



From Brooks LIFE SCIENCES

# 2-Component & Standard PCR Consumables



Product Overview

# About us

## Manufacturing & Quality Standards

### About us

4titude® Ltd is a market leader in the design and manufacture of consumables and bench top instrumentation for a range of fields within the life sciences industry, *from Research to Molecular Diagnostics*.

Since our inception in 2005, 4titude® has grown and developed internationally, with facilities in Germany, France, USA, Hungary, and our UK-based head office and manufacturing plant located in the Surrey Hills, south of London.

The state-of-the-art manufacturing facility boasts 25,000 square feet of floor space, producing consumables for a wide range of life science and medical applications, including research into combatting cancer and infectious diseases, drug development, molecular diagnostics, and forensics.

Current off-the-shelf products include PCR consumables, sealing materials and heat sealing instrumentation, microplates for cell screening and storage, and solutions for sample tracking, including barcodes and 2D data matrix codes on products.

In addition to these products, we have the capability to offer completely tailored solutions, from custom design of bespoke products, right through to tool making & manufacturing of the parts. 4titude® can offer you a complete solution from concept to completion.

### 4titude® manufacturing & quality standards

4titude® are ISO 9001:2008 & ISO 13485:2012 certified to manufacture and supply consumables for the life sciences sector. Our management systems comply with the requirements to produce medical devices which we sell to diagnostics companies of all sizes including multinational corporations. We also provide complete custom design solutions from prototyping to tool design and contract manufacturing.

### Manufacturing standard

- ISO 9001:2008 & ISO 13485:2012 certified
- Process validation & mapping
- Fully document controlled manufacturing processes
- Statistical analysis of production processes
- Continuous improvement programs
- Injection moulding in ISO class 7 cleanrooms
- Virgin, medical grade polymers



### Quality standard

4titude® performs visual, physical and biological tests to ensure the integrity of our consumables and that they are contamination free at all times.

- Consumables are certified free from human genomic DNA, nucleases and pyrogens
- Skirted microplates and PCR plates meet the SBS standard footprint
- PCR inhibition tests are performed on polymers used
- Leak tests are performed on every well of every PCR plate
- White-well plates are checked for background fluorescence

# 2-Component & Standard PCR Consumables

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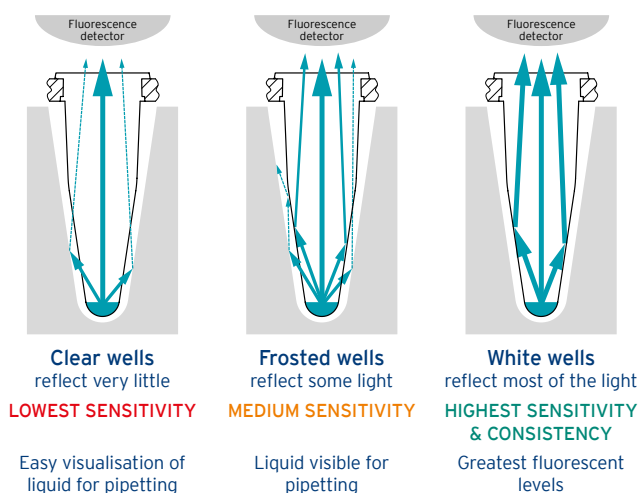
# Clear, Frosted or White Wells & Low DNA Binding Properties

Selection of the right plastic material of your PCR consumables has a measurable effect on your (q)PCR results. 4titude® have carried out extensive research and development into our PCR consumables to offer our customers a range of products suitable for the diverse applications and instruments they are required for.

## Well colour options - A question of sensitivity

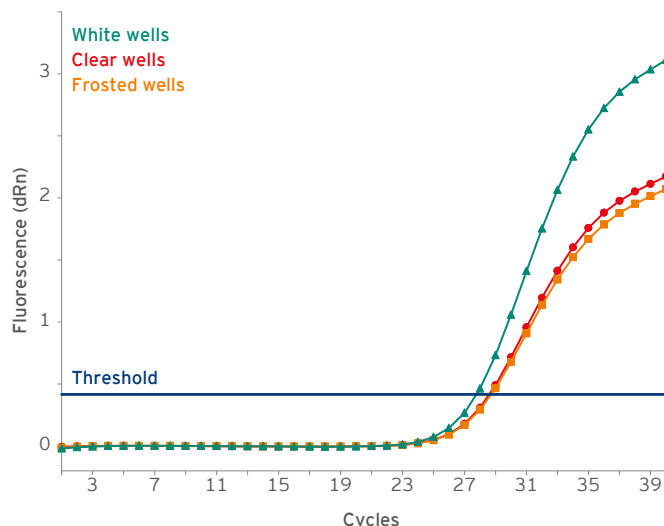
Well colour is often not considered when choosing a PCR plate, but can in fact have a significant impact on results. PCR plates are available in three colour options: clear, frosted and white, each of which has specific advantages and disadvantages.

their instruments and ABI® recommend the use of frosted wells. In addition to using the recommended well colour for your instrumentation, this must be combined with thin walled tubes for optimal heat transfer and optimal sealing to prevent evaporation.



**Figure 1:** Greater sensitivity in a qPCR reaction enables earlier Ct values and higher fluorescence readings.

4titude® recommends the use of white wells, where possible, to achieve the greatest sensitivity and consistency of qPCR reactions. Another point to consider are consumable colour recommendations from (q)PCR instrument manufacturers, for example, Roche recommend the use of white wells on



**Figure 2:** Identical qPCR assays in plates with clear, frosted and white wells (4ti-0770/C, 4ti-0772 and 4ti-0771, respectively). Clear and frosted wells perform similarly whereas white wells gave earlier Ct values and higher fluorescence intensity.

## Low DNA binding - Smarter plastics for advanced applications

Polypropylene (PP) is the best material for PCR tubes as PP is chemically inert, resistant to solvents and well suited for injection moulding, allowing for production of thin-walled tubes for optimum PCR results.

DNA has been shown to bind PP, especially at high ionic strength, despite the very hydrophobic nature of this material. This has typically not been an issue but due to progressing miniaturisation of reaction volumes and the introduction of new technologies such as NGS,

ultra-low DNA binding consumables have become essential for use in sensitive assays.

Please see our dedicated application note on low DNA binding products which can be found on our website for information outlining the characteristics of our selected low bind polymer and for the the range of low-binding PCR consumables available.





# Coding Options & Ethylene Oxide Treatment

## Linear and 2D matrix coding - Sample tracking made easy

All skirted and semi-skirted plates are available with linear Code 128 format barcodes for identification and traceability of your samples.

The labels are highly scratch-resistant and can withstand cold storage (-80°C), temperatures of up to 100°C, and solvents such as DMSO. Single, double, triple or quadruple barcodes are available, and a variety of customisations are possible.

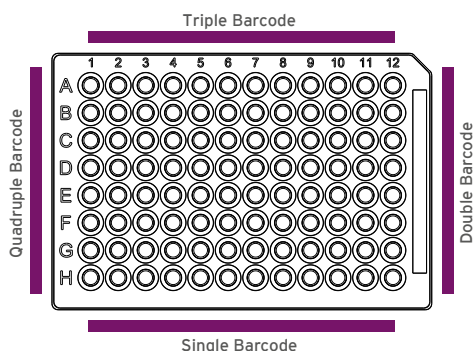


Figure 3: Position of standard barcode labels

2D data matrix coding uses a defined number of fields to encode alphanumeric information. The code uses data redundancy so even if codes become partly destroyed, the information will be retained. 4titude® offer 2D coding on several products including FrameStrips® and PCR tubes with flat caps.

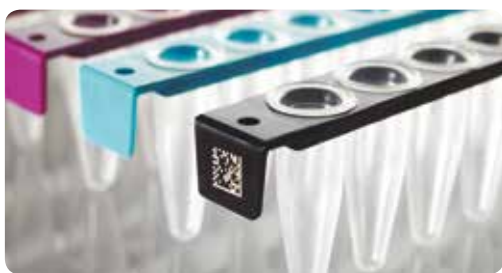


Figure 4: FrameStrip® with off-the-shelf 2D code

Should additional customisations not covered by our standard barcoding and 2D coding service be required, further information and our custom linear barcode request form can be found on our website.

## Ethylene Oxide Treatment - Reliable consumables for forensic applications

At 4titude®, we have a stringently controlled cleanroom production facility, certified according to ISO 9001 and ISO 13485, for production of PCR consumables free from DNA and RNA contamination. However, some applications require the absolute highest quality of consumables such as forensic workflows and tissue culture.

For these applications, 4titude® offer treatment of selected products with Ethylene Oxide, a technique proven to reduce traces of amplifiable DNA, for peace of mind in your reactions. Additional plate types can be treated on request.



Figure 5: Ethylene oxide treated plates for forensic use

4titude® offers a variety of products including additional processing options in an off-the-shelf format.

These include plates with clear, frosted or white wells, low binding products, barcoded or 2D coded products and Ethylene Oxide treated plates for forensic use.

For details, please refer to the corresponding product specifications in this brochure or visit [www.4ti.co.uk](http://www.4ti.co.uk).

Please contact us to discuss any custom solution.

# FrameStar<sup>®</sup> 2-Component PCR Plates

## FrameStar<sup>®</sup> 2-component PCR plates

FrameStar<sup>®</sup> PCR plates prevent sample loss by minimising thermal expansion during PCR, enabling reductions in PCR volumes and cost savings on reagents.

The 2-component design combines the advantages of thin walled polypropylene (PP) tubes, for optimum PCR results, with a rigid polycarbonate (PC) skirt and deck for highest thermal stability and rigidity, making them the plates of choice for any robotic workflows.

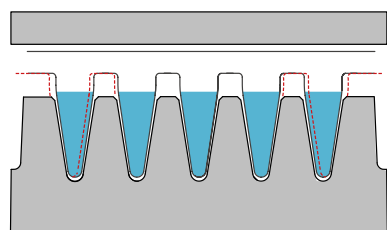
- Seven frame colours with clear, frosted or white tubes available  
**Flexible solutions for every application**
- No warping due to stable polycarbonate frame  
**Reliable use with stackers and liquid handlers**
- Minimised thermal expansion  
**Better sealing properties & reduced evaporation for improved PCR consistency**
- Downscaling of reaction volumes possible  
**Cost saving**
- Standard and custom barcoding options available  
**Error-free sample tracking**
- Plates with ultra-low DNA binding properties and processing options such as ethylene oxide treatment available  
**Tailor-made solutions**



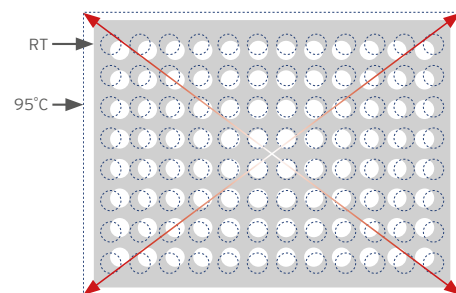
## Evaporation from standard PCR plates vs. FrameStar<sup>®</sup> plates

Thermal expansion of polypropylene (PP) plates leads to greater risk of evaporation from outer wells.

