HIDEX

Liquid Scintillation Counting

Application fields

With over 3 decades of expertise in detecting alpha, beta, and gamma emitters, Hidex excels in liquid scintillation counting, gamma counting, microplate reading, and provides solutions for PET radiochemistry and sample preparation.

Environmental radioactivity

Environmental radioactivity poses significant challenges to public health and safety. Hidex instruments are at the forefront, contributing to water testing efforts that monitor radionuclide levels in drinking water, surface waters, and cooling waters from nuclear plants.

Radiopharmaceuticals

Radiopharmaceuticals play a pivotal role in non-invasive diagnostics and targeted cancer therapies, and Hidex instrumentation is essential in their discovery, development, and understanding.

Nuclear medicine

Nuclear medicine applications are supported by various advanced Hidex technologies. From analysing molecules with radioimmunoassays and supporting kidney function studies to ensuring the quality control of $^{68}Ge/^{68}Ga$ generators and utilising ^{15}O labelled water as a radioactive tracer in PET, Hidex offers multiple solutions.

Biocarbon analysis

Biocarbon analysis determines the modern carbon percentage in the sample. Using the Hidex sample preparation and LSC instrument, we provide reliable determination of biocarbon percentage with ultra-sensitive ^{14}C measurement.

Agrochemical industry

Agrochemical industry stands as a crucial pillar in modern agriculture, providing essential tools in the form of plant protection products, commonly known as pesticides. These products undergo meticulous evaluation through environmental fate studies to provide information on degradation, metabolism, and accumulation.

Nuclear industry

Nuclear industry utilises Hidex instruments for nuclear decommissioning and radioactive waste management. From identifying radioactive isotopes within building materials during decommissioning projects to characterising of radioactive waste, advanced sample preparation and liquid scintillation counters contribute to the industry's safety standards.

Radiation protection

Radiation protection is essential in monitoring internal contamination and workplace cleanliness verification studies. With applications ranging from urine testing, to wipe tests for alpha and beta emitters, our liquid scintillation counters offer precise solutions for regulatory compliance and safety standards.

Hidex offers the broadest range of liquid scintillation counters available

Triathler

Hidex 300 SL

Hidex 600 SLe

Hidex ULLA

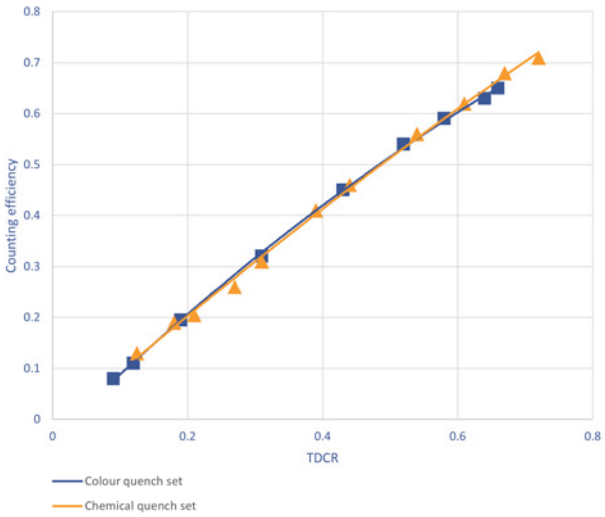
From portable field deployable single sample counters... ...to high performance ultra low level systems... ...and high sample capacity automated systems for centralized labs... ...allow us to help you find the right LSC solutions for your needs.

Hidex has served the liquid scintillation counting community for over twenty years. Our pioneering work started with the world's first portable liquid scintillation counter – the Triathler. Over the years Hidex has introduced ground breaking innovations such as graphical 3D alpha/beta separation, luminescence free triple coincidence counting, first combined LSC and gamma counter and the world's first commercial TDCR triple to double coincidence counter.

