HIDEX

Hidex Q-ARE

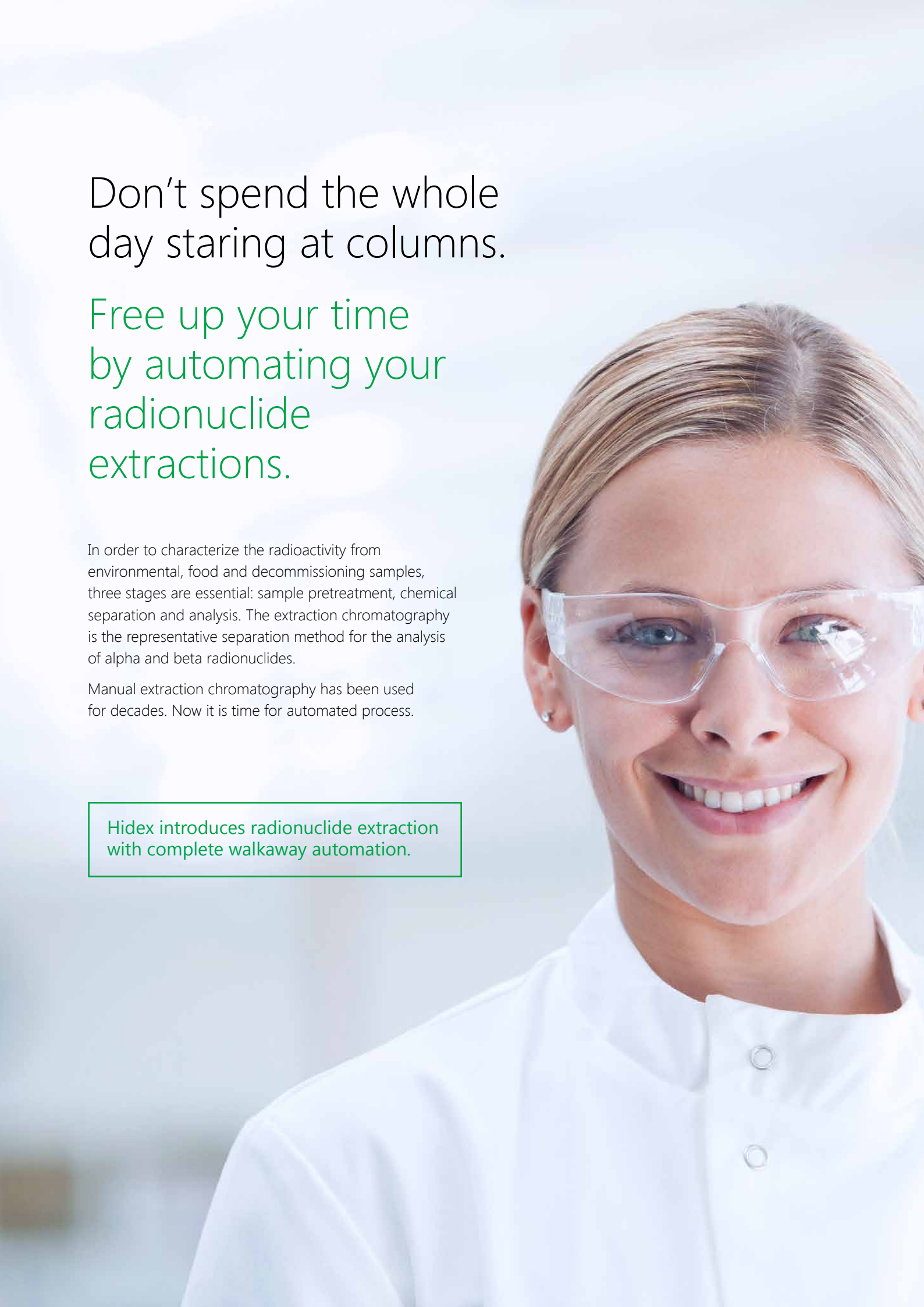
Don’t spend the whole day staring at columns.

Free up your time by automating your radionuclide extractions.

In order to characterize the radioactivity from environmental, food and decommissioning samples, three stages are essential: sample pretreatment, chemical separation and analysis. The extraction chromatography is the representative separation method for the analysis of alpha and beta radionuclides.

