ISO 17034.

Our ISO 17034 pH Buffer CRMs range covers pH 1.697 to pH 12.00 inclusive.

All are manufactured to exacting specifications with an extended shelf life and stability, even after opening the bottle.

#### Traceability

These pH buffer CRMS are directly traceable to the IUPAC pH scale by an unbroken chain of traceability. Reagecon achieve this traceability through a series of comparisons, with the key reference materials being Standard Reference Materials (SRMs) manufactured by NIST.

For proof of traceability, all these comparisons must be made in a technically valid manner and the accuracy of each step must be quantified by calculating the associated Uncertainty of Measurement. Reagecon's pH Buffer Standards meet the ISO definition of traceability: "The ability to relate measurements back to a stated reference (usually an international standard) through an unbroken chain of comparisons, each having stated uncertainties of measurement." Reagecon's traceability claims are guaranteed by our accreditation to ISO 17034 and ISO 17025.

pH Buffer CRMs are supplied with a detailed Certificate of Analysis which outlines traceability to NIST, with the NIST SRM(s) Lot No. stated on the certificate.

Temperature dependence data is available via the product label as are lot numbers and expiry dates for user convenience.

#### Why use traceable pH Buffers?

Your pH measurements can only be as good as the pH Buffers that you use. If your pH calibration is made using traceable pH Buffers then you have a direct link to the International pH scale for your measurements. Without this link, you are not entitled to report your measurements in pH units so the number displayed on your pH meter is just that - a number and is not a pH value. The common link that is achieved by traceability allows comparability of results regardless of:

- ✓ When the measurements were made
- Where the measurements were made
- What instrumentation was used to make the measurements

Traceable analysis is necessary for consistency and universal acceptance of your pH results - including acceptance by regulatory bodies.

#### **Control Buffers**

For increased confidence in their test measurements analysts should regularly measure the pH of a Control Standard. If an acceptable value is obtained from the Control Standard measurement then the analysts, can have improved confidence that their test measurements will be correct.

#### Summary of Features & Benefits

- Manufactured and certified in accordance with the requirements of ISO 17034 and ISO 17025
- ✓ NIST traceable
- Directly traceable to the IUPAC pH scale by an unbroken chain of traceability. Reagecon achieve this traceability through a series of comparisons, with the key reference materials being Standard Reference Materials (SRMs) manufactured by NIST
- ✓ Values specified at specific temperature e.g. 20°C/25°C
- Manufactured to exacting specifications with an extended shelf life & stability
- Guaranteed stability throughout entire shelf life, even after opening the bottle, eliminates the requirement to open a fresh bottle of standard every time it is used
- Temperature dependence data is available via the product label as are lot numbers and expiry dates for user convenience
- Consistency of product Independent, Traceable, Cartified
- Certificates of Analysis and Safety Data Sheets available online

# pH Buffer Standards ISO 17034 Certified Reference Materials

#### **Fully Accredited**

Reagecon's pH analysis is accredited to ISO 17034 and ISO 17025 "General requirements for the competence of testing and calibration laboratories". Reagecon's accreditation to ISO 17034 and ISO 17025 gives independent proof of three key areas:

- Our pH analysis is technically valid and is carried out in a thoroughly controlled manner by highly qualified staff
- Our claims over the accuracy of our pH analysis are valid and we have properly quantified our accuracy in our uncertainty of measurement calculations
- Our pH analysis is traceable to NIST SRMs

Why take chances with your pH buffer supplier's traceability? By using buffers from a manufacturer that holds ISO 17034 and ISO 17025 accreditation you have a guarantee of traceability.

#### Stability

Reagecon's pH Buffers have been specially formulated to ensure their stability. The packaging bottles that we use have also been selected and tested to provide maximum stability. We have conducted stability trials on both freshly-opened and part-full bottles of our pH Buffers to validate their shelf-life - an example is given in Figure 2.

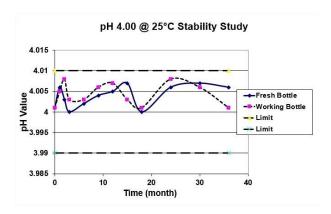


Figure 2: Stability Data for Reagecon pH 4.00 @ 25  $^{\circ}\mathrm{C}$ 

## pH Buffer Standards at 20°C NIST Values ISO 17034 Certified Reference Materials (CRMs)

Item No.	Description	UoM
CRM103788	Buffer Standard pH 3.788 $\pm$ 0.010 at 20°C NIST Value	500ml
CRM104001	Buffer Standard pH 4.001 $\pm$ 0.010 at 20°C NIST Value	500ml
CRM106881	Buffer Standard pH $6.881 \pm 0.010$ at $20^{\circ}$ C NIST Value	500ml
CRM107429	Buffer Standard pH 7.429 $\pm$ 0.010 at 20°C NIST Value	500ml
CRM109225	Buffer Standard pH 9.225 $\pm$ 0.010 at 20°C NIST Value	500ml
CRM110062	Buffer Standard pH 10.062 $\pm$ 0.010 at 20°C NIST Value	500ml