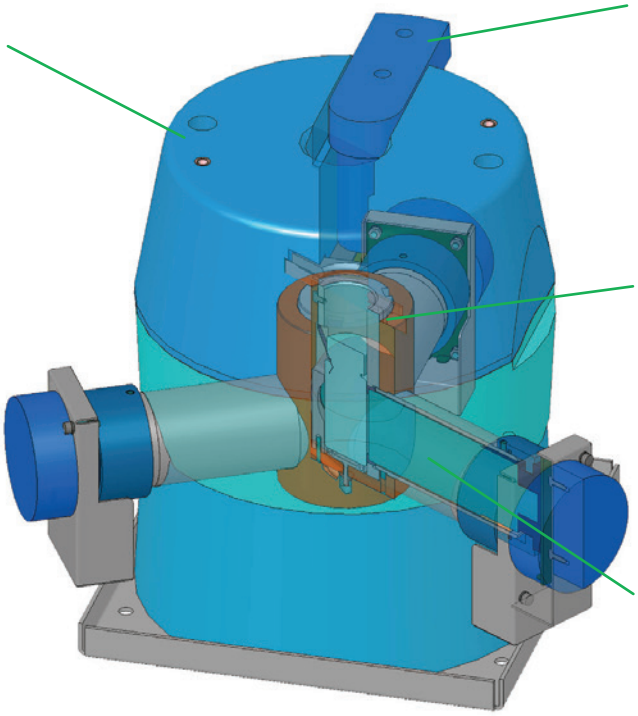
Our commitment to advancing scintillation counting is today stronger than ever. That is why we bring new innovation, new products and unrivalled service and support worldwide.

Absolute activity with TDCR technology

Hidex automatic liquid scintillation counters are equipped with a triple photomultiplier detector. This enables triple to double coincidence ratio (TDCR) counting, an absolute method for obtaining counting efficiency of the samples without external or internal standard sources. Unlike external standard methods, TDCR is a universal method applicable for both chemical and color quenching, for aqueous and organic samples and for different cocktails and range of isotopes. TDCR method can be used not only for typical beta isotopes like ^{3}H and ^{14}C but also for absolute activity determination of Cerenkov radiation e.g. from $^{90}Y/^{90}Sr$ and monoenergetic isotopes such as ^{55}Fe.



Optimal lead shield design with a minimum of 70 mm shielding in all directions provides good shielding.



Lead shutter provides optimal shielding from cosmic radiation.

Measurement chamber with high reflective opaque paint maximises light collection.

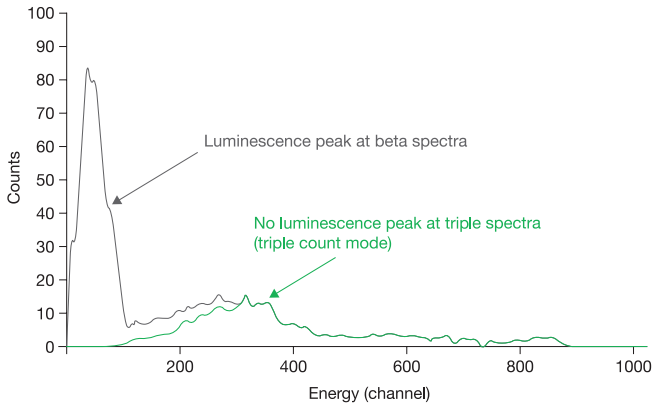
Robotic loading arm removes the need for a complex elevator mechanism. Vertical shielding both on top and bottom of detector chambers provides biggest reduction of background effects.

Three PMTs with highly reflective measurement chamber design provide optimal measurement geometry and enable TDCR counting.

Technical innovations

Luminescence free counting

The triple photomultiplier tube can be used in triple coincidence mode only, which removes interference from chemiluminescence. Samples with long luminescence decay such as ^{14}C in NaOH can be counted immediately without the need to dark adapt. Method is applicable also for detection of ^{3}H in water.

