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Find the *Perkin Elmer 343* at our website: ***Click HERE***

Series 341/343 Polarimeters



the **industry-standard** for

optical activity measurement

PerkinElmer®
precisely.

PerkinElmer polarimeters – precision in optical analysis



Series 341/343 Polarimeter – the industry standard.

Polarimetry is an important technique for the investigation and analysis of optically active substances. Common applications include:

- Characterization of newly synthesized compounds
- Quality control of pharmaceutical drugs
- Precise quantitative analysis of sugars
- Selective detection of optically active components by HPLC
- Monitoring and control of enzymatic reactions

Based on decades of experience in the development and manufacture of precision polarimeters, the PerkinElmer Series 341/343 polarimeters have been developed for these and many other applications.

The proven optical null principle, with automatic rotation of the analyzer, is the basis of PerkinElmer's reputation for excellence in polarimetry. This principle, combined with state-of-the-art microprocessor electronics, results in an instrument which combines the highest possible accuracy and precision with simple operation. For routine measurements simply select the wavelength, insert the sample and read the result – either on the integral display or in PerkinElmer's unique POL WinLab™ software.

Operating principle

As Figure 1 illustrates, monochromatic light passes through the polarizer, the sample cell and the analyzer to a photomultiplier. In the optical null position, the plane of polarization of the analyzer is perpendicular to the direction of polarization of the incoming radiation. When an optically active sample is placed into the beam path, a servo feedback system automatically rotates the analyzer until the optical null position has been obtained again. The angle of rotation is measured by an optical encoder with a resolution of 0.0001° and is displayed with the correct sign of the rotation.

“The Series 341/343 Polarimeters offer the highest possible accuracy and precision.”

High precision and accuracy

The operating principle of the Series 341/343 Polarimeters guarantees accuracy of ± 0.002° for optical rotations ≤ 1°. The use of spectral lamps combined with suitable interference filters ensures a very high spectral purity, as the wavelength used for the measurement is precisely defined. This is essential when measuring substances with high values of rotation.

The instrument’s automatic gain adjustment and selectable integration times allow you to measure the optical rotation of even the strongest absorbing samples with high accuracy.

High versatility

With the Model 341 Polarimeter, five measurement wavelengths are separated precisely from the spectra of the built-in Hg and Na spectral lamps by interference filters. If required, four spare positions on the motor-driven filter turret can accept additional filters for additional Hg lines. This feature, in connection with the Glan-Taylor polarizer (calcite polarizer prisms with an air gap), enables you to extend the measuring range of the Model 341 Polarimeter far into the UV region – to about 250 nm.

Two selectable apertures for standard cells or micro-cells, along with 10 different integration times, allow you to select the optimum parameters for your application.

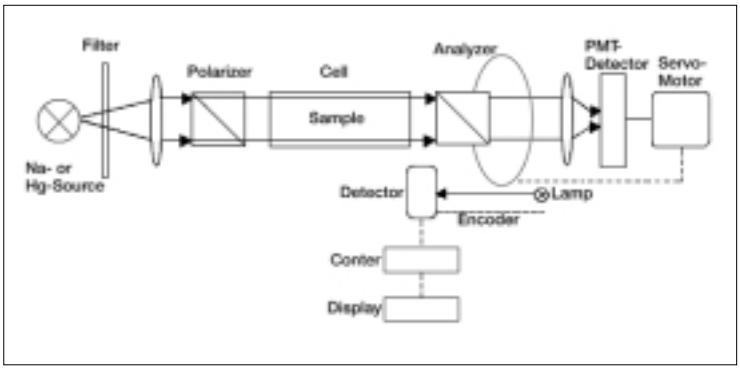




Figure 1. Functional principle of the PerkinElmer Model 341 Polarimeter.