PP is the optimum material for PCR tubes. It provides the most efficient heat transfer, as well as an inert surface with low binding affinity to nucleic acids, proteins and other molecules. However, the material is not thermally stable in plate format, causing it to expand and contract during each PCR cycle. Such thermal expansion will weaken the plate seal and lead to sample evaporation, mainly from corner and outer wells.



**Figure 6:** Side-on view of a PCR plate in a thermal cycler. The sealed plate is sandwiched between the cycler block and the heated lid but it is only partly fixed in position at the bottom of tubes, allowing the plate to expand horizontally at the top.



**Figure 7:** Standard polypropylene plates expand by up to 2 mm during thermal cycling which leads to movement of wells away from the plate centre. This movement is most significant in corner and outer wells.

FrameStar® 2-component technology allows for reduction of assay volumes and cost.

Due to the much improved seal integrity, reaction volumes can often be reduced when using FrameStar® plates. Such downscaling of experiments can be successfully implemented without any loss of assay sensitivity or consistency and reagent savings can be considerable.

### Evaporation from standard PP plates is highest in the outer wells

Since thermal expansion and movement of wells in standard PP plates is greatest around the edges of the plates, evaporation is highest from the two outer rows of wells. Figure 8 illustrates the level of risk of sample evaporation from different areas of PP plates. The inner 32 wells of a standard 96 well plate have low risk of evaporation where the risk of sample loss is much higher in the outer two rows which contain 65 per cent of the wells.

**“FrameStar® plates led to significantly better results and reduced evaporation compared to standard PCR plates.”**

Dr. Andreas Dahl, MPI f. Molekulare Genetik, Berlin, Germany

### FrameStar® 2-component plates improve consistency of PCR results

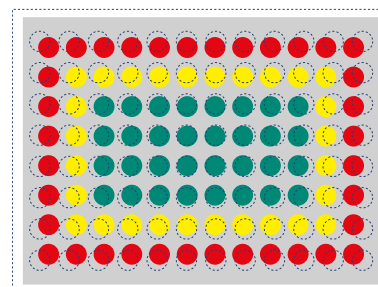
We have compared the degree of evaporation from different areas of standard PP and FrameStar® PCR plates. First, the 64 outer wells (two outer rows - Figure 8, red and yellow area) of both plate types were filled with 10 µl H<sub>2</sub>O. Plates were then sealed with a qPCR adhesive seal (code 4ti-0560) and their total weight determined before and after PCR. The experiment was repeated with a set of plates of which the inner 32 wells (Figure 8, green area) were filled. Table 1 shows that evaporation from outer wells of standard PP plates was 65% higher than from inner wells. As a result, evaporation causes varying changes in reaction volume across standard PP plates.

The results below show that reaction volumes remain consistent across the 96 wells (or 384 wells, data not shown) in FrameStar® plates. In contrast, the reaction volumes in standard plates differ significantly between wells during PCR. Reagent concentrations in outer rows will increase dramatically, resulting in sub-optimal reaction efficiency. In extreme cases samples may fully evaporate.

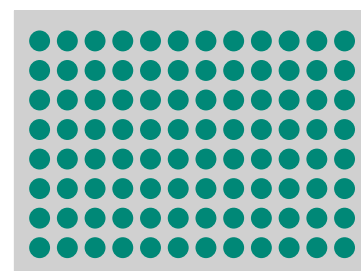
### FrameStar® minimises sample loss across the plate

Plate Type	Well position	Starting weight (g)	Weight post PCR (g)	Weight loss (g)	Volume loss	
					Total	Per well
FrameStar® 4ti-0710	outer 64 wells	26.230	26.193	0.037	37 µl	0.57 µl
Standard PP	outer 64 wells	17.299	17.118	0.181	181 µl	2.8 µl
FrameStar® 4ti-0710	inner 32 wells	25.841	25.824	0.017	17 µl	0.53 µl
Standard PP	inner 32 wells	17.132	17.078	0.054	54 µl	1.69 µl

**Table 1:** Weight and volume loss from different sections of 96 well PCR plates. Results shown are averages from 5 plates of each plate type. Volume loss from the outer wells of standard PP plates was 5-times higher than from FrameStar® plates.



**Figure 8:** Risk of evaporation from the outer rows (red) of a standard PP PCR plate is highest, medium level evaporation occurs in the second row (yellow) and sample loss from the inner 32 wells (green) is lowest (the dotted line represents an expanded standard PP plate).

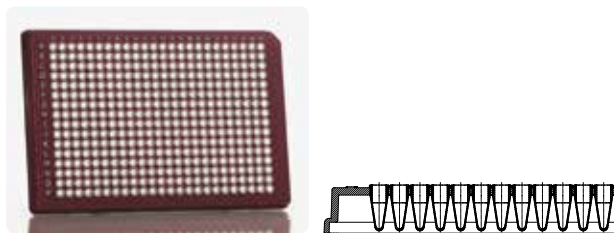


**Figure 9:** The polycarbonate frame of FrameStar® plates is more heat resistant than standard polypropylene plates which reduces thermal expansion to a minimum. For this reason seal integrity remains intact even at elevated temperatures during PCR.

Evaporation has a significant effect on the reaction conditions resulting in noticeable effects, especially for qPCR. Identical samples can exhibit significant differences in their Ct values, depending on their position on the plate.

A solution to the problem of evaporation related qPCR inaccuracies is the usage of 2-component plates.

## FrameStar® 384 Well Skirted PCR Plate



### Features

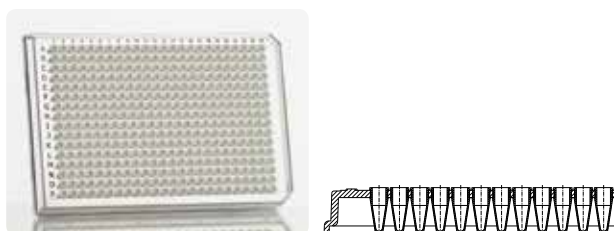
- Compatible with the majority of 384 well block PCR, qPCR and sequencing instruments
- Available with frosted wells for increased qPCR signal intensities

### FrameStar® 384 Well Skirted PCR Plate

PP wells, PC frame, cut corner A24, working volume: <30 µl, total well capacity: 55 µl

Code	Details			Plates/Case	
4ti-0384		purple frame		clear wells	50
4ti-0384/B		blue frame		clear wells	50
4ti-0384/C		clear frame		clear wells	50
4ti-0384/G		green frame		clear wells	50
4ti-0384/R		red frame		clear wells	50
4ti-0384/X		black frame		clear wells	50
4ti-0385		black frame		white wells	50
4ti-0386		black frame		black wells	50
4ti-0387		clear frame		frosted wells	50

## FrameStar® 384 Well Skirted PCR Plate, Roche Style



### Features

- Designed for use on the Roche LightCycler® 480 with 384 well block
- Available as a combi pack with qPCR adhesive seals

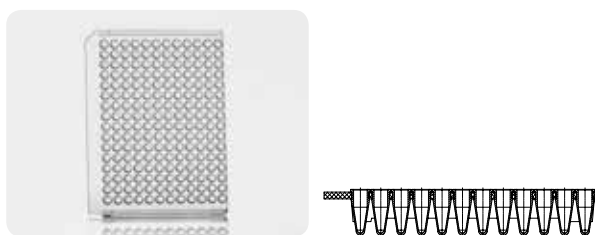
### FrameStar® 384 Well Skirted PCR Plate, Roche Style

PP wells, PC frame, cut corner A24/P24, working volume: <30 µl, total well capacity: 55 µl

Code	Details			Plates/Case	
4ti-0380/C		clear frame		clear wells	50
4ti-0381		clear frame		white wells	50

Code Combi Pack	Plates and Seals/Case	
4ti-0382	4ti-0381 + qPCR Seal (4ti-0560)	50
4ti-0383	4ti-0380/C + qPCR Seal (4ti-0560)	50

## FrameStar® 192 Well Semi-Skirted PCR Plate



### Features

- Half 384 well plate for lower sample throughput
- Two plates can be combined to give the capacity of one full 384 well plate
- Compatible with the majority of 384 well block PCR, qPCR and sequencing instruments
- Matching PCR and qPCR seals are available

### FrameStar® 192 Well Semi-Skirted PCR Plate

PP wells, PC frame, cut corner A1, no grid reference, working volume: <30 µl, total well capacity: 55 µl

Code	Details			Plates/Case	
4ti-0192/C		clear frame		clear wells	40

Half plate seals are available to match the size of this plate, please see the 4titude® sealing brochure or our website for more details.

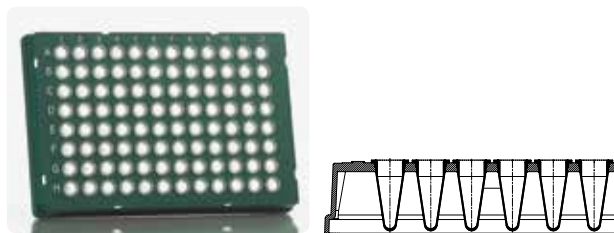
Code half plate seals	Seals/Case	
4ti-0500/HP	Adhesive PCR seal for use with 4ti-0192	100
4ti-0560/HP	Adhesive qPCR seal for use with 4ti-0192	100

Figure 10: The FrameStar® 192 plate is designed to optimise the use of 384 well PCR blocks as two plates can be combined to complete the block.





## FrameStar® 96 Well Skirted PCR Plate



### Features

- Fully skirted plate with broad instrumentation compatibility
  - Available as a combi pack with Q-Stick™ qPCR adhesive seals
  - Available ethylene oxide treated and barcoded for forensic use
  - Available with extra rigid skirt - especially suitable for use in plate handling robots as tested on PerkinElmer® automation systems
  - Available with low DNA binding properties for sensitive applications with ultra-low DNA input such as Next Generation Sequencing (NGS) sample prep and library construction.
- For details including experimental data see [www.4ti.co.uk](http://www.4ti.co.uk).