Manual extraction chromatography has been used for decades. Now it is time for automated process.

Hidex introduces radionuclide extraction with complete walkaway automation.



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Automated Radionuclide Extraction System

Q uick
A utomated
R adionuclide
E xtraction

The most advanced automated radionuclide extraction chromatography system dedicated to radionuclide separation from environmental, food and decommissioning samples.

Quick and easy-to-use unattended radionuclide extraction.

User friendly, intuitive and hassle free.

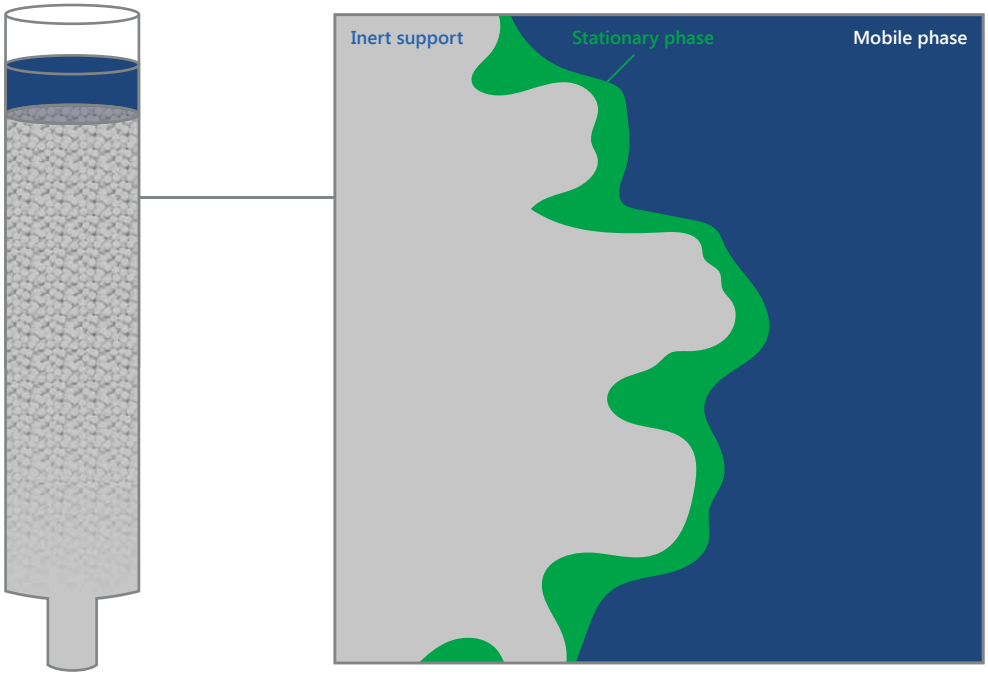
+ Fully automated column conditioning, sample loading, washing and elution steps
+ Compatible with various size of pre-packed and self-packed columns
+ User-safe fume hood free design to avoid exposure to strong acids and samples
+ Single and tandem chromatography separation
+ Up to 8 samples simultaneous processing
+ Up to 5 elution fractions collection from one sample

Extraction chromatography

Extraction chromatography (EXC) is a separation technique that is ideal for extraction of radionuclides from a wide variety of samples. It is a continuous multi-step process performed in a resin packed column. The EXC utilizes the selectivity of liquid-liquid extraction in an easy-to-use column chromatography format.

The extraction chromatography system consists of three different components:

1. bead-based inert support material
2. stationary phase
3. mobile phase



Extraction chromatography resin structure.
The stationary phase contains liquid extractant compound specific to the target radionuclide.

The stationary phase contains single or several liquid extractant compounds that are impregnated onto the support material and used for uptake of the target nuclides.
The extractants are organic molecules, for example, crown ether type structures that selectively binds the target radionuclide. The binding is based on non-covalent interactions and therefore, the bound radionuclides can be eluted by changing the liquid mobile phase conditions such as acidity. In general, the mobile phase is usually an acid solution and different type of acids are used to achieve optimal selectivity.

