

PCR and Molecular Biology

Certified quality products for (q)PCR





SARSTEDT has developed and manufactured high-quality products for medical and scientific applications since 1961.

On the following pages you will discover our extensive range of molecular biology products and find additional useful tips to help you further optimize the PCR reaction process.

To ensure the consistent high quality of our products, we place great emphasis on:

- Carefully considered product and tool design to ensure uniform wall thickness
- Selection of high-quality raw materials (e.g. medical grade materials)
- Automated production under clean room conditions
- Stringent quality controls (e.g. 100% leakproofness tests)
- ISO 13485-certified quality management system
- A highly trained workforce

Together, this is how we achieve our outstanding product quality.

In addition to our standard product range, we offer high-performance products that are manufactured using the latest technology. Examples include products that have low-binding properties for certain biomolecules or that consistently display the very highest purity levels. For special requirements, we also manufacture products that are customized to meet individual customer needs. If you are interested, please do not hesitate to contact us directly.

Your SARSTEDT team

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Get started right away – with the highest purity!

Clean room conditions, trained staff in protective clothing and automated production processes are the basic requirements for SARSTEDT's certified quality standards.

We use an independent laboratory to regularly carry out thorough quality controls. As a result, the consumables we offer can be used reliably without additional costs.

Today, the process of autoclaving consumables is still common practice for some. Many people confuse sterile products with DNA-free ones. However, sterilization does not remove unwanted biomolecules such as DNA, RNases or pyrogens. An even more serious problem, however, is that products can become contaminated through autoclaving. Consistent

separation of clean consumables from autoclaves for sterilizing laboratory waste rarely works in the long term. In the steam-saturated environment of autoclaves, plasmids or RNases are easily transferred from previously autoclaved laboratory waste to consumables that are actually clean.

So, why not spare yourself this additional hazardous task and get started right away with SARSTEDT certified high-purity consumables?

The quality of PCR plastic consumables is important – our pioneering product standards ensure reliable performance in all (q)PCR applications

Throughout our PCR-focused manufacturing process, we take into account essential parameters that affect the quality of PCR plastic consumables. This starts with precision engineering in design and construction. After all, only precisely manufactured tools can produce highly uniform plastic consumables with uniform wells that minimize data variability. Our products are manufactured in ultraclean production units using automated processes. We implement thorough cleaning procedures, because even the smallest residual traces of chemicals could inhibit PCR amplification. From design through to final packaging, our product process is highly automated and takes place under controlled conditions, in plant complexes protected by laminar flow technology.

Only selected raw materials of the highest purity and quality are used to manufacture SARSTEDT products. These materials meet the standards of numerous international guidelines and norms (primarily medical grade). We only choose suppliers

who endorse our philosophy of maximum quality. And of course, we do not use additives such as bisphenols, or any biocides. To get the most out of SARSTEDT products, all materials have been carefully selected for their particular intended application and specially validated.

Effective quality controls, such as leak testing of each individual well and verification of product geometry, augment our production standards. In particular, our quality consistency, which ensures we always produce uniform wall thicknesses, means you can rest assured that your PCR results will always be accurate and reproducible.

Maximum purity and reliability for highly sensitive analyses

PCR Performance Tested



SARSTEDT's purity certification "PCR Performance Tested" was specially developed for nucleic acid analytics. All products certified as PCR Performance Tested are tested by an independent laboratory and are free

from human and bacterial DNA, DNases & RNases, and PCR inhibitors. Additional testing for PCR inhibitors is important to us, because any additives that are used during the manufacture of consumables can have a PCR inhibitory effect.

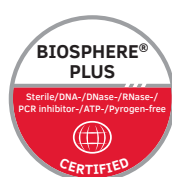
In addition, many substances that can easily be introduced into your precious samples have a strong inhibitory effect on the PCR reaction. Well-known examples are hemoglobin and ethanol, which is often used to isolate nucleic acids. However, many PCR inhibitors are largely unknown. For example, sputum samples often have a PCR inhibitory effect, but the constituents responsible for this effect have not yet been identified. The effect of PCR inhibitors is particularly serious if the inhibitory effect differs between different target genes (e.g. if the amplification of a housekeeping gene is affected less or more than the amplification of another gene of interest that is being analyzed in parallel). Subsequently it is best to only use consumables that have been tested for the absence of PCR inhibitors.

When working with RNA, the ubiquitous RNases are always a challenge. Unlike the related DNases, many RNases do not need any co-factors such as Mg^{2+} in order to be active. In addition, RNases are very stable and are able to fold themselves back into their original conformation when heated.

We guarantee that our PCR Performance Tested products meet the following threshold values:

Human DNA	< 0.5 pg / μ l
Bacterial DNA	< 0.02 pg / μ l
DNase	< 1×10^{-5} U / μ l
RNase	< 1×10^{-9} Kunitz units / μ l
PCR inhibitors	< 0.5 cycles
	C_t value shift

Biosphere® plus – our additional security guarantee



More and more applications require the absolute guaranteed absence of DNA and other biomolecules. For these needs, SARSTEDT's Biosphere® plus-certified products undergo an additional validated decontamination

process. A treatment with ethylene oxide (EtO) is used, which destroys all possible traces of DNA and other biomolecules and sterilizes the products. Further tests to verify the absence of pyrogens and ATP (tip: important in luminescence-based assays) complete our Biosphere® plus certification.

To ensure that you can reliably rule out the possibility of even the slightest contamination, we guarantee that our Biosphere® plus-certified products meet the following threshold values:

Human DNA	< 5.0 fg / μ l
Bacterial DNA	< 0.2 fg / μ l
Sterility validated according to	ISO 11135
ATP	< 1×10^{-12} mmol / μ l
Pyrogens/endotoxins	< 0.002 EU / ml
DNase	< 5×10^{-7} U / μ l
RNase	< 5×10^{-11} Kunitz units / μ l
PCR inhibitors	< 0.5 cycles
	C_t value shift

Optimized sensitivity and improved reproducibility

Particularly when using smaller volumes, fluorescence-based applications such as real-time PCR (qPCR) benefit from the significantly superior reflective properties of white PCR consumables. The opaque coloring ensures fluorescent light is not lost through the walls, and the reflection of the optimized white dye keeps the quantity of fluorescent light reaching the detector more constant than when transparent products are used. Accordingly, this results in substantially less variation when performing repeated experiments or applying duplicates and triplicates.

The higher fluorescence level of white PCR consumables and consistent background effects of the fluorophore used help achieve a superior signal-to-background ratio. The opaque white coloring also prevents the detection of scattered fluorescent light from neighboring wells and thus the worse-case scenario of a false-positive detection.

However, the biggest advantage is that sensitivity is substantially superior in white PCR consumables than in transparent materials. Fig. 1 shows that the measured fluorescence intensity for the same template and enzyme quantity is significantly higher in white vessels than in transparent ones. In addition, the C_t value actually reduces from 24.87 ± 0.08 (transparent) to 23.40 ± 0.07 (white), which shows that the detection of 1000 template molecules occurs sooner in white vessels. This is another big advantage, particularly if only very small amounts of the starting material are available.

Consequently, switching from transparent to white PCR consumables also achieves a cost-effective volume reduction in experiments. Thus, the quantity of reagents used (enzyme, probe, primer, etc.) can be substantially reduced, lowering reagent costs.

Comparison of fluorescence level of white and transparent wells

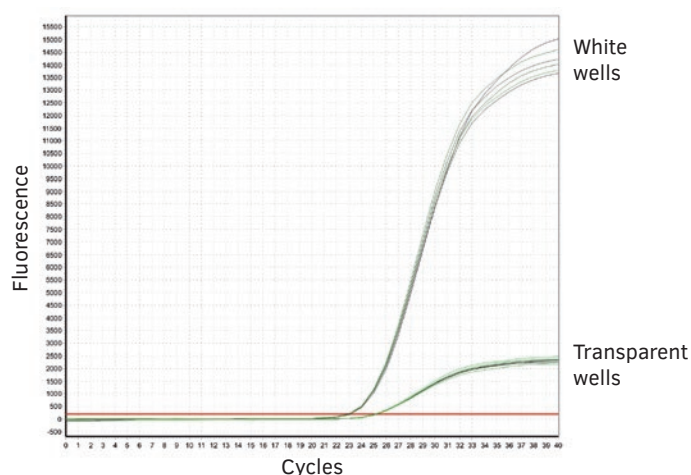


Fig. 1: Comparison of fluorescence value of product 72.985.002 (transparent) and 72.985.092 (white), both sealed with high-transparent lid strip 65.989.002. A 100 bp fragment of EmGFP plasmid (template quantity 1000 molecules) was amplified in a volume of 20 μ l using the Eppendorf realplex 4S Thermocycler (n=8).