### FrameStar® 96 Well Skirted PCR Plate

Low profile, 0.1 ml PP wells, PC frame, cut corner H1, working volume: <100 µl, total well capacity: 200 µl

Code	Details	Plates/Case
4ti-0960	purple frame <span>C</span> clear wells	50
4ti-0960/B	blue frame <span>C</span> clear wells	50
4ti-0960/C	<span>C</span> clear frame <span>C</span> clear wells	50
4ti-0960/G	green frame <span>C</span> clear wells	50
4ti-0960/R	red frame <span>C</span> clear wells	50
4ti-0960/X	black frame <span>C</span> clear wells	50
4ti-0960/W	<span>W</span> white frame <span>C</span> clear wells	50
4ti-0961	black frame <span>W</span> white wells	50
4ti-0961/C	<span>C</span> clear frame <span>W</span> white wells	50
4ti-0966	black frame <span>■</span> black wells	50
4ti-OX960C/SBC	4ti-0960/C for forensic use, ethylene oxide treated and barcoded	20
4ti-0960/RIG	4ti-0960/X, with extra rigid skirt	50
4ti-LB0960/RIG	4ti-0960/RIG, with low DNA binding properties	50

Code Combi Pack	Plates and Seals/Case
4ti-0960/0565	4ti-0960 + Q-Stick™ qPCR Seal (4ti-0565) 50

## FrameStar® 96 Well Semi-Skirted PCR Plate, Roche Style



### Features

- Designed for use on the Roche LightCycler® 96 and 480 with 96 well block
- Available as a combi pack with qPCR Seal or Q-Stick™ qPCR Seal adhesive seals

### FrameStar® 96 Well Semi-Skirted PCR Plate, Roche Style

Low profile, 0.1 ml PP wells, PC frame, cut corner H12, working volume: <100 µl, total well capacity: 200 µl

Code	Details	Plates/Case
4ti-0950/C	<span>C</span> clear frame <span>C</span> clear wells	50
4ti-0951	<span>C</span> clear frame <span>W</span> white wells	50

Code Combi Pack	Plates and Seals/Case
4ti-0952	4ti-0951 + qPCR Seal (4ti-0560) 50
4ti-0953	4ti-0950/C + qPCR Seal (4ti-0560) 50
4ti-0951/0565	4ti-0951 + Q-Stick qPCR Seal (4ti-0565) 50

## FrameStar® 96 Well Semi-Skirted PCR Plate, Roche Style, High Sensitivity



### Features

- Designed for use on the Roche LightCycler® 96 and 480 with 96 well block
- Extra white wells for improved sensitivity and optimal performance
- Available as a combi pack with qPCR Seal

### FrameStar® 96 Well Semi-Skirted PCR Plate, Roche Style, High Sensitivity

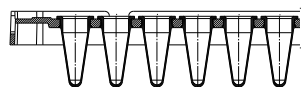
Low profile, 0.1 ml PP wells, PC frame, cut corner H12, working volume: <100 µl, total well capacity: 200 µl

Code	Details	Plates/Case
4ti-0954	<span>C</span> clear frame <span>W</span> extra white wells	50

Code Combi Pack	Plates and Seals/Case
4ti-0954/0560	4ti-0954 + qPCR Seal (4ti-0560) 50

## FrameStar® 96 Well Semi-Skirted PCR Plate, ABI® FastPlate Style



### Features

- Designed for use on ABI® Fast Block cyclers
- Available with frosted wells for increased qPCR signal intensities
- Available as a combi pack with Q-Stick™ qPCR Seal adhesive seals

### FrameStar® 96 Well Semi-Skirted PCR Plate, ABI® FastPlate Style

Low profile, 0.1 ml PP wells, PC frame with upstand, cut corner A1, working volume: <100 µl, total well capacity: 200 µl

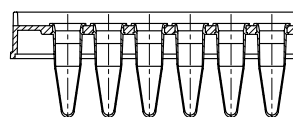
Code	Details				Plates/Case
4ti-0910/C	C	clear frame	C	clear wells	50
4ti-0910/C/10P	C	clear frame	C	clear wells	10
4ti-0911	C	clear frame	W	white wells	50
4ti-0912	C	clear frame	f	frosted wells	50
4ti-0912/10P	C	clear frame	f	frosted wells	10

### Code Combi Pack

### Plates and Seals/Case

4ti-0910/C/0565	4ti-0910/C + Q-Stick™ qPCR Seal (4ti-0565)	50
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## FrameStar® 96 Well Semi-Skirted PCR Plate With Upstand, ABI® Style



### Features

- Designed for use on ABI® instruments
- Available ethylene oxide treated and barcoded for forensic use
- Available as a combi pack with Q-Stick™ qPCR Seal adhesive seals

### FrameStar® 96 Well Semi-Skirted PCR Plate With Upstand, ABI® Style

Standard profile, 0.2 ml PP wells, PC frame with upstand, cut corner A12 working volume: <200 µl, total well capacity: 300 µl

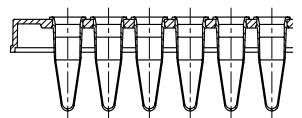
Code	Details				Plates/Case
4ti-0730	■	purple frame	C	clear wells	50
4ti-0730/B	■	blue frame	C	clear wells	50
4ti-0730/C	C	clear frame	C	clear wells	50
4ti-0730/C/10P	C	clear frame	C	clear wells	10
4ti-0730/G	■	green frame	C	clear wells	50
4ti-0730/R	■	red frame	C	clear wells	50
4ti-0730/X	■	black frame	C	clear wells	50
4ti-0731	■	black frame	W	white wells	50
4ti-0X730C/SBC	4ti-0730/C for forensic use, ethylene oxide treated, barcoded				20

### Code Combi Pack

### Plates and Seals/Case

4ti-0730/C/0565	4ti-0730/C + Q-Stick™ qPCR Seal (4ti-0565)	50
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## FrameStar® 96 Well Semi-Skirted PCR Plate, ABI® Style



### Features

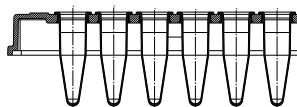
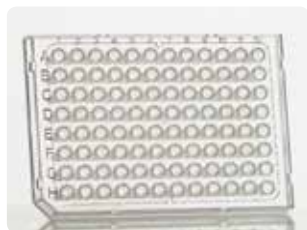
- Designed for use on all major thermal cyclers including ABI® instruments with standard 96 well blocks
  - Can be used directly in ABI® 96 well instruments with no adapters required
  - Available with frosted wells for increased qPCR signal intensities
  - Available ethylene oxide treated and barcoded for forensic use
  - Available with low DNA binding properties for sensitive applications with ultra-low DNA input such as Next Generation Sequencing (NGS) sample prep and library construction.
- For details including experimental data see [www.4ti.co.uk](http://www.4ti.co.uk).

### FrameStar® 96 Well Semi-Skirted PCR Plate, ABI® Style

Standard profile, 0.2 ml PP wells, PC frame, cut corner A12 working volume: <200 µl, total well capacity: 300 µl

Code	Details				Plates/Case
4ti-0770	■	purple frame	C	clear wells	50
4ti-0770/B	■	blue frame	C	clear wells	50
4ti-0770/C	C	clear frame	C	clear wells	50
4ti-0770/C/10P	C	clear frame	C	clear wells	10
4ti-0770/G	■	green frame	C	clear wells	50
4ti-0770/R	■	red frame	C	clear wells	50
4ti-0770/X	■	black frame	C	clear wells	50
4ti-0771	■	black frame	W	white wells	50
4ti-0772	C	clear frame	f	frosted wells	50
4ti-0772/10P	C	clear frame	f	frosted wells	10
4ti-0X770C/SBC	4ti-0770/C for forensic use, ethylene oxide treated, barcoded				20
4ti-LB0770/C	4ti-0770/C, with low DNA binding properties				50

## FrameStar® 96 Well Semi-Skirted PCR Plate



### FrameStar® 96 Well Semi-Skirted PCR Plate

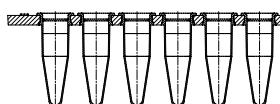
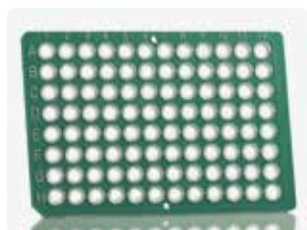
Standard profile, 0.2 ml PP wells, PC frame, cut corner H1, working volume: <200 µl, total well capacity: 300 µl

Code	Details		Plates/Case
4ti-0900/C	C	clear frame	C clear wells 50
4ti-0901	C	clear frame	W white wells 50

#### Features

- Universal semi-skirted plate
- Designed for use on standard thermal cyclers

## FrameStar® 96 Well Non-Skirted PCR Plate



### FrameStar® 96 Well Non-Skirted PCR Plate

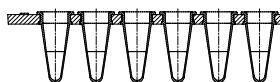
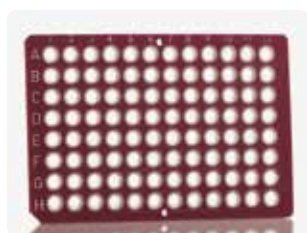
Standard profile, 0.2 ml PP wells, PC frame, cut corner H1, working volume: <200 µl, total well capacity: 300 µl

Code	Details		Plates/Case
4ti-0710	■	purple frame	C clear wells 50
4ti-0710/B	■	blue frame	C clear wells 50
4ti-0710/C	C	clear frame	C clear wells 50
4ti-0710/G	■	green frame	C clear wells 50
4ti-0710/R	■	red frame	C clear wells 50
4ti-0711	■	black frame	W white wells 50

#### Features

- Universal non-skirted plate
- Designed for use on all major thermal cyclers
- Also available as low profile plates for reaction volumes <20 µl to suit your reaction volume

## FrameStar® 96 Well Non-Skirted PCR Plate, Low Profile



### FrameStar® 96 Well Non-Skirted PCR Plate, Low Profile

Low profile, 0.1 ml PP wells, PC frame, cut corner H1, working volume: <100 µl, total well capacity: 200 µl

Code	Details		Plates/Case
4ti-0720	■	purple frame	C clear wells 50
4ti-0720/B	■	blue frame	C clear wells 50
4ti-0720/C	C	clear frame	C clear wells 50
4ti-0721	■	black frame	W white wells 50

#### Features

- Universal non-skirted, low profile plate
- Designed for use on all major thermal cyclers
- Also available as standard profile plates

# FrameStar® Break-A-Way

## Dividable 2-Component PCR Plates



FrameStar® Break-A-Way offers you all the flexibility of tube strips, in a plate format

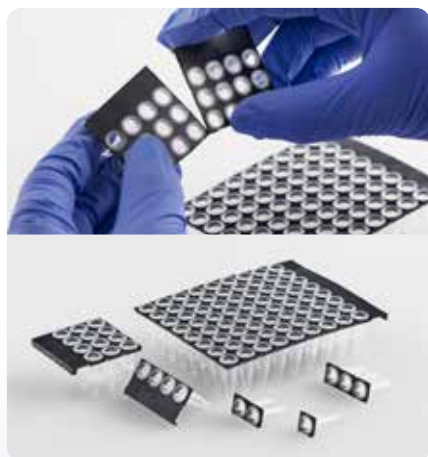


Figure 11: FrameStar® Break-2-Ways Plates, dividable both horizontally and vertically

### FrameStar® Break-A-Way & Break-2-Ways Plates

FrameStar® Break-A-Way and Break-2-Ways plates can be easily divided into smaller plate sections, ensuring no tubes are wasted.