Hidex Q-ARE 100plus

Sample Zone

Samples are loaded into disposable 50 ml bottles on top of the instrument. Maximum of 8 samples can be processed in one run.

Reagent Zones

Reagents zone have capacity of 12 one litre bottles. Six reagent bottles are connected to the columns 1-4 (left) and 4-8 (right). This enables run of two different EXC protocols.

Elution Zone

Elution solutions are collected into 50 ml bottles. Up to 5 elution fractions can be collected from one sample.

Pumps

Each sample line has individual peristaltic pump for optimal flow and volume control. The tubing material is resistant to strong acids that are commonly used in EXC.

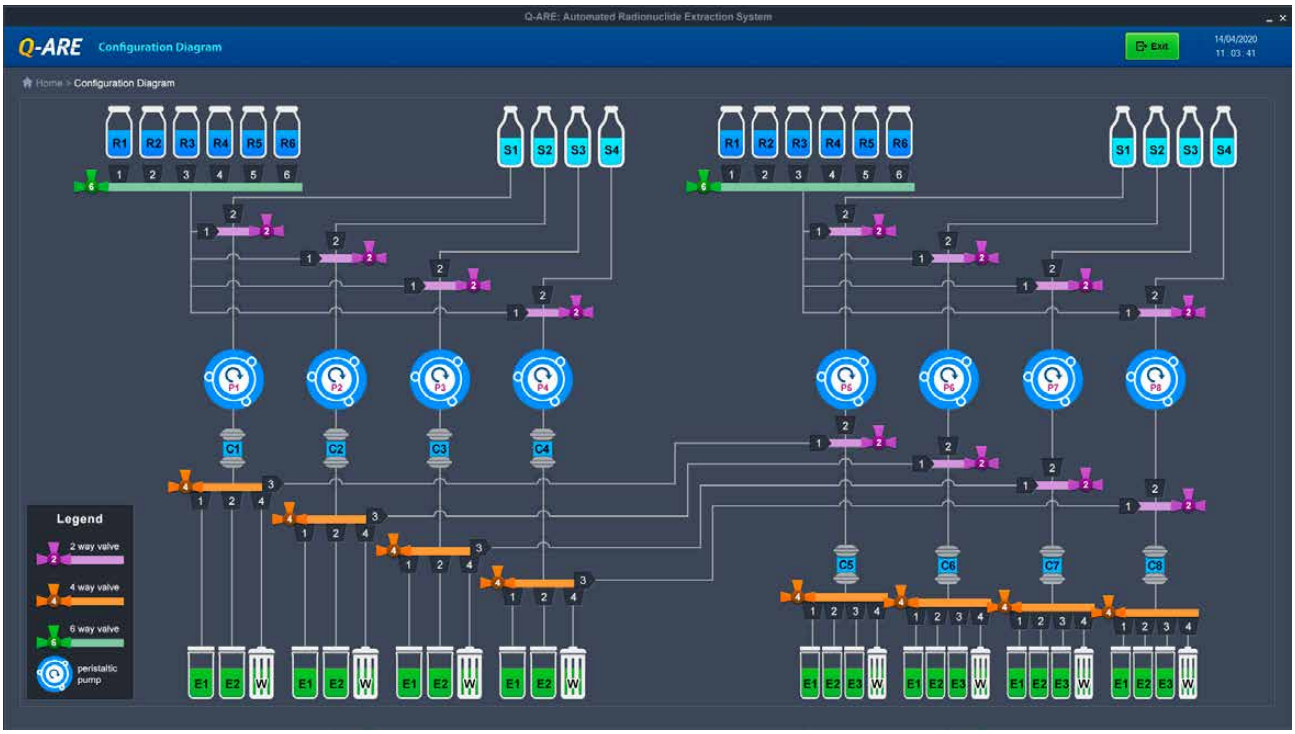
Columns

The system is compatible with various size of extraction chromatography columns. The columns are easily attached to the fittings containing acid-proof ring gasket.

