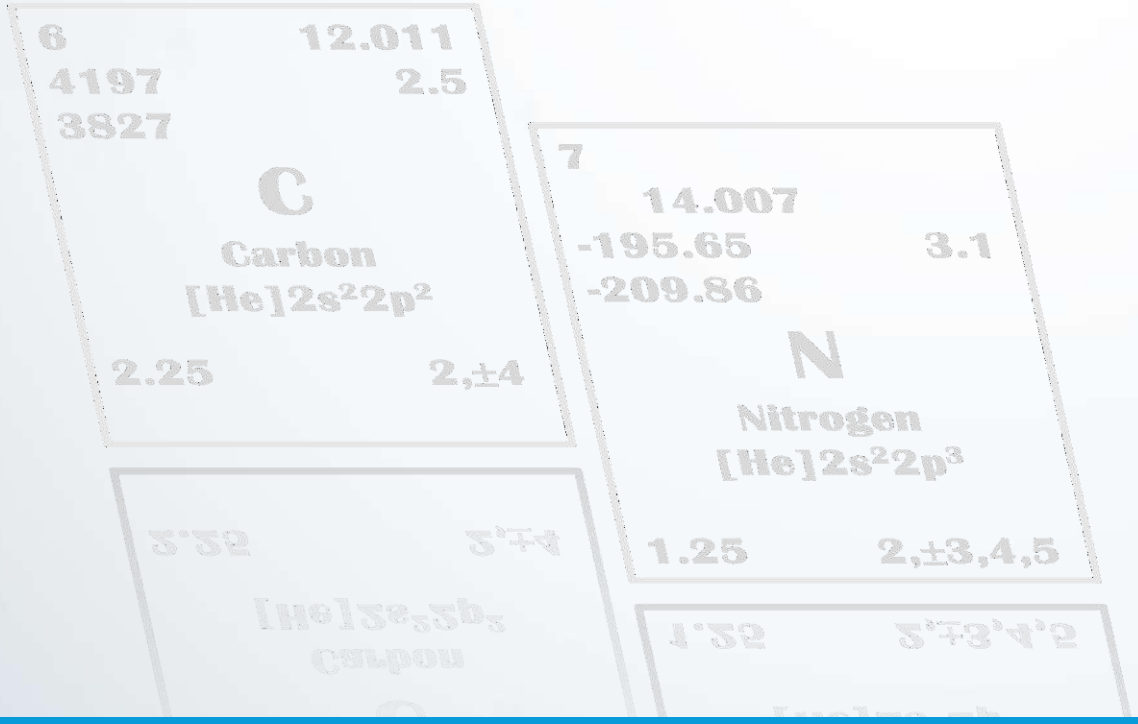
compact **science** systems

NC TECHNOLOGIES
Innovative Elemental µ-Analysis

EA ID MICRO

C, N, S & O Stable Isotopes Analysis



ECS 80 SERIES - ID MICRO

ID Micro EA (C N S O)

✓ Mass Spectometer

The mass spectrometer is a 14 cm radius 90degree magnetic sector with a triple Faraday cup collector for detection of the isotopes of carbon, nitrogen and oxygen.

High stability permanent magnet manufactured from custom made alloy

High sensitivity gas tight-ion source with trap current adjustable up to 1,000 micro amps.

Beam steering in the Y and Z directions for optimising ion beam transmission.

The pumping system consists of a 70 L per sec compound turbomolecular drag pump, associated backing line and oil free diaphragm pump mounted inside the mass spectrometer bench. Vacuum pressure is measured by an active Penning gauge.

The Penning gauge set level pressure trip will be used to protect the ion source filament and supply from vacuum over pressure.

Includes 1/16th inch tubing & fittings kit. 1 spare CSS manufactured filament.

✓ Reference Gas Injector

The reference gas injector is situated in the ID Micro cabinet. It produces reference gas pulses for Carbon Dioxide and Nitrogen.

Reference gases are switched off when not in use for reference pulses thus reducing supply gases consumption. The reference gas pressures can be adjusted remotely allowing the ratio change with pressure characteristic to be measured and linearising corrections applied when necessary.

