isotrak™

Liquid Scintillation Counting Standards

Eckert & Ziegler Analytics manufactures a complete range of NIST traceable Standards for the calibration of Liquid Scintillation Counters (LSC). Our LSC Standards are calibrated in an ISO9001 certified and ISO17025 accredited laboratory using state of the art equipment, operated by experienced, professional staff.

We offer unquenched Tritium and Carbon-14 Standards and a wide range of quenched Standards for the verification and calibration of LSC instruments from all major manufacturers.

Providing the LSC community with customized, NIST traceable, quenched LSC Standards is one of our core strengths. For counting efficiency calibration by internal standardization we provide all common nuclides in form of NIST traceable standardized solutions.

Eckert & Ziegler
Isotope Products

Unquenched LSC Standard Sets

This unquenched Liquid Scintillation Counting Set of 3 Standards contains 1 Carbon-14, 1 Tritium (H-3) and 1 Background Standard.

The set is designed for establishing the optimum LSC operating settings and verify long term stability. It can be used with all common LSC instruments. Each source is calibrated, measurement uncertainty <4% (k=2).

The standards are available in 20 ml and 7 ml Argon purged, flame sealed borosilicate glass LSC vials.

Chemical Form

C-14 or H-3 labeled toluene in toluene based scintillator, PPO/bis-MSB in scintillation grade toluene.

Technical Data

Product Code	SET-H3C14-LSC-20FST 20 ml unquenched LSC Standard Set	SET-H3C14-LSC-7FST 7 ml unquenched LSC Standard Set
Nuclides	Carbon-14 and Tritium (H-3)	Carbon-14 and Tritium (H-3)
C-14 Activity	1667 Bq (100 000 dpm) +/-10%, calibrated, NIST traceable	1667 Bq (100 000 dpm) +/-10%, calibrated, NIST traceable
Active Volume	15 ml C-14 labeled toluene in toluene based scintillator	5 ml C-14 labeled toluene in toluene based scintillator
H-3 Activity	4167 Bq (250 000 dpm) +/- 10%	4167 Bq (250 000 dpm) +/- 10%
Active Volume	15 ml H-3 labeled toluene in toluene based scintillator	5 ml H-3 labeled toluene in toluene based scintillator
BKG-Standard	Background Standard, 15ml toluene based scintillator	Background Standard, 5ml toluene based scintillator

Technical Data / Unquenched C-14/H-3 Standards for Beckman Coulter LSC

Product Code	LSCBC566321 20 ml unquenched LSC Standard Set Recommended for Beckman Coulter LSC Instruments	LSCBC594946 7 ml unquenched LSC Standard Set Recommended for Beckman Coulter LSC Instruments
Nuclides	Carbon-14 and Tritium (H-3)	Carbon-14 and Tritium (H-3)
C-14 Activity	1667 Bq +/-10% (100 000 dpm) calibrated, NIST traceable	750 Bq +/-10% (45 000 dpm) - calibrated, NIST traceable
Active Volume	15 ml C-14 labeled toluene in toluene based scintillator	5 ml C-14 labeled toluene in toluene based scintillator
H-3 Activity	1667 Bq +/-10% (100 000 dpm) calibrated, NIST traceable	1667 Bq +/-10% (100 000 dpm) calibrated, NIST traceable
Active Volume	15ml, H-3 labeled toluene in toluene based scintillator	5ml H-3 labeled toluene in toluene based scintillator
BKG-Standard	Background Standard, 15ml toluene based scintillator	Background Standard, 5ml toluene based scintillator

Quenched LSC Standard Sets–Toluene

Quenched Liquid Scintillation Counting Sets contain 10 Standards. Each standard contains the same amount of radioactivity but with progressively higher levels of quenching agent nitromethane.

Toluene based LSC Standards are designed to establish counting efficiency correlation curves which are applicable to a wide range of scintillations cocktails and quenching agents. The standards are available in 20 ml and 7 ml Argon purged, flame sealed borosilicate glass LSC vials.

Each source is calibrated, measurement uncertainty <4% (k=2). The Transformed Spectral Index of the External Standard (tSIE) value is approx. 150 to 1000.

Chemical Form

C-14 or H-3 labeled toluene in toluene based scintillator, PPO/bis-MSB in scintillation grade toluene, quenching agent nitromethane.