Feature	Benefit
UV-transmitting Glan/Taylor polarizer	Enhanced sensitivity at low wavelengths
Pure light from Hg and Na spectral lamps	Highly accurate readings
Several interface ports	Flexible use as a standalone system with printer, PC system or HPLC detector
Simple user interaction	Easy operation, quick to learn
POL WinLab™ software	Simple operation, database results and method management and customized reporting
POL WinLab ES™ (Enhanced Security) Software for 21 CFR Part 11 technical compliance	Fully meets FDA requirements for regulated industries

Models for specific applications

PerkinElmer polarimeter products include five instrument versions, all based on the same technical platform with similar optical performance. Each model operates as a stand-alone instrument or with POL WinLab or POL WinLab ES PC software.

Model 341

A universal and general-purpose precision Polarimeter with Na and Hg source lamps and Glan-Taylor polarizer. Model 341 is a highly versatile instrument for research applications as well as for quality control work. The instrument can be extended into the UV range and is ready for polarimetric HPLC detection.

Model 343

A single wavelength polarimeter using the important Na spectral line at 589 nm. A cost-effective solution to many routine applications.

Model 343plus

A dual wavelength polarimeter, which includes the green Hg spectral line at 546 nm in addition to the 589 nm line.

Model 343S

A dedicated instrument version for the sugar industry and for process monitoring applications. Equipped with a Hg source lamp for measurements at 546 nm.

Model 341LC

An instrument package consisting of a Model 341 Polarimeter with an additional filter for 302 nm and special polarimetric HPLC flow cells for use as a selective polarimetric HPLC detector.



Multiple formats for results presentation

Results may be displayed and reported as:

- angle of rotation
- specific rotation
- molar rotation
- with a user-selected concentration factor
- sugar content in °Z of the International Sugar Scale
- the energy (radiant intensity) available for the measurement
- the standard deviation calculated during the integration (averaging) period

Cells for any application

Standard cells and microcells are offered in a variety of different pathlengths. Microcells for small sample volumes have, for instance, a volume of 1 mL or 350 µL at a pathlength of 100 mm. The cell windows are fused to the cell body in a special proprietary procedure which keeps the windows free of tension. This guarantees that the residual rotation of the cell windows is insignificant and may be dismissed for most applications. For HPLC detection, special flow cells are available – 100 mm pathlength and volumes of 80 µL and 40 µL, respectively.



Figure 2. Sample compartment for the Series 341/343 Polarimeters with standard cell, temperature probe with conveniently removable thermostatting tubing.

POL WinLab ES Software — 21 CFR Part 11 Compliance

As part of PerkinElmer's suite of Enhanced Security products, POL WinLab ES was developed after thorough analysis of the FDA regulations and extensive consultation with customers and industry experts, ensuring that regulated companies can prove the integrity of their electronic records. POL WinLab ES seamlessly integrates a suite of security features to provide rigorous 21 CFR Part 11 technical compliance:

- Access Control – password protected login prevents unauthorized access. Includes password aging and expiry.
- Multilevel user permissions including administrator and analyst restrict access to specified methods and tasks within the software (Figure 3).
- Comprehensive audit trails for all significant tasks and actions (Figure 4).
- Electronic signatures provide traceable approval and archiving of methods, results and reports, and allowing organizations to realize the benefits of the paperless laboratory.
- Secure database storage for rapid access to all data and methods, allow authorized users to manage and interpret results with maximum efficiency.

POL WinLab ES is also available as a standard version, POL WinLab, for non-regulated industries. POL WinLab and POL WinLab ES both feature robust pre-defined methods that simplify routine analysis, minimizing operator error and increasing confidence in results. Methods include instrument settings, results calculations and customized, flexible report templates. A simple interactive user interface ensures easy instrument set-up and displays the status of all parameters at a glance (Figure 5). For further assurance, an automated instrument validation module ensures that instrument performance is measured at regular intervals in accordance with Good Laboratory Practice (GLP) guidelines.