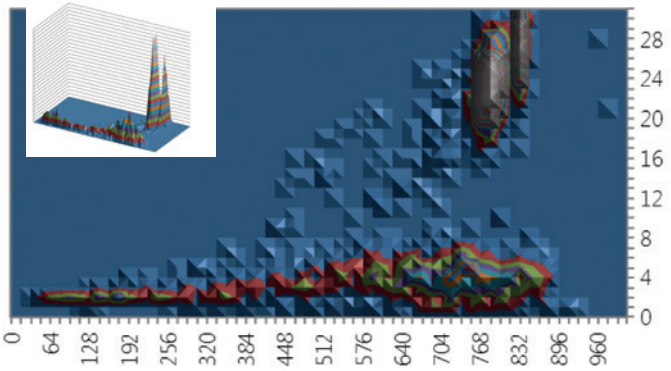


Exceptionally high counting efficiency

The three photomultipliers are aligned at 120° from each other. This structure yields better detection geometry than conventional double PMT detector. And the more there is quenching, the greater the advantage of triple coincidence detector

Alpha/beta separation

Advanced alpha/beta separation is available as an option. It facilitates extremely sensitive detection of alpha isotopes in presence of high beta radiation. Calibration and results validation can be done using convenient and reliable 2D/3D spectrum analysis tool without laborious and isotope specific misclassification run. Separation works even for unknown mixture of alpha and beta isotopes. Typical applications include detection of ^{222}Rn, $^{226}Ra/^{228}Ra$, ^{241}Am and gross alpha/beta. Calibration and verification of results using the 3D graph tool improves reliability of the results by avoiding uncertainty caused by conventional calibration using different isotopes than the actual samples.



Example: Efficiency for ^{3}H (in 20 ml vials)

	Hidex 300 SL	Traditional Double Coincidence Counters
Unquenched	> 70%	65%
^{3}H in water	> 35%	25%
^{3}H in water, high quench	10%	5%

TDCR Cerenkov counting

Conventional external standard quench correction methods cannot be used for Cerenkov radiation. TDCR, however, correlates linearly with Cerenkov-efficiency. The method is simple and can be used e.g. for absolute activity determination of $^{90}Y/^{90}Sr$, reducing the total detection time even by several days.

Temperature control unit

Both the Hidex 300 SL and 600 SLe can be equipped with an external cooling unit. This compressor based unit cools the interior of the instrument specifically the detector and the sample tray compartment to a controlled level. Sample temperature stability is especially important in low level applications and improves the reproducibility of results and cocktail sample mixing properties.

Active Guard

The Active Guard is a separate plastic scintillator detector which detects and subtracts real-time background radiation. The guard can be turned off for high activity samples and does not interfere with alpha/beta separation.

External Standard

External ^{152}Eu standard source is available as an optional item. This provides conventional quench correction using external quench parameter. It is recommended for samples with variable quenching.

Digital Pb shield

Is a proprietary Hidex spectral fitting algorithm that decreases the background and improves the uncertainty of the results by utilizing spectrum information for active sample tritium counts and background counts.

Application oriented software

The Hidex ULLA uses the modern and user-friendly VALO software. The Hidex 300 SL and Hidex 600 SLe are operated using an external PC with Windows 10 and 11 compatible MikroWin 300 SL or 600 SLe software. VALO and MikroWin softwares are designed for multi-user environments, enabling unlimited number of methods for different isotopes and easy data export to Excel or other programs. Users can add samples with new methods, and high priority samples while the instrument is counting. Both VALO and MikroWin are also available in 21 CFR Part 11 compliant versions.

Hidex ULLA
The ultimate ultra low level analyzer

In recent years, the global market has been missing a true ultra low level LSC that would meet the most demanding needs. Applications in hydrogeology when mapping the global clean water resources, detection of biogenic carbon content in materials or measuring trace concentrations of alpha and beta isotopes in soil, food and water require accuracy and precision. Hidex ULLA combines existing technology, latest innovation and modern usability.