The plates combine the advantages of the FrameStar® and FrameStrip® range (see page 16), as well as single tube formats. The result is PCR consumables with thin-walled polypropylene (PP) tubes for optimal PCR results with a rigid polycarbonate frame for easy and reliable handling.

The two-component design minimises evaporation allowing for the downscaling of reaction volumes and the breakability of the plates offers flexibility to suit your experiment size. Once broken down, strips remain straight and stable for ease of handling and to enable effortless sample tracking if 2D coded.

#### FrameStar® Break-A-Way & Break-2-Ways - Division brings flexibility!

- Dividable horizontally, vertically or both  
Flexible solutions for every application
- Available as standard and low profile plates to suit your reaction volume and instrument format  
Highest instrument compatibility
- Seven frame colours with clear or white tubes available  
Colour coding for different workflows
- 2D coded options available  
Error-free sample tracking
- Plate segmentation can be automated
- Also available as pre-cut strips, see FrameStrips®, page 16

#### Sealing options

Plates can be sealed with standard heat or adhesive seals and then cut using the 4titude® plate cutter (4ti-3000, please see [www.4ti.co.uk](http://www.4ti.co.uk)) to produce individually sealed strips of wells.

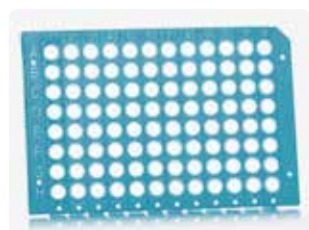
Alternatively, partial seals such as the half plate seals (4ti-0500/HP and 4ti-0569/HP), strip seals (4ti-0500/8) or caps (4ti-0751) can be used, depending on the number of strips required. Please refer to [www.4ti.co.uk/seal](http://www.4ti.co.uk/seal).





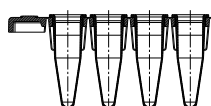
FrameStar® Break-A-Way and Break-2-Ways plates can be easily divided into smaller plate sections, ensuring no tubes are wasted.

## FrameStar® Break-A-Way PCR Plate

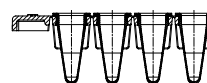


### FrameStar® Break-A-Way PCR Plate

96 well semi-skirted plate, vertically scored, snaps easily into strips of 8 tubes or part plates, cut corner A12



**Standard profile**  
0.2 ml PP wells, PC frame,  
working volume: <200 µl,  
total well capacity: 300 µl



**Low profile**  
0.1 ml PP wells, PC frame,  
working volume: <100 µl,  
total well capacity: 200 µl

#### Features

- 96 well PCR plate that can easily be divided into smaller plate sections or strips
- Simply snap along the pre-formed lines
- Flexible and efficient use of plates
- Available as standard and low profile plates, suitable for reaction volumes <20 µl

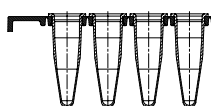
Code Standard profile	Code Low profile	Details			Plates/Case	
4ti-1000/P	4ti-1200/P		purple frame	C	clear wells	50
4ti-1000/B	4ti-1200/B		blue frame	C	clear wells	50
4ti-1000/C	4ti-1200/C		clear frame	C	clear wells	50
4ti-1000/G	4ti-1200/G		green frame	C	clear wells	50
4ti-1000/R	4ti-1200/R		red frame	C	clear wells	50
4ti-1000/X	4ti-1200/X		black frame	C	clear wells	50
4ti-1000/W	4ti-1200/W		white frame	C	clear wells	50
4ti-1001	4ti-1201		black frame	W	white wells	50

## FrameStar® Break-2-Ways PCR Plate

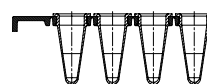


### FrameStar® Break-2-Ways PCR Plate

96 well rigid plate, vertically and horizontally scored, snaps easily into part plates, 8 well strips, 12 well strips, part strips or individual tubes,



**Standard profile**  
0.2 ml PP wells, PC frame,  
working volume: <200 µl,  
total well capacity: 300 µl



**Low profile**  
0.1 ml PP wells, PC frame,  
working volume: <100 µl,  
total well capacity: 200 µl

#### Features

- The most flexible, efficient and cost-effective use of FrameStar® PCR plates, ensuring not a single tube is wasted
- Available as standard and low profile plates, suitable for reaction volumes <20 µl
- Designed for use on all instruments that fit non-skirted standard or low profile plates, respectively

Code Standard profile	Code Low profile	Details			Plates/Case	
4ti-1300/X	4ti-1400/X		black frame	C	clear wells	50

FrameStar® Break-A-Way enables reagent dispensing to be automated in plate format, then post-dispensing the plate can be divided, as required, by either kit manufacturers or end-users.

# Random Access Plates

## 96 well Plates with Individually Removable Wells

### Random Access Plates

FrameStar® is our superior technology of making PCR plates with ultra-thin polypropylene wells fitted into a robust polycarbonate frame that provides excellent stability. Our Random Access plates develop this technology further to supply a novel 96 well plate with individually removable wells combining both flexibility and robustness.

Random Access (RA) plates provide the greatest flexibility in PCR plates, affording handling of individual wells in a 96 well plate format. Each well is moulded into a rigid frame suitable for use with automation. Once containing your sample or reagents, plates can be sealed using random access heat seals resulting in filled wells which can be removed from the plate as required.

The wells are made from medical grade polypropylene which is perfectly suited for use in PCR as well as for long term storage. The exact number of wells required can be used, meaning no wastage of consumables or reagents. Empty frames are also available for tubes to be transferred to, however, frames can be re-used multiple times, depending on their application.

Each well clicks into place within the frame, holding it securely for use with automation and for transport. Additionally, the fit of the tubes is not compromised following a PCR run due to resistance of the rigid frame to thermal expansion.

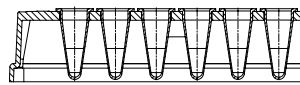
- SBS footprint - suitable for automation
- Rigid frame - does not expand during PCR cycles allowing for RA tubes to fit tightly in the frame before and after PCR
- PP wells - low binding to nucleic acids and high solvent resistance, ideal for both PCR and storage
- Thin walled tubes - optimal heat transfer during PCR
- Individually sealed using RA seals - tubes can be filled, sealed and then single tubes removed
- Tubes can be removed and inserted again - ultimate flexibility
- Storage of small samples - plates take up minimal freezer space



Figure 12: Random Access 96 Well Skirted PCR Plate

Random Access plates provide the greatest flexibility in PCR plates, affording handling of individual wells in a 96 well plate format.

## Random Access 96 Well Skirted PCR Plate



### Features

- Individual PP tubes that can be clicked in and out of the frame
- Ideal for reagent storage and (q)PCR
- Can be individually sealed using Random Access seals

### Random Access 96 Well Skirted PCR Plate

Low profile, 0.1 ml PP wells, rigid PC frame, cut corner H1  
working volume: <100 µl, total well capacity: 200 µl

Code	Details	Plates/Case
4ti-0960/RA	<input type="checkbox"/> W white frame <input type="checkbox"/> C clear wells	50

### Random Access 96 Well Skirted Frame

Rigid PC frame, cut corner H1

Code	Details	Frames/Case
4ti-0960/RA-F	<input type="checkbox"/> W white	10

### Random Access Pierce Heat Seal Strong

96 foil seal spots for sealing of individual wells, sheet or roll format, pierceable, suitable for PCR/sample shipping/compound storage

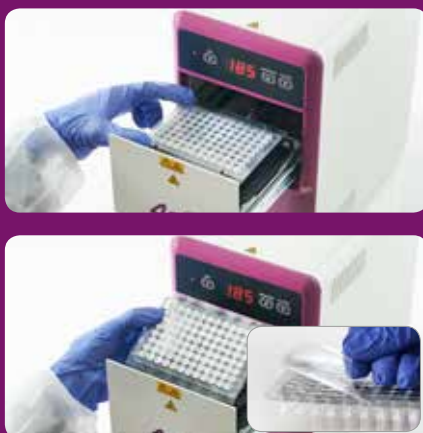
Please see the 4titude® sealing brochure or our website for more details.

Code	Random Access seals	Sheets/Case
4ti-05381/RA	Random Access Pierce Heat Seal Strong, sheets, for use with 4s3™ Semi-Automatic Sheet Heat Sealer	100
4ti-0539/RA	Random Access Pierce Heat Seal Strong, roll, for use with a45 <sup>RA</sup> Automatic Random Access Heat Sealer	1

## Random Access Sealing Options

Heat sealing is the gold standard to seal consumables to achieve long shelf lives and stability in shipping processes. Our Random Access plate formats, can be sealed in one go to give individually accessible, dividable seals, without further processing.

This links in with our a45<sup>RA</sup> Automatic Random Access Heat Sealer allowing streamlined usage from small to large scale.



**Figure 13:** Random Access Sealing Procedure using the 4s3 Semi-Automatic Sheet Heat Sealer (4ti-0655)

1. Place Random Access Plate in Heat Sealer
2. Place Random Access Seal onto the plate
3. Plate is automatically sealed, remove plate
4. Remove the backing liner from the seal



**Figure 14:** Random Access Sealing Procedure using the a45<sup>RA</sup> Automatic Random Access Heat Sealer (4ti-0675, prototype shown)

1. Place Random Access Plate in Random Access Heat Sealer
2. Plate is automatically sealed and backing liner removed
3. Sealed Random Access plate ready-to-use

# FrameStrip®

## 2-Component PCR Tube Strips

### FrameStrip® 2-Component PCR Tube Strips

Strips of 8, 0.2 ml clear polypropylene PCR tubes held in a rigid polycarbonate frame.

By moulding the frame portion in a more rigid polymer, the mechanical stability of FrameStrips® is greatly improved compared with traditional single piece products, as seen in the figure 15.