DNA & protein low binding – for maximum sample recovery

The trend towards ever smaller sample volumes is making it more important to minimise any interaction between analytes and vessels. In addition, the increasing use of PCR consumables for other applications often requires maximum sample recovery. In particular, when preparing and storing (low-concentrate) nucleic acid samples and when making dilution series, great importance is attached to ensuring that all biomolecules can be recovered from the cavities.

In mass spectrometry analysis of proteins and peptides, in which glass vials and standard PP vessels are usually used, loss of peptides and proteins is a well-known phenomenon. By using low protein binding products, substantially more protein and peptide can be recovered for subsequent analyses. Any enzymes used also remain active, because the surface of low protein binding products also reduces enzyme denaturation caused by interaction with the vessel wall. As soon as the protein concentration falls below a critical level, it is usually no longer possible to perform reliable protein analysis with standard reaction vessels. Low protein binding

products also provide maximum reliability for immunoprecipitation, purification or isolation of proteins and for storage of protein, peptide and antibody samples.

The low binding properties of our products for nucleic acids or peptides/proteins are the result of using special raw materials and a special physical treatment. And of course, these special properties are not achieved by using layers of silicon or similar materials.

We offer products with low DNA and low protein binding properties that have been manufactured using the latest technology.

Protein low binding – comparison of protein losses:

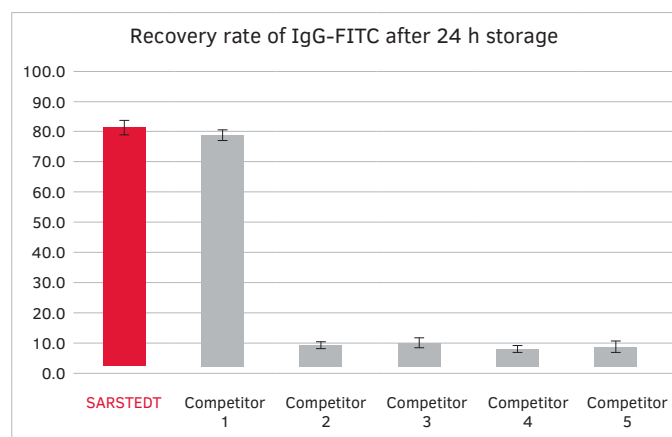


Fig. 2: 8x 125 µl of an IgG-FITC conjugate solution (1.0 µg/ml in PBS; Sigma Aldrich, item no F9636) were stored for 24 hours in low protein binding products from SARSTEDT and five competitors. After incubation, 100 µl from each vessel was transferred to black ELISA plates (SARSTEDT, item no 82.1581.220), which had been blocked beforehand for at least 2 h using 1x Roti Block (Carl Roth, item no A151.4), and were measured in the Infinite 200 pro (Tecan) plate reader. The experiment was repeated on three consecutive days. Unlike most of the tested competitor products, storage in the SARSTEDT low protein binding products did not result in a significant loss of protein. One competitor product also showed a high recovery rate.

DNA low binding – comparison of DNA losses:

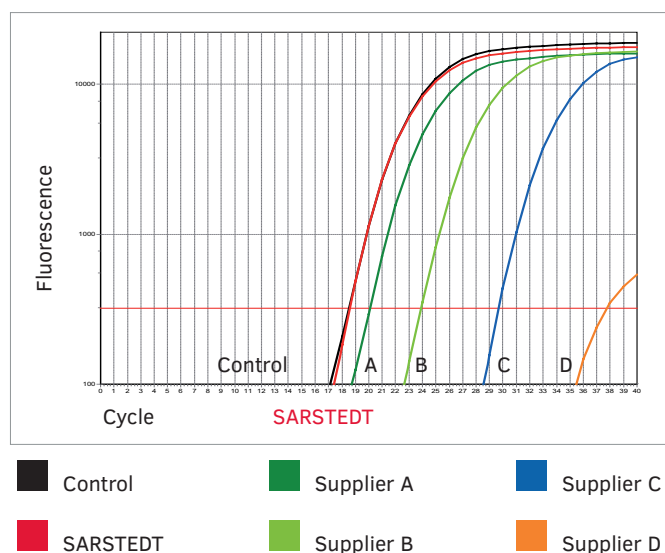


Fig. 3: Ten test tubes from various suppliers were filled with 100 µl of a plasmid DNA solution (concentration: 10⁴ copies/µl) and shaken at 37 °C.

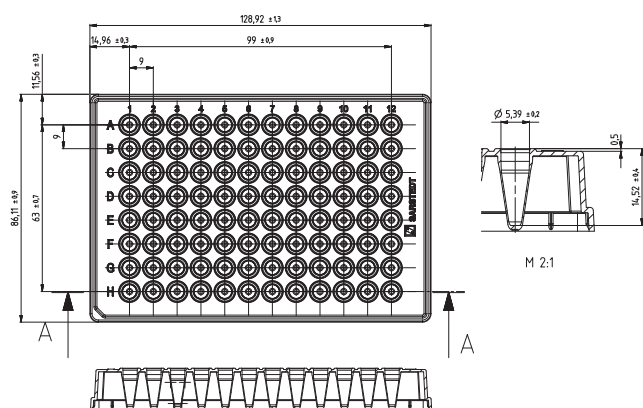
After an incubation period of 3 hours, the DNA content was determined using real time PCR. One of the 10 test series is shown in this diagram as an example.

Multiply[®] PCR plates by SARSTEDT – maximum reliability





PCR plates with skirt – maximum efficiency and reduced variability



PRODUCT INFORMATION

- > Profile: Low profile
- > Maximum well volume: 0.1 ml
- > Cutaway corner: H1

Features and benefits

- Highly uniform and thin well walls ensure consistently even and quickest possible transfer of heat. This guarantees reliable and reproducible results.
- ANSI/SLAS-compliant dimensions enable ready use in automated systems.
- Raised well rims protect against cross contamination and facilitate secure sealing with films and foils, thus preventing evaporation loss.
- Black alphanumeric labeling facilitates sample identification and traceability during manual filling.
- Production under clean room conditions and independently conducted biological tests allow for outstanding PCR Performance Tested and Biosphere® plus purity certifications.
- Testing of each individual well for 100% leakproofness ensures maximum security for valuable samples.
- Plates can be stacked safely and securely, enabling efficient use of space if storage is limited.

96-well PCR plate with skirt

Description	Color	Purity	Packaging (SP/IB/OC)	Order no
96-well PCR plate with skirt	<input checked="" type="checkbox"/>		10 / 100	72.1980
96-well PCR plate with skirt	<input checked="" type="checkbox"/>		1 / 20	72.1980.201
96-well PCR plate with skirt	<input type="checkbox"/>		10 / 100	72.1980.010
96-well PCR plate with skirt, DNA Low Binding	<input checked="" type="checkbox"/>		10 / 100	72.1980.700

Key

Colour

- ☐ White
- ☒ Transparent

Packaging

- SP smallest sub-packaging of an article
- IB Inner box, the SP is packed in the IB
- OC Outer carton, the outer carton is usually also the minimum order quantity

