TECHNE

Prime Pro 48

Real Time PCR System

- High uniformity ±0.1°C
- Adaptive LED control
- Fast ramping 5.5°C/sec
- 40 cycles in 40 minutes
- High resolution melt
- MIQE guidelines compliant
- Accurately quantify NGS libraries
- 400 qPCR detection kits
- Validated sample 5 to 20µl

Introducing Prime Pro

The Prime Pro 48 real time PCR system is a high specification, economically priced real time thermal cycler that accommodates a unique 48-well polypropylene PCR plate utilising the same geometry as standard 384-well plates, but only 1/8 of the size. This enables users to dramatically reduce the qPCR reagent volumes compared to traditional 96-well instruments, saving users precious sample, whilst still producing a strong fluorescence signal. Minimizing the plate size also significantly improves thermal uniformity. A minimum volume of 5µl is validated, resulting in a more efficient use of expensive and 'hard to acquire' template DNA samples.

Key features

High speed

- Ramp rate average 5.5°C/sec. Fast heating and cooling.
- 40 cycles in 40 minutes (under 20 minutes optimised) with standard chemistry.
- Process up to 40% more samples per hour than a traditional 96-well instrument.
- MIQE guidelines compliant software.

Thermal system

- High resolution melt (HRM) capability.
- Patented thermal system. Hollow fluid-filled silver block anodised with gold.
- Unparalleled market-leading uniformity ±0.1°C at 95°C.
- Up to 5x greater uniformity than any other block-based qPCR instrument.

Reagents

- Techne supply 400 probe based qPCR detection kits.
- Kit components are lyophilised for ambient shipping and storage.
- Prime Pro 48 also accepts all popular brands of reagents.

Advanced optical technology

- 4 colours for easy multiplexing.
- Patented optical system utilised Adaptive LED Control.
- Automatically normalises fluorescence. Never saturate the detector. Eliminate cross talk.
- Always reads all 48 wells, with all 4 filters at every cycle.

Prime Pro workflow

1. Load samples into 48 well plate using backlit loading block.
2. Insert plate into Prime Pro 48.
3. Run a MIQE compliant experiment via ProControl software.
4. Analyse results in ProStudy software.
5. Generate a full report automatically.

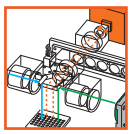
ProDock

The ergonomic plate loading dock allow for easy loading of the plate and is backlit to allow the user to easily visualise sample loading.

- Base with LED backlight
- Plate adapter fits standard centrifuge rotors
- Includes plate sealing tool

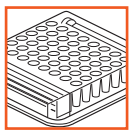
Advanced optical technology

Intuitive icons lead researchers through setup, run and analysis quickly and easily



Sensitive optical system delivers precise detection for a range of fluorophores

Convenient 48-well format meets the throughput needs of most researchers

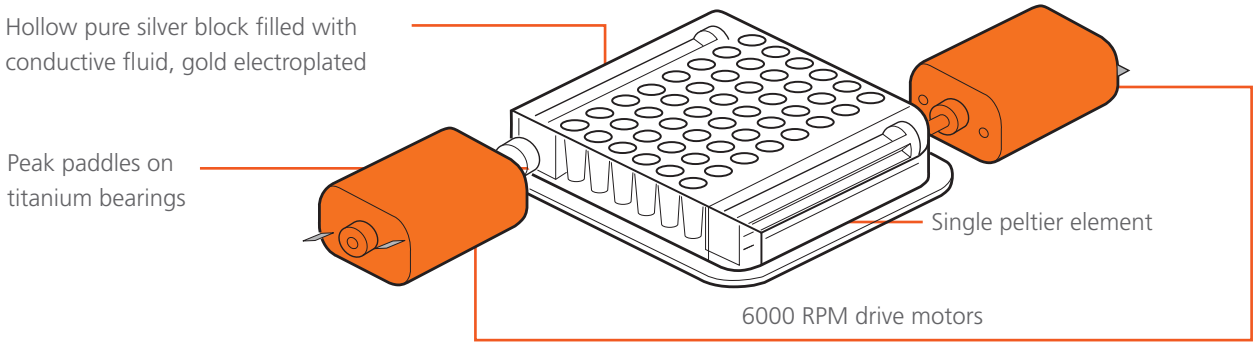


Unique thermal system provides unmatched temperature control for the most accurate results