For colour coding of experiments, we offer strips with clear wells in 6 different frame colours. Additionally, for optical assays such as qPCR, we supply strips with white wells in black frames. White wells increase the signal-to-noise ratio by maximising reflection of light in fluorescent based assays.

FrameStrips® are available with either domed cap strips or flat, optically clear cap strips, and are compatible with the majority of thermal cyclers. End tabs allow for easy handling and labelling of the strips and some products are also available with an off-the-shelf 2D code, offering a vast supply of unique code combinations.



Figure 15: Unlike standard tube strips, the FrameStrip® will remain straight and stable, even at elevated temperatures and when filled with liquid.

### FrameStrip® 8 Well PCR Tube Strips

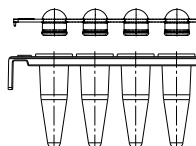


#### Features

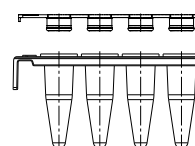
- 2-component design in an 8 well strip format
- Compatible with the majority of thermal cyclers
- Available with either domed cap strips or with flat, optically clear cap strips
- Available with off-the-shelf 2D code

#### FrameStrip® 8 Well PCR Tube Strips

Standard profile, 0.2 ml PP wells, PC frame, working volume: <200 µl, total well capacity: 300 µl, available with either strips of domed or flat optical caps



FrameStrip® 8 Well PCR Tube Strips, Plus Strips of Domed Caps



FrameStrip® 8 Well PCR Tube Strips, Plus Strips of Flat Optical Caps

Code FrameStrip® + Domed Caps	Code FrameStrip® + Flat Caps	Details	Tube and Cap Strips/Case
4ti-0785/P	4ti-0786/P	purple frame	clear wells 120
4ti-0785/B	4ti-0786/B	blue frame	clear wells 120
4ti-0785/G	4ti-0786/G	green frame	clear wells 120
4ti-0785/R	4ti-0786/R	red frame	clear wells 120
4ti-0785/X	4ti-0786/X	black frame	clear wells 120
4ti-0785/XW	4ti-0786/XW	black frame	white wells 120
4ti-0785/M	4ti-0786/M	mixed frame colours	clear wells 120

Code FrameStrip® 2D coded + Domed Caps	Code FrameStrip® 2D coded + Flat Caps	Details	Tube and Cap Strips/Case
4ti-0785/X/2D	4ti-0786/X/2D	black frame	clear wells 120
4ti-0785/W/2D	4ti-0786/W/2D	white frame	clear wells 120



FrameStrips® feature a rigid polycarbonate frame for highest mechanical stability



# Vari-Strip™ & Vari-Plate™

## PCR Tube Strips in Frames

### Vari-Strips™ and Vari-Plates™

PCR tube strips in frames - excellent flexibility

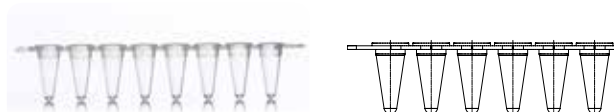
The 4titude® Vari-Strip™ and Vari-Plate™ system offers total flexibility in plate usage. It allows the user to insert or remove strips of 8 tubes from a 96 well plate frame.

- Vari-Strips™ can be used as a stand alone product or inserted in one of two Vari-Plate™ frames for ease of handling
- Vari-Plate™ frames are available for use on Roche LightCycler® 480 and for universal use
- Pre-loaded frames are available
- Sealable using cap strips, adhesive seals or heat seals



Figure 16: Vari-Strips™ can be used as a stand alone product or with a frame for ease of handling.

### Vari-Strip™ 8 Well PCR Tube Strips, Low Profile



#### Features

- Thin-walled polypropylene tubes for optimum PCR and qPCR results
- Hole in end tab of white strips to visualise alphanumeric grid reference on the Vari-Plate™

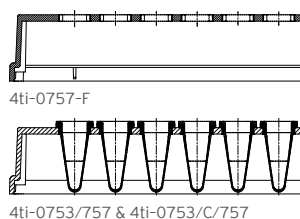
#### Vari-Strip™ 8 Well PCR Tube Strips, Low Profile

Low profile, 0.1 ml PP wells, working volume: <100 µl, total well capacity: 200 µl

Code	Details	Strips/Case
4ti-0753	W white wells	120
4ti-0753/C	C clear wells	120

Code	Details	Tube and Cap Strips/Case
4ti-0754	W white wells	plus strips of 8 flat optical caps 120
4ti-0754/C	C clear wells	plus strips of 8 flat optical caps 120

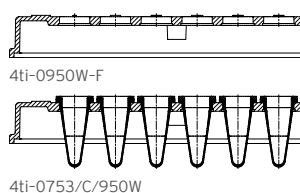
### Vari-Plate™ Frames & Vari-Plates™



#### Vari-Plate™ 96 Well Skirted Frame

PC, white, cut corner H1, universal use

Code	Details	Frames or Plates/Case
4ti-0757-F	Empty frame	10
4ti-0753/757	4ti-0757-F pre-loaded with Vari-Strips™, white	50
4ti-0753/C/757	4ti-0757-F pre-loaded with Vari-Strips™, clear	50



#### Vari-Plate™ 96 Well Semi-Skirted Frame, Roche Style

PC, white, cut corner H12, designed for use on Roche LightCycler® 480

Code	Details	Frames or Plates/Case
4ti-0950W-F	Empty frame	10
4ti-0753/950W	4ti-0950W-F pre-loaded with Vari-Strips™, white	50

# Standard PCR Plates, Strips & Tubes

## Standard PCR Plates, Strips & Tubes

4titude® offers a wide range of PCR consumables for low to medium throughput applications. Our standard one-piece PCR consumables are manufactured from virgin polypropylene in our Class 7 ISO certified cleanroom production facility, and comply to the same stringent QC requirements as our FrameStar® range (see page 4).

The ultra-thin walled tubes of our standard PCR plates maximise heat transfer and the raised rims facilitate sealing. Our range of plates includes fully skirted, semi-skirted, and non-skirted plates, available in clear or white (for qPCR), with additional colours for non-skirted plates available.

All our PCR consumables are certified free from RNase, DNase, and human genomic DNA. These plates fit most thermal cyclers; for a complete list please see the compatibility table on page 26.

- Cleanroom Injection Moulding - Class 7 ISO Certification  
No contamination and 10 fold lower amount of air particles compared to most PCR plate manufacturers
- Virgin, Medical Grade Polymers  
No leakage of substances which may have a detrimental effect on product purity
- Certified RNase-, DNase-, DNA, and Pyrogen-free  
Inhibitor free consumables
- Ultra-thin and consistent wall thickness  
Fast and precise thermal transfer



### NEW 384 Well Skirted PCR Plate



#### Features

- Designed for use on standard 384 well thermal cyclers

#### 384 Well Skirted PCR Plate

polypropylene, cut corner A24, working volume: <20 µl, total well capacity: 55 µl

Code	Details	Plates/Case
4ti-1384	C clear	50
4ti-1387	f frosted	50
4ti-1385	W white	50

### NEW 384 Well Skirted PCR Plate, Roche Style



#### Features

- Designed for use on the Roche LightCycler® 480 with 384 well block

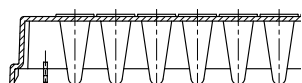
#### 384 Well Skirted PCR Plate, Roche Style

white polypropylene, cut corner A24/P24, working volume: <20 µl, total well capacity: 55 µl

Code	Details	Plates/Case
4ti-1381	W white	50

4titude®'s standard PCR plates, strips and tubes are manufactured from virgin polypropylene in our Class 7 ISO certified cleanroom production facility.

## 96 Well Skirted PCR Plate



### Features

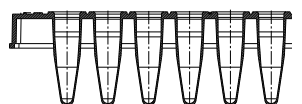
- Universal 96 well skirted plate
- Designed for use on standard thermal cyclers

### 96 Well Skirted PCR Plate

Low profile, 0.1 ml wells, polypropylene, cut corner H1, working volume: <100 µl, total well capacity: 200 µl

Code	Details	Plates/Case
4ti-0740	C clear	50
4ti-0741	W white	50

## 96 Well Semi-Skirted PCR Plate



### Features

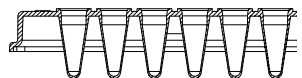
- Universal semi-skirted plate
- Designed for use on standard thermal cyclers

### 96 Well Semi-Skirted PCR Plate

Standard profile, 0.2 ml wells, polypropylene, cut corner A12, working volume: <200 µl, total well capacity: 300 µl

Code	Details	Plates/Case
4ti-0760	C clear	50
4ti-0761	W white	50

## 96 Well Semi-Skirted PCR Plate, Roche Style



### Features

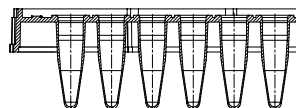
- Designed for use on Roche LightCycler® 480

### 96 Well Semi-Skirted PCR Plate, Roche Style

Low profile, 0.1 ml wells, polypropylene, cut corner H12, working volume: <100 µl, total well capacity: 200 µl

Code	Details	Plates/Case
4ti-0955	W white	50

## 96 Well Semi-Skirted PCR Plate, ABI® Style



### Features

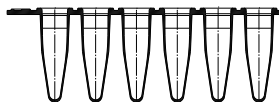
- Designed for use on ABI® thermal cyclers
- Frosted version available for increased qPCR signal intensities
- Deck design is equivalent to ABI plates and therefore can be used as a direct swap out

### 96 Well Semi-Skirted PCR Plate, ABI® Style

Standard profile, 0.2 ml wells, polypropylene, cut corner A12, working volume: <200 µl, total well capacity: 300 µl

Code	Details	Plates/Case
4ti-0735	C clear	50
4ti-0736	f frosted	50

## 96 Well Non-Skirted PCR Plate



### Features

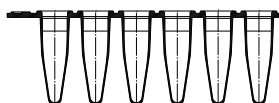
- Universal non-skirted plate
- Designed for use on standard thermal cyclers

### 96 Well Non-Skirted PCR Plate

Standard profile, 0.2 ml wells, polypropylene, cut corner H12, working volume: <200 µl, total well capacity: 300 µl

Code	Details	Plates/Case
4ti-0750	C clear	50
4ti-0750/P	P purple	50
4ti-0750/B	B blue	50
4ti-0750/G	G green	50
4ti-0750/R	R red	50
4ti-0750/W	W white	50
4ti-0750/Y	Y yellow	50

## Non-Skirted PCR Plate Segments



### Features

- 96 Well Non-Skirted PCR Plate (see above) divided into 8 well, 16 well, 24 well, 32 well, or 48 well segments
- Available in 6 colours
- A versatile solution when a whole PCR plate may not be needed

### Non-Skirted PCR Plate Segments

Standard profile, 0.2 ml wells, polypropylene, working volume: <200 µl, total well capacity: 300 µl

Code	Details	Segments/Case
4ti-0750/8	C 1 x 8 well plate segments	600
4ti-0750/16	C 2 x 8 well plate segments	300
4ti-0750/24	C 3 x 8 well plate segments	200
4ti-0750/32	C 4 x 8 well plate segments	150
4ti-0750/48	C 6 x 8 well plate segments	100

Note: Codes of the clear versions are shown above.

