

Technical specifications

Thermo Gravimetric Analyzer

TGA balance type	Top-loading balance
Temperature range	Ambient to 1000°C
Temperature calibration	Curie point
Scanning rates	0.1 to 200°C/min
Scanning temperature accuracy	±1 °C
Scanning temperature precision	±0.8 °C
Sample temperature precision	±0.3 °C @ 300 °C ±0.5 °C @ 900 °C
Sample to program temperature correlation	±0.5 °C @300 °C ±1°C @ 900°C
Scanning baseline dynamic drift	<50mg
Balance digital resolution	0.2 µg
Balance sensitivity	1 µg
Balance accuracy	± 0.02%
Balance precision	± 0.01%
Balance capacity	1500mg
Sample pans	180 µl Ceramic 180 µl Platinum
Cooling time	1000 °C to 100°C under 8 mins 1000 °C to 50 °C under 11 mins
Atmosphere	Static or dynamic, including nitrogen,argon, helium, carbon dioxide, air, oxygen or other inert or active gases over full temp range
Mass flow controller	Included
User control	Pyris Software
21 CFR Part 11 compliant	Optional
Autosampler	Optional, 45-position
Dimensions	17×38×41 cm(6.7×15×16.5 in)
Weight	16kg/ 35.2 lbs (18.3kg/403 lbs with auto-sampler)
Power requirements	100-240 Volts, 50/60Hz
Hyphenation options	Yes
Certificates/Compliances/Quality Assurance	Developed under ISO 9001. Designed and tested to be in compliance with the legal requirements for laboratory analytical instruments.

FT-IR Spectrometer

Wavelength Range	8300-350 cm^{-1} optimized, proprietary KBr beamsplitter
Spectral Resolution	0.5 cm^{-1} standard
Wavelength Precision	Better than 0.01 cm^{-1} at 3000 cm^{-1}
Wavelength Accuracy	0.1 cm^{-1} at 3000 cm^{-1}
Signal-to-noise	9300: 1 peak-peak, 5 seconds 32000: 1 peak-peak, 1 minute 14500: 1 peak-peak, 5 seconds 50000: 1 peak-peak, 1 minute Without optional performance
General	Long-life sealed and desiccated optical unit incorporating Opticsguard design, vibration isolated baseplate
Interferometer	Rotary Michelson interferometer, High stability, self-compensating for dynamic alignment changes due to tilt and shear.
Optics	Kinematically mounted, zero alignment optics, with high reflectivity and a low-angle off axis design. Proprietary OpticsGuard system for extended desiccant life and additional optical component protection.
Detectors	High linearity room temperature detector (standard) Temperature-stabilized room temperature DTGS detector optional.
Source	Long-life source with proprietary hot-spot stabilization.
Beam splitter	Proprietary extended range KBr
Desiccant	Long-life desiccant system accepts disposable packs. Software controlled desiccant status indicator.
Validation	Software controlled validation wheel options containing a polystyrene reference material, traceable to a NIST standard for wavenumber accuracy and a Schott NG11 filter for ordinate repeatability.
Optical Windows	KBr(standard), ZnSe option for exceptionally high humidity environments
Signal Sampling	Over-sampling delta-sigma converter
Communication	USB, wireless and TCP/IP interface allows direct connection with LAN.
Calibration Transfer	Absolute Virtual Instrument (AVI) option-actively standardizes instrument response to further improve repeatability and protect data integrity
Atmospheric compensation	Minimizes effect of atmospheric water and CO ₂ on the sample spectra without the need for reference or calibration spectra. Operates at various instrument settings without having to recalibrate the correction
Accessory recognition	Spectrum Two accessories are automatically detected as soon as they are locked into the sampling area. Instrument parameters are optimized for the installed accessory. Accessories information stored with spectral data.
Error Trapping	All samples spectra are checked for common spectroscopic and sampling problems. Key instrument components are continuously monitored.
Component Checks	Individual component checks under software control can be executed on-demand or automatically scheduled at preset times/intervals
Powersave mode	Instrument standby and power-up can be automatically scheduled.
Size	450mm × 300mm × 210mm(W×D×H)
Weight	13kg
Power Supply	Universal voltage power supply enables operation from mains. Optional rechargeable battery pack for remote operation, chargeable from mains or car battery. Optional power pack also serves as an Uninterrupted Power Supply (UPS)
Operating range	5-45 °C
Typical desiccant lifetime	5 years at 25 °C and 90% relative humidity

DSC 6000

DSC Type	Single furnace
Measurement principle	Heat flux
Furnace material	Alumina coated aluminium
Temperature sensors	Thermocouple based.precisely-machined disc Of Chromel alloy(90% Nickel/10%Chromium)
MT-DSC	Included
Software	Includes pyris software,pyris player,Isothermal Kinetics,scanning kinetics, scanning kinetics,specific heat and purity software packages
Cooling accessories	Cryofill (liquid (N2) Chiller or circulator Intracooler Portable cooling device
Hardware Features	
Dual,digital mass flow-controller	Included
Cooling accessory upgrades	Minimal downtime and expense
Photocalorimetry	Optional
Calorimetric performance	
Dynamic range	$\pm 175\text{mW}$
Accuracy	$\pm 2\%$
Precision	$\pm 0.1\%$
Indium height/width(mW/'c)	Indium melting peak height/width at half height. 1 mg indium,10°C/min,nitrogen purge.No Mathematical treatment to the data or correction applied.
Indium melting time(sec)	Form the onset of the indium melting peak to the peak maximum
Digital resolution	0.02 μW
Temperature performance	
Range	-180°C to 450°C
Accuracy	$\pm 0.1^\circ\text{C}$
Precision	$\pm 0.02^\circ\text{C}$
Data points/sec	10
Controlled heating rates	0.1 to 100°C/min
Controlled cooling rates	0.1 to 100°C/min
Cooling times-intracooler(100°C to 0°C)	For fast sample turnaround
Regulatory	
21 CFR part 11 compliance	optional
Qualification ,verification and calibration services	Available
Site requirements	
Dimensions(HxXd)	17x38x41cm(6.7"x15"x16.5)
Wight	16.5kg(36lb),19kgwith autosampler(42 lb)
Power requirements	100-240Volt 50/60 Hz

