

THE SERCON GROUP

# WES-DI

WATER EQUILIBRATION  
SYSTEM - DUAL INLET



**sercon**  
The *Stable* Isotope Company



## WES-DI WATER EQUILIBRATION SYSTEM - DUAL INLET

Sercon are dedicated to the design, manufacture and support of **Isotope Ratio Mass Spectrometers** and their associated **sample preparation systems**.

Water equilibration is the method of choice for  $^{18}\text{O}$  and  $^2\text{H}$  determination from water samples. The WES is available in both continuous flow and dual inlet form and provides the best performance from the widest range of samples.

Both versions benefit from our 2x110 heated sample tray which permits up to 220 samples to be analysed. It also enables one batch to be equilibrating whilst the other batch is being analysed and so increases laboratory throughput.

The water equilibration system is a high performance equilibration system for automatic measurement of water isotopes by dual-inlet on the GEO20-22



The deuterium and oxygen-18 signature of a water based sample is measured by equilibrating with hydrogen and carbon dioxide respectively. A procedure that is totally automated and allows either separate or sequential analysis of the two isotopes.

Precise temperature control and integration of the GEO 20-22 provides ultimate precision of stable isotope analysis. The whole instrument system is driven by Windows compatible software for ease of operation and networking capability.

### Power and Gas Requirements:

Power	100-240 VAC
Carbon Dioxide	99.999%
Hydrogen	99.999%
Compressed Air	100 psi





- Water based samples (e.g. brine and urine) can be analysed without the need for pre-distillation. System control via software macro allows sequential analysis of hydrogen and oxygen isotopes.
- Thermostatically controlled block to hold sample containers above room temperature and so maintain a precise equilibration point (designed to operate at  $60 \pm 0.1$  °C).
- Autosampler to accommodate up to 220 disposable septum sealed containers (removes the possibility of sample cross contamination).
- 3 port gas inlet for hydrogen, carbon dioxide and helium and dedicated vacuum line for automated evacuation and filling of sample containers.
- Helium flushing facility to purge gas transfer lines to remove sample 'memory'.
- Small sample requirement (1 to 0.1 mL range).
- Cryogenic trap to prevent water vapour reaching mass spectrometer inlet.
- Re-usable hydrophobic Platinum rods to catalyse the hydrogen: water equilibration.

## SPECIFICATIONS

Specification	WES
Design	Small footprint benchtop unit with autosampler mounted. 3 port gas inlet, stainless steel gas transfer lines, dedicated vacuum pumping and normally closed valves.
Autosampler	X, Y and Z coordinate high precision sampler.
Temperature Control	Thermostatically controlled block for 220 containers, designed to operate up to $60^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$ .
Gas Inlet	3 port gas inlet for hydrogen, carbon dioxide and helium.
Sample Containers	Disposable septum sealed 5ml glass containers.
Sample Range	1 to 0.1 ml
Water Removal	Cryogenic trap to prevent transfer of vapour to the mass spectrometer inlet.
Hydrogen Catalyst	Hydrophobic Platinum catalyst sticks.
Software	Proprietary operational software for system control which is integrated with the GEO 20-22 control and acquisition software. System uses Sercon Callisto which is Windows 7 based.

## INTERNAL PRECISION

$2\sigma$ 10 for 10 changeovers on gases at natural abundance.

Gas	Sample Size (bar $\mu\text{L}$ )	Standard Inlet (‰)	Cold Finger (‰)
$\text{CO}_2$ (C)	100	0.01	0.01
	10		0.02
	3		
$\text{CO}_2$ (O)	100	0.015	0.015
	10		0.03
	3		
$\text{H}_2$	200	0.15	
External Precision	$\sigma(n-1)$ for $n=5$ containers.		

Waters	Sample Size (ml)	Standard Inlet (‰)
$\text{CO}_3$ (C)	1	0.05
	0.1	0.1
$\text{H}_2$	1	1.0





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