For colour options please add the corresponding letter to the product code, e.g. order 4ti-0750/8/P for 8 well plate segments in purple.

P = purple	B = blue	G = green
R = red	Y = yellow	

## 8 Well PCR Tube Strips



### Features

- Suitable for all standard 0.2 ml block thermal cyclers
- Optionally available as a combi pack with strips of 8 domed or flat optical caps

### 8 Well PCR Tube Strips

Standard profile, 0.2 ml wells, clear polypropylene, working volume: <200 µl, total well capacity: 300 µl

Code	Details	Strips/Case
4ti-0781	C clear wells	125

Code Combi Pack	Tube and Cap Strips/Case
4ti-0780	C plus strips of 8 domed caps 125
4ti-0784	C plus strips of 8 flat optical caps 125



### Vari-Strips™ and Vari-Plates™ - PCR tube strips in frames, see page 17

The 4titude® Vari-Strip™ and Vari-Plate™ system offers total flexibility in plate usage. It allows the user to insert or remove strips of 8 tubes from a 96 well plate frame. The low profile Vari-Strips™ can be used as a stand alone product or inserted in one of two Vari-Plate™ frames for ease of handling.



## 8 Well PCR Tube Strips, With Attached Caps



### Features

- The tubes are joined together either by three links (4ti-0792 and 4ti-0793) or by one strong link (4ti-0794) to make the strip more rigid and help reduce any chance of spillage
- Each cap is separately joined to a tube to avoid any possible cross contamination

### 8 Well PCR Tube Strips, With Attached Caps

0.1 ml or 0.2 ml wells, clear polypropylene, with attached domed or flat optically clear caps

0.1 ml (working volume: <100 µl, total well capacity: 200 µl)  
0.2 ml (working volume: <200 µl, total well capacity: 300 µl)

Code	Details	Strips/Case
4ti-0792	0.2 ml wells, with flat optical caps	120
4ti-0793	0.1 ml wells, with flat optical caps	120
4ti-0794	0.2 ml wells, with domed caps	120

## 4 Well PCR Tube Strips, Rotor-Gene® Style, With Caps



### Features

- Optically clear strips ideally suited for qPCR
- Frosted cap extensions allow for easy handling and labelling
- Designed for Qiagen/Corbett Rotor-Gene® instruments

### 4 Well PCR Tube Strips, Rotor-Gene® Style, With Caps

0.1 ml wells, clear polypropylene, with strips of 4 caps, working volume: <100 µl, total well capacity: 200 µl

Code	Details	Strips/Case
4ti-0796	clear	250

## Individual PCR Tubes, With Attached Caps



### Features

- Suitable for all standard 0.2 ml block thermal cyclers
- Snap-shut cap design
- Also available with unique 2D coded flat cap



### Individual PCR Tubes, With Attached Caps

Standard profile, 0.2 ml wells, polypropylene, working volume: <200 µl, total well capacity: 300 µl

Code	Details	Tubes/Case
4ti-0790	With flat optical cap	1 000
4ti-0790/2D	With flat 2D coded cap	960
4ti-0795	With domed cap	1 000



### 2-Component 8 Well PCR Tube Strips, see page 16

Our FrameStrip® PCR tube strips are a unique two-component design, with thin walled polypropylene tubes for efficient heat transfer and a frame moulded from polycarbonate. This gives a rigid tube strip for easy and reliable handling which can be 2D coded and is available in various colours.

# Tear-A-Way™ PCR Plates

## Dividable Standard PCR Plates

### Tear-A-Way™ PCR Plates

Tear-A-Way™ plates allow for the most flexible, efficient and cost-effective use of a PCR plate. Avoid the costly use of half-empty plates or the fiddly separation of plates with scissors. Cutting plates can damage wells and sealing rings, risking evaporation and sample contamination.

Based on our standard non-skirted PCR plate (4ti-0750), Tear-A-Way™ plates can be quickly and easily divided along the perforations between the rows. The correct number of wells can be separated off for each experiment, saving time and costs.

The Tear-A-Way™ PCR plate is available perforated either in the vertical direction, tearing into 8 well strips, or in the horizontal direction, tearing into 12 well strips. Both Tear-A-Way™ versions maintain all the benefits of our standard non-skirted PCR plate, but with increased flexibility.

- Allows for the most flexible and efficient use of a PCR plate  
No need to run half-empty plates, so reducing costs
- Plate is perforated to enable accurate tearing into either 8 well or 12 well strips -  
No tricky cutting of plates with scissors risking perforating wells, damaging sealing rings and contamination
- Black grid reference on all strips – No sample identification errors
- Non-skirted plates – Universal cycler and sequencer compatibility
- 8 well version is easily divided into 24 and 48 well plates to fit a 24 or 48 well thermal cycler block
- 12 well version perfectly suited for gradient cyclers
- White version available for superior qPCR performance

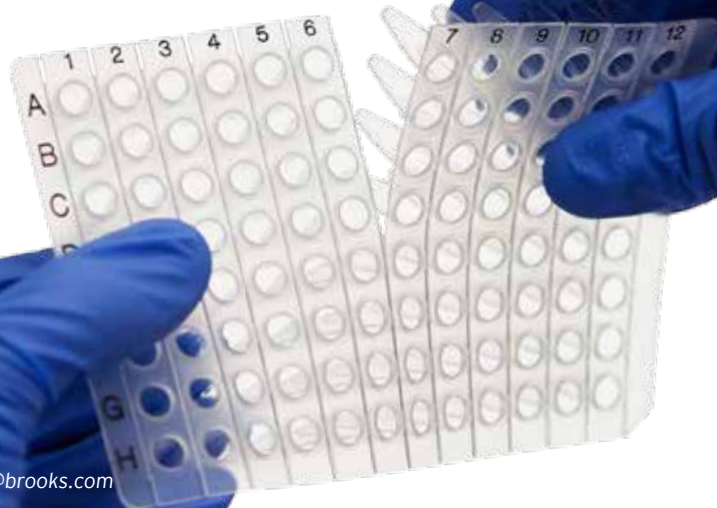


**Figure 17:** Tear-A-Way™ 96/12 PCR Plates allow you to make full use of your gradient PCR instruments. The temperature gradient is typically created along the horizontal direction of the block, thus 12 well strips or sections are ideal.

#### How trustworthy are your scissors?

Scissors are widely used by everyone in the lab for cutting diverse materials and are typically highly contaminated with substances including bacteria and DNA.

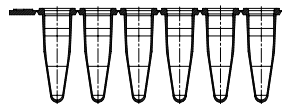
Cutting PCR plates with scissors should be avoided as it may lead to contamination of the wells.



Horizontally or vertically perforated versions.

Easily dividable into part plates and individual strips, 8 well or 12 well, for highest flexibility.

## Tear-A-Way™ 96/8 PCR Plate



### Features

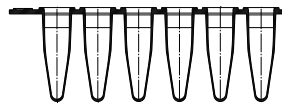
- Vertically perforated, tears easily into strips of 8 tubes or part plates
- Universal cycler and sequencer compatibility
- Easily divided into 24 and 48 well plates to fit a 24 or 48 well thermal cycler block

### Tear-A-Way™ 96/8 PCR Plate

96 well non-skirted PCR plate, vertically perforated, standard profile, 0.2 ml wells, polypropylene, cut corner H12, working volume: <200 µl, total well capacity: 300 µl

Code	Details	Plates/Case
4ti-0750/TA	C clear	50
4ti-0750/W/TA	W white	50

## Tear-A-Way™ 96/12 PCR Plate



### Features

- Horizontally perforated, tears easily into strips of 12 tubes or part plates
- Universal cycler and sequencer compatibility
- Perfectly suited for gradient cyclers

### Tear-A-Way™ 96/12 PCR Plate

96 well non-skirted PCR plate, horizontally perforated, standard profile, 0.2 ml wells, polypropylene, cut corner H12, working volume: <200 µl, total well capacity: 300 µl

Code	Details	Plates/Case
4ti-0750/TA/12	C clear	50

Flexible plate formats require flexible seals.

Avoid wasting seals or the risk of contaminating your samples by the use of scissors.

8 well and 12 well seal strips (4ti-0500/8 and 4ti-0500/12) are available to seal your plate in individual rows.

Alternatively, 8 well cap strips are available in flat (4ti-0751 or 4ti-0783) or domed (4ti-0752 or 4ti-0782) cap format, our 12 well cap strips are available with flat caps only (4ti-0788).

For greatest optical clarity in sensitive qPCR assays, use our CrystalStrips™ (4ti-0755).

# 4titude® Sealing Solutions

## 4titude® Sealing Solutions

4titude® offers the widest range of plate sealing solutions available on the market. You can choose between sealing with strip caps, mats, lids, adhesive seals in strip or plate format, and heat seals in flexible formats up to plate size. The choice of an optimised sealing solution is particularly important for (q)PCR because thermal cycling can be associated with evaporation of reaction reagents.

Please see below for a brief overview of our sealing solutions for PCR plates and strips and refer to our webpage [www.4ti.co.uk/seal](http://www.4ti.co.uk/seal) or the **4titude® Sealing Solutions Product Overview brochure** for more details.

