The PerkinElmer LS 55 Luminescence spectrometer offers flexibility, versatility, reliability and ease-of-use. Based on years of experience in Luminescence Spectroscopy, the LS 55 spectrometer includes a host of automated accessories and software to address a wide range of bioresearch applications. Whether your application requires fluorescence, phosphorescence, chemi– or bioluminescence, the LS 55 is ready for the challenge.
**Bioresearch**

The LS 55 is built on PerkinElmer’s heritage of sensitivity and reliability. A wide range of automated accessories have also been developed for the system making it the system ideal for bioresearchers conducting:

- Microplate-based measurements
- Polarization
- Anisotropy assays
- Intact cell work
- Analysis of protein suspensions

**Optical performance you can count on**

Our monochromator based LS 55 uses a high energy pulsed Xenon source for excitation. For more than 25 years PerkinElmer has used pulsed Xenon sources to minimize photobleaching of samples and provide a long-lived excitation source.

The variable slit and holographic gratings provide flexibility with very low stray radiation. We’ve incorporated holographic gratings to further reduce stray light and improve the system’s already impressive performance. And a newly designed reference signal system has been added to provide users with much more control over signal dynamics. This is particularly useful for samples with widely differing intra-sample signal size.

For example, the LS 55 signal system has reduced noise by a factor of about 5 for intracellular ion analyses, and increased data transfer rates by a factor of 10.

**Powerful software controls your entire analyses**

Our FL WinLab™ software is designed for demanding laboratories. It seamlessly combines PerkinElmer’s extensive application specific knowledge and instrumentation control with the ease-of-use provided by the Windows® operating environment.

Specific modes of instrument operation such as Scan, Time Drive, and Ratio Data Collection can be easily accessed from the Applications Menu. Excitation and emission monochromators can be independently or synchronously scanned, while the Prescan mode is ideal for method development and locating of peak excitation and emission maxima.

FL WinLab includes a validation protocol that automatically checks the instrument performance to ensure that it is operating within specification. With its unique set of accessories and software applications, the LS 55 offers the most powerful and flexible system for data collection and analysis.

**Measurement modes for the LS 55**

- Fluorescence, phosphorescence and bio- and chemi-luminescence-measurement modes
- Excitation, emission, constant wavelength synchronous, and constant energy synchronous spectral scanning
- 3D excitation/emission scans, 3D synchronous and kinetic scans
- Microplate measurements with fixed wavelength, wavelength program or automated spectral data collection
- TLC plate, electrophoresis gel or other flat sample types can be analyzed with our Plate Reader accessory
- Single and multiple wavelength kinetics
- Simultaneous kinetics for multiple samples
- Simple quantitation by curve fitting with a number of fit algorithms
- Intracellular ion analyses

**Accessories add sampling flexibility**

The LS 55 includes a single cell thermostatted sample holder that can accommodate 1 cm pathlength cells as well as semi-micro cuvettes with or without stirring. Semi-micro cuvettes are particularly useful where the sample is precious or volume is limited such as cell cultures and DNA samples.

The system also includes an automated Polarizer that consists of two filter wheels; each wheel containing a horizontal and vertical polarizing element. Polarizer positions are software controlled and can be manually set or automatically controlled for polarization, anisotropy or G-factor. Additional accessories are discussed below.

**Front Surface accessory**

The Front Surface accessory is ideal for analyzing films, papers, powders and other flat samples. The sample may be placed in the accessory directly or held in the powder holder that has a synthetic fused silica window. Ultrasmall volumes or viscous samples such as oils, opaque and turbid samples may be measured via the powder holder or cuvette.

**LC flow cell**

The LC flow cell for high sensitivity liquid chromatography is a good means of expanding the utility of the LS 55. Providing laboratories with an alternative to a dedicated LC fluorescence detector. The twin monochromators of the system enable accurate wavelength selection for maximum selectivity and sensitivity.
Remote Fiber Optic accessory

The Remote Fiber Optic accessory allows you to take the measurement at the sample rather than taking the sample to the instrument. It is ideal for remote, non-destructive testing of fluorescent papers and fabrics as well as the sampling of hazardous materials such as radioactive sources.

S10 Autosampler accessory

The high throughput S10 Auto sampler, when coupled to the LS 55, can measure up to 200 samples in a single rack. This provides a high sensitivity alternative to microplate reading. The autosampler has a built in peristaltic pump that is controlled directly by a dedicated software program for collection of intensity, polarization or anisotropy measurements.

Unleash the LS 55 for bioresearch

Plate Reader accessory

The Plate Reader accessory is a sensitive and easy-to-use way to measure fluorescence based assays in multiwell plates. Controlled from the LS 55, it is able to use a wide range of UV and Visible wavelengths ensuring the detection of virtually all fluorescent dyes used in for bio assays. Two programs are included in FL WinLab for the Plate Reader. One allows the user to create flexible wavelength programs for single end-point and kinetic analyses. The other allows the measurement of flat samples such as gels, and presents data as a 3D image. In addition, an optional plug-in program allows the user to collect up to 100 spectra per well.

Autopole system and software

The Autopole system and software automates the measurement of polarization or anisotropy versus temperature. It includes a temperature control system with temperature sensing built into the cuvette.

Biokinetics accessory

The Biokinetics accessory consists of a single position stirred cell holder with event marking and temperature sensing. It is useful for all life science based work, but particularly useful for polarization anisotropy work, protein folding/unfolding, and DNA melting.

Fast Filter accessory

The Fast Filter accessory is used for rapidly collecting data when studying biochemical processes such as intracellular ion monitoring. Pairs of optical filters specifically designed for the indicator dyes are rotated rapidly in either the excitation or emission beam allowing ratio measurements to be made every 40 millisecond. Two pairs of filters can be fitted on each wheel. The ratio data or the individual intensities can be viewed in real-time. For example, the Fast Filter allows for the simultaneous measurement of both calcium and pH using a pair of FURA-2 and BCECF filters.