Technical Data	C-14 Standards	H-3 Standards
Product Code	**SET-C14-LSC-20FST**	**SET-H3-LSC-20FST**
Product	**Set of 10 quenched C-14 Standards - 20 ml vials**	**Set of 10 quenched H-3 Standards - 20 ml vials**
Nuclide	Carbon-14	H-3 (Tritium)
Activity	1667 Bq +/-10% (100 000 dpm) per vial, calibrated, NIST traceable	4167 Bq +/-10% (250 000 dpm) per vial, calibrated, NIST traceable
Active Volume	15 ml C-14 labeled toluene in toluene based scintillator	15 ml H-3 labeled toluene in toluene based scintillator

Product Code	**SET-C14-LSC-7FST**	**SET-H3-LSC-7FST**
Product	**Set of 10 quenched C-14 Standards - 7 ml vials**	**Set of 10 quenched H-3 Standards - 7 ml vials**
Nuclide	Carbon-14	H-3 (Tritium)
Activity	1667 Bq +/-10% (100 000 dpm) per vial, calibrated, NIST traceable	4167 Bq +/-10% (250 000 dpm) per vial, calibrated, NIST traceable
Active Volume	5 ml C-14 labeled toluene in toluene based scintillator	5 ml H-3 labeled toluene in toluene based scintillator

Technical Data	C-14 Standards for Low Level Counting	H-3 Standards Low Level Counting
Product Code	**SET-C14-LSC-20FST-LOW**	**SET-H3-LSC-20FST-LOW**
Product	**Set of 10 quenched C-14 Standards - 20 ml vials**	**Set of 10 quenched H-3 Standards - 20 ml vials**
Nuclide	Carbon-14	H-3 (Tritium)
Activity	333 Bq +/-10% (20 000 dpm) per vial, calibrated, NIST traceable	500 Bq +/-10% (30 000 dpm) per vial, calibrated, NIST traceable
Active Volume	15 ml C-14 labeled toluene in toluene based scintillator	15 ml H-3 labeled toluene in toluene based scintillator

Technical Data — Quenched C-14/H-3 Standard Sets for Beckman Coulter LSC

Product Code	LSCBC566681	LSCBC566680
Product	**Set of 10 quenched C-14 Standards - 20 ml vials**	**Set of 10 quenched H-3 Standards - 20 ml vials**
Nuclide	Carbon-14	H-3 (Tritium)
Activity	2500 Bq +/-10% (150 000 dpm) per vial, calibrated, NIST traceable	8333 Bq +/-10% (500 000 dpm) per vial, calibrated, NIST traceable
Active Volume	15 ml C-14 labeled toluene in toluene based scintillator	15 ml H-3 labeled toluene in toluene based scintillator

Product Code	LSCBC566682	LSCBC566683
Product	**Set of 10 quenched C-14 Standards - 7 ml vials**	**Set of 10 quenched H-3 Standards - 7 ml vials**
Nuclide	Carbon-14	H-3 (Tritium)
Activity	2250 Bq +/-10% (135000 dpm) per vial, calibrated, NIST traceable	8333 Bq +/-10% (500 000 dpm) per vial, calibrated, NIST traceable
Active Volume	5 ml C-14 labeled toluene in toluene based scintillator	5 ml H-3 labeled toluene in toluene based scintillator

Quenched Standard Sets – Ultima Gold

Quenched Liquid Scintillation Counting Sets contain 10 Standards. Each standard contains the same amount of radioactivity but with progressively higher levels of quenching agent nitromethane. These LSC Standards are designed to establish counting efficiency correlation curves which are applicable to Ultima Gold LSC cocktails. The Transformed Spectral Index of the External Standard (tSIE) value is approx. 150-650. The standards are available in 20ml and 7 ml, flame sealed borosilicate glass LSC vials. Each source is calibrated, measurement uncertainty <4% (k=2).

Chemical Form

C-14 labeled glucose or Tritium labeled water in Ultima Gold scintillation cocktail. Quenching agent nitromethane.

Technical Data	C-14 Standards	H-3 Standards
Product Code	**SET-C14-LSC-20FSUG**	**SET-H3-LSC-20FSUG**
Product	**Set of 10 quenched C-14 Standards - 20 ml vials**	**Set of 10 quenched H-3 Standards - 20 ml vials**
Nuclide	Carbon-14	H-3 (Tritium)
Activity	1667 Bq +/-10% (100000 dpm) per vial, calibrated, NIST traceable	4167 Bq +/-10% (250000 dpm) per vial, calibrated, NIST traceable
Active Volume	15 ml C-14 labeled glucose in Ultima Gold scintillation cocktail	15 ml Tritiated water (H-3) in Ultima Gold scintillation cocktail.
Product Code	**SET-C14-LSC-7FSUG**	**SET-H3-LSC-7FSUG**
Product	**Set of 10 quenched C-14 Standards - 7 ml vials**	**Set of 10 quenched H-3 Standards - 7 ml vials**
Nuclide	Carbon-14	H-3 (Tritium)
Activity	1667 Bq +/-10% (100000 dpm) per vial, calibrated, NIST traceable	4167 Bq +/-10% (250000 dpm) per vial, calibrated, NIST traceable
Active Volume	5 ml C-14 labeled glucose in Ultima Gold scintillation cocktail	5 ml Tritium labeled water in Ultima Gold scintillation cocktail.