The Pro 48 Real-time system offers the qPCR capabilities of larger instruments in a compact, accurate footprint. Innovative features include a precise thermal system for unrivalled temperature control, an advanced optical system for highly sensitive fluorescence detection, a 48-well plate for flexible sample throughput, and intuitive, icon-driven software for error-free instrument operation.

Prime Pro 48 thermal system

qPCR specificity and efficiency relies on precise temperature control during the denaturation and annealing steps. For the highest accuracy, temperature must remain uniform across the entire heat block, ensuring that all samples are processed equally. The unique thermal block design of Pro 48 achieves this with a unique heating and cooling system that provides accurate ±0.1°C temperature control and quickly cycles from one temperature to the next.

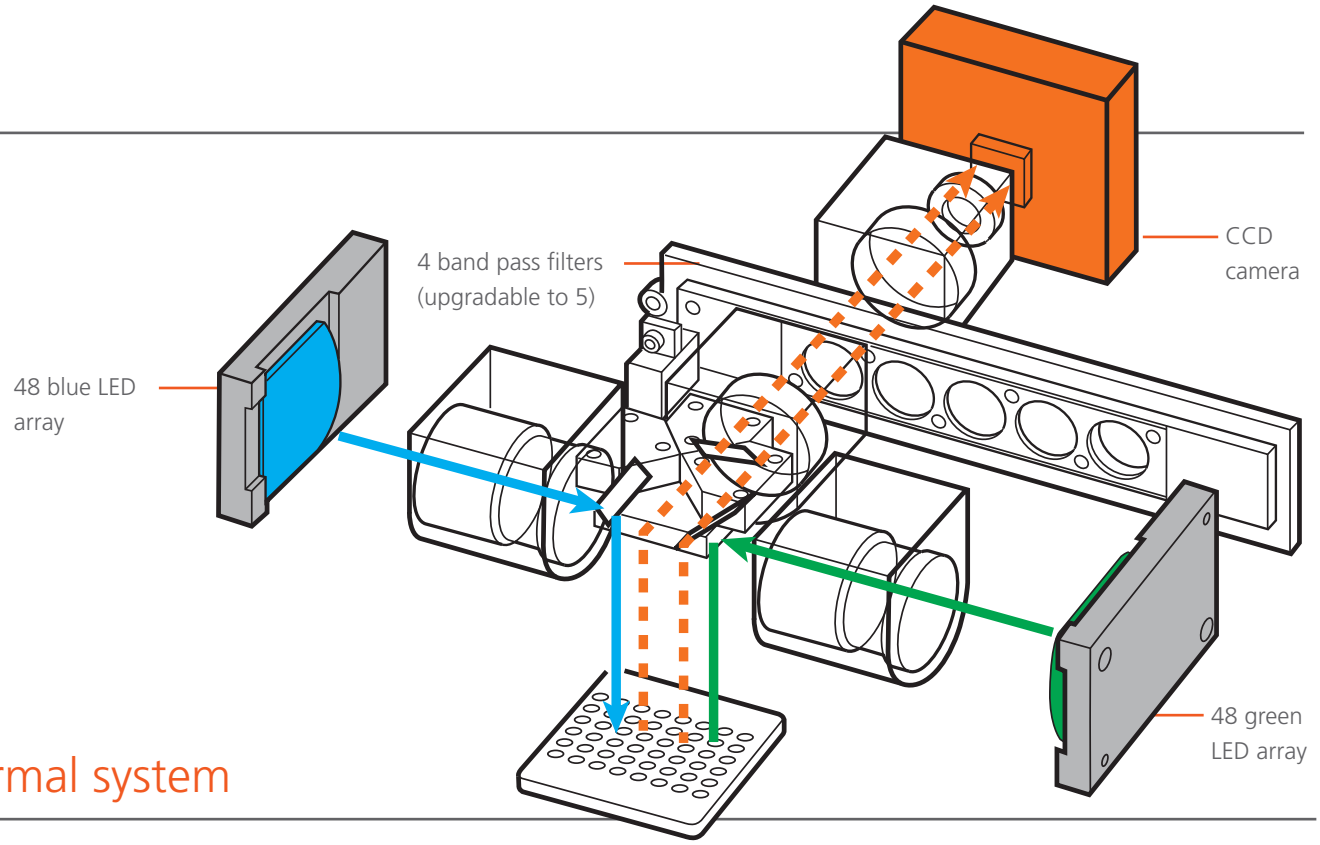


To achieve true temperature control the Pro 48 thermal system consists of a precisely electroformed 48-well hollow silver block containing conductive fluid. The block is heated and cooled by a single peltier device, with an agitator assembly consisting of two paddles driven by electromagnetic motors. During PCR cycling, the paddles move rapidly, circulating the fluid across the 48 wells, allowing the block to achieve high ramp rates, thus reducing the overall experiment time.

Design developed at the Caltech Laboratories of Nobel Laureate David Baltimore

This unique design delivers industry leading thermal stability of ±0.1°C virtually eliminating thermal non-uniformity and preventing edge effect. The result is higher qPCR performance, tighter Cq, greater PCR efficiency, higher R^2 and the ability to perform demanding HRM applications.

Fast, uniform temperature control is important because accurate dwell temperatures ensure primers bind most efficiently and polymerase enzymes work optimally, generating the maximum yield of target DNA. The hermetically sealed hollow block contains a conductive fluid and two opposing agitators driven by electromagnetic motors. During PCR cycling, these agitators rapidly circulate fluid throughout the hollow block, transferring heat from the peltier quickly and evenly.