4-position automatic Cell Changer

The 4-position automatic Cell Changer includes water thermostatting and stirring for each sample position. This is especially useful for simultaneous, multiple time-dependent measurements from each of 4 cuvettes. Multiple samples can now be multiplexed for analyses such as enzyme activities.

Applications

Applications for fluorescence can be found in many laboratories in a range of industries such as:

<table>
<thead>
<tr>
<th>Category</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell based</td>
<td>Cytotoxicity, cell viability, cell quantification, cell proliferation, adhesion, reporter gene expression, apoptosis</td>
</tr>
<tr>
<td>Clinical</td>
<td>Enzyme and substrate assays, porphyrins, steroids, blood flow</td>
</tr>
<tr>
<td>Environmental</td>
<td>Pesticide detection on many substrates including leaves, ground water tracing, oil contamination of fresh and marine water, EROD assays, chlorophyll determination of normal and toxic algae</td>
</tr>
<tr>
<td>Pharmaceutical</td>
<td>Vitamins, biogenic amines, pharmaceutical and abuse drugs, toxicity assays, cell function assays</td>
</tr>
<tr>
<td>Inorganic</td>
<td>Aluminum, lead, magnesium, manganese, selenium, tin, zinc</td>
</tr>
<tr>
<td>Molecular biology</td>
<td>DNA quantification, gene expression, membrane structure and function, protein folding/unfolding, protein quantitation, enzyme activity, PCR product quantitation</td>
</tr>
<tr>
<td>Industrial</td>
<td>Crack tracing in the aerospace industry, security inks, coding phosphors, brightening/whitening agents, UV stabilizers and plasticizers, LED and TFT screen, solid state physics R&amp;D</td>
</tr>
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</table>
## Specifications LS 55

**Principle**
Computer controlled ratioing luminescence spectrometer with the capability of measuring fluorescence, phosphorescence or chemiluminescence, and bioluminescence. Pulse rate, delay and gate times can be varied.

**Source**
Xenon flash lamp, pulsed at line frequency (50 or 60 Hz). Pulse width at half peak height < 10μs, power equivalent to 20 kW at continuous operation. Delay (td) and gate time (tg) can be varied to measure phosphorescence. Source can be turned off for measuring chemiluminescence and bioluminescence.

**Optics**
Monk-Gillieson type monochromators using low stray light, holographic gratings cover the following ranges:
- Excitation 200-800 nm with zero order selectable
- Emission 200-650 nm with zero order selectable (standard photomultiplier)
  - 200-900 nm with zero order R928 photomultiplier (optional)
Synchronous scanning is available with constant wavelength or constant frequency difference. Excitation spectra are automatically corrected.
An excitation filter wheel is incorporated into the optical unit and inserts a 390 nm cut-off filter as an excitation spectrum is scanned through 410 nm.
Excitation and Emission Polarizers consisting of 2 filter wheels, each with horizontal and vertical polarizer elements are included.

**Wavelength accuracy**
+ 1 nm

**Wavelength reproducibility**
+ 0.5 nm

**Spectral bandpass**
The excitation slits 2.5-15 nm and emission slits 2.5-20 nm can be varied and selected in 0.1 nm increments.

**Scanning speed**
The scanning speed can be selected in increments of 1 nm from 10–1500 nm/minute.
Data can also be collected with respect to time.

**Emission filters**
Computer selectable cut-off filters, 290, 350, 390, 430 and 515 nm, a blank (to act as a shutter), a 1 % attenuator, and a clear beam position.

**Sensitivity**
Minimum signal-to-noise level using the Raman band of water, excitation 350 nm, is 750:1 RMS measuring noise on the Raman peak, and 2500:1 RMS measuring noise on the baseline.

**Standard sample holder**
A single position water thermostatted holder for 10 mm cuvettes.

**Accessories**
- Front Surface accessory
- LC Flow Cell accessory
- Remote Fiber Optic accessory
- S10 Autosampler

**Computer controlled accessories**
Single position water thermostatted stirred cell holder.
Four position water thermostatted automatic cell changer.
Excitation and emission polarizers with 40 msec signal sampling.
Sipper accessory.
Well plate reader accessory available with standard or far-UV fiber optics.
Total emission accessory.
Biokinetic accessory.
Fast filter accessory.

**Data acquisition**
Instrumental parameters are controlled by FL WinLab software, which is installed in the Windows environment. The luminescence intensity and the excitation and emission wavelengths can be displayed in real-time. Spectral and time drive data are displayed in real-time and can be stored on disc.

**Data analysis**
Routines are available for performing mathematical calculations on stored data. These include arithmetic functions, smoothing, 1-4th order derivatives, area, peak, normalization, merge, difference, interpolate.
Specific applications programs are provided for determining intracellular ion concentration and simple quantitation.

**Data output**
Presentation quality output is available using the Report Builder program.

**Data system processor**
Intel® Pentium 4 or equivalent, 1.6 GHz processor, or equivalent
At least 1 GB of Random Access Memory (RAM)
The capability of displaying at least high color (16 bit) at 1280 x 768
40 GB Hard disk with at least 1 GB free space as an NTFS drive
CD-ROM drive, 1 RS232 port, 1 USB port
Operating System: Windows® 7, 32 bit operating system required
Note: FL WinLab will operate under Windows® 7, 32 bit.

**Power requirements**
- 90 – 132 VAC, 50/60 Hz, 2A
- 200 – 264 VAC, 50/60 Hz, 1A

**Dimensions**
- 265 mm high, 790 mm wide, 680 mm deep (including sample compartment).
- Weight 49.5 kg.