Swift®

Swift Spectrum™ 48 Real Time Thermal Cycler

Spectrum 48 Real Time Cycler

Swift Spectrum Series Combines Amplification and Detection

Polymerase Chain Reaction (PCR) is an important tool for the detection of DNA and RNA with applications across all Biotechnology / Molecular Biology research, including forensics, gene expression, identification and discovery.

Traditional PCR has relied on Agorose gel-based end point detection of the reaction, in the plateau phase. This has been time consuming, not very precise and with a degree of sample to samples variability. Real time PCR combines the amplification and detection steps into one single procedure, saving time. Real time PCR measures sample during the Exponential phase of the PCR reaction and produces results while the reaction is in progress. This achieves detection accuracy from very low initial concentrations of starting material. Real Time PCR is sufficiently sensitive to detect as low as 2-fold changes, allowing discrimination in yields that are not possible to achieve with Agarose gels.

- In Real Time PCR, a fluorescent label is added to the PCR reaction.
- By measuring the increase in fluorescence during the exponential phase of PCR, the starting amount of nucleic acid can be quantified.

The Swift Spectrum Real Time Thermal Cycler monitors the reaction mixture and measures fluorescence during each round of amplification, not just at the end point.

- There is a quantitative relationship between the amount of starting material and the amount of PCR product at any specific cycler number. RT-PCR detects the accumulation of amplicon during the reaction and when the flourescence intensity of the reaction exceeds the background fluorescence (Ct Value) the amplification can be visualized.
- When samples of known starting amounts are simultaneously amplified under the same conditions as the unknowns, it is possible to construct a standard curve. From this curve, the investigator can determine amplicon concentrations.

Final steps in a PCR protocol include visualization and quantification of the amplified nucleic acids. Without real time thermal cycling, this is time consuming, requires additional instrumentation, and limits capacity for detection. Additionally, very low nucleic acid concentrations are sometimes difficult to visualize.

Advantages of Esco Swift Spectrum 48 Real Time Thermal Cycler

Unlike conventional 96 well block designs, Esco Swift Spectrum 48 Thermal Cycler uses a unique, proprietary block, designed to increase performance and maximize efficiency.

- Up to 48 sample capacity with broad range linear detection.
- Advanced Peltier and fiberoptic technology achieves accuracy and stability throughout the process.
- Uniform heating and cooling throughout the sandwich design, patented sample block delivers highly controlled ramp up, dwell, cool-down and repeat functions critical to sensitive PCR reactions.
- This layout guarantees efficient and rapid heat exchange, and, together with the heated lid, eliminates sample evaporation.
- The block design minimises the risk of over- and under-shoots and guarantees accuracy and temperature uniformity.
- This, in turn, increases PCR efficiency and higher template yields, allowing the detection of low concentrations of starting materials.
- It is possible to divide the block into 4 segments, allowing the analysis of up to 4 different sample groups.

Features

- Gradient function creates a temperature gradient of 24°C across the sample block.
- Volume sensor software automatically adjusts ramp rates to accommodate differences in sample volumes.
- A blue light diode for fluorescent dye excitation.
- A direct current constant power supply improves thermal efficiency, performance and stability while reducing power consumption by 30% over comparatively sized models.
- An automatic hot lid with adjustable temperature.
- All data is saved automatically in the event of a power failure occuring during the reaction.
- An automatic over temperature function sounds an audible warning at excessive temperatures and automatically shuts down the instrument.
- Ramp rates can be adjusted to allow the direct application of established protocols.
- Advanced multi-point temperature control and monitoring permits more accurate and uniform temperature control throughout the heating block.
- The system automatically holds samples at 4°C following completion of the cycle. This sample hold can be adjusted to any temperature.
- Coaxial fiberoptics in the instrument increase the signal-to-noise ratio and improve accuracy.
- The sample block accepts a variety of 0.2ml tubes including 8-tube strips.
- Amplitude is automatically adjusted based on detection of fluorescence intensity emitted by the samples.
- Defined experimental conditions can be easily uploaded with easy-to-use PC-based software.
- Open platform chemistry assures compatibility with commonly used protocols.