Standard Sets For Low Level Counting – Ultima Gold

Technical Data	C-14 Standards for Low Level Counting	H-3 Standards Low Level Counting
Product Code	**SET-C14-LSC-20FSUG-LOW**	**SET-H3-LSC-20FSUG-LOW**
Product	**Set of 10 quenched C-14 Standards - 20 ml vials**	**Set of 10 quenched H-3 Standards - 20 ml vials**
Nuclide	Carbon-14	H-3 (Tritium)
Activity	333 Bq +/-10% (20000 dpm) per vial, calibrated, NIST traceable	500 Bq +/-10% (30000 dpm) per vial, calibrated, NIST traceable
Active Volume	15 ml C-14 labeled glucose in Ultima Gold scintillation cocktail	15 ml Tritium labeled water in Ultima Gold based scintillator

LSC Alpha/Beta Standard Set – Ultima Gold AB

This quenched Liquid Scintillation Counting Set of 3 Standards contains 1 Americium-241, 1 Chlorine-36 and 1 Background Standard. The set is used to optimize the pulse discrimination parameter for alpha/beta separation. The standards are available in 20 ml, flame sealed borosilicate glass LSC vials.

Technical Data **Alpha/Beta LSC Standard Set**

Product Code	SET-AM1CL6-LSC-20FSUGAB
Am-241/Cl-36/BKG	**Alpha/Beta Standard Set - 20 ml vials**
Nuclide	**Am-241**
Am-241 Activity	1667 Bq +/-10% (100 000 dpm) per vial, calibrated, NIST traceable
Active Volume	15 ml
Vial Type	20 ml flame sealed borosilicate glass ampoule
Chemical Form	Americium Chloride in Ultima Gold AB scintillation cocktail.
Nuclide	**Cl-36**
Cl-36 Activity	1667 Bq +/-10% (100 000 dpm) per vial, calibrated, NIST traceable
Active Volume	15 ml
Vial Type	20 ml flame sealed borosilicate glass ampoule
Chemical Form	Sodium Chloride in Ultima Gold AB scintillation cocktail
BKG-Standard	**Background Standard**
Volume	15 ml
Vial Type	20 ml flame sealed borosilicate glass ampoule
Chemical Form	Ultima Gold AB scintillation cocktail

Single LSC Standards

Unquenched LSC Standards in flame sealed borosilicate glass ampoules.

All standards are calibrated, NIST traceable, measurement uncertainty <4% (k=2). Customized standards are available on request.

Nuclide	Product Code	Activity	DPM	Vial	Active Volume	Chemical Form
C-14	C14-LSC-20FST-666BQ	666 Bq +/- 10%	40 000	20 ml	15 ml	C-14 labeled toluene
C-14	C14-LSC-20FST-1666BQ	1667 Bq +/- 10%	100 000	20 ml	15 ml	C-14 labeled toluene
C-14	C14-LSC-7FST-666BQ	666 Bq +/- 10%	40 000	7 ml	5 ml	C-14 labeled toluene
C-14	C14-LSC-7FST-1666BQ	1667 Bq +/- 10%	100 000	7 ml	5 ml	C-14 labeled toluene

Nuclide	Product Code	Activity	DPM	Vial	Active Volume	Chemical Form
H-3	H3-LSC-20FST-1333BQ	1333 Bq +/- 10%	80 000	20 ml	15 ml	Tritium labeled toluene
H-3	H3-LSC-20FST-1666BQ	1667 Bq +/- 10%	100 000	20 ml	15 ml	Tritium labeled toluene
H-3	H3-LSC-7FST-1666BQ	1667 Bq +/- 10%	100 000	7 ml	5 ml	Tritium labeled toluene
H-3	H3-LSC-20FST-4167BQ	4167 Bq +/- 10%	250 000	20 ml	15 ml	Tritium labeled toluene
H-3	H3-LSC-7FST-4167BQ	4167 Bq +/- 10%	250 000	7 ml	5 ml	Tritium labeled toluene

The vial caps are color-coded and laser engraved.