Features

- True ultra low level LSC
- Hidex VALO user software
- Extensive lead shielding and triple PMT for optimal counting
- Anticoincidence guard
- Ultra low background and triple coincidence detector
- Temperature control and gas inlet to purge the measurement chamber with gas

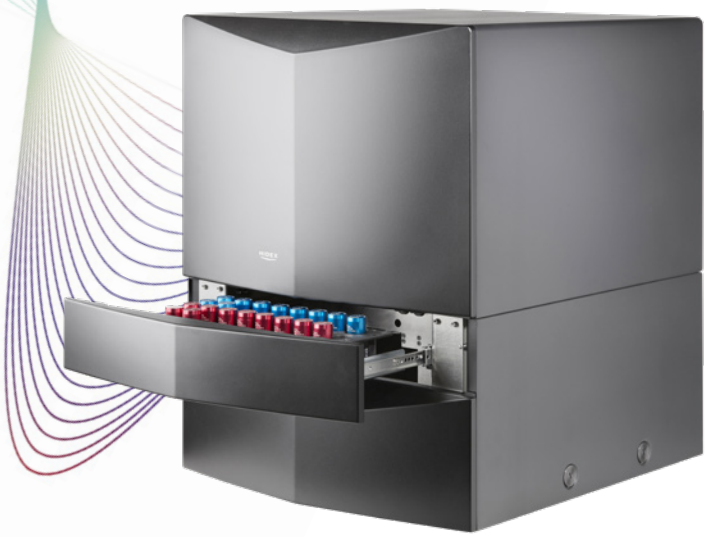
Technical Specifications

Sample capacity, 20/7/5 ml	80/192/192
Isotopes, typical examples	^{3}H, ^{14}C, $^{90}Sr/^{90}Y$, ^{226}Ra, ^{222}Rn, Gross a/b
Counting efficiency $^{3}H/^{14}C$ (%)	70/97 (unquenched) > 35 for ^{3}H in 8+12 ml H_2O
Background (CPM) *25% ^{3}H ROI in 8+12 ml H_2O	< 1 CPM in normal surface lab condition
FOM ^{3}H in 8+12 ml H_2O	> 600 with open settings > 900 with optimization and DigitalPb
Dimensions, W/H/D (cm)	69/130/95 (with cooler)
Weight (kg)	~800

Hidex 300 SL
The most user friendly LSC on the market

The Hidex 300SL is a revolutionary instrument which incorporates the most advanced triple-PMT detector technology facilitating

- exceptionally high counting efficiency,
- luminescence free counting mode
- absolute activity counting without external radioactive source using triple-to-double coincidence ratio (TDCR) method.



Hidex 300 SL is ideal for all routine scintillation counting applications. For example, monitoring of beta emitters in nuclear power stations is easy with the Hidex 300 SL. Results can be printed out with required uncertainty calculations providing hassle free operation with no further data analysis needed.

Super low level model

The Hidex 300 SL Super Low Level model comes with the lowest background and is equipped with an active guard for further decrease in background counts.

Compact and transportable

The 300 SL has a modern and compact design measuring half the size and weight of some of its long standing rivals. It is therefore much easier to install and fit it into smaller, more space conscious laboratories, such as research vessels or mobile labs.

Optional features

- External ^{152}Eu standard source
- Alpha/beta separation
- Temperature control
- Low level option
- Anticoincidence guard

Technical Specifications

	Hidex 300 SL	Hidex 300 SL Super Low Level	Hidex 300 SL Metrology	Hidex 300 SL Academic
Sample capacity, 20/7/5 mL	40/96/96	40/96/96	40/96/96	40/96
Counting efficiency ^{3}H/^{14}C (%)	70/96	70/96	70/96	65/96
Background ^{3}H in water (CPM)	12	3	12	15
Dimensions, W/H/D (cm)	52/68/63	52/68/63	52/68/63	52/68/63
Weight (kg)	125	180	125	115

Hidex 600 SLe
Advanced LSC with high sample capacity

Hidex 600 SLe is designed for high sample load capacity required in centralized laboratories. The Hidex 600 SLe uses the robust and convenient triple to double coincidence ratio TDCR counting well known from the 300 SL series. With the added sample capacity of over 500 small vials or 200 large vials, even the most crowded labs can rely on this work horse. Samples are loaded in racks with barcode template identifier which makes multi-user environment with different needs extremely easy. With the high sample capacity and convenient multi-user interface, the Hidex 600 SLe is ideal for drug metabolism and pharmacokinetic studies using radioisotopes.