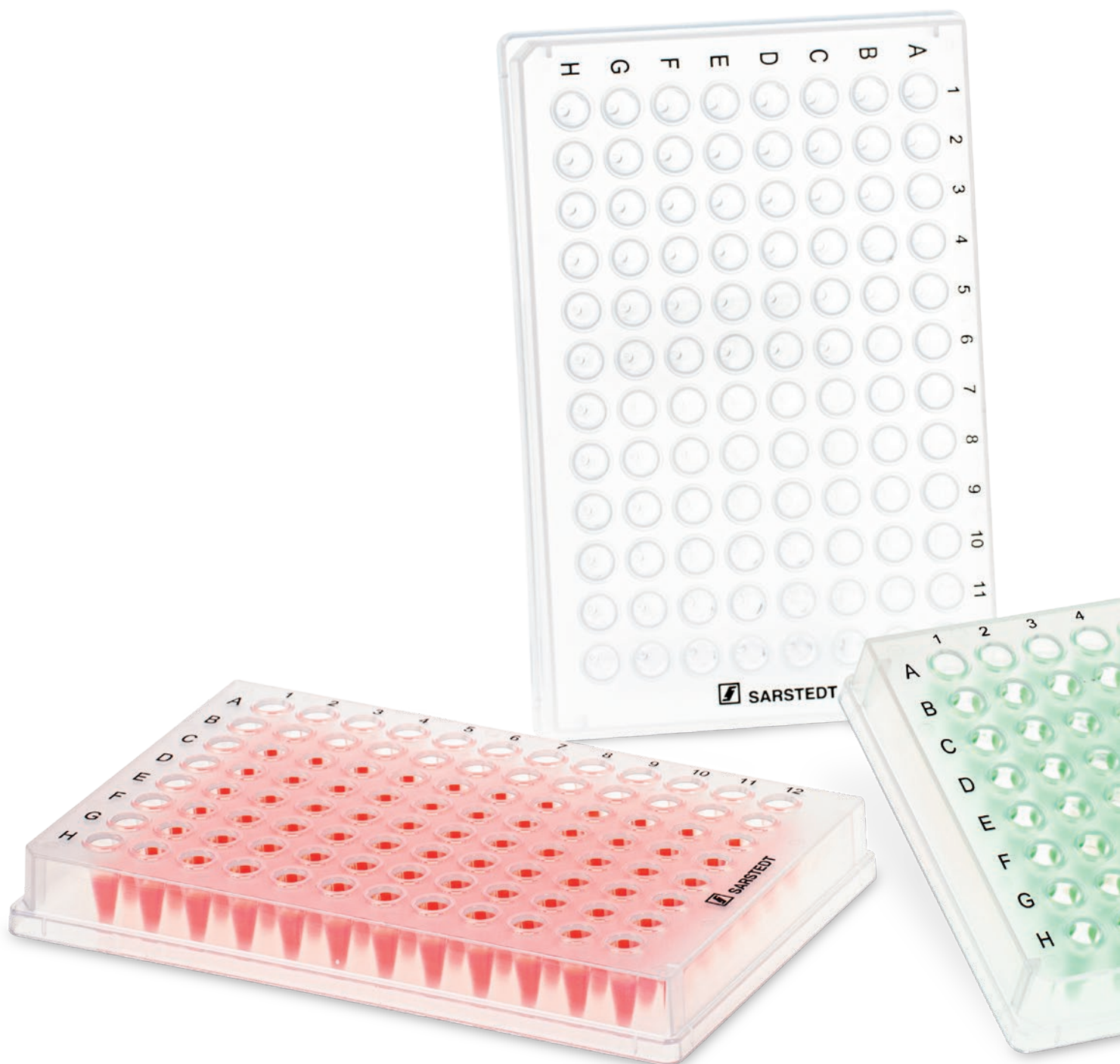
Other colors and barcoded variants available on request.
Suitable lid strips and sealing films and foils can be found on pages 24–27.

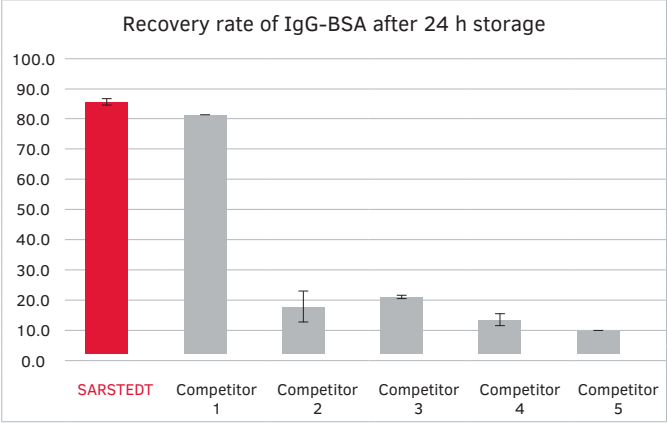


Protein low binding PCR plate with skirt

In mass spectrometry analysis using glass vials and standard PP vessels, loss of peptides and proteins is a well-known phenomenon. As soon as the protein concentration falls below a critical level, it is usually no longer possible to perform reliable protein analysis with standard reaction vessels. Subsequently SARSTEDT low protein binding 96-well plates



with skirt for sample preparation/input and for storing extremely small sample quantities in the minus temperature range (-20°C to -80°C). In addition, the plates are ideally suited for immunoprecipitation, purification or isolation of proteins and for storing protein, peptide and antibody samples.

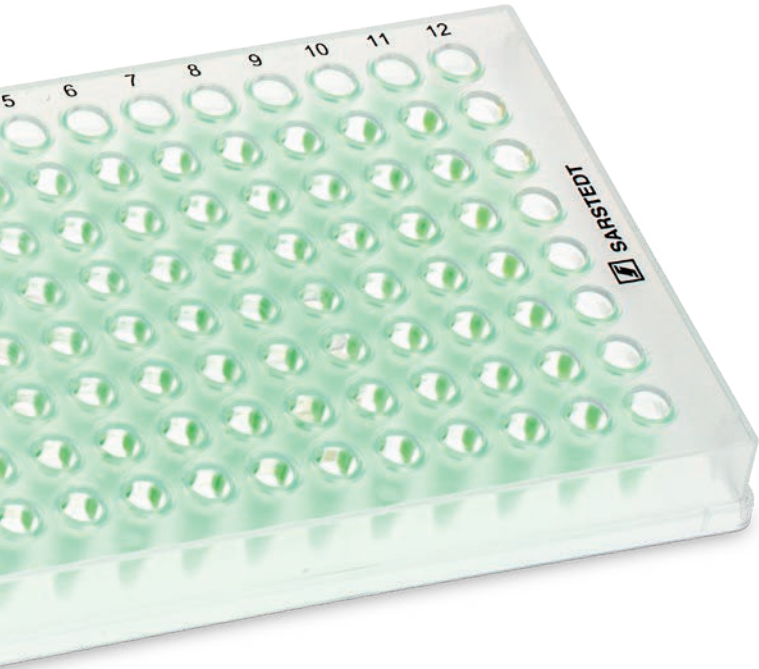




8x 125 µl of a BSA-FITC conjugate solution (1.0 µg/ml in PBS; ThermoFisher Scientific, item no A23015) were stored for 24 hours in low protein binding products from SARSTEDT and five competitors. After incubation, 100 µl from each vessel was transferred to black ELISA plates (SARSTEDT, item no 82.1581.220), which had been blocked beforehand for at least 2 h using 1x Roti Block (Carl Roth, item no A151.4), and were measured in the Infinite 200 pro (Tecan) plate reader. The experiment was repeated on three consecutive days. Unlike most of the tested competitor products, storage in the SARSTEDT low protein binding products did not result in a significant loss of protein. One competitor product also showed a high recovery rate.

96-well PCR plate with skirt

Description	Color	Purity	Packaging (SP/IB/OC)	Order no
96-well PCR plate with skirt, Protein Low Binding	☒		10 / 100	72.1980.600
PCR 8-lid strips	☒		120 / 480	65.989.002