### pH Buffer Standards at 25°C DIN 19266 ISO 17034 Certified Reference Materials (CRMs)

Item No.	Description	UoM
CRM101679	Buffer Standard pH 1.679 $\pm$ 0.010 at 25°C DIN 19266	500ml
CRM103776	Buffer Standard pH 3.776 $\pm$ 0.010 at 25°C DIN 19266	500ml
CRM104005	Buffer Standard pH 4.005 $\pm$ 0.010 at 25°C DIN 19266	500ml
CRM10687	Buffer Standard pH $6.865 \pm 0.010$ at $25^{\circ}$ C DIN 19266	500ml
CRM107413	Buffer Standard pH 7.413 $\pm$ 0.010 at 25°C DIN 19266	500ml
CRM109180	Buffer Standard pH $9.180 \pm 0.010$ at $25^{\circ}$ C DIN 19266	500ml
CRM110012	Buffer Standard pH 10.012 $\pm$ 0.010 at 25°C DIN 19266	500ml

### pH Buffer Standards at 25°C DIN 19267 ISO 17034 Certified Reference Materials (CRMs)

Item No.	Description	UoM
CRM103065	Buffer Standard pH 3.06 ± 0.02 at 25°C DIN 19267	500ml
CRM104655	Buffer Standard pH $4.65 \pm 0.01$ at $25^{\circ}$ C DIN 19267	500ml
CRM106795	Buffer Standard pH $6.79 \pm 0.01$ at $25^{\circ}$ C DIN 19267	500ml
CRM109235	Buffer Standard pH 9.23 $\pm$ 0.01 at 25°C DIN 19267	500ml

# pH Buffer Standards ISO 17034 Certified Reference Materials

## pH Buffer Standards at 20°C ISO 17034 Certified Reference Materials (CRMs)

Item No.	Description	UoM
CRM1020	Buffer Standard pH 2.00 ± 0.02 at 20°C	1L
CRM1030	Buffer Standard pH 3.00 ± 0.02 at 20°C	1L
CRM1040	Buffer Standard pH 4.00 ± 0.01 at 20°C	1L
CRM1050	Buffer Standard pH 5.00 ± 0.01 at 20°C	1L
CRM1060	Buffer Standard pH 6.00 ± 0.01 at 20°C	1L
CRM1070	Buffer Standard pH 7.00 ± 0.01 at 20°C	1L
CRM1080	Buffer Standard pH 8.00 ± 0.01 at 20°C	1L
CRM1090	Buffer Standard pH 9.00 ± 0.01 at 20°C	1L
CRM1100	Buffer Standard pH 10.00 ± 0.01 at 20°C	1L
CRM1110	Buffer Standard pH 11.00 ± 0.05 at 20°C	1L
CRM1120	Buffer Standard pH 12.00 ± 0.05 at 20°C	1L
Item No.	Description	UoM
CRM10685	Buffer Standard pH 6.80 ± 0.01 at 20°C	500ml
CRM10925	Buffer Standard pH 9.20 ± 0.01 at 20°C	500ml
CRM109220	Buffer Standard pH 9.22 ± 0.01 at 20°C	500ml

## pH Buffer Standards at 25°C ISO 17034 Certified Reference Materials (CRMs)

Item No.	Description	UoM
CRM102025	Buffer Standard pH 2.00 ± 0.02 at 25°C	1L
CRM103025	Buffer Standard pH 3.00 ± 0.02 at 25°C	1L
CRM104025	Buffer Standard pH 4.00 ± 0.01 at 25°C	1L
CRM105025	Buffer Standard pH 5.00 ± 0.01 at 25°C	1L
CRM106025	Buffer Standard pH 6.00 ± 0.01 at 25°C	1L
CRM107025	Buffer Standard pH 7.00 ± 0.01 at 25°C	1L
CRM108025	Buffer Standard pH 8.00 ± 0.01 at 25°C	1L
CRM109025	Buffer Standard pH 9.00 ± 0.01 at 25°C	1L
CRM110025	Buffer Standard pH 10.00 ± 0.01 at 25°C	1L
CRM111025	Buffer Standard pH 11.00 ± 0.05 at 25°C	1L
CRM112025	Buffer Standard pH 12.00 ± 0.05 at 25°C	1L

Item No.	Description	UoM
CRM1068525	Buffer Standard pH 6.80 ± 0.01 at 25°C	500ml
CRM1068805	Buffer Standard pH 6.86 ± 0.01 at 25°C	500ml
CRM1094025	Buffer Standard pH 9.40 ± 0.01 at 25°C	500ml
CRM11001525	Buffer Standard pH 10.01 ± 0.01 at 25°C	500ml

## pH Buffer Standards at 20°C Colour Coded ISO 17034 Certified Reference Materials (CRMs)

Item No.	Description	UoM
CRM10405C	Buffer Standard pH 4.00 ± 0.01 at 20°C Colour Coded (Red)	500ml
CRM10705C	Buffer Standard pH 7.00 ± 0.01 at 20°C Colour Coded (Yellow)	500ml
CRM11005C	Buffer Standard pH 10.00 ± 0.01 at 20°C Colour Coded (Blue)	500ml