Optimised design

The Hidex 600 SLe is the enhanced version of the Hidex 600 SL, featuring a user-friendly design and improved capabilities. The model is equipped with an upgraded cooler, which cools samples also in the conveyor and has programmable temperature control. Additionally, traceability of samples is now easier than ever, as vials can have individual barcodes.

Optional features

- External ^{152}Eu standard source
- Alpha/beta separation
- Sample QR code reader
- Temperature control
- Low level option

Technical Specifications

	Hidex 600 SLe	Hidex 600 SLe Super Low Level
Sample capacity, 20/7/5 mL	200/500/500	200/500/500
Counting efficiency ^{3}H/^{14}C (%)	70/96	70/96
Background ^{3}H in water (CPM)	12	3
Dimensions, W/H/D (cm)	125/69/64	125/69/64
Weight (kg)	200	255

HIDEX

Hidex Triathler
The Versatile Counter

Triathler has been thoroughly tested and proven under extreme conditions. Around 2000 units have been delivered and they are used in all kinds of laboratories and in some of the planet's most demanding environments — in the desert and jungle, as well as on ocean-going vessels and oil platforms.

Features

Triathler is a single-sample counter, which provides fast and accurate results for several life science and environmental applications. It can count all radioisotopes including tritium in a variety of sample formats. Due to its very small size and light weight, Triathler can be taken into the field to measure samples on spot. Although compact, Triathler has many advanced features such as spectrum analysis using a multichannel analyzer (MCA), Instant DPM results, single-photon luminescence counting, and optional alpha/beta separation.

Triathler models and extensions

The Triathler Multilabel Tester (MLT) model handles all technologies (liquid scintillation counting, luminometry, and gamma spectrometry) in the same compact design. The Triathler LSC, Gamma, and Luminometer models are budget options for specific applications. The Triathler NaI System includes a Triathler connected to an external NaI well-type gamma detector housed in a separate 33 kg lead shield and is commonly used for medical isotopes. It accepts vials and tubes up to 25 mm in diameter. Similarly, the Triathler Becquerel Finder (TBF) model is connected to an external planar-type NaI gamma detector, housed in an enlarged 100 kg lead shield. It uses large Marinelli beakers up to 1 litre in volume and is commonly used for environmental water and food analysis.

Ideal for:

- Homeland Security
- Radiation Safety
- Wipe Tests
- Life Sciences
- Molecular Biology
- Ecology
- Environmental Testing