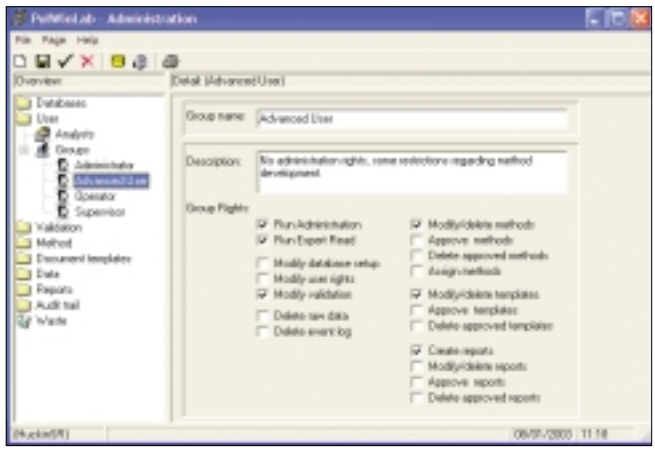


Figure 3. POL WinLab ES multilevel user permissions.

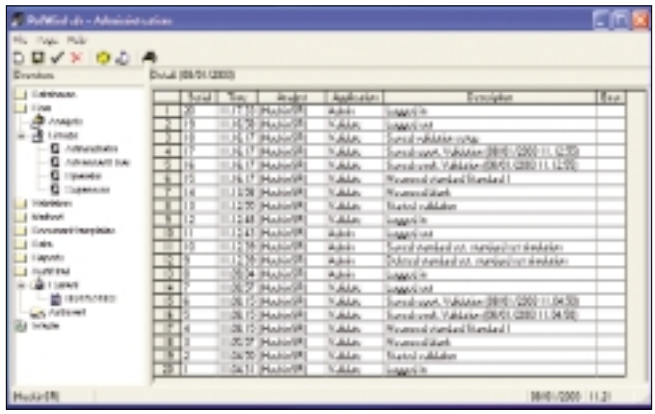


Figure 4. POL WinLab ES audit trail.

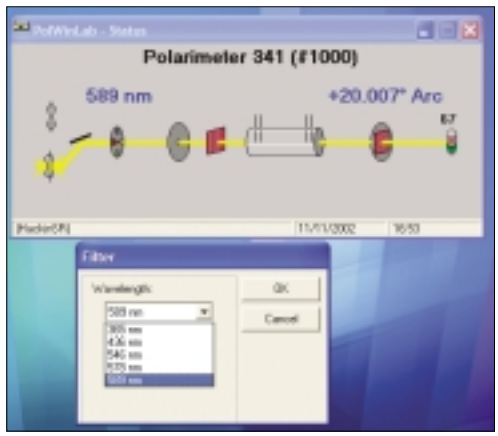


Figure 5. POL WinLab instrument status and set-up display.

Instrument performance verification

For laboratories working to GLP or Good Manufacturing Practice (GMP) guidelines or FDA regulations it is mandatory to regularly verify instrument performance. Quartz standards (control plates) are recommended by national pharmacopeias for this purpose, and PerkinElmer offers several different primary and secondary reference materials which are stable, easy to use and traceable. All standards include certification of the rotational values at the NaD spectral line (589 nm) and several Hg lines. An instrument performance certificate and complete documentation of all instrument performance parameters are included with every PerkinElmer polarimeter.

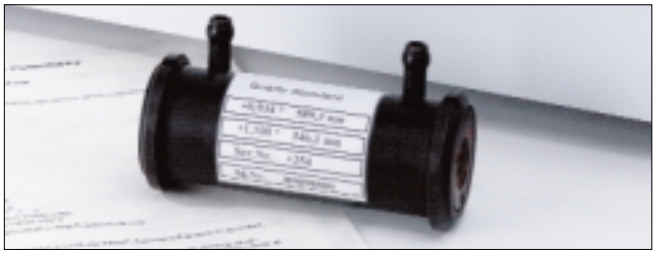


Figure 6. The quartz control plate allows GLP-compliant instrument performance verification.