## Strips of Sealing Caps

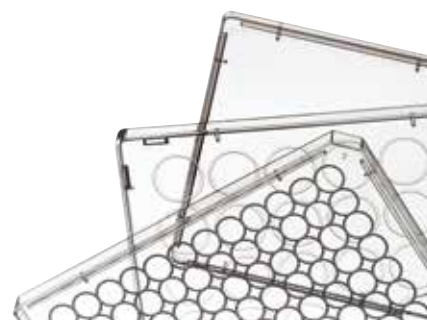
- Available in strips of 8 or 12, either domed or flat optical caps
- Universal fit for all 4titude® PCR tube strips and PCR plates
- CrystalStrips™ made of a special polymer with improved optical properties leading to high transmission rates, ideally suited for small samples with low signal intensity

Code	Details	Strips/Case
4ti-0751	Strips of 8 flat optical caps	300
4ti-0783	as above	125
4ti-0752	Strips of 8 domed caps	300
4ti-0782	as above	125
4ti-0755	CrystalStrip™, crystal clear strips of 8 flat optical caps	300
4ti-0755/125	as above	125
4ti-0788	Strips of 12 flat optical caps	200

## Rigid Polystyrene Plate Lids

- Protect samples from contamination and evaporation
- A variety of lids are available from our PCR Plate Lids & FrameStar® Lids (see below) and Microplate Lids product range

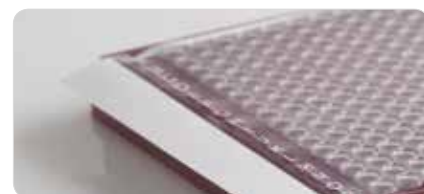
Code	Details	Lids/Case
4ti-0285	Ultra-Low Universal Lid, ultra-low profile, without condensation rings, non-sterile	100
4ti-0287	FrameStar® 96 NGS Lid, for use with 4ti-0960/RIG, with condensation rings, non-sterile	50
4ti-0288	PCR Plate Lid, low profile, without condensation rings, non-sterile	50
4ti-0289	FrameStar® 96 Lid, for use with 4ti-0770, without condensation rings, non-sterile	50



## Adhesive Sealing

4titude® offers the widest range of adhesive sealing solutions available on the market. You have the option to choose your seal based on a wide variety of properties offered including peelability, pierceability, gas permeability, optical clarity, temperature stability and solvent resistance.

Most of our adhesive sheet seals are supplied with convenient tabs on both ends for ease of application. These tabs enable easy peeling for seal removal and peelable seals leave the sealing surface residue free after removal. We also offer a number of our seals in various roll formats compatible with most roll sealers on the market, for ease of use or for automation.





# Highest flexibility to meet your application needs

## Example: PCR Seal

- Durable transparent polyester film with a strong adhesive layer, peelable
- Enables high integrity and efficiently prevents sample evaporation
- Recommended for PCR and other optical applications as well as sample storage
- Also available in two flexible formats as perforated sheets, to enable tearing into either 8 well or 12 well strips and as half plate seals to match the size of our FrameStar® 192 Well Semi-Skirted PCR Plate

Code	Details	Sheets/Case
4ti-0500	Sheets (135 x 80 mm)	100
4ti-0500/8	Vertically perforated for division into 12 strips of 8 wells, sheets (115 x 100 mm)	100
4ti-0500/12	Horizontally perforated for division into 8 strips of 12 wells, sheets (137 x 71 mm)	100
4ti-0500/HP	Half plate size sheets (70 mm x 80 mm)	100

## Example: qPCR Seal

- Clear, non-sticky film with a strong pressure-activated adhesive, peelable
- Recommended for qPCR and other imaging techniques including crystallisation
- Also available as half plate seals to match the size of our FrameStar® 192 Well Semi-Skirted PCR Plate

Code	Details	Sheets or Rolls/Case
4ti-0560	Sheets (140 x 77 mm)	100
4ti-0560/HP	Half plate size sheets (70 mm x 77 mm)	100
4ti-0561	Roll (100 m x 80 mm, approx. 700 seals)	1

## Heat Sealing

Heat sealing is the gold standard method of plate and tube sealing

- Superior sealing performance compared to cap, mat and adhesive sealing
- 100% complete seal prevents sample loss by evaporation - **maximum sample security**
- Prevents leakage and contamination
- Allows the use of smaller reagent volumes - **reagent cost savings**
- Available as sheets, for use with manual and semi-automated sealers, such as our 4s3™ Sheet Heat Sealer, and in multiple roll formats compatible with specified automated heat sealers, such as our a4S Roll Heat Sealer
- You have the option to choose your seal based on a wide variety of properties offered including peelability, pierceability, gas permeability, optical clarity, temperature stability and solvent resistance



## Example: Peel Heat Seal, for PCR

- Peelable laminate seal compatible with PP plates
- Can be removed from PP plates by peeling, even when plate has been removed directly from -80°C storage
- Suitable for very low temperature storage & high temperature uses
- Recommended for PCR

Code	Details	Sheets or Rolls/Case
4ti-0520	Roll (610 m x 78 mm, approx. 5,000 seals) <sup>1,5</sup>	1
4ti-0520/122	Roll (122 m x 78 mm, approx. 1,000 seals) <sup>1</sup>	1
4ti-0522	Roll (500 m x 115 mm, approx. 6,250 seals) <sup>2,5</sup>	1
4ti-0521	Sheets (125 mm x 78 mm)	100

## Example: Clear Heat Seal, for qPCR

- Optically clear, suitable for imaging and qPCR, peelable
- Suitable for imaging, fluorescence detection, and colorimetric assays
- Recommended for qPCR and other imaging techniques including crystallisation

Code	Details	Sheets or Rolls/Case
4ti-0540	Roll (500 m x 78 mm, approx. 4,200 seals) <sup>1,5</sup>	100
4ti-0540/80	Roll (80 m x 78 mm, approx. 640 seals) <sup>1</sup>	1
4ti-0540/REMP	Roll (500 m x 78 mm, approx. 4,200 seals) <sup>3</sup>	1
4ti-0542	Roll (350 m x 115 mm, approx. 4,400 seals) <sup>2,5</sup>	1
4ti-0542/REMP	Roll (350 m x 115 mm, approx. 4,400 seals) <sup>4</sup>	1
4ti-0541	Sheets (125 mm x 78 mm)	100

<sup>1</sup> Compatible with 4titude® a4S Automatic Roll Heat Sealer/Thermo Fisher ALPS 300™ and ALPS 3000™/KBiosystems Wasp™/KBioscience FlexiSeal and Cube; <sup>2</sup> Compatible with Agilent (Velocity 11) PlateLoc®; <sup>3</sup> Compatible with REM-P Portrait Heat Sealer (PHS); <sup>4</sup> Compatible with REM-P Landscape/Stacking Heat Sealers (LHS/SHS); <sup>5</sup> Sample rolls available



# Instrument Compatibility Table

			FrameStar® 2-Component PCR Plates								
Skirt			skirted			semi-skirted					
Number of wells			384	384	96	192	96	96	96	96	96
Standard/Low Profile			/	/	L	/	L	L	S	S	S
Details see page			8	8	9	8	9	10	10	10	11
Product code <sup>1</sup> /Short description			4ti-0384 FrameStar® 384	4ti-0380 FrameStar® 384 Roche	4ti-0960 FrameStar® 96	4ti-0192 FrameStar® 192	4ti-0950 & 4ti-0954 FrameStar® 96 Roche	4ti-0910 FrameStar® 96 FastPlate	4ti-0730 FrameStar® 96 ABI <sup>2</sup>	4ti-0770 FrameStar® 96 ABI <sup>2</sup>	4ti-0900 FrameStar® 96
<b>ABI® / LIFE TECHNOLOGIES / THERMO FISHER SCIENTIFIC</b>											
Thermal Cyclers	96 well standard block	Veriti, Proflex, Simplicamp							✓	4	
		GeneAmp® 2700 / 2720 / 9600 / 9700							✓	4	
	96 well FAST block	GeneAmp® 9800 FAST, Veriti FAST						4			
	384 well block	GeneAmp® 9700, Veriti, Proflex, Multiblock system	4			•					
qPCR Cyclers	96 well standard block	7000, 7300, 7500, 7700, 7900 HT							✓	4	
		QuantStudio™ 3 / 5 / 6 / 7 / 12K, ViiA7™							✓	4	
	96 well FAST block	StepOne									
		StepOne Plus™							4		
7500 FAST, 7900 HT FAST								4			
	384 well block	QuantStudio™ 3 / 5 / 6 / 7 / 12K, ViiA7™						4			
Sequencers	96 well block	3100, 3130XL, 3500, 3500XL, 3730, 3730XL							4	✓	
	384 well block	3100, 3130XL, 3500, 3500XL, 3730, 3730XL	4								
<b>AGILENT / STRATAGENE</b>											
Thermal Cyclers	96 well block	Surecycler 8800									
	384 well block	SureCycler 8800	4			•					
	96 well block	Robocycler Gradient			4						✓
qPCR Cyclers	96 well block	AriaMx			4						
		Mx3000P™, Mx3005P™								4	✓
		Mx4000™							✓	4	
<b>ANALYTIK JENA / BIOMETRA</b>											
Thermal Cyclers	Strips only	TRIO, Tpersonal, T3 Thermocycler									
	96 well block	Flexcycler2, T1 Thermocycler, Tgradient, Tone, Tadvanced, TProfessional (Standard/Basic) Gradient/XL			4					✓	✓
		Trobot 96, SpeedCycler2 (SP, SPR)			4					✓	✓
	384 well block	Flexcycler2, T1 Thermocycler, Tadvanced, TProfessional, Trobot 96	4			•					
qPCR Cyclers	96 well block	qTOWER <sup>3</sup> / G / touch, Optical								4	✓
	384 well block	qTOWER <sup>3</sup> 84 / 84G	4			•					
<b>BIOER TECHNOLOGIES</b>											
Thermal Cyclers	Strips only	GeneQ									
	96 well block	Gene Touch 96								4	✓
	384 well block	Gene Touch 384	4			•					
<b>BIO-RAD</b>											
Thermal Cyclers	Strips only	Genecycler									
	96 well block	C1000 Touch, S1000			4					✓	✓
		iCycler™, MyCycler™, T100								4	✓
	384 well block	C1000 Touch, S1000	4			•					
qPCR Cyclers	96 well block	CFX96 Touch, CFX96 Touch Deep Well, CFX connect			4						
	384 well block	MyiQ™, iCycler™ IQ / IQ 4 / IQ 5								4	✓
	384 well block	CFX384 Touch	4			•					
<b>BIO-RAD MJ RESEARCH</b>											
Thermal Cyclers	Strips only	Mini Gradient									
	96 well block	Personal									4
		PTC100™ / 200™ / 220™ / 221™ / 225™ / 240™				4				✓	✓
	384 well block	PTC200™ / 220™ / 221™ / 225™ / 240™	4			•					

<sup>1</sup> Short product code shown only (without details on frame and well colour), please refer to the corresponding product page for ordering details of all variations available.

<sup>2</sup> For compatibility information of the Vari-Plates™ please refer to the table entry for the respective Vari-Plate™ frame.

4 Recommended option ✓ Compatible • Should be compatible, please check with your specific instrument/block TA Compatible with separated Tear-A-Way™ Plates, only, please refer to page 22.