All valves are electronically actuated (compressed air not required). The sample diluter is situated in the ID Micro cabinet and can be actuated remotely by computer to suit sample diluting requirements.

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EA ID MICRO application fields

- ✓ Organic chemistry and pharmaceutical
- ✓ Soil science and geology - marine science
- ✓ Forensic
- ✓ Environmental analysis
- ✓ Petrol chemistry and energy
- ✓ Materials characterization
- ✓ Food (special configuration for big size samples is easily available)

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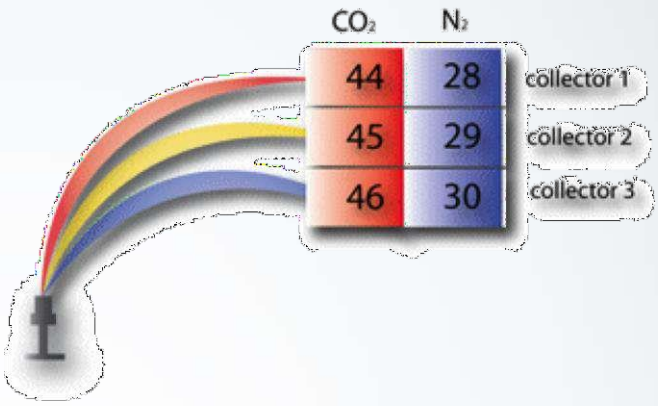
✓ Electronics:

The electronics are contained in the same unit as the mass spectrometer and are driven by a PC computer via a PIC processor intelligent interface.

The condition of the electronics, pumps and gas pressures are monitored by a secondary processor and fed back in real time to the computer and can be monitored remotely at the factory in the UK.



✓ Data System

Tower PC of current specification consisting of LCD Monitor, keyboard & mouse. The PC is interfaced to the IRMS via an Ethernet connection and can be networked to other computers.

The data system contains instrumentation diagnostic routines, preparation system control and analytical data acquisition and results display. Printer not included.

✓ System

Isodelta is a fully functional software package for the control of the mass spectrometer and interpretation of the Isotope Ratio analysis. It comprises:

- Connection status: This control informs the user whether the host PC is connected to the Mass Spectrometer (MS). If the host PC is connected and communicating with the MS, the IP address of the MS is displayed.

- Run control. This control allows the user to start, pause or stop an analytical run.
Instrument status display: The status display shows all the relevant readbacks from the MS. These include the beam intensity from each channel, the relevant ratio, source voltage, source status and vacuum pressure.

- Sample sheet: The sample sheet allows the user to input the samples to be run and the manner in which the MS should handle the samples. The sheet also displays a summary of the results as analysis progresses.

- Function control panel: The function control panel allows the user to select a series of different functions and options necessary to run the instrument. These include the following:

i. The Sample sheet.
ii. A graphical representation of data acquisition in real time.
iii. Systems Monitor
(Includes - Windows 10 Professional & Microsoft Office Professional (Latest Version))

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Installation

Installation and 4 days operator training are included

IDmicro EA (standard sensitivity) System Specification

1) Internal reproducibility of 12 repeated injections of carbon dioxide reference gas, at a mass 44 ion beam intensity of 20 Nano amps : +- 0.10 ‰ for delta 13C at natural abundance (1 standard deviation).

2) Internal reproducibility of 12 repeated injections of nitrogen reference gas, at a mass 28 ion beam intensity of 20 Nano amps: +- 0.15‰ for delta 15N at natural abundance (1 standard deviation).

3) External sample reproducibility of 5 dried UREA samples containing 100 ug carbon sealed in a tin boat: +-0.20‰ for delta 13C at natural abundance. (1 standard deviation).

4) External sample reproducibility of 5 dried UREA samples containing 100 ug nitrogen sealed in a tin boat: +-0.30‰ for delta 15N at natural abundance. (1 standard deviation).

Sample Throughput

Approximately 1 sample every 4 – 5 minutes (dependent on elemental analyzer)

Isotope Ratio Mass Spectrometer

Single focusing, 14 cm radius 90° magnetic sector analyzer, excellent temperature stability.
Analyzer magnet with 70Lsec-1 turbo pump.
Resolution: >75 at mass 29.