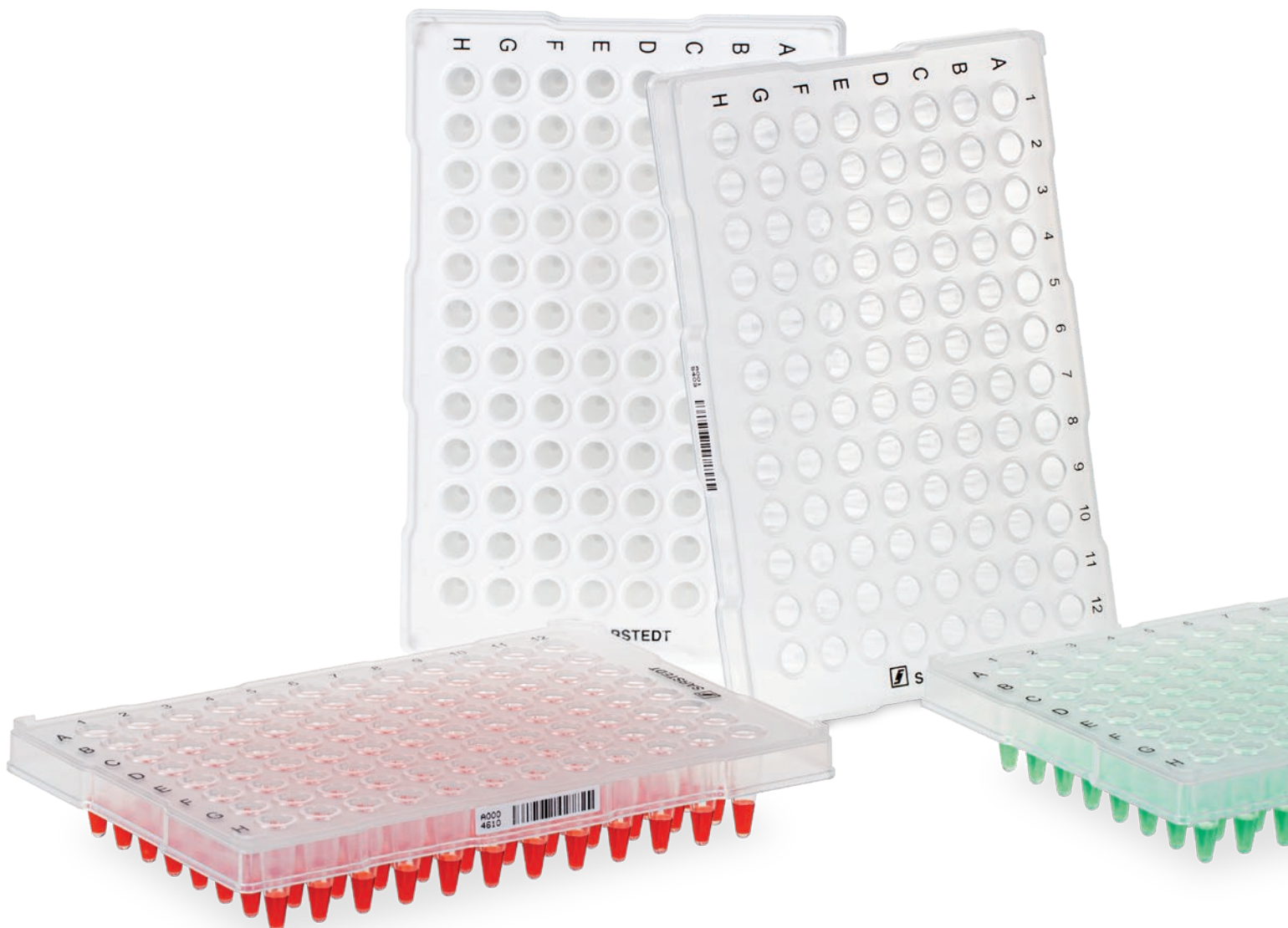
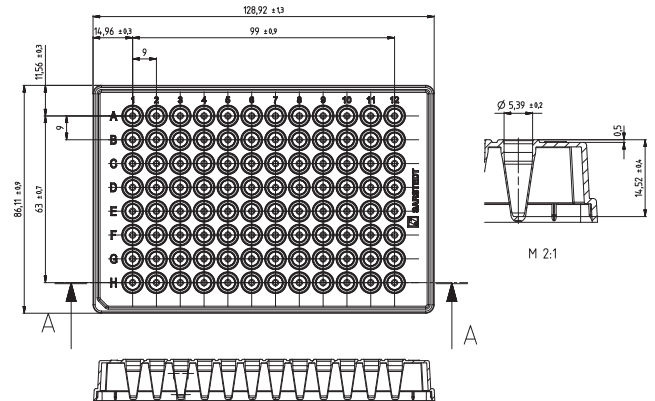


Tip

We recommend using the compatible lid strips 65.989.002 to seal stored samples.



PCR plates with half skirt – high profile



PRODUCT INFORMATION








- > Profile: High profile
- > Maximum well volume: 0.2 ml
- > Cutaway corner: A12

Features and benefits

- Highly uniform and thin well walls ensure consistently even and quickest possible transfer of heat. This guarantees reliable and reproducible results.
- Raised well rims protect against cross contamination and facilitate secure sealing with films and foils, thus preventing evaporation loss.
- Black alphanumeric labeling facilitates sample identification and traceability during manual filling.
- Production under clean room conditions and independently conducted biological tests allow for outstanding PCR Performance Tested and Biosphere® plus purity certifications.
- Testing of each individual well for 100 % leakproofness ensures maximum security for valuable samples.
- Plates can be stacked safely and securely, enabling efficient use of space if storage is limited.



96-well PCR plate with half skirt

Description	Color	Purity	Packaging (SP/IB/OC)	Order no
96-well PCR plate with half skirt	<input checked="" type="checkbox"/>		10 / 50 / 100	72.1979
96-well PCR plate with half skirt	<input checked="" type="checkbox"/>		1 / 10 / 20	72.1979.201
96-well PCR plate with half skirt	<input type="checkbox"/>		10/ 50 / 100	72.1979.010
96-well PCR plate with half skirt & Barcode	<input checked="" type="checkbox"/>		10 / 50 / 100	72.1979.003
96-well PCR plate with half skirt, DNA Low Binding	<input checked="" type="checkbox"/>		10 / 50 / 100	72.1979.700
96-well PCR plate with half skirt and flat deck	<input checked="" type="checkbox"/>		5 / 25 / 100	72.1979.102
96-well PCR plate with half skirt and flat deck	<input type="checkbox"/>		5 / 50 / 100	72.1979.132

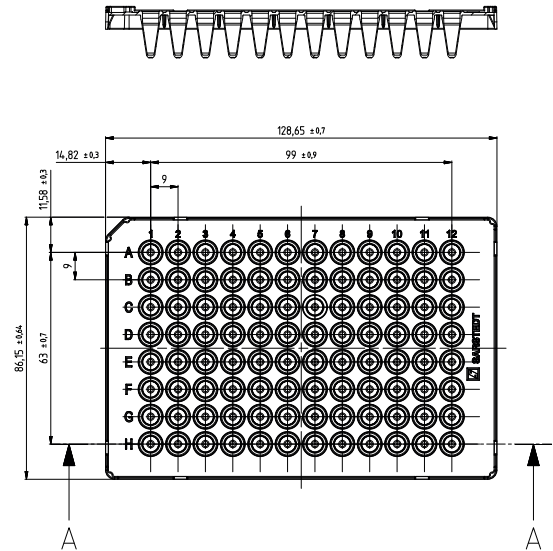
Other colors and barcoded variants available on request.
Suitable lid strips and sealing films and foils can be found on pages 24–27.