Technical solutions

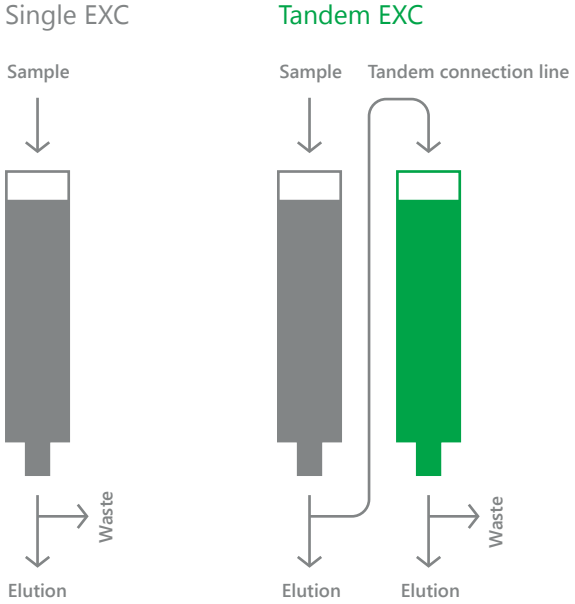
Automated EXC for 8 samples simultaneous processing

The Q-ARE 100 comprises of simultaneous cooperation of 8 pumps and samples lines, 12 reagent lines and 50 valves for automated extraction chromatography. The system has capacity for maximum of 20 elution fractions collection for separated bottles. Each pump is individually calibrated for highly accurate flow and volume dispensing.



Automated tandem chromatography

The Q-ARE has single and tandem chromatography modes. Tandem chromatography mode allows sample and reagents to flow consecutively through two columns. Elution is performed from the two columns into different elution bottles automatically without manual steps. From one sample up to 5 elution fractions can be collected and total of 4 samples can be processed in parallel in the tandem mode. All the radionuclide extraction applications based on Triskem and Eichrom columns and resins can be automated with the Q-ARE.



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User friendly intuitive software

The Q-ARE is operated using an external PC. The EXC protocol typically consists of four different steps: 1) conditioning, 2) sample loading, 3) washing and 4) elution. The protocols with reagent, flow and volume control are easy to create using pre-filled dropdown menus. Two different protocols for 4 + 4 samples can be run simultaneously using reagent lines 1-6 for the columns and pumps 1-4 and reagents lines 7-12 for the columns 5-8.

Acid resistant and user safe fume-hood free design

The pumps, valves, tubing and fittings are made of acid resistant materials such as PEEK and PTFE. Pumps and columns are protected with acrylic doors. All the Q-ARE bottle caps are compatible with inlet check valve to avoid acid fumes and enable fume hood free operation.

Hidex Q-ARE 50

EXC for four samples parallel processing

The Q-ARE 50 is a cost-effective alternative for the Q-ARE 100plus. The system is based on same high-quality components and it has capacity for four samples simultaneous processing. The two reagent zones holds up to 12 reagent bottles. In tandem mode the capacity is two samples. The physical size is same as Q-ARE 100plus.

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Specifications

	Q-ARE 100plus	Q-ARE 50
Dimensions, W/H/D (cm)	78/59/55	78/59/55
Weight (kg)	60	55
Power (V/Hz)	100-240/50-60	100-240/50-60
Pumps (No.)	8	4
Sample capacity (columns)	8 (4 in tandem)	4 (2 in tandem)
Elution fractions collection (No.)	20	10
Reagent bottles	12	12
Compatible column size (ml)	1-20	1-20
Sample bottle size (ml)	50, 10*	50, 10*
Elution bottle size (ml)	50, 20*, 10*	50, 20*, 10*
Pumping volume accuracy (%)	≥95	≥95
Flow rate, typically (ml/min)	0.5-5	0.5-5
Valves	Body PEEK, Diaphragm PTFE	Body PEEK, Diaphragm PTFE
Tube/Fitting material	PTFE/PEEK/ETFE	PTFE/PEEK/ETFE
Media temperature (C°)	50 (short time 90)	50 (short time 90)

** Optional bottle cap for 10 ml bottles and 20 ml LSC bottle*

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 scientific research and safety of everyday life.

Today more than 3000 Hidex precision instruments are at service in leading laboratories worldwide as well as in some of the hardest conditions on the planet. Jungles and deserts, oil platforms and ocean going vessels – even submarines are no challenge for Hidex instruments.

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