Thermal system

The Prime Pro 48 Real Time PCR system contains an advanced high-performance optical system that delivers precise and sensitive fluorescence detection, facilitating all 4 colour multiplex applications. The system is provided factory-calibrated for use with SYBR®, FAM™, HEX™, VIC™, ROX™, Cy®5 and can also be used with any qPCR fluorophores overlapping with these calibrated dyes. For excitation, two panels of 48 fixed LEDs provide excitation energy of distinct spectra, enabling broad range excitation. Each of the 48 LEDs illuminates a specific well location, eliminating the optical distortion created by most stationary optical systems. HRM analysis protocols are supported by continuous data acquisition during the melt for increased data collection and reduced run times, HRM of a full plate is less than 10 minutes. The user can change the plate setup and perform data analysis after the run is complete.

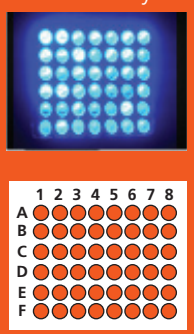
Adaptive LED control (ALC)

ALC normalises variation in fluorescence across all wells at each cycle of a run and provides specific tuning for each LED following each PCR cycle.

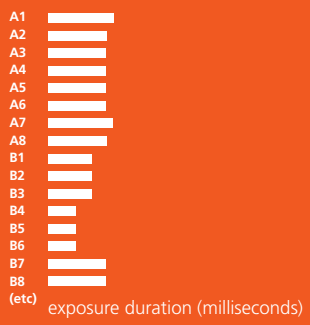
- Speeds up data collection because only 1 image is required to cover the full sample dynamic range.
- Expands the linear range of detection by reducing LED exposure to high emission wells and preventing premature detector saturation.
- LED adjustment following each amplification allows Prime Pro 48 to reduce exposure time as signal intensity increases, maximising the linear range of emission detection.
- Minimise optical artefacts by keeping each well brightness similar to the CCD. This reduces the influence of a highly fluorescing sample on adjacent wells and avoids 'blooming', no artificats from adjacent wells.
- Maximise sensitivity by permitting an appropriate exposure level for each well, by dye, rather than compromise with a universal setting.