# Instrument Compatibility Table

FrameStar® PCR Plates, RA Plate, FrameStrips®									Standard PCR Plates and Strips																																
non skirted		Break-A-Way		Break-2-Ways		skirted	strips	skirted			semi-skirted			non	strips					strips																					
96	96	96	96	96	96	96	8	384	384	96	96	96	96	96	8	8	8	8	8	8	4																				
S	L	S	L	S	L	L	S	/	/	L	S	L	S	S	S	L	S	L	S	S	/																				
11	11	13	13	13	13	15	16	18	18	18	19	19	19	20/22	20	17	21	21	21	21	21																				
4ti-0710 FrameStar® 96		4ti-0720 FrameStar® 96		4ti-1000 FrameStar® Break-A-Way		4ti-1200 FrameStar® Break-A-Way		4ti-1300 FrameStar® Break-2-Ways		4ti-1400 FrameStar® Break-2-Ways		4ti-0960/RA Random Access 96		4ti-0785 & 4ti-0786 FrameStrip® 8 Well		4ti-1384 384 Well		4ti-1381 384 Well Roche		4ti-0740 96 Well		4ti-0760 96 Well		4ti-0955 96 Well Roche		4ti-0735 96 Well ABI®		4ti-0750 - 96 Well 4ti-0750/TA- dividable		4ti-0781 8 Well		4ti-0753 Vari-Strips™ 8 Well <sup>2</sup>		4ti-0792 8 Well, Attached Flat Caps		4ti-0793 8 Well, Attached Flat Caps		4ti-0794 8 Well, Attached Domed C.		4ti-0796 4 Well Rotor-Gene®	
✓		✓		✓			✓				✓		✓	✓	✓		✓		✓		✓																				
✓		✓		✓			✓				✓		✓	✓	✓		✓		✓		✓																				
			✓		✓																																				
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			✓		✓						✓		✓	✓	✓		✓		✓		✓																				
			✓		✓						✓		✓	✓	✓		✓		✓		✓																				
✓		✓		✓							✓		✓	✓	✓		✓		✓		✓																				
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			④		✓			✓						TA	✓		✓		✓		✓																				
✓		✓		✓				✓			✓			✓	✓		✓		✓		✓																				
✓		✓		✓				✓			✓			✓	✓		✓		✓		✓																				
✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓																				
			④		✓			✓						TA	✓		✓		✓		✓																				
✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓																				
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✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓																				

The individual instrument-plate compatibility information is for guidance only. Samples of all plates are available before purchase to ensure compatibility. Please check installed heat block, refer to instruments manual for details or contact our technical support.  
 4titude® recognises that designated trademarks and brands of the Instrument Compatibility Table are the property of their respective owners.

# Instrument Compatibility Table

			FrameStar® 2-Component PCR Plates								
			skirted			semi-skirted					
Skirt											
Number of wells			384	384	96	192	96	96	96	96	
Standard/Low Profile			/	/	L	/	L	L	S	S	
Details see page			8	8	9	8	9	10	10	11	
Product code <sup>1</sup> /Short description			4ti-0384 FrameStar® 384	4ti-0380 FrameStar® 384 Roche	4ti-0960 FrameStar® 96	4ti-0192 FrameStar® 192	4ti-0950 & 4ti-0954 FrameStar® 96 Roche	4ti-0910 FrameStar® 96 FastPlate	4ti-0730 FrameStar® 96 ABI <sup>2</sup>	4ti-0770 FrameStar® 96 ABI <sup>2</sup>	
<b>BIO-RAD MJ RESEARCH</b> <i>continued</i>											
qPCR Cyclers	Strips only	MiniOpticon									
	96 well block	Chromo4™ Opticon2™			4					✓	
<b>CORBETT RESEARCH</b>											
Thermal Cyclers	96 well block	(Qiagen) Palm Cycler								4	
	384 well block	(Qiagen) Palm Cycler 384	4			•				✓	
qPCR Cycl.	Strips only	Rotor-Gene series									
<b>EPPENDORF</b>											
Thermal Cyclers	96 well block	MasterCycler® ep / ep gradient / Pro / Pro S / nexus / nexus gradient / nexus SX1 / nexus GSX1 MasterCycler® nexus X2 / GX2 / GX2e / X2e			4					✓	
	384 well block	MasterCycler® ep 384 / Pro 384	4			•					
qPCR Cycl.	96 well block	Mastercycler™ ep realplex			4					✓	
<b>GE HEALTHCARE / AMERSHAM</b>											
Sequencers	96 well block	MegaBACE™ 500, MegaBACE™ 1000 mark 2			4						
	384 well block	MegaBACE™ 4000	4			•					
<b>PEQLAB / VWR</b>											
Thermal Cyclers	Strips only	peqSTAR XS, peqSTAR 2X									
	96 well block	peqSTAR 96X			4					✓	
	384 well block	peqSTAR 384X	4			✓				✓	
<b>ROCHE</b>											
qPCR Cyclers	96 well block	LC96, LC480					4				
	384 well block	LC480		4							
	Strips only	Nano									
<b>SENSOQUEST</b>											
Thermal Cyclers	96 well block	Labcycler			✓			✓	✓	✓	
	192 well block	Labcycler				✓					
	384 well block	Labcycler	4			•					
<b>TAKARA</b>											
Thermal Cycl.	96 well block	Dice touch, Gradient							4	✓	
<b>TECHNE</b>											
Thermal Cyclers	Strips only	3Prime, 3PrimeG, 3PrimeX									
		Prime, PrimeG, Prime Elite, Prime Elite Satellite							4	✓	
	96 well block	PCRmax Alpha cyclers 1 / 2 / 4							4	✓	
		TC412, TC512, Genius, Genius Quad, Touchgene, Touchgene Gradient, Flexigene			4					✓	✓
		Prime, PrimeG, Prime Elite, Prime Elite Satellite	4			•					
384 well block	PCRmax Alpha cyclers 1 / 2 / 4	4			✓						
	TC412, TC512, Genius, Genius Quad, Flexigene	4			✓						
qPCR Cycl.	96 well block	Quantica			4						

<sup>1</sup> Short product code shown only (without details on frame and well colour), please refer to the corresponding product page for ordering details of all variations available.

<sup>2</sup> For compatibility information of the Vari-Plates™ please refer to the table entry for the respective Vari-Plate™ frame.

4 Recommended option ✓ Compatible • Should be compatible, please check with your specific instrument/block TA Compatible with separated Tear-A-Way™ Plates, only, please refer to page 22.





# Custom Capabilities

We are your ideal partner for diagnostic kit components

## Custom Capabilities for OEM Diagnostic Kit and Medical Device Manufacturing

Our management team brings decades of development expertise to any custom project. Our experience in working with partners worldwide has placed us as the company of choice for introducing practical solutions to changing workflows, using innovative design and bespoke manufacture.

Our commitment to quality is reflected in our ISO certified management system which is applied at all levels, from manufacture, to technical support, to packaging and delivery.

4titude® has an integrated quality management system where products undergo a wide range of QC inspections. We constantly perform visual, physical and biological tests to ensure both the absence of contaminants, as well as the integrity of the products. Our DIN EN ISO 9001:2008 and ISO 13485:2012 certifications are endorsements of our excellent manufacturing practices.

The ultimate quality of any product is dependent not only on the design of the component to be produced, but also the accuracy, construction and precision of the tooling and manufacturing processes.

4titude®'s highly skilled engineers have extensive knowledge and experience in the design and manufacture of precision components for the life science industry.

By working with our in-house engineers we can offer a completely integrated project management service to ensure there is a smooth transition from initial project idea through to finished product. We aim to help enhance end products, reduce overall part and production costs, and streamline assembly within manufacturing. Whatever your custom requirement, you will receive ongoing support and advice from a designated sales contact, our QC department and Customer Services team.

**We understand the costs and complexities involved with OEM products and would be happy to discuss a range of solutions for your project. Please contact us to discuss your specific requirements in detail and complete confidence.**



### Custom and OEM Services Overview

- Product design and manufacturing for injection-molded parts
- Instrumentation design and manufacture: Heat sealers, press tools, cutters, liquid handling instrumentation
- Heat and adhesive sealing: Custom material design and manufacture
- Sample tracking solutions: Custom applications and specifications for linear and 2D coding
- Surface treatment options
- Sterilisation options
- Packaging choices
- Specified QC procedures



# 4titude<sup>®</sup> Product Portfolio

## 2-Component PCR Consumables, including

- FrameStar<sup>®</sup> 384/192/96 well PCR plates
- FrameStar<sup>®</sup> Break-A-Way and Break-2-Ways dividable PCR plates
- Random Access Plates - plates with 96 individually removable wells
- FrameStrip<sup>®</sup> 2-component PCR tube strips

## Sealing solutions, including

- Heat sealing consumables
- Heat sealing instrumentation
- Adhesive sealing consumables
- Cap Strips, Lids & Mats

## Standard PCR Consumables, including

- 384/96 well PCR plates
- Tear-A-Way<sup>™</sup> dividable 96 well plates
- 96 well plate segments of 8 to 48 wells
- 8 well PCR tube strips - standard/low profile, without/with attached caps
- 4 well PCR tube strips
- Individual tubes

## Processing options

- Barcoding, including linear Code 128 barcodes, 2D codes & custom solutions - enhance sample traceability and identification
- Ethylene Oxide Treatment for complete removal of any amplifiable DNA - for forensic applications
- Low Binding Products made of selected low bind polymers for sensitive applications such as Next Generation Sequencing sample preparation

## Instrumentation

- TubeMarker<sup>™</sup> 2 - designed to directly print text, linear barcodes, 2D codes and graphics on plastic laboratory tubes
- 4LAB<sup>™</sup> - automated, high-precision low volume pipetting system,
- Heat Sealing instrumentation - 4s3<sup>™</sup> Semi-Automatic Sheet Heat Sealer/a4S Automatic Roll Heat Sealer/a4S<sup>RA</sup> Random Access Automatic Heat Sealer
- Hand Held Barcode Scanner & Barcode Rack Scanner
- Plate cutter - air pressure operated, semi-automatic instrument, to be used to create strips or partial plates from e.g. FrameStar<sup>®</sup> Break-A-Way plates

## Microplates, including

- Storage and reservoir plates - polypropylene, 384/96 wells, round/square wells, flat/U-shaped/V-shaped bottom
- Assay plates - solid flat bottom wells, 384/96/24 wells, black/white/clear polystyrene
- Vision Plates<sup>™</sup> - clear flat bottom wells, 384/96/24 wells, black polystyrene

## License Statement and Trademarks

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