The engraving includes:

- Product code
- Nuclide
- Measured activity in Bq and DPM
- Reference date
- Expiration date
- Serial number
- Radioactive labeling

Quenched single LSC Standards – Ultima Gold cocktail in flame sealed borosilicate glass ampoules, Argon purged.

All standards are calibrated, NIST traceable, measurement uncertainty <4% (k=2). The tSIE quench value is approx.750.

Nuclide	Product Code	Activity	DPM	Vial	Active Volume	Chemical Form
Am-241	AM1-LSC-20FSUG-1666BQ	1667 Bq +/- 10%	100000	20 ml	15 ml	Americium Chloride
Am-241	AM1-LSC-7FSLUG-1666BQ	1667 Bq +/- 10%	100000	7 ml	5 ml	Americium Chloride

Nuclide	Product Code	Activity	DPM	Vial	Active Volume	Chemical Form
C-14	C14-LSC-20FSLUG-333BQ	333 Bq +/- 10%	20000	20 ml	15 ml	C-14 labeled glucose
C-14	C14-LSC-20FSLUG-1666BQ	1667 Bq +/- 10%	100000	20 ml	15 ml	C-14 labeled glucose
C-14	C14-LSC-7FSLUG-1666BQ	1667 Bq +/- 10%	100000	7 ml	5 ml	C-14 labeled glucose

Nuclide	Product Code	Activity	DPM	Vial	Active Volume	Chemical Form
Cl-36	CL6-LSC-20FSUG-1666BQ	1667 Bq +/- 10%	100000	20 ml	15 ml	Sodium Chloride
Cl-36	CL6-LSC-7FSUG-1666BQ	1667 Bq +/- 10%	100000	7 ml	5 ml	Sodium Chloride

Nuclide	Product Code	Activity	DPM	Vial	Active Volume	Chemical Form
H-3	H3-LSC-20FSUG-500BQ	500 Bq +/- 10%	30000	20 ml	15 ml	Tritium labeled water
H-3	H3-LSC-20FSUG-1666BQ	1667 Bq +/- 10%	100000	20 ml	15 ml	Tritium labeled water
H-3	H3-LSC-7FSUG-1666BQ	1667 Bq +/- 10%	100000	7 ml	5 ml	Tritium labeled water

Nuclide	Product Code	Activity	DPM	Vial	Active Volume	Chemical Form
Ni-63	NI3-LSC-20FSUG-1666BQ	1667 Bq +/- 10%	100000	20 ml	15 ml	Nickel Chloride
Ni-63	NI3-LSC-7FSUG-1666BQ	1667 Bq +/- 10%	100000	7 ml	5 ml	Nickel Chloride

Nuclide	Product Code	Activity	DPM	Vial	Active Volume	Chemical Form
Sr-90	SR0-LSC-20FSUG-1666BQ	1667 Bq +/- 10%	100000	20 ml	15 ml	Strontium Chloride
Sr-90	SR0-LSC-7FSUG-1666BQ	1667 Bq +/- 10%	100000	7 ml	5 ml	Strontium Chloride

Internal standards for LSC counting efficiency calibration

Eckert & Ziegler Analytics offers a wide range of NIST traceable, calibrated solutions for the determination of the counting efficiency by internal standardization. They are provided in a 10 ml flame sealed glass ampoule with an active volume of 10 ml. Customized solutions are available on request. Activity tolerance +/-20%.