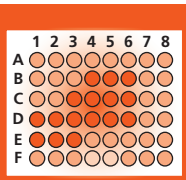
Pre-scan

LED Array



LED excitation time





Alternative plate-based qPCR systems excite all samples with equivalent amounts of energy, leading to large differences in emission energy between wells. This leads to crosstalk as a result of light emission from wells with strong signals affecting adjacent wells with weaker signals.

Applications

The Prime Pro 48 is a high performance instrument for demanding applications.

Absolute & Relative Quantitation

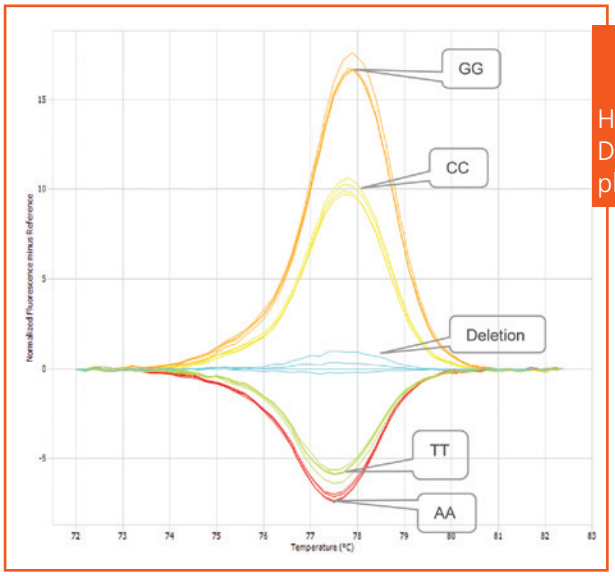
- Absolute quantification standard curves with efficiency calculation.
- Relative quantification using the ΔΔCq method with support for multiple reference gene normalization.
- Relative gene expression with efficiency control.
- Next Generation Sequencing (NGS) library quantification.
- Copy Number Variation: insertions, deletions, inversions.
- RNA Characterisation: siRNA and miRNA.
- Viral load.

Genotyping and High resolution melting

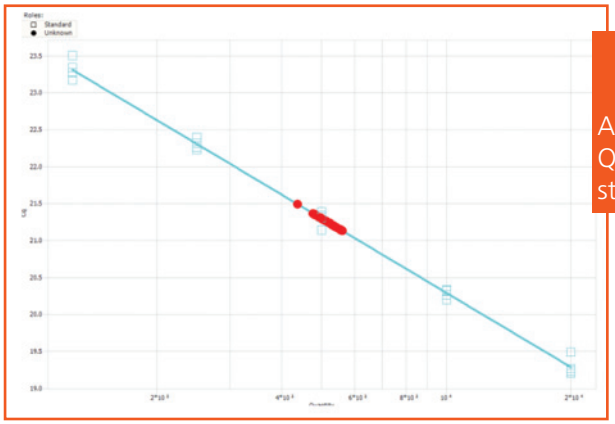
- Allelic Discrimination.
- DNA Methylation.
- SNP Verification.
- Microbiology: pathogen detection and identification.