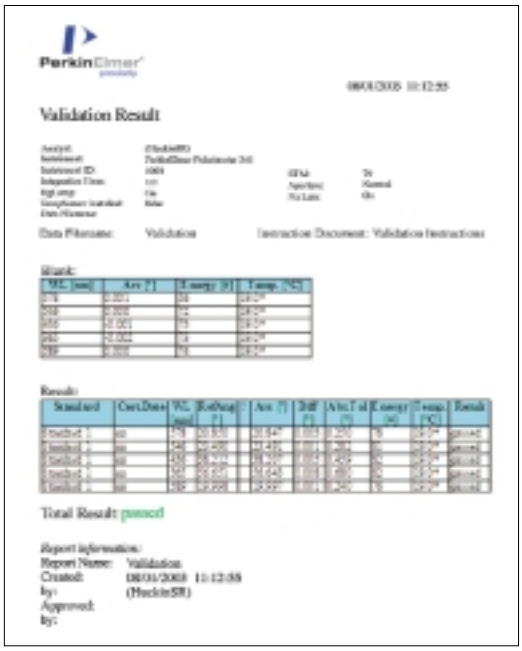


Figure 7. POL WinLab validation report.

All models include built-in test and check routines to ensure reliable operation. Additionally, POL WinLab and POL WinLab ES each include a thorough validation module including:

- User-specified intervals between Instrument Performance Verification (IPV) tests
- Access-controlled entry of reference data and tolerances
- Automatic prompting when new test is required
- Audit-trail of all validation activities
- Electronic signature to authenticate test results
- Secure database storage of all test results.
- Comprehensive validation reports (Figure 7).

For regulated industries, thorough IQ/OQ plans are available for stand-alone and PC-controlled systems as well as software upgrades.

Polarimetry in chemical and pharmaceutical quality assurance

Polarimetry is a well established technique for the characterization and quality assurance of drug substances, as many have pharmacological properties which depend on enantiomeric purity. Polarimetric tests for numerous compounds, including antibiotics, vitamins and steroids are included in many pharmacopoeias. The series 341/343's simple operation, reliability, rigorous validation routines and 21 CFR Part 11 compliance provides the ideal solution for high quality, trustworthy QA/QC measurements in regulated environments.

Analysis of sugars or other food components – process control

All PerkinElmer polarimeters allow the analysis of sugar concentration in degree sugar of the international sugar scale. The model 343S is equipped with a dedicated Hg source lamp for measurements at 546 nm, and is frequently also used for process control applications. Carbohydrates, as well as other food components like lactic acid, amino acids, flavors or aroma compounds show optical activity and can be analyzed with the 341/343 polarimeters.

Polarimetric detection in HPLC

The Model 341 can be used as a fast, highly sensitive polarimetric HPLC detector, by simply installing a purpose-designed HPLC flow cell into the sample compartment. The precisely adjustable cell holder and fast integration times ensure accurate and reproducible measurements. The UV-transmitting Glan-Taylor calcite polarizers permit detection at Hg lines between 302 nm and 253 nm, enhancing sensitivity for most substances compared to detection in the visible wavelength range.

Worldwide support and service

PerkinElmer offers technical and service support in more than 125 countries and in a variety of ways – experience and knowledge, easy-to-purchase accessories and consumables, and thorough IQ/OQ and validation services. Through process improvement initiatives, like Six Sigma and our world-class PACE project management system, we're constantly introducing innovative products that meet your demands for productivity, reliability and ease-of-use.

Order information:

L3000011	Model 341 Polarimeter (50 Hz)
L3000012	Model 341 Polarimeter (60 Hz)
L3000013	Model 343 Polarimeter (50 Hz)
L3000014	Model 343 Polarimeter (60 Hz)
L3000015	Model 343P Polarimeter (50 Hz)
L3000016	Model 343P Polarimeter (60 Hz)
L3000017	Model 343S Polarimeter (50 Hz)
L3000018	Model 343S Polarimeter (60 Hz)
L3000019	Model 341LC Polarimeter (50 Hz)
L3000020	Model 341LC Polarimeter (60 Hz)
	All models are are PC ready and include POL WinLab standard version software
L6100082	POL WinLab ES Software for 21 CFR Part 11 compliance

A wide range of cells, filters and reference materials are also available – simply ask for our consumables catalog or browse and shop online at *www.perkinelmer.com/supplies*



Series 341/343 Polarimeter with POL WinLab software.