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ID Micro features

Focusing	Single focusing 14 cm radius 90° magnetic sector analyzer
Resolution	>75 at mass 29
Isotopes detection	N C S O
Detection	Triple Faraday cup collector
Magnet	Permanent, alloy made
Pumping system	oil free diaphragm pump system
Instrument setting	Via PC. PIC processor intelligent interface
Software	Isodelta

Analytical conditions

Samples throughput	1 sample every 4-5 min (depending on elemental analyzer)
Internal reproducibility*	±0.10‰ for delta ^{13}C at natural abundance ±0.15‰ for delta ^{15}N at natural abundance
External reproducibility**	±0.20‰ for delta ^{13}C at natural abundance ±0.30‰ for delta ^{15}N at natural abundance ±0.25‰ for delta ^{34}S at natural abundance ±0.30‰ for delta ^{18}O at natural abundance

* 12 repeted injections of carbon dioxide reference gas, at mass 44 or nitrogen reference gas, at mass 28, ion beam intensity of 20 Nano amps.

** 5 dried urea samples containing 100 µg carbon or 100 µg nitrogen sealed in a tin capsule.

External sample reproducibility of ^{34}S :- 5 dried Ammonium Sulphate samples containing 50 ug Sulphur sealed in a tin boat: +-0.25‰ for delta ^{34}S at natural abundance. (1 standard deviation).

External sample reproducibility of ^{18}O : Reportability for 5 samples containing 200µg O

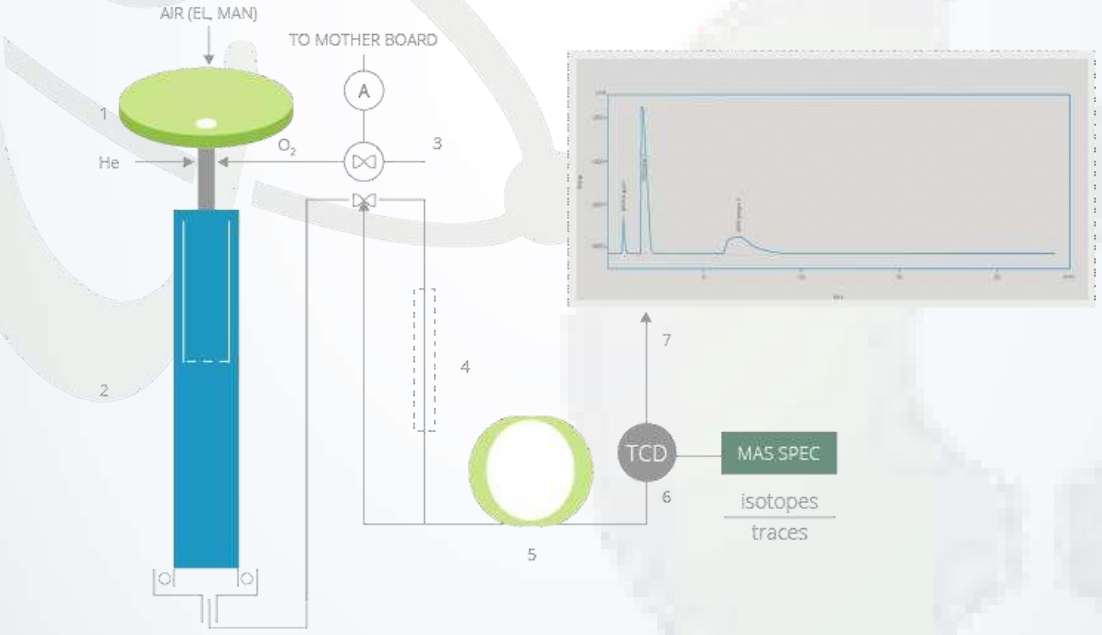
Physical Specifications

Dimensions	30x47x70 cm
Weight	45 kg
Power supply	230V±8%, 50/60Hz
Adsorbed power	5 Amp, 1100W
Gas requirements	Helium (99.995% purity) H2O<2 v.p.m. CO2 (99.995% purity) N2 (99.995% purity) H2O<4 v.p.m.