High resolution melting (HRM)

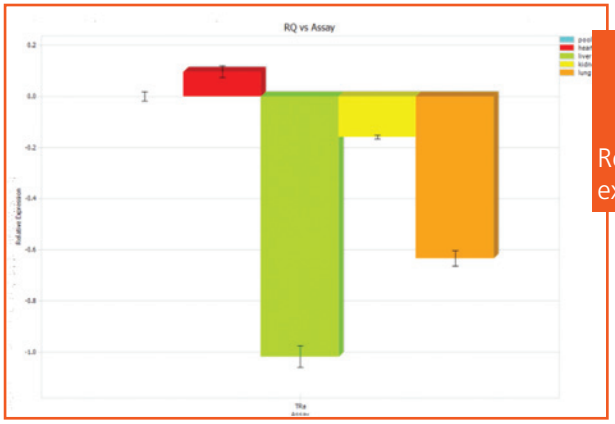
- Genotyping, methylation studies and mutation screening.



HRM Differential plot



Absolute Quantification standard curve



Relative gene expression

Library quantification

- qPCR is the most precise method for quantifying libraries prior to cluster generation.
- Works at concentrations below the detection threshold of conventional spectrophotometric methods.

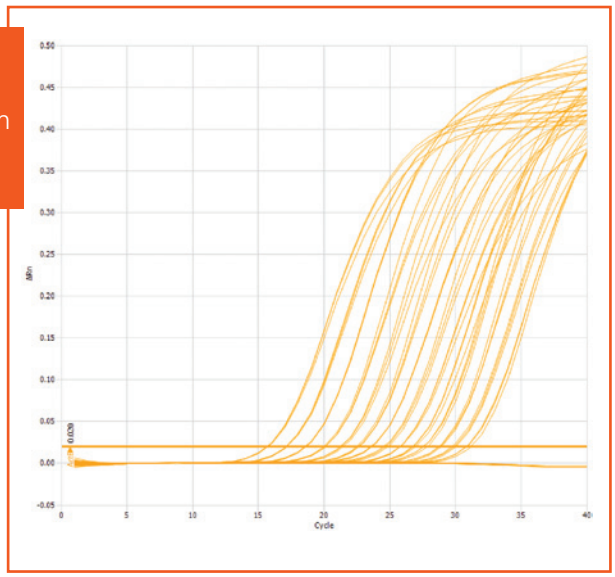
Data

- Validation of array and sequencing quality data.

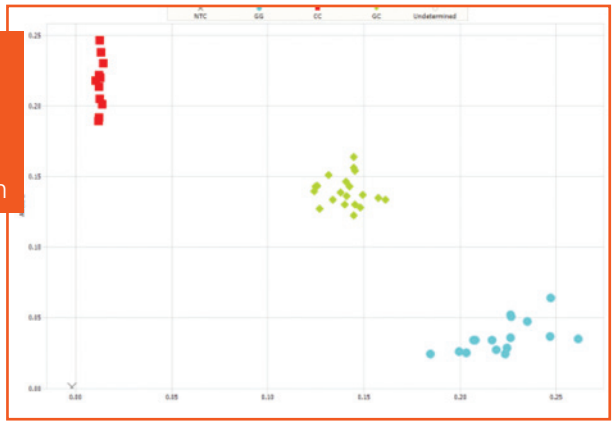
Designed for:

- Academic, Government and Corporate laboratories.
- Human research, AgriGenomics, Translational, Forensics and many more markets.
- Probe, DNA Binding Dye and HRM chemistries.
- Gene expression, Viral detection, Sequencing Library Preparation, Genotyping and Mutation Screening applications.
- Pro 48 is for research use only – not suitable for human or veterinary clinical diagnostics.