PCR plates with half skirt – low profile

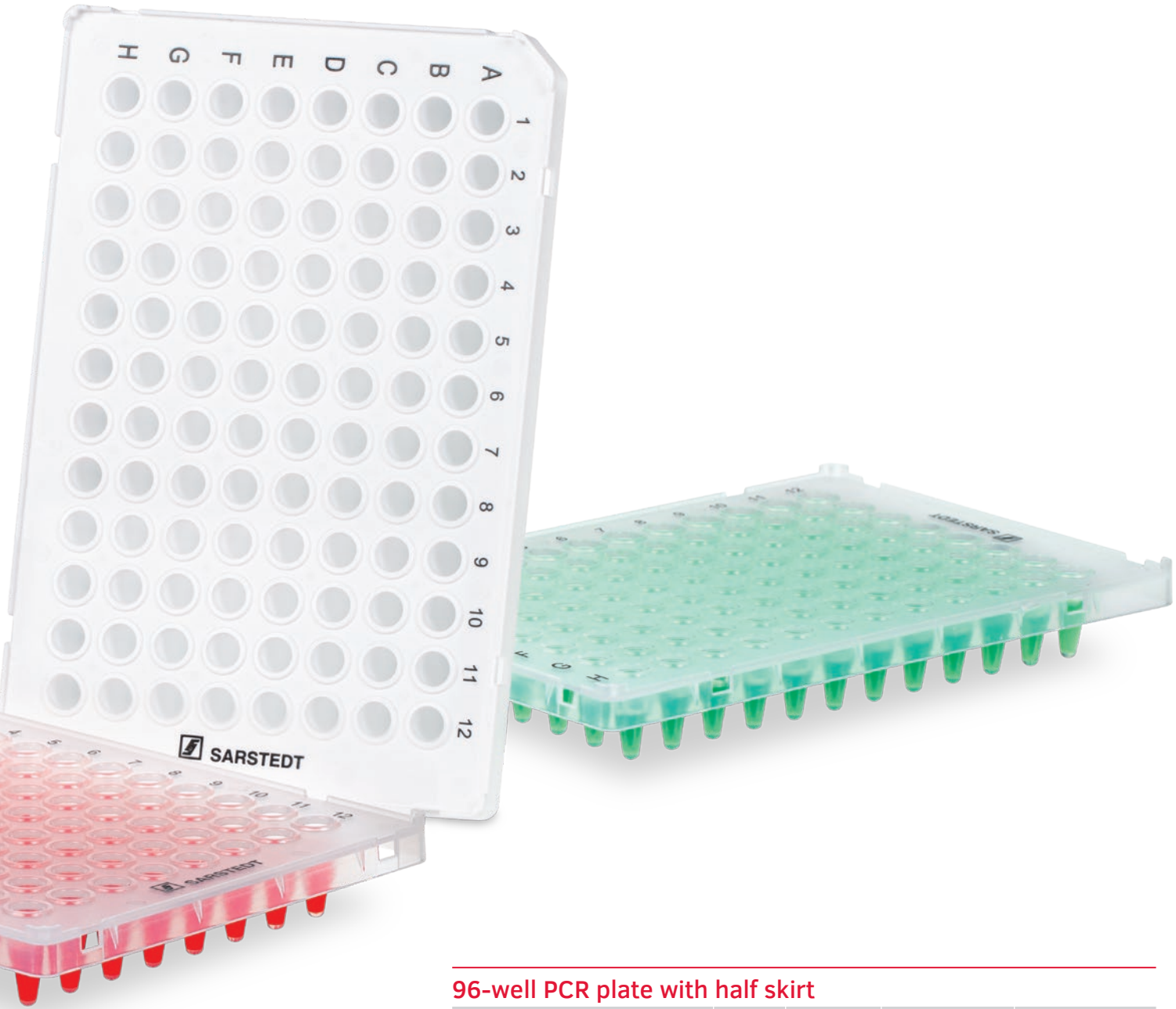
Features and benefits

- Highly uniform and thin well walls ensure consistently even and quickest possible transfer of heat. This guarantees reliable and reproducible results.
- ANSI/SLAS-compliant dimensions enable use in automated systems.
- Raised well rims protect against cross contamination and facilitates secure sealing with films and foils, thus preventing evaporation loss.
- Black alphanumeric labeling facilitates sample identification and traceability during manual filling.
- Production under clean room conditions and independently conducted biological tests allow for outstanding PCR Performance Tested purity certification.
- Testing of each individual well for 100% leakproofness ensures maximum security for valuable samples.
- Plates can be stacked safely and securely, enabling efficient use of space if storage is limited.






PRODUCT INFORMATION

- > Profile: Low profile
- > Maximum well volume: 0.1 ml
- > Cutaway corner: A1



96-well PCR plate with half skirt

Description	Color	Purity	Packaging (SP/IB/OC)	Order no
96-well PCR plate with half skirt	<input checked="" type="checkbox"/>		10 / 50 / 100	72.1981
96-well PCR plate with half skirt	<input type="checkbox"/>		10 / 50 / 100	72.1981.010
Lightcycler 480 PCR plate with half skirt, 96-well	<input type="checkbox"/>		10 / 50 / 100	72.1982.252

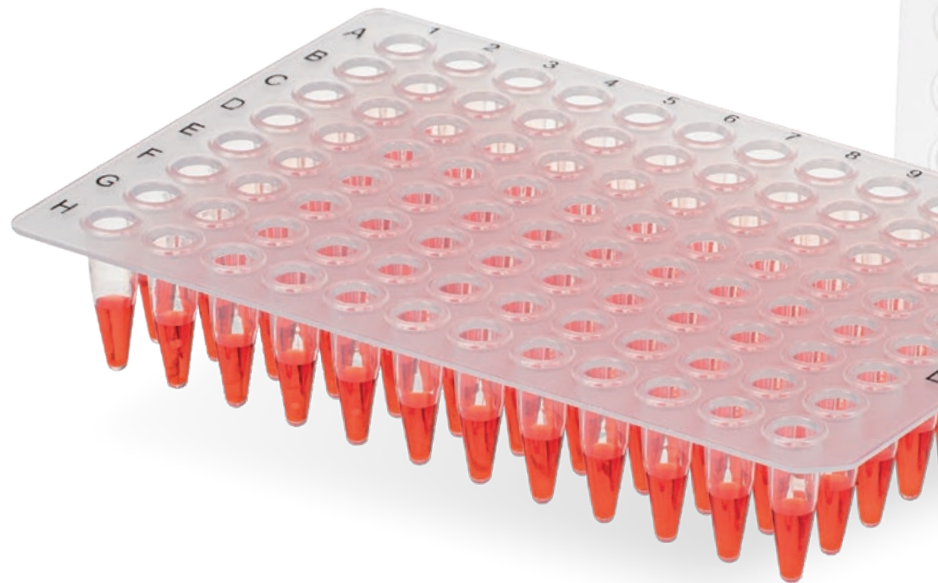
Other colors and barcoded variants available on request.
Suitable lid strips and sealing films and foils can be found on pages 24–27.



PCR plates without skirt – high profile

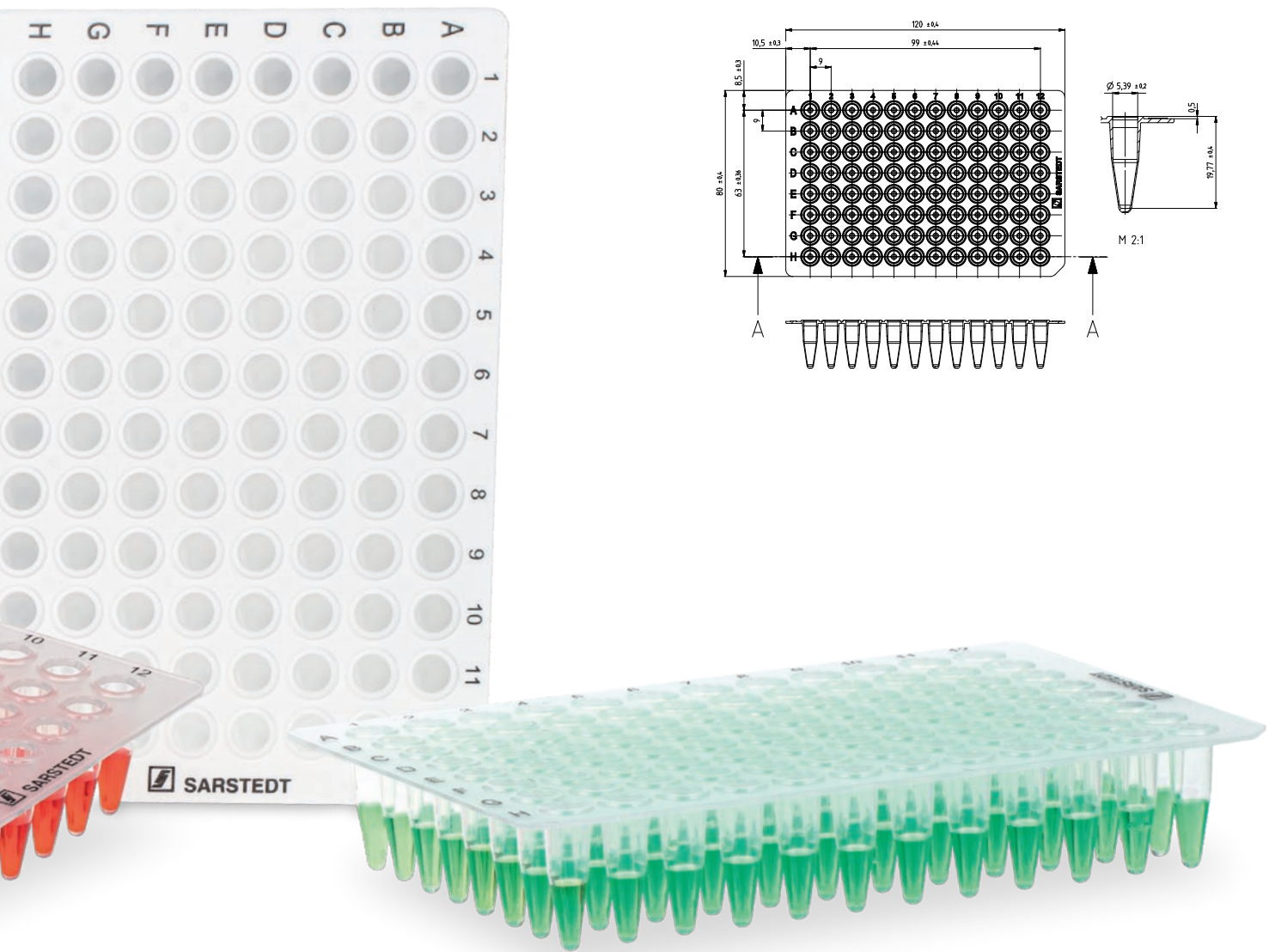
Features and benefits

- Easy to cut if the sample volume is low or if 24- or 48-well formats are required.
- Highly uniform and thin well walls ensure consistently even and quickest possible transfer of heat. This guarantees reliable and reproducible results.
- ANSI/SLAS-compliant dimensions enable use in automated systems.
- Raised well rims protect against cross contamination and facilitate secure sealing with films and foils, thus preventing evaporation loss.
- Black alphanumeric labeling facilitates sample identification and traceability during manual filling.
- Production under clean room conditions and independently conducted biological tests allow for outstanding PCR Performance Tested purity certification.
- Testing of each individual well for 100 % leakproofness ensures maximum security for valuable samples.
- Plates can be stacked safely and securely, enabling efficient use of space if storage is limited.