ECS 80 Series | 8020 – 8040 – 8060

✓ Key features

- Sample preparation and weighing
- Zero Blank Autosampler
- O_2 comburent dosing
- Oxidation/reduction combustion phase
- Separation of fumes components
- Detectors
- Data acquisition & data presentation



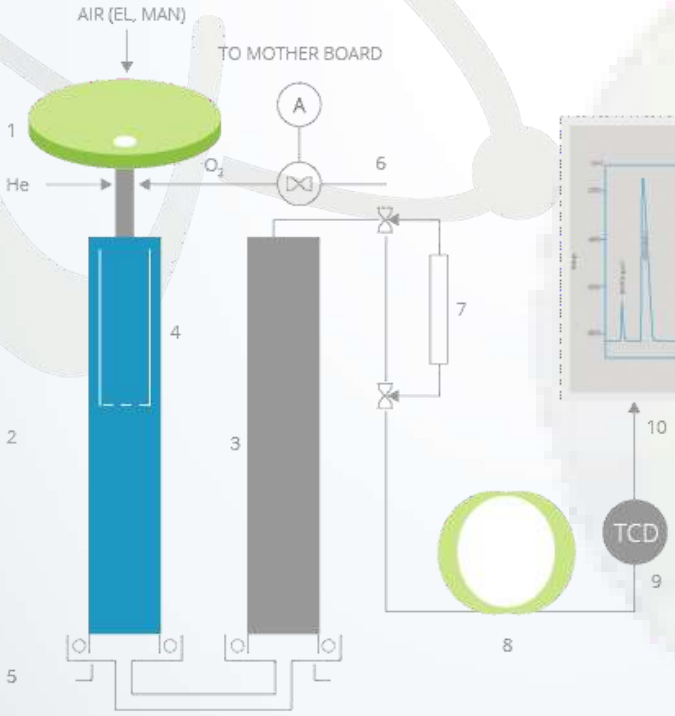
1. Autosampler
2. Oxidation reactor
3. Automatic oxygen doser
4. H2O TRAP
5. Oven and chromatographic column
6. High Resolution TCD
7. Data acquisition and data presentation

ECS 8020 – CHNS-O Analyzer
Organic Elemental Analysis

ECS 8020 is a C-H-N-S-O Elemental Analyzer Model based on the Dumas combustion method.

ECS 8020 is a state-of-the-art system for the elemental analysis based on sample combustion and separation of gases with a chromatographic column.

The combustion products, i.e. CO2, H2O, N2 and SO2, are separated and quantified by a high resolution TCD detector.



ECS 8020 is fully automatic, from the available samplers to the oxygen dosage, from the monitoring of consumables status to the automatic leak test

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ECS 8020 is composed by:

Dual furnace combustion system (for a better combustion and optimization of catalysts)
Safety quick fit system for reactors connection (easy and safe way to set the instrument)
Customized GC column
Detection system
Data acquisition and handling

Several configurations may be set for the determination of the target element.
Typical configurations are for:
CHNS; CHN; CN; CNS; O

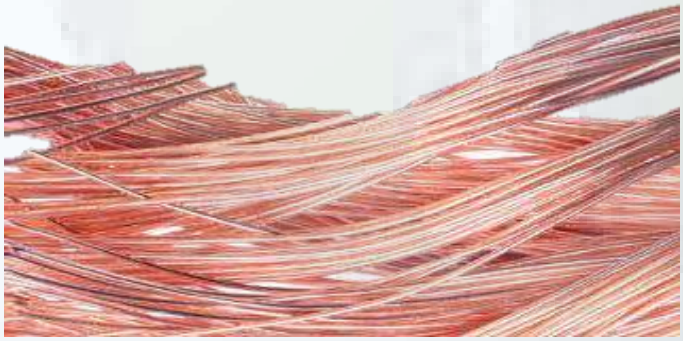
Choose the proper chemical, consumables and prepacked reactors and get the best configuration.