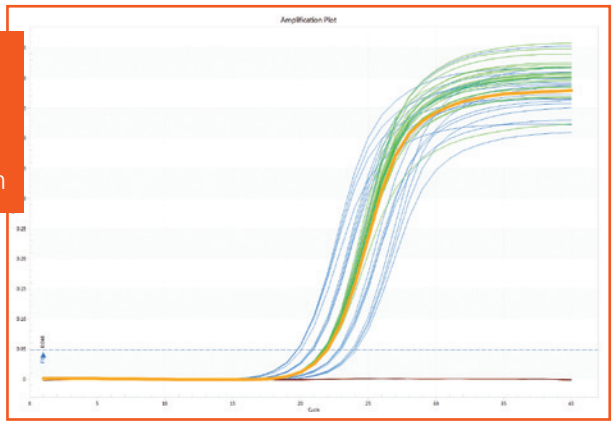
Discrimination of 2-fold differences



Allelic discrimination

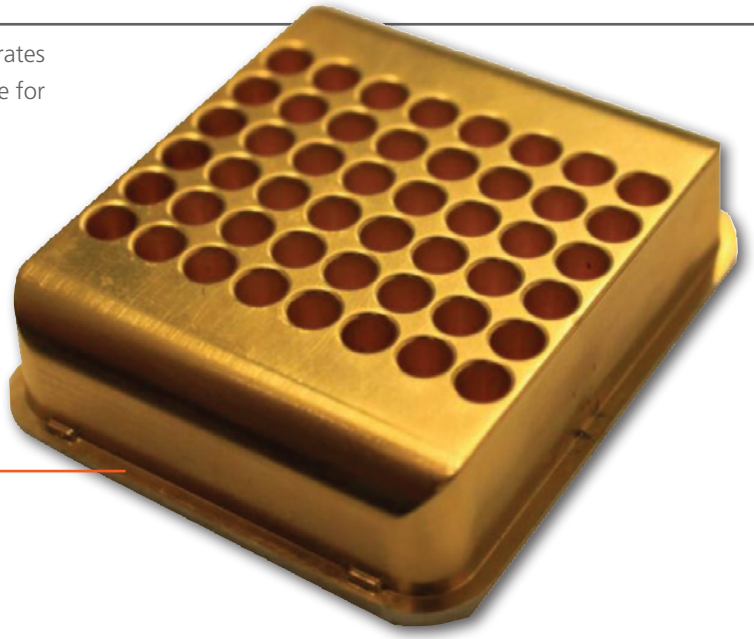


NGS library quantification



Rapid cycling

The Pro 48 has rapid heating and cooling rates. Average ramp rates of 5.5°C/sec reduce overall PCR run times. The typical run time for a 40 cycle PCR protocol is under 20 minutes when optimised.



Pro 48 hollow silver fast block, gold plated

High throughput

Pro 48 thermal control is superior to traditional 96-well peltier systems where thermal efficiency decreases as distance from the peltier increases. With Pro 48, faster and more precise cycling increases sample throughput because the need for multiple replicates is reduced by increased uniformity across the block. Pro 48 well-to-well, plate-to-plate and instrument-to-instrument results are as consistent as running a single experiment. To take advantage of this, Pro 48 has a function in the software where multiple experiments are combined. High uniformity eliminates the need for triplicates which reduces reagent running costs and ensures the entire plate of data is valuable.

Prime Pro 48 wells	24 samples	36 samples
HIGH uniformity - Run **duplicates**	Run time **40 minutes**	per hour
±0.1°C uniformity means Prime Pro 48 requires fewer replicates than a conventional 96 well system.	The Prime Pro 48 is capable of running 40 cycles in 40 minutes.	Fewer replicates and faster cycling allows Prime Pro 48 to process more samples than a standard 96 well system.

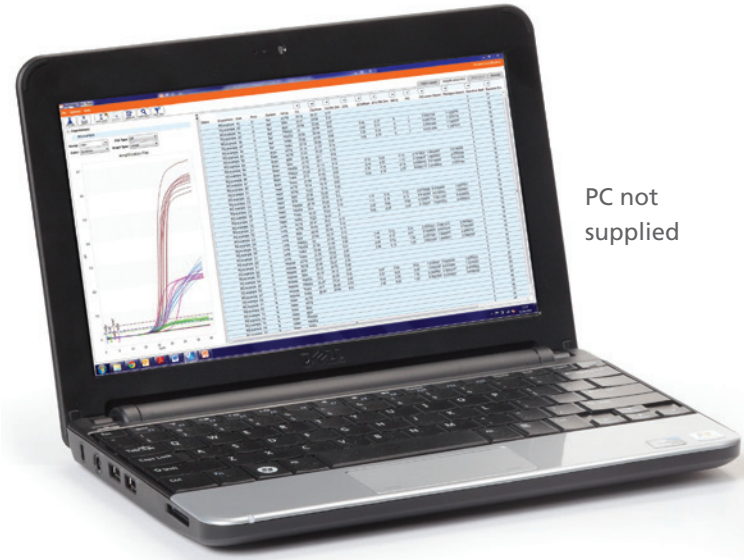
Conventional 96 wells	32 samples	24 samples
LOW uniformity - Run **triplicates**	Run time **1 hour 20 minutes**	per hour