Specifications

Principle: Automatic precision Polarimeter with optical null principle by rotation of the analyzer; automatic gain control.

Radiation: Hg high-pressure lamp and Na spectral lamp in Models 341 and 343plus. Na spectral lamp in Model 343. Hg high-pressure lamp in Model 343S.

Spectral lines: Selectable from instrument keypad; Models 341: Na 589 nm, Hg 578 nm, Hg 546 nm, Hg 436 nm and Hg 365 nm; four spare positions for additional optional filters. Model 343: Na 589 nm. Model 343S: Hg 546 nm. Model 343plus: Na 589 nm and Hg 546 nm.

Apertures: Selectable apertures for standard cells and microcells.

Detector: Photomultiplier 1P28A.

Polarizer and analyzer: UV/Vis-transmitting calcite Glan-Taylor prisms in Model 341. Vis-transmitting polarizers in Model 343.

Rotatory range: ± 85°

Balancing speed: 1.3°/s at 50 Hz; 1.5°/s at 60 Hz.

Accuracy: ± 0.002° for rotations ≤1°; ± 0.2% for rotations >1°

Reproducibility: Better than 0.002° (for zero and rotational reading).

Internal angular resolution: 1×10^{-4} °

Integration times: 0.1s, 0.2s, 0.5s, 1s, 2s, 5s, 10s, 20s, 50s and 100s.

Autozero setting: Electronically from instrument keypad at any desired position in the rotatory range.

User interaction: Either menu-driven from integrated touch-keys (English, German, French, Spanish and Italian), or PC-controlled from POL WinLab or POL WinLab ES software.

Display: Stand-alone operation: vacuum fluorescence display, two lines with 20 characters each. PC-operation.

Format of results: Selectable from instrument keypad – angular rotation, specific rotation, molar rotation, international sugar scale, user-defined scale with factor and offset.

Printer output: Standard parallel printer port (Centronics port) supporting HP-PCL, Epson esc-p and generic ASCII format.

Communications: RS-232C serial interface, selectable communication parameters.

Data input: Input port for Intermec 9720 barcode reader and/or standard PC/AT keyboard.

Analogue output: Digital-to-analogue conversion of angular rotation for connecting integrators or chart recorders; recording ranges ± 50°, ± 5°, ± 0.5°, ± 0.05°; resolution 0.1% of range width; cyclic repeatability in all ranges; output voltage 0 to 10 mV, 100 mV, and 1 V.

External "Ready": Relay contact closure (normally open), signal floating; maximum load 110 V, 0.3 A AC or 30 V, 1A DC; activated by print signal, selectable delay and duration.

External autozero: External activation of autozero function; TTL signal, low active; or contact closure; duration 100 ms minimum.

Temperature sensor: PT-100 temperature sensor for sample cells (optional accessory); temperature range -23° C to +198° C.

Power requirements: 90 V to 132 V AC or 190 V to 264 V AC, 50 ± 0.5 Hz or 60 ± 0.5 Hz, 200 VA.

Dimensions: 825 mm x 310 mm x 390 mm (WxHxD) (32.5 in. x 12 in. x 15.5 in.).

Weight: Approximately 40 kg.

Regulatory compliance: POL WinLab ES software is fully technically compliant with 21 CFR Part 11. Software includes access control, user permissions, electronic signatures and secure database.

Minimum PC specification:

Processor:	500 MHz Intel Pentium III
Operating System:	MS-Windows 2000 Professional, Service Pack 2.
Memory:	64 MB RAM
Cache:	256 KB
Hard Drive:	10 GB. At least 1 GB free space must be available.
CD:	CD recordable drive
Floppy:	3.25 in. floppy disk drive
RS232 on-board:	One free RS232 serial com port

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