CHNS/O Analyzer(2400 series II – PerkinElmer)

	EA 2400 SERIES II
Instrument Design	
Combustion furnace temp	100-1100°C
Reduction furnace temp	100-1000°C
Pyrolysis furnace temp	100-1100°C
Sample temp	≥1800°C
Separation technique	Frontal chromatography
Detector	TCD(thermal conductivity detector)
Gas requirements	
Carrier gas	Helium or argon
Combustion gas	Oxygen
Pyrolysis gas	5-8% H in He
Pneumatic gas	Air ,Nitrogen or Argon
Cost saving features	
Gas saver	Included
Flexible carrier gas	Helium or Argon
Optimized combustion	Included
Copper reduction agent regeneration	Optional
Productivity features	
Autosampler	60 position
Automatic weight,transfer	Optional
Automatic shutdown and wake up	Included
Column switching accessory	Optional
Software features	
21 CFR part 11	PerkinElmer enhanced security*(ES)
Advanced calculations	Elemental ratio,simplest empirical formula,% polymer,solvent of crystallization,dry basis and heating value
Record of analysis	Sample: optimize combustion conditions background (blank)and calibration(kfactor)values
Statistical analyses	Average,standard deviation,variance and relative standard deviation
Diagnostic recording	Included
Performance	
Accuracy	≤0.3%
Precision	≤0.2%

Analysis times	
CHN	6 mins
CHNS	8 mins
Oxygen	4 mins
Sample size	
Range	0 to 500 mg
Analytical range	
C	0.001-3.6 mgs
H	0.001-1.0 mgs
N	0.001-6.0 mgs
S	0.001-2.0 mgs
O	0.001-2.0 mgs
Site requirements	
Weight	61cm.(24 in.)x55 cm.(22 in.)x55cm.(22 in.)
Weight	45kg(99lb.)
Power requirements	100-230 VAC

ICP-OES(Optima 8000- Perkin Elmer)

Model	Table top model and compact design
Wavelength range	160 nm --900 nm
Spectral resolution	less than 0.009 nm at 200 nm (actual obtained 0.007 nm)
Design	Double optical spectrometer Design results in high speed, high light throughput and optical system with excellent resolution.
Nebulizer	with Mass Flow Controller device
Sealed Optical System	purging of nitrogen gas for excellent low UV performance (below 190 nm) e.g. Pb, S, etc. elements
optics	dual view (both radial and axial)
Speed	Typically 20-25 elements in less than 2 minutes.
Solid State RF Generator	40 MHz Free Running which ensures highest power efficiency with 0.1% variation in output power stability
Plasma ignition	computer controlled and totally automated
ICP software	based on Windows 2000/XP
Double spectrometer	The Optima 8000 ICP-OES uses a unique double spectrometer optical system. This design results in a high-speed, high light-throughput optical system offering excellent resolution, all in a compact system. The sealed optical system can be purged with nitrogen for low UV (165-190 nm) performance.
Echelle spectrometer	The high-dispersion echelle spectrometer has a focal length of 0.3 meter and a Stigmatic Littrow configuration. The echelle grating used for dispersion has 79 lines/mm with a blaze angle of 63.4 degrees.
Plasma viewing	The system includes complete dual-viewing optics under computer and software control. Any wavelength can be used in the radial, axial or mixed viewing modes in a single method. With the patented dual-view capabilities of the Optima 8000 system, viewing of the plasma is accomplished by computer control of a mirror located in the optical path and allows selection of axial or radial view and adjustment of the plasma viewing in both the vertical and horizontal planes
Detector	The UV-sensitive, dual backside-illuminated Charge-Coupled Device (CCD) array detector is cooled directly using a single-stage integrated Peltier cooler operated at approximately -8 °C. The detector has two photosensitive segments containing 176 by 128 pixels.
ICP system specifications	
Ignition and power control	Plasma ignition is computer-controlled and totally automated. The plasma can be ignited

	automatically at a user-determined time and turned off automatically after an analysis
Cooling water	A water-recirculating cooling system is required, with approximately 4 L/min flow capacity at 310 to 550 kPa and a temperature between 15 °C and 25 °C.
Gas flow controls	
Argon flow	Flow within the range of 0-20 L/min in 1 L/min increments for plasma argon and 0 to 2.0 L/min in 0.1 L/min increments for auxiliary argon. A mass-flow controller is supplied with all systems for the nebulizer argon flow and is variable between 0 and 2.0 L/min in 0.01 L/min increment
Shear gas	A compressed-air shear gas (18-25 L/min) is used to remove the plasma tail from the optical path, minimizing interferences and extending the dynamic range.