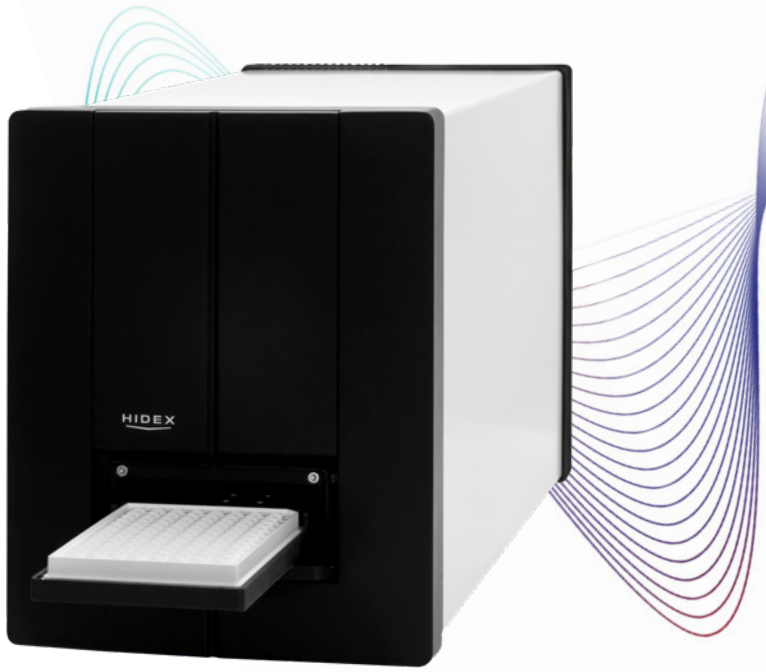
Optional features

- Alpha/beta separation
- Internal lead shield with low-level PMT
- External well-type NaI detector
- External planar NaI detector
- Field case with battery and/or wheels

Hidex Sense Beta
Sensitive and compact microplate counter

The Hidex Sense Beta is a high-performance microplate counter for liquid scintillation, beta, and gamma counting. It supports all common radioactive assays and also features luminescence technology for exceptionally demanding luminescence assays.

The automatic detector microplate touch control ensures optimal detection geometry with minimal cross-talk. Time resolved LSC functionality for background reduction, ensures optimal liquid scintillation assay results.



Wide range of options

- Microplate stacker featuring capacity for up to 25 pcs of 96 well microplates.
- Barcode reader enables plate identification and versatile mix of assays in the same batch.
- Automation service with industrial standard dotNET interface offers easy integration with most robot systems available.

Technical Specifications

Liquid scintillation counting	LSC mode beta and gamma emitters up to 2000 keV
Plate types	24, 96, 384 well plates
Counting efficiency	^{3}H >50%, ^{125}I >65%, ^{14}C >90% (±3%, B/W 96 plate, organic sample+MaxiLight)
Background	< 80 CPM
Time resolved liquid scintillation	< 20 CPM
Cross-talk	<0.05%, for ^{3}H and ^{14}C (B/W 96 plate)
Direct Luminescence	< 6 amol ATP / 96 well (Glow)
Width/Height/Depth (cm)	20/28/49
Weight (kg)	13

Hidex 600 OX Oxidizer
Automated ^{14}C and ^{3}H sample preparation

The Hidex 600 OX Oxidizer is a fully computer controlled automated sample combustion instrument dedicated for liquid scintillation counting sample preparation. Solid organic samples such as soil, tissue, plant, oil and concrete are transformed into homogenous and clear liquid sample for LSC measurement.

Oxidize up to 6 samples in one run

The instrument allows processing of six samples in the same run increasing the maximum sample combustion capacity per one working day. The appropriate Hidex 600 OX Oxidizer model can be selected based on lab needs, such as ^{14}C samples, ^{14}C and ^{3}H single-labelled samples, or ^{14}C and ^{3}H double labelled samples.

Optional features

- Automated gas tightness test before every sample combustion
- Oxygen input flow regulation system
- Possibility to collect several low-activity sample combustions into one LSC vial for concentrating the activity
- Samples directly ready for liquid scintillation counting

Technical Specifications

	Oxidizer Basic	Oxidizer Standard	Oxidizer Dual Label
Recovery	^{14}C 99%, typically 95%	^{14}C 99% and ^{3}H over 90%, typically 95%	^{14}C 99% and ^{3}H over 90%, typically 95%
Memory	^{14}C 0.1%	^{14}C 0.1% and ^{3}H 1%	^{14}C 0.1% and ^{3}H 1%
Power Requirements	210-240 VAC, 16 A, 50 Hz	210-240 VAC, 16 A, 50 Hz	210-240 VAC, 16 A, 50 Hz
Gas Connections	Oxygen: 2-5 bar, Nitrogen: 2-5 bar, Pressurized air 5 bar	Oxygen: 2-5 bar, Nitrogen: 2-5 bar, Pressurized air 5 bar	Oxygen: 2-5 bar, Nitrogen: 2-5 bar, Pressurized air 5 bar
Dimensions: W/H/D (cm)	90/60/66	90/60/66	90/60/66
Weight (kg)	85	85	85