PRODUCT INFORMATION

- > Profile: High profile
- > Maximum well volume: 0.2 ml
- > Cutaway corner: H12



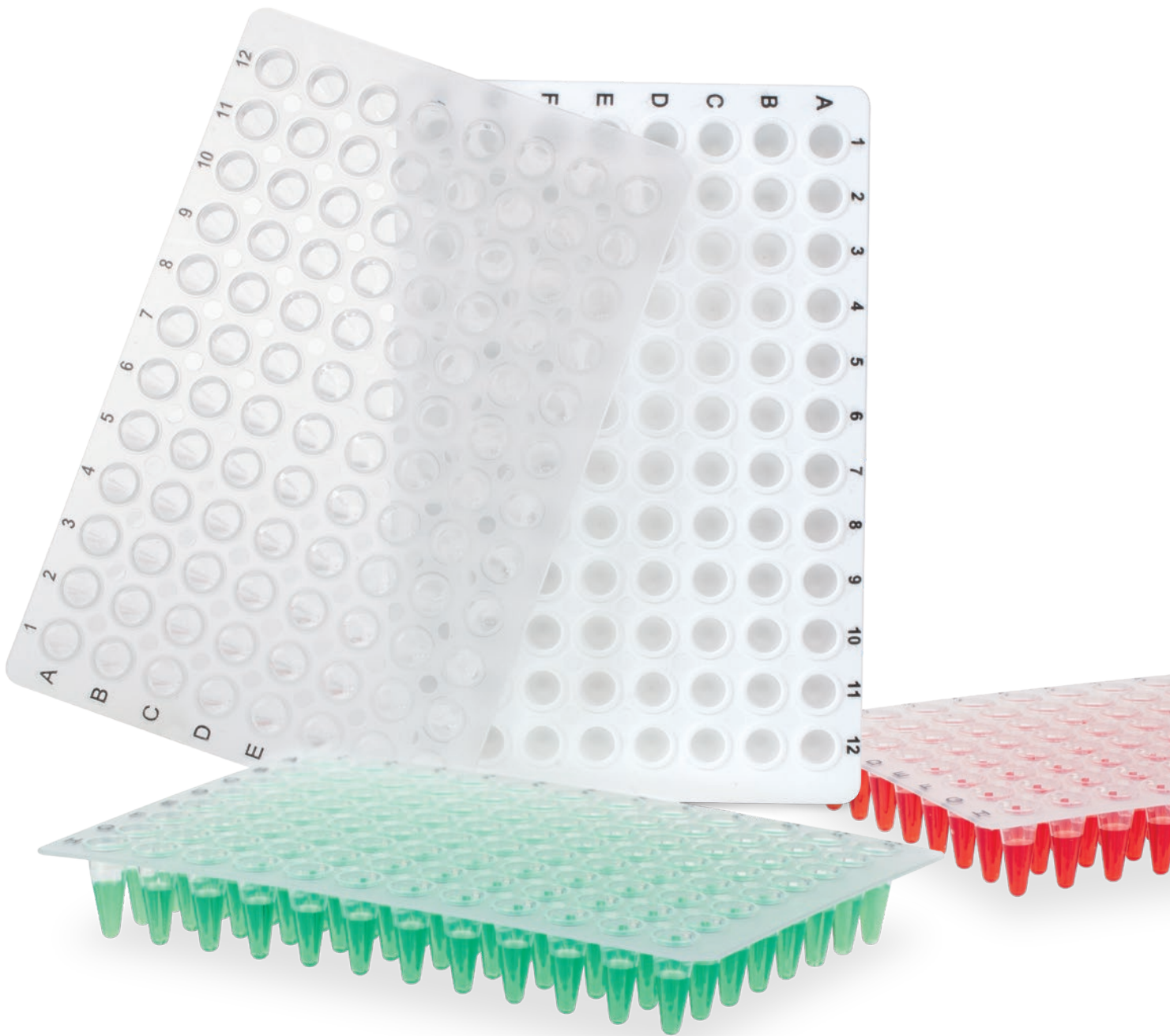
96-well PCR plate without skirt

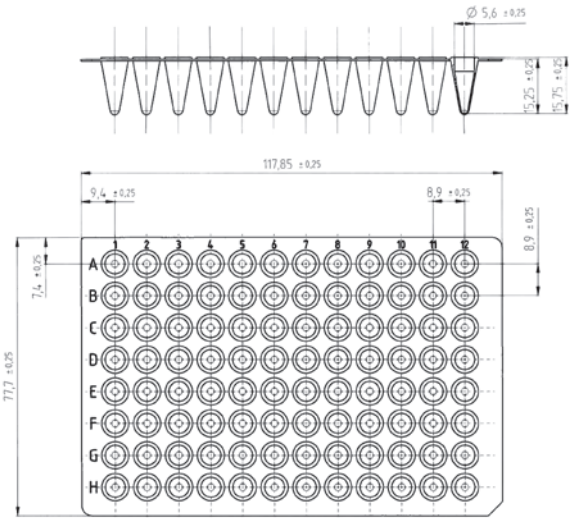
Description	Color	Purity	Packaging (SP/IB/OC)	Order no
96-well PCR plate without skirt	<input checked="" type="checkbox"/>		10 / 50 / 100	72.1978
96-well PCR plate without skirt	<input type="checkbox"/>		10 / 50 / 100	72.1978.010

Color variants available on request.
Suitable lid strips and sealing films and foils can be found on pages 24–27.



PCR plates without skirt – low profile





PRODUCT INFORMATION



- > Profile: Low profile
- > Maximum well volume: 0.1 ml
- > Cutaway corner: H12

Features and benefits

- Easy to cut if the sample volume is low or if 24- or 48-well formats are required.
- Highly uniform and thin well walls ensure consistently even and quickest possible transfer of heat. This guarantees reliable and reproducible results.
- ANSI/SLAS-compliant dimensions enable use in automated systems.
- Raised well rims protect against cross contamination and facilitate secure sealing with films and foils, thus preventing evaporation loss.
- Black alphanumeric labeling facilitates sample identification and traceability during manual filling.
- Production under clean room conditions and independently conducted biological tests allow for outstanding PCR Performance Tested purity certification.
- Plates can be stacked safely and securely, enabling efficient use of space if storage is limited.



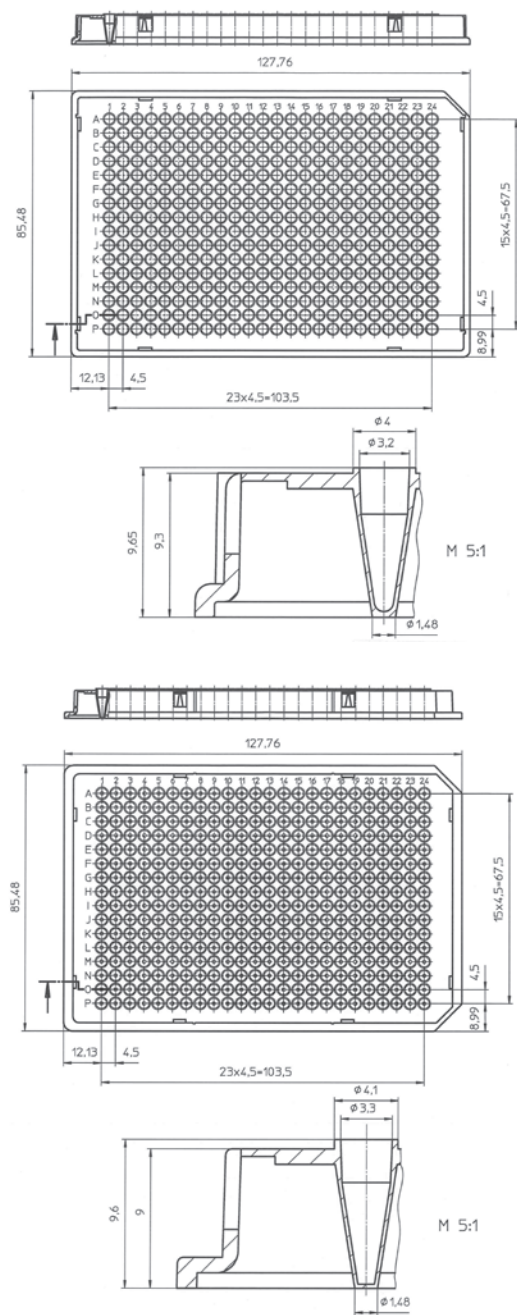
96-well PCR plate without skirt

Description	Color	Purity	Packaging (SP/IB/OC)	Order no
96-well PCR plate without skirt	<input checked="" type="checkbox"/>		10 / 20 / 100	72.1977.202
96-well PCR plate without skirt	<input type="checkbox"/>		10 / 20 / 100	72.1977.232