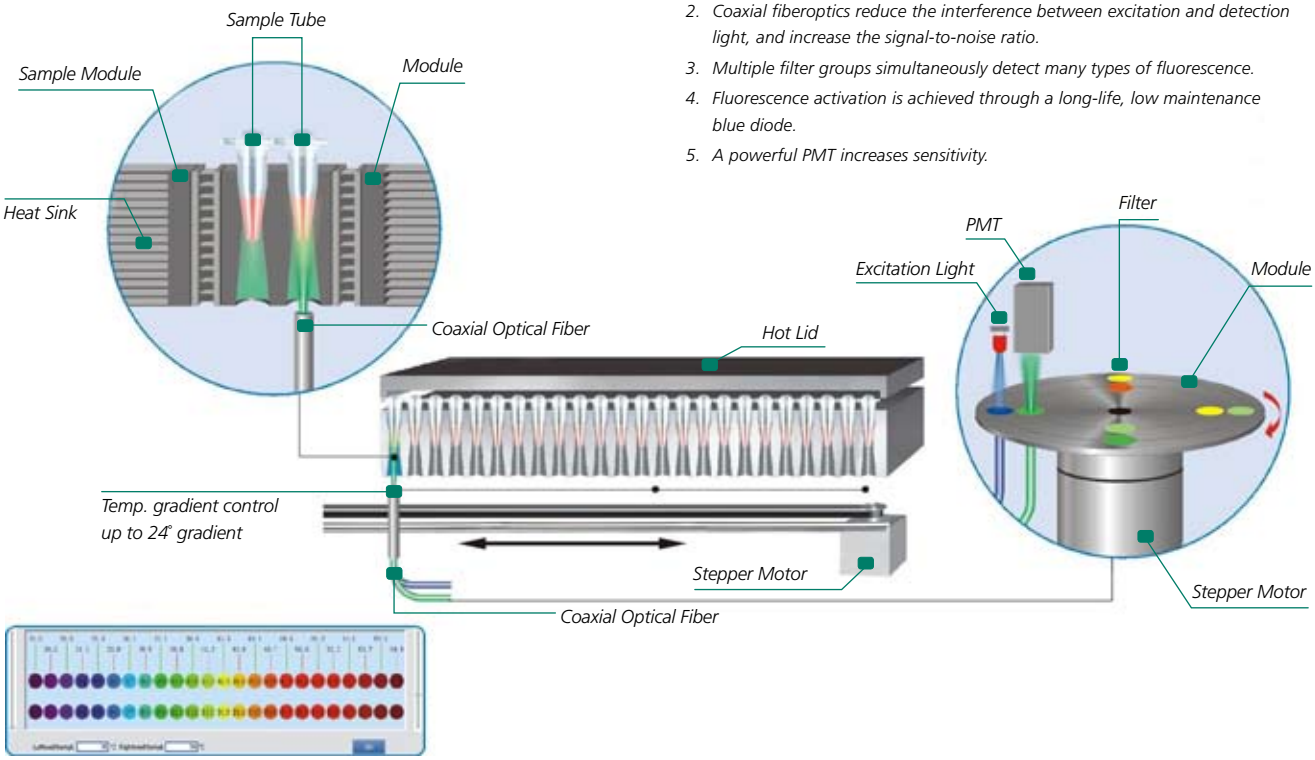
Software

In addition to program and assay set-up, the Swift Spectrum Intuitive software can be programmed to perform a variety of analyses in addition to program and assay set-up. These include

- Quantification and relative quantification
- 2nd derivative fluorescence curve values
- Fit point analyses
- Block fragmentation
- SNP and more.