The versatility of ECS 8020 can be expressed as:

Sample weight

Sample type

Liquid or solid sample



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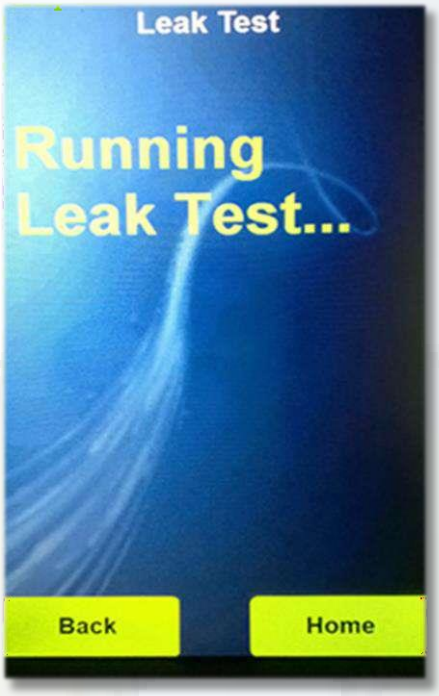
Three different samplers are available:

Pneumatic autosampler up to 147 positions
Electronic autosampler with 32, 50, 100 positions
Manual sampler

Automatisms make it particularly user-friendly:

Automatic oxygen dosage system
(for a better consumption of oxygen and consumables)
Automatic consumables status monitoring
Automatic leak test
Standby mode
(gas, energy and time savings)



Automatic oxygen dosage: main highlights.

Details of sample are registered:
Position
Type
Weight

ECS 8020 will dose the oxygen for the right combustion. No oxygen or consumables wastes

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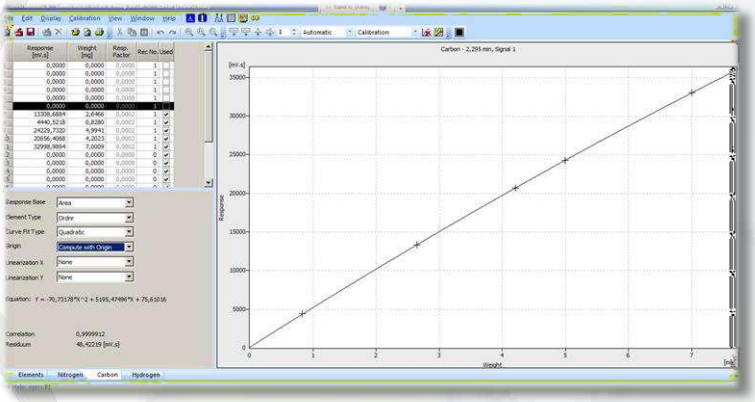
EAS Clarity

Powerful software for powerful instrument
Getting data, analyzing data, presenting data

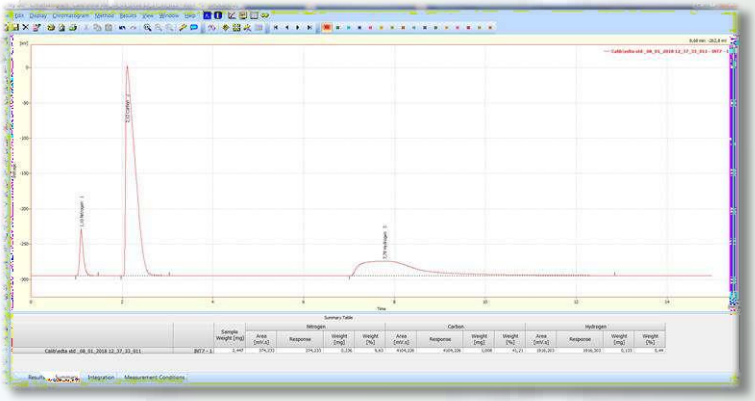
Integration

There is extensive possibility to modify chromatograms. The chromatogram can be changed by entering global parameters or interactively, through direct graphic modification of the baseline.



Overlay

Simultaneously displays a virtually unlimited number of chromatograms and their mathematical modification.



Calibration

Internal and external standard calculation methods.

Automated measuring support

Sequence tables for any set of samples.

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What the user can do

Summary result tables
Displays and prints selected results from all simultaneously displayed chromatograms.