384-well PCR plates





PRODUCT INFORMATION



- > Profile: Low profile
- > Maximum well volume: 40 µl
- > Cutaway corner: A24 or A24 & P24

Features and benefits

- Highly uniform and thin well walls ensure consistently even and quickest possible transfer of heat. This guarantees reliable and reproducible results.
- ANSI/SLAS-compliant dimensions enable use in automated systems.
- Raised well rims protect against cross contamination and facilitate secure sealing with films and foils, thus preventing evaporation loss.
- Black alphanumeric labeling facilitates sample identification and traceability during manual filling.
- Production under clean room conditions and independently conducted biological tests allow for outstanding PCR Performance Tested purity certification.



384-well PCR plate with skirt

Description	Color	Purity	Packaging (SP/IB/OC)	Order no
384-well PCR plate with skirt	<input checked="" type="checkbox"/>		25 / 50	72.1984.202
384-well PCR plate with skirt	<input type="checkbox"/>		25 / 50 / 100	72.1985.202

Multiply® PCR plates – compatibility table

Number of wells	96	96	96	96	96	384
Half/full skirt	Without	Without	Half	Full	Half	Full
Profile	High	High	High	Low	Low	-
Order no. PCR plates	72.985	72.1978	72.1979	72.1980	72.1981	72.1984.202
		72.1978.010	72.1979.010	72.1980.010	72.1981.010	
			72.1979.003	72.1980.201		
			72.1979.201	72.1980.600		
			72.1979.700	72.1980.700		
			72.1979.102			
			72.1979.132			
Amersham Biosciences® / GE Healthcare®						
MegaBACE 500/1000 DNA Analysis System				●		
MegaBACE 4000 DNA Analysis System						●
Analytik Jena® / Biometra®						
FlexCycler² 96-well		●				
qTOWER 2.0/2.2 SP	●	●		●		
SpeedCycler2 96-well SP & SPR	●	●		●		
TAdvanced	●	●				
TOne		●	●	●		
TOptical	●	●		●		
TRobot 96-well	●	●		●		
TRobot 384-well						●
TProfessional family 96-well (except TRIO)		●		●		
TProfessional family 384-well (except TRIO)						●
Applied Biosystems® / Life Technologies®						
GeneAmp® 2700/2720		●	●			
GeneAmp® 7500/5700		●	●			
GeneAmp® 9600	●	●	●			
GeneAmp® 9700	●	●	●			
GeneAmp® 9800 FAST Block					●	
PE 2700		●	●			
PE 9600	●	●	●			
PE 9700	●	●	●			
Prism® 2720		●	●			
Prism® 7000/7700		●	●			
Prism® 7300/7500			●			
Prism® 7500 Fast					●	
Prism® 7900HT			●			●
Prism® 7900 Fast					●	
Prism® 7900HT Fast					●	●
QuantStudio™ (3, 5, 6, 7 & 12)			●		●	
StepOne Plus™					●	
Veriti® 96-well/384-well			●			●
Veriti® Fast 96-well			●		●	
ViiA7™			●			
310 Genetic Analyser		●	●		●*	
3100/3130 Genetic Analyser		●	●		●*	
3500/ 3500XL Genetic Analyser			●		●*	
3700/3730/3730XL Genetic Analyser		●	●		●*	
PeqLab®						
peqSTAR 96		●	●	●		
peqSTAR 384						●
Thermo Fisher Scientific®						
MultiBlock System		●		●		●
PCR Sprint		●		●		

The compatibility table shows usage recommendations for the products listed. Please note that we do not routinely test the products for their compatibility with the listed devices. Product characteristics therefore cannot be guaranteed.

Key:

● = recommended
□ = not checked

*with a suitable ABI adapter

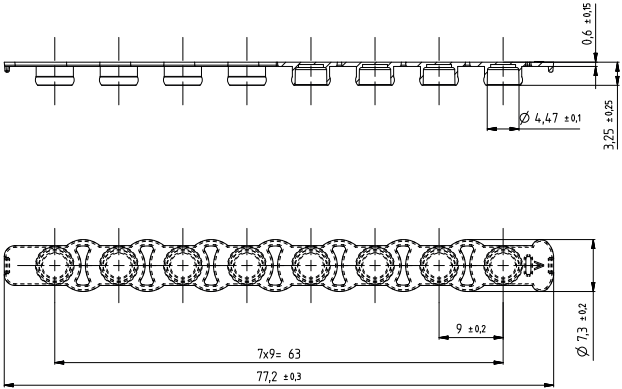
Multiply® PCR plates – compatibility table

Number of wells	96 pre-inserted	96	96	96	96	384	96	384
Half/full skirt	Without	Without	Half	Full	Half	Full	Half	Full
Profile	High	High	High	Low	Low	-	'Lightcycler'	'Lightcycler'
Order no. PCR plates	72.985	72.1978 72.1978.010	72.1979					
			72.1979.010	72.1980				
			72.1979.003	72.1980.010				
			72.1979.201	72.1980.201	72.1981	72.1984.202	72.1982.252	72.1985.202
			72.1979.700	72.1980.600	72.1981.010			
			72.1979.102	72.1980.700				
			72.1979.132					
BioRad® / MJ Research®								
CFX96 Touch™ Real-Time PCR								
CFX384 Touch™ Real-Time PCR								
CFX Automation System II								
T100™ Thermal Cycler								
S1000™ Thermal Cycler								
C1000Touch™ Thermal Cycler								
iCycler iQ™ Thermal Cycler								
iQ4™ Thermal Cycler								
iQ5™ Thermal Cycler								
MyCycler™ Thermal Cycler								
Chromo4™								
Opticon™, Opticon2™								
BaseStation™								
Corbett Research® / Qiagen®								
Palm Cycler 96-well								
Palm Cycler 384-well								
Eppendorf®								
Mastercycler® nexus								
Mastercycler® ep realplex								
Mastercycler® gradient								
Mastercycler® ep gradient								
Mastercycler® pro								
Ericom®								
Deltacycler								
SingleBlock								
TwinBlock								
MWG®								
Primus 96-well								
Primus 384-well								
The Q-Lifecycler								
Roche®								
Lightcycler® 96 System								
Lightcycler® 480 System								
Stratagene® / Agilent®								
AriaMx Real-Time PCR System								
Mx3000P™								
Mx3005P™								
Mx4000™								
Gradient Cycler								
Robocycler 384-well								
Techne®								
Cyclogene								
Flexigene								
Genius / Genius Quad								
OMN-E								
PCR Express								
Primus 96								
Px2 / PxE								
Quantica								
TC412 / TC512								
Touchgene / Touchgene Gradient								



PCR lid strips








Tip

To achieve easy opening and re-sealing, we recommend using lid strips to seal samples stored in PCR plates.

Features and benefits

- Suitable for sealing SARSTEDT PCR plates and strips.
- High-transparent lid strips optimized for real-time PCR and other fluorescence-based applications.
- Direction indicator on ends of lid strips makes orientation easy.
- Universal compatibility of lid strips with both SARSTEDT PCR strips and PCR plates.
- Production under clean room conditions and independently conducted biological tests allow for outstanding PCR Performance Tested and Biosphere® plus purity certifications.

PCR lid strips

Description	Color	Purity	Suitable for	Packaging (SP/OC)	Order no.
PCR lid strips	☒		72.1978	12 / 240	65.989
			72.1978.010		
			72.1979		
			72.1979.010		
			72.1979.003		
			72.1979.201		
			72.1979.700		
			72.1980		
			72.1980.010		
			72.1980.201		
PCR lid strips	☒		72.1980.600	120 / 480	65.989.002
			72.1980.700		
			72.1981		
			72.1981.010		
			72.985.002		
			72.985.092		
			72.985.992		
PCR lid strips	☒		72.1979.102	12 / 1200	65.1998.400
			72.1979.132		
			72.1982.252		

Adhesive sealing films

Polypropylene, polystyrene and polycarbonate micro test plates must be sealed tightly with made-to-measure film material to prevent evaporation and to protect specimens during application, storage and transport.