Hidex Q-ARE
Fully automated extraction chromatography

The Hidex Q-ARE is an automated radionuclide extraction chromatography (EXC) system dedicated to radionuclide separation from environmental, food and decommissioning samples. The automated solid phase extraction is a separation technique performed in resin packed columns utilizing the selectivity of liquid-liquid extraction. The Hidex Q-ARE has single and tandem chromatography modes. The tandem chromatography mode allows sample and reagents to flow in consecutively through two columns allowing collection of up to 5 elution fractions from one sample.

Features

- Automatic extraction chromatography for up to 8 samples
- Compatible with various sizes of pre-packed and self-packed columns
- Fully automated column conditioning, sample loading, washing and elution steps
- Single and tandem chromatography modes

Technical Specifications

	Q-ARE 50	Q-ARE 100
Pumps (No.)	4	8
Sample capacity (columns)	4 (2 in tandem)	8 (4 in tandem)
Elution fractions collection (No.)	10	20
Reagent bottles	12	12
Compatible column size (ml)	1-20	1-20
Pumping volume accuracy (%)	> 95%	> 95%
Flow rate, typically (ml/min)	0.5-15	0.5-15
Power	100-240V AC, 50-60Hz	100-240V AC, 50-60Hz
Dimensions WxDxH (cm)	78x56x65	78x59x55
Weight (kg)	55	60

Additional services and products

Standards

Hidex offers a range of standards for instrument calibration and validation. Unquenched and quenched standards are NIST traceable. Internal standards are also available for validating cocktails, vials and sample preparation procedures.

Cocktails

Hidex offers a broad range of high performance cocktails for vial-based counters, microplate readers, oxidizers, and flow counters, including a comprehensive selection of NPE-free options for enhanced environmental safety and user convenience.

Vials

A large variety of different vials are available together with your instrument. From low volume plastic vials to high performance frosted glass vials – get the best out of your instrument with the right consumables.

Biofuel method

The Hidex Biofuel method is a novel method for detection of biogenic carbon-% in fuels for in-house use at oil refineries or at contract research organizations. The direct detection of biofuel by LSC overcomes many limitations of traditional biocarbon quantification and our mix & go method improves upon it by bypassing the need for a background sample and providing individualised calibration.

Hidex Solid Biocarbon Method

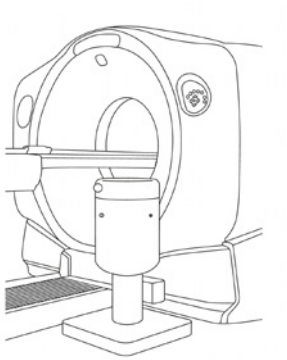
The Hidex Solid Biocarbon method determines biocarbon which is the modern carbon percentage in a particular sample. The method is based on advanced sample preparation technology followed by LSC analysis.

Hidex AMG

Hidex Automatic gamma counter is ideal for nuclear medicine and preclinical research applications. With our onboard balance, samples can automatically be weighed and results reported as activity per mass.

Hidex Sense

Hidex Sense is a compact, application ready, high performance multimode microplate reader featuring all common assay technologies. It is the ideal solution for multi-user environments where uncompromised performance, usability and sensitivity are required.



Hidex RWG

Hidex Radiowater Generator is an automated production system for ^{15}O labelled water in PET blood flow studies. With the convenience and easy operation of Hidex RWG, you can reach the full potential of blood flow studies with a system that is designed for increased patient safety and convenient operation.

About Hidex

Hidex is a family owned high technology company which develops and manufactures high performance analysis equipment for life science research, radiation measurement and nuclear medicine. Our products utilize modern technology and excellent tradition of workmanship. With strong links to the scientific community we continue to innovate and develop to improve the research of medicine, safety of nuclear industry, sustainability of the environment, and purity of our food and water supplies.

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