Results from multiple instruments can be combined together

Also available from Techne®

Techne® has developed a comprehensive new range of thermal cyclers around its belief that all users deserve PCR without compromise. Our design philosophy has focused on delivering an enhanced user experience on all models.

- USB software upgrade and program transfer
- Total reliability with 4 year warranty
- Touchscreen interface on all models
- Unique gradient upgrade function
- High performance cycling block
- Exceptional value for money



PC not supplied

Software

Easy to use software that integrates user control, real-time data collection, and advanced data analysis.

Pro software.

- User-installable, intuitive, easy to use software that integrates user control, real-time data collection, and advanced data analysis.
- Supplied fully featured including HRM capability.
- New software version 5 enables a widened chemistry library and contains new thermal profiles.
- Facilitates rapid thermal cycling: 40 cycles in 40 minutes.
- Supplied on a USB stick.

ProStudy software.

- Data analysis and Multi-Experiment Analysis.
- Allows higher throughput.
- Expert results to Excel and Powerpoint
- Supplied on a USB stick.

Easy-to-Use Interface

- Pro 48 software uses a unique icon-driven user interface to simplify experimental design and setup.
- Pre-set thermal profile defaults are provided for the most commonly used experimental protocols.
- Temperature and time for each protocol step can easily be changed by click-and-drag action with the mouse.
- Experiment templates can be customized and saved for future use.

Data Analysis

- With the Pro 48 system and software, data collection is monitored in real time, allowing researchers to access run viability immediately.
- The user-friendly data analysis interface also allows researchers to easily view the amplification plot, melt curve analysis, and the analysed results, including Cq values, PCR efficiency, R^2 and Y-intercept.
- Data can be exported into Excel and custom reports generated directly into PowerPoint or PDF formats.
- High-resolution images can be directly exported in multiple image formats, ready to use in presentations.
- Conforms to Minimum Information for Publication of Quantitative Real-Time PCR Experiments (MIQE) guidelines, making data analysis and submission for publication review more efficient.

High-Performance Results

- Due to unmatched temperature control and an optical system designed for individual well monitoring, the Pro 48 system produces highly accurate, reliable results with PCR efficiencies between 90% and 110% and $R^2 > 0.99$ when using standard optimized assays.

qPCR probe-based detection reagent kits

Every assay is expert designed, involving in-depth literature review followed by extensive bioinformatics analysis. The kits are optimised via a strict biochemical validation on synthetic oligos to ensure optimal PCR performance. Every kit operates with the same standardised protocol and cycling conditions, which allows multiple kits to be used on the same plate in the same PCR run.

- Designed and manufactured in the UK.
- Wide range of 400 qPCR detection kits.
- Designed to work with Pro 48 and all other qPCR machines.
- Kits sold with/without Mastermix, 150 tests.

Human Pathogens

Techne supply a comprehensive range of all the commonly tested infections and diseases. If your test is not available contact Techne or your local dealer to enquire about getting a custom kit made for you.

- Respiratory Infections.
- Sexually Transmitted Diseases.
- Herpes Viral Infections.
- Hepatitis Infections.
- Human Papillomavirus.
- Gastrointestinal Infections.
- Vector-Borne Diseases.
- Meningitis.
- Periodontal Infections.