User settings
User selects parameters for peak display and the specification for axes, including color from an extensive array of color settings. Text labels and lines, either as part of the area or anchored to a chromatogram, may also be inserted.

Export
Optional exportation of all results, with or without the chromatogram, in various formats, into a file or clipboard.

Import
Imports chromatograms or mathematical curves, which have been saved in text or AIA formats, from other programs.

Special features

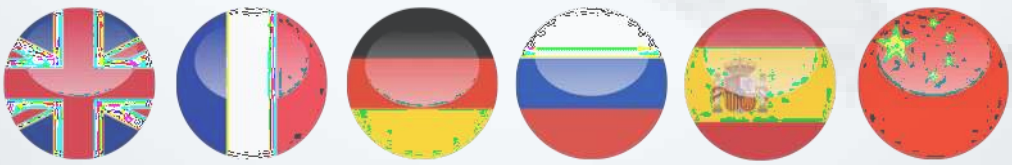
LIMS
Clarity offers connectivity with LIMS both for sample submission and result output. This can be done via convenient ASCII transfers.

Method and calibration history
Each chromatogram can easily be displayed under the same conditions as when it was printed, exported or saved.

Column performance
Calculations of peaks in terms of symmetry, efficiency, resolution; all by several methods.

Batch
Automatically batch processes, displays, exports or prints any number of chromatograms.

Language localization available
Basic version in English language.
French, German, Russian, Spanish and Chinese localizations are also available in single installation package.



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ECS 8020 key points

- ✓ Fully automated analysis system
- ✓ High sensitivity, accuracy and precision
- ✓ Flexibility and versatility of applications
- ✓ Detector does not require reference gas
- ✓ Powerful software for viewing results from a computer
- ✓ Touch-screen display for an easy settings management
- ✓ Consumables status monitoring for an optimization of catalysts usage
- ✓ Three types of samplers available: electronic / pneumatic / manual.
- ✓ Easy connection to ID Micro MS for stable isotopes analysis
- ✓ Low operation and management costs
- ✓ Standby mode for gas, energy and time savings

ECS 80 SERIES - ID MICRO

Analytical and Technical Features

ECS 8020 Features

Type	CHNS-O	
Analysis time	CN	5 min
	CHN	8 min
	CHNS	10/25 min
	O	4 min
Analytical range	C	0.002-20 mg
	H	0.002-5 mg
	N	0.002-20 mg
	S	0.002-6 mg
	O	0.002-2 mg
Accuracy*	<0,2% (certified standard; purity >99.9%)	
Precision*	<0,1% (certified standard; purity >99.9%)	
Sampler	Pneumatic autosampler	147 positions max
	Electronic autosampler	32, 50, 100 positions
	Manual sampler	

Dual furnace system
Safety quick fit system
Touch screen display
Standby mode

* Accuracy and precision are related to samples nature and homogeneity .

Physical Specifications

Dimensions	81x50x37 cm
Weight	68 kg
Power supply	230V, 50/60Hz
Adsorbed power	5 Amp, 1100W
Gas requirements	Helium (99.999% purity), 3-5 bar
	Oxygen (99.999% purity), 3-5 bar
	Air (oil free compressed air)

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Analytical and Technical Features

Analytical Conditions

Gas carrier	Helium
Leak test	Automatic
Furnace temperature	Left Furnace: max 1100°C Right Furnace max 1100°CMax
Oven temperature	110°C
Oxygen volume need	Automatically calculated by the oxygen doser
Flow rate	Electronic Flow Rate
Gas separation	0.8-4 m GC Column
Detector	High Sensitivity TCD
Software data analysis	EAS Clarity
Calibration	Linear, Quadratic, Cubic
Active calibration	As needed

Sample

Sample size	0.1-500mg (depending on sample nature) Up to 1 g for soil samples
Sample type	Liquid Solid
Capsule	High purity tin and/or silver capsule

Accessories

Installation kit	
Sampling kits	Small samples; big samples; deluxe kit
Microbalance	
Consumables	Proprietary NC Technologies S.r.l.
Technical assistance	By phone or email within 24 hours

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