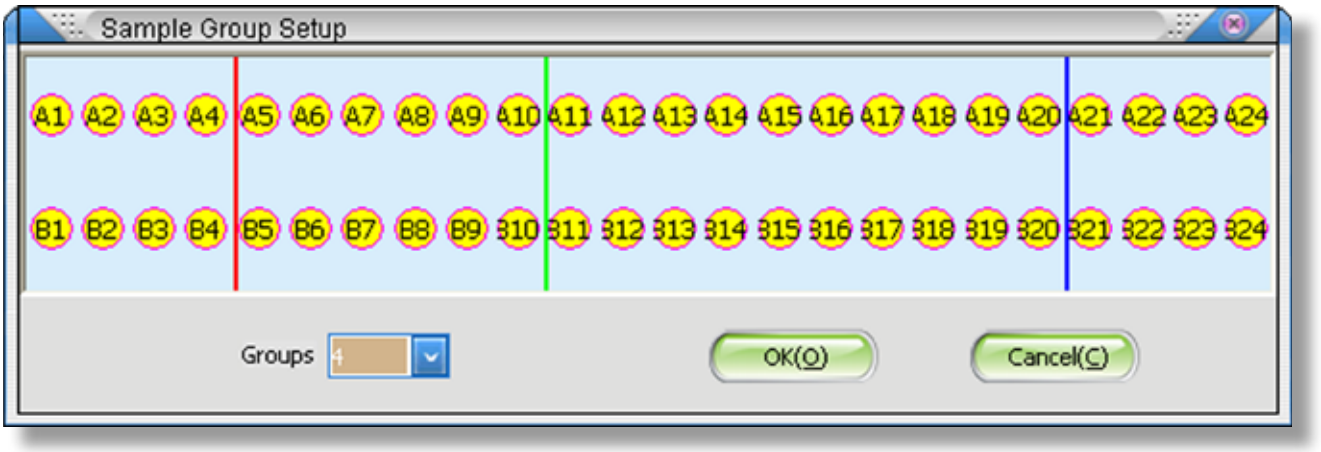
Unique Block Design

Unlike conventional 96 well block designs, the Swift Spectrum 48 uses a unique, proprietary block designed to increase performance, maximize efficiency and optimize the expression of the lowest starting concentrations for best PCR efficiency.



Operating Principle

1. *The block design shortens the light path and increases sensitivity.*
2. *Coaxial fiberoptics reduce the interference between excitation and detection light, and increase the signal-to-noise ratio.*
3. *Multiple filter groups simultaneously detect many types of fluorescence.*
4. *Fluorescence activation is achieved through a long-life, low maintenance blue diode.*
5. *A powerful PMT increases sensitivity.*



* *Sample grouping*

Multiple Channels, Open Platform Chemistry

Channel	Excitation	Emission	Application
Channel 1	470 nm	525 nm	FAM, SYBR Green 1
Channel 2	523 nm	564 nm	HEX, VIC
Channel 3	543 nm	584 nm	TAMRA
Channel 4	570 nm	612 nm	ROX, Texas Red

* *Multi-channel fluorescence detection permits the use of many commercially available dyes with a wide variety of applications. Examples include TaqMan® probes, SYBR Green 1, Molecular Beacons, FAM, HEX, TAMRA, Texas Red, ROX and others.*

Technical Specifications, Swift™ Spectrum 48, Model Number SPT-RT-48	
Number of Channels	4
Excitation Wavelength (450 – 590mm)	Standard channels: F1:470nm F2:523nm F3:543nm F4:571nm
Emission Wavelength	Standard channels: F1:525nm F2:564nm F3:584nm F4:612nm
Fluorescence	FAM, SYBR Green 1, HEX, VIC, TAMRA, TEX RED, ROX
Temperature Range	4°C ~ 99.9°C
Heating Rate (max)	4.0°C/ sec
Cooling Rate	4.0°C/ sec
Block Temperature Uniformity	±0.3°C
Temperature Control Accuracy	±0.1°C
Gradient Range	1°C ~ 24°C
Hot-lid Range	80°C ~ 110°C
Sample Capacity	48 x 0.2ml
Sample Volume	10 ~ 100µl
Dynamic Range	10 ~ 10^{10} copies
Power Supply	110V or 220V/ 50 ~ 60Hz
Dimensions (L x W x H)	520 x 450 x 320mm (20.4" x 17.7" x 12.6")
Software Operating System	Windows 2000/XP

Since Esco Healthcare was founded in 1979, our company has earned a reputation for innovation in the worldwide laboratory equipment industry. With years of research, R & D and manufacturing experience, Esco Healthcare Pte Ltd emerged as an innovative global player in the design and manufacturing of peltier-driven thermal cycler products for the life science market. Products sold in more than 100 countries include conventional thermal cyclers, real-time PCR systems and microplate shakers / incubators.

PCR Thermal Cyclers • Real-time PCR Systems • Microplate Shaker / Incubators

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