Biothreat detection

Techne supply a small but key list of detection kits, aimed at detecting some particularly harmful viruses and bacteria

- Japanese Encephalitis virus.
- Slow Bee Paralysis virus.
- African Horse Sickness.
- Taï Forest Ebola virus.
- Sudan Ebola virus.
- Rift Valley Fever virus.
- Reston ebola virus.
- Zaire ebola virus.
- Bacillus anthracis.
- Yersinia enterocolitica.

Food & Water Testing

With ever increasing demands for clarity on the source and type of products we are consuming, speciation and pathogen detection kits have been generated to allow users to do exactly that.

- GMO.
- Speciation.
- Allergens.
- Pathogen Contamination.

Veterinary and Agriculture

A wide range of veterinary and agricultural pathogen detection kits, all offering a potentially significant economic impact.

- Avian.
- Bovine.
- Ovine - Caprine.
- Equine.
- Feline.
- Canine.
- Porcine.
- Piscean.

Prime Pro 48 technical specification

High Resolution Melt	Yes
Volume per well	Validated for 5 to 20µl
Detection sensitivity	1 copy
Temp uniformity	±0.1˚C
Temperature range	30 to 100˚C
Average ramp rate	5.5˚C/sec
Thermal system	Proprietary hollow silver block, Peltier-based system with conductive fluid
Block format	48-well block
Consumables	48-well custom plates and optical adhesive seals
Optical system	Dual LED excitation (452–486 nm and 542–582 nm). CCD camera 4 emission filters (505–545nm, 562–596nm, 604–644nm, 665–705nm)
Calibrated dyes	SYBR®, FAM™, HEX™, ROX™, Cy®5. Additional dyes within the wavelength range compatible with Pro 48 filters are supported with no additional calibration required for implementation
Passive reference dyes	Use of ROX™ is supported, but optional
Data collection	Data collected in all four filters for all wells regardless of plate setup. Plate setup for data analysis can be altered after run completes. Melt curve analysis supports continuous data acquisition in a single filter to provide increased data point collection and reduced run times
PCR cycle time (standard)	40 cycles in less than 40 minutes
PCR cycle time (FAST)	40 cycles in less than 20 minutes
Dynamic range	>9 logs
Calibration	Not required
Installation	Plug and play design. Installed by experienced or novice scientists
Precision	Discriminates 5,000 and 10,000 template copies with 99% confidence
Warranty	1 year (parts and labour included)
Voltage	120–240 V
Frequency	50-60 Hz
Nominal current draw	5A
Peak power	500W (typical power is 180W)
Software	Multiple-licence Pro 48 system software is included at no additional cost. All chemistries supported. Applications include Absolute Quantification, Relative Quantification, Allelic Discrimination, High Resolution Melt (HRM)
Dimensions closed (WxDxH)	34.5cm x 31cm x 32cm (13.6 in × 12.2 in × 12.6 inches)
Dimensions open (WxDxH)	34.5cm x 31cm x 37cm (13.6 in × 12.2 in × 14.5 inches)
Weight	13.6 Kg (30 lb)

Ordering information

PRIMEPRO48	Prime Pro 48 Real Time PCR System, includes Dock and Squeegee, EcoControl and EcoStudy software USB stick, Plates (Pack of 50), Plate seals (Pack of 50), Power and Ethernet Cables.PC not supplied
PROPLATE48	Pack of 50 Real Time PCR Plates
PROSEAL48	Pack of 50 Real Time PCR Plate seals
PRODOCK48	Prime Pro additional loading dock, with 2 centrifuge adapters

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Use the above details to contact us if this literature doesn't answer all your questions.

Pricing on any accessories shown can be found by keying the part number into the search box on our website.

The specifications listed in this brochure are subject to change by the manufacturer and therefore cannot be guaranteed to be correct. If there are aspects of the specification that must be guaranteed, please provide these to our sales team so that details can be confirmed.