Nuclide	Product Code	Activity Conc. [kBq/g]	Total Activity [kBq]	Activity Conc. [DPM/g]	Measurement Uncertainty (k=2)	Chemical Form
H-3 (Tritium)	8003-10FSAH-400KBQ	40	400	2.4×10^6	<3.5%	Tritium labeled water
H-3 (Tritium)	8003-10FSAT-400KBQ	40	400	2.4×10^6	<3.5%	Tritium labeled Toluene
C-14	8014-10FSAT-100KBQ	10	100	6×10^5	<4%	C-14 labeled Toluene
C-14	8014-10FSAG-100KBQ	10	100	6×10^5	<4%	C-14 labeled glucose (50µg/g) + formaldehyde (1µg/g) in H_2O
C-14	8014-10FSAC-100KBQ	10	100	6×10^5	<4%	Na_2CO_3 in 0.001M NaOH, 30µg/g C
Am-241	8241-10FSA-100KBQ	10	100	6×10^5	<2%	Americium Chloride in 1M HCl, no carrier added
Ca-45	8045-10FSA-100KBQ	10	100	6×10^5	<6%	Calcium Chloride in 0.1 M HCl, 30 µg/g Ca
Cd-109	8109-10FSA-100KBQ	10	100	6×10^5	<2%	Cadmium Chloride in 0.1 M HCl, 30 µg/g Cd
Cl-36	8036-10FSA-100KBQ	10	100	6×10^5	<4%	Sodium Chloride in 0.0005M NaOH, 30 µg/g Cl
Co-60	8060-10FSA-100KBQ	10	100	6×10^5	<1.5%	Cobalt Chloride in 0.1 M HCl, 30 µg/g Co
Cr-51	8051-10FSA-100KBQ	10	100	6×10^5	<2%	Chromium Chloride in 0.1 M HCl, 30 µg/g Cr
Cs-137	8137-10FSA-100KBQ	10	100	6×10^5	<2%	Cesium Chloride in 0.1 M HCl, 30 µg/g Cs
Fe-55	8055-10FSA-100KBQ	10	100	6×10^5	<4%	Ferric Chloride in 0.1 M HCl, 30 µg/g Fe
I-125	8125-10FSA-100KBQ	10	100	6×10^5	<3.5%	Sodium Iodide in 0.1 M NaOH + 0.006M Na_2SO_3, 30 µg/g I
I-129	8129-10FSA-100KBQ	10	100	6×10^5	<3.5%	Sodium Iodide in 0.1 M NaOH + 0.006M Na_2SO_3, 30 µg/g I
Ni-63	8063-10FSA-100KBQ	10	100	6×10^5	<3%	Nickel Chloride in 0.1 M HCl, 30 µg/g Ni
S-35	8035-10FSA-100KBQ	10	100	6×10^5	<3.5%	Sodium Sulfate in H_2O, 30 µg/g S
Sr-90	8090-10FSA-100KBQ	10	100	6×10^5	<2%	Strontium Chloride in 0.1 M HCl, 30 µg/g Sr + 30 µg/g Y
Tc-99	8099-10FSA-100KBQ	10	100	6×10^5	<3%	Sodium pertechnetate in 0.001M NaOH, no carrier added

Low-Background (dead) Water

This freshwater is collected from an artesian well that is screened at a depth of >100 m below the water table. Based upon hydraulic conductivity this water has not been in contact with the atmosphere for several thousand years and should therefore contain undetectable amounts of tritium. Analysis of this water by the University of Miami Tritium Laboratory indicates that the tritium levels are below their detection limit (< 0.1 TU). This water is suitable for use as analytical instrument, field and equipment blanks. The water will be delivered in 1 liter polyethene bottles. A copy of the batch analysis will be provided.

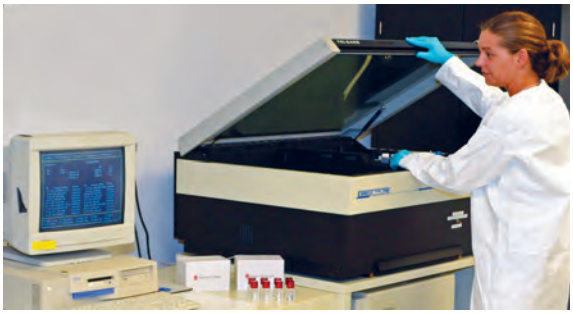
Product Code: BGW-1LB
1 Liter Low-Background Water
Tritium (H-3) activity less than 0.006 Bq/kg (6 pBq/g)
Batch Analysis Certificate provided

Customized LSC standards and calibrated solutions

Eckert & Ziegler Analytics provides customized, NIST traceable LSC Standards for most applications. Please contact us with your requirements.

We will need the following information for a quotation:

- Set of sources or single standard
- Nuclide(s)
- Activity per nuclide
- Scintillation cocktail
- Active volume
- Vial type (volume)
- Quench tSIE value/range



Eckert & Ziegler

Isotope Products

Eckert & Ziegler
Analytics, Inc.

1380 Seaboard
Industrial Boulevard
Atlanta, Georgia 30318
USA

Ph: +1 404 352 8677
F: +1 404 352 2837

E: isotrakusa@ezag.com
Web: www.ezag.com

Eckert & Ziegler
Nuclitec GmbH

Gieselweg 1
38110 Braunschweig,
Germany

Ph: +49 5307 932 555
F: +49 5307 932 194

E: infoisotrak@ezag.com
Web: www.ezag.com

Eckert & Ziegler
Isotope Products France

12 Avenue Des Tropiques
Hightec Sud - Bâtiment B
91955 Courtaboeuf Cedex
France

Ph: +33 (0)1 64 86 22 22
F: +33 (0)1 69 86 10 65

E: infoisotrak@ezag.com
Web: www.ezag.com

isotrak™