### pH Buffer Standards at 25°C Colour Coded ISO 17034 Certified Reference Materials (CRMs)

Item No.	Description	UoM
CRM1040525C	Buffer Standard pH 4.00 ± 0.01 at 25°C Colour Coded (Red)	500ml
CRM1070525C	Buffer Standard pH 7.00 ± 0.01 at 25°C Colour Coded (Yellow)	500ml
CRM1100525C	Buffer Standard pH 10.00 ± 0.01 at 25°C Colour Coded (Blue)	500ml

## pH Buffer Standards at 20°C High Resolution Colour Coded ISO 17034 Certified Reference Materials (CRMs)

Item No.	Description	UoM
CRM104000C	Buffer Standard pH 4.000 ± 0.010 at 20°C High Resolution Colour Coded (Red)	500ml
CRM107000C	Buffer Standard pH 7.000 ± 0.010 at 20°C High Resolution Colour Coded (Yellow)	500ml
CRM110000C	Buffer Standard pH 10.000 $\pm$ 0.010 at 20°C High Resolution Colour Coded (Blue)	500ml

## pH Buffer Standards at 25°C High Resolution Colour Coded ISO 17034 Certified Reference Materials (CRMs)

Item No.	Description	UoM
CRMH40525C	Buffer Standard pH 4.000 ± 0.010 at 25°C High Resolution Colour Coded (Red)	500ml
CRMH70525C	Buffer Standard pH 7.000 ± 0.010 at 25°C High Resolution Colour Coded (Yellow)	500ml
CRMH100525C	Buffer Standard pH 10.000 $\pm$ 0.010 at 25°C High Resolution Colour Coded (Blue)	500ml

### pH Buffer Standards at 25°C Technical Colour Coded ISO 17034 Certified Reference Materials (CRMs)

Item No.	Description	UoM
CRMTB401	Buffer Standard pH 4.01 ± 0.02 at 25°C Technical Colour Coded (Red)	500ml
CRMTB460	Buffer Standard pH 4.60 ± 0.02 at 25°C Technical Colour Coded (Red)	500ml
CRMTB700	Buffer Standard pH 7.00 ± 0.02 at 25°C Technical Colour Coded (Yellow)	500ml
CRMTB921	Buffer Standard pH 9.21 ± 0.02 at 25°C Technical Colour Coded (Blue)	500ml
CRMTB100	Buffer Standard pH 10.00 ± 0.02 at 25°C Technical Colour Coded (Blue)	500ml

## Sucrose in Water (Brix) Standards ISO 17034 Certified Reference Materials

Reagecon manufacture a range of Sucrose in Water (Brix)
Certified Reference Materials (CRMs), which are
manufactured and certified in accordance with the
requirements of ISO 17034 and ISO 17025. Product
measurement uncertainty is computated on a batch to
batch basis, guaranteed to never exceed ± 0.15 °Brix.

These products are used primarily either as a calibrant or analytical control solution in Refractive Index based methods of Brix value determinations, they can also be used to validate appropriate test methods or qualify a refractometer for use in a regulated industry.

Our Sucrose in Water Standards have a shelf life of 20 weeks and are produced in accordance with ICUMSA guidelines.

#### **Summary of Features & Benefits**

- Extended shelf life 20 weeks (Manufactured in accordance with ICUMSA guidelines)
- Manufactured and certified in accordance with the requirements of ISO 17034 and ISO 17025
- ✓ Can be used with any brand of refractometer
- Extensive range (1-60% mass/mass Sucrose in Water Solutions)
- Product measurement uncertainty is computated on a batch to batch basis, guaranteed to never exceed ± 0.15 °Brix
- Presented in a convenient high quality dropper bottle
- ✓ Ready to Use
- Consistency of product Independent, Traceable, Certified
- Certificates of Analysis and Safety Data Sheets available online



## Sucrose in Water (Brix) ISO 17034 Certified Reference Materials (CRMs)

Item No.	Description	UoM
BS05	5% Sucrose in Water (Brix)	15ml
BS07	7% Sucrose in Water (Brix)	15ml
BS10	10% Sucrose in Water (Brix)	15ml
BS112	11.2% Sucrose in Water (Brix)	15ml
BS115	11.5% Sucrose in Water (Brix)	15ml
BS12	12% Sucrose in Water (Brix)	15ml
BS125	12.5% Sucrose in Water (Brix)	15ml
BS15	15% Sucrose in Water (Brix)	15ml
BS20	20% Sucrose in Water (Brix)	15ml
BS25	25% Sucrose in Water (Brix)	15ml
BS30	30% Sucrose in Water (Brix)	15ml
BS35	35% Sucrose in Water (Brix)	15ml
BS40	40% Sucrose in Water (Brix)	15ml
BS45	45% Sucrose in Water (Brix)	15ml
BS50	50% Sucrose in Water (Brix)	15ml
BS55	55% Sucrose in Water (Brix)	15ml
BS60	60% Sucrose in Water (Brix)	15ml





For further information or enquiries, please contact us

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