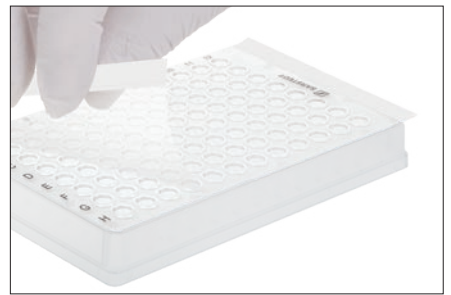
There are various SARSTEDT sealing films available that have been developed especially to meet the high demands in PCR, storage of active agents and high-throughput screening. All films are produced under cleanroom conditions to prevent contamination with DNases/RNases and nucleic acids.



Highly transparent adhesive film for quantitative real-time PCR (qPCR) // REF 95.1999

The 50 µm thin film is coated with a non-streak, transparent adhesive that adheres only slightly at room temperature. This makes handling easier. Stronger adhesion is achieved only after pressing on the film and leads to the lowest evaporation loss.

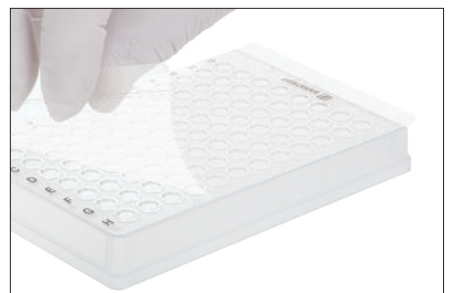
- Highly transparent made-to-measure film for real-time PCR (qPCR) and other fluorescence-based applications.
- Secure seal with innovative adhesive.
- Film does not adhere to gloves when being applied.
- Optimal specimen protection due to encapsulated adhesive



Transparent adhesive film for quantitative real-time PCR // REF 95.1993

The film consists of a 50 µm thin, especially clear polyester film coated with a thin layer of adhesive.

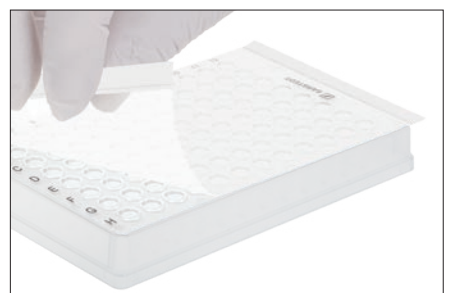
- High transparency
- High evaporation protection



Transparent adhesive film for PCR // REF 95.1994

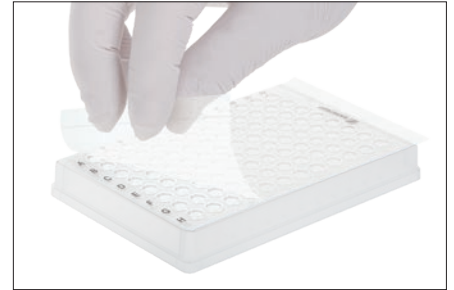
Optically clear film for PCR

- Ideal for storing sample material at up to -70 °C.
- Extremely robust and resilient



Strong, transparent adhesive film for specimen storage // REF 95.1992

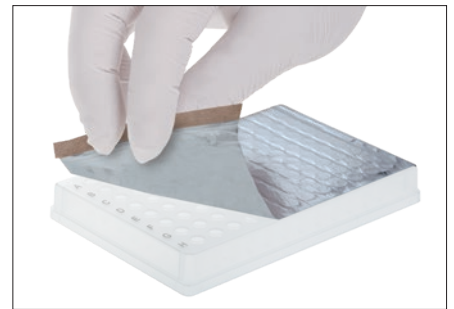
- Ideal for storing specimens at up to -80 °C.
- Removable film
- Highly resistant to solvents such as DMSO



Adhesive aluminium film for PCR and specimen storage // REF 95.1995

The heat-resistant, robust and pierceable 38 µm thin aluminium film features high evaporation protection and high resistance to solvents. Perforated application strips at the sides can be easily detached after application.

- The aluminium film can be easily pierced by pipette tips.
- Ideal for storing sample material/active agents at up to -70 °C.



Features

Product description	Application	Special properties	Optical	Pierceable	Functional temperature range	Packaging (SP/OC)	Order no
Adhesive, optically highly transparent qPCR film	qPCR, fluorescence analyses	Highly transparent, heat-sensitive adhesive, lowest evaporation rates	+	no	-80 °C to 100 °C	100 / 1	95.1999
Transparent PCR film	PCR, qPCR	Thin material, high optical clarity	+	no	-40 °C to 120 °C	100 / 1	95.1993
Transparent PCR film	PCR, specimen storage	High adhesive strength, highly resistant to chemicals	+	no	-70 °C to 105 °C	100 / 1	95.1994
Adhesive aluminium film	Specimen storage, PCR	Pierceable, light protection for specimens, highly resistant to chemicals	-	yes	-70 °C to 105 °C	100 / 1	95.1995
Transparent sealing film	Specimen storage, PCR	Extremely robust, lowest evaporation rates	+	no	-80 °C to 120 °C	100 / 1	95.1992

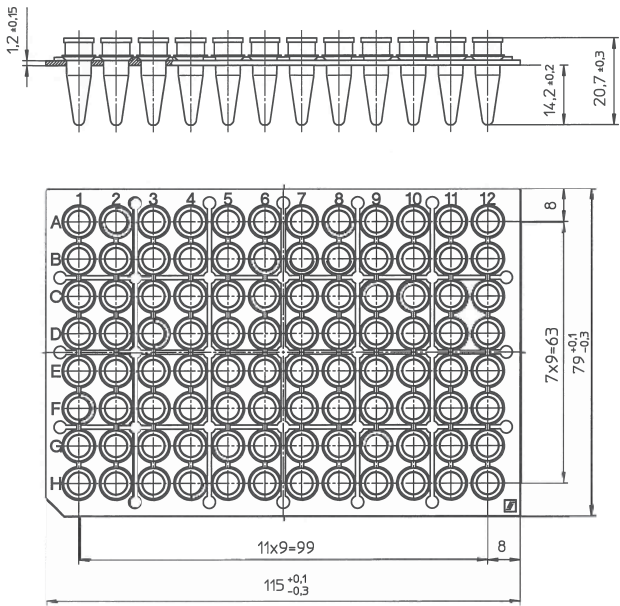
Which is the right film for my application?

Application	Application specification	Perfect product	Pierceable	Removable
PCR & real-time PCR (qPCR)	Highest transparency & specimen safety (encapsulated adhesive)	95.1999	no	yes
	Excellent transparency & standard adhesive	95.1993	no	yes
	Standard transparency & specimen safety	95.1994	no	yes
Fluorescence- & luminescence-based assays	Highest transparency & specimen safety (encapsulated adhesive)	95.1999	no	yes
	Excellent transparency & standard adhesive	95.1993	no	yes
Specimen storage	Storage of light-sensitive specimens	95.1995	yes	medium
	Standard specimen storage at -80 °C	95.1992	no	yes
Evaporation protection (PCR)	Standard transparency & specimen safety	95.1992	no	yes



Handily pre-inserted – the alternative to two-component PCR plates with polycarbonate frame





PRODUCT INFORMATION

- > Profile: High profile
- > Maximum well volume: 0.2 ml



Twelve pre-loaded PCR 8-strips in PCR work tray with maximum purity certification

Features and benefits

- Biosphere® plus purity, individually sterile wrapped
- Sealable with highly transparent lid strip REF 65.989
- Rigid polycarbonate tray
- Can be used in rack system (see page 37)



96-well PCR strips in work tray

Description	Color	Purity	Packaging (SP/OC)	Order no
96-well PCR strips in work tray	☒		1 / 20	72.985
PCR lid strip, Biosphere® plus	☒		12 / 240	65.989



PCR strips with separate lid strip









PRODUCT INFORMATION

- > Profile: High profile
- > Maximum well volume: 0.2 ml

Features and benefits

- Compatible lid strips and PCR strips optimized to ensure a tight seal.
- No warping, bending or breaking – strengthened connectors prevent PCR strips from sagging.
- Direction indicator on ends of lid strips makes orientation easy (one-sided protrusion).
- Highly uniform and thin well walls ensure consistently even and quickest possible transfer of heat. This guarantees reliable and reproducible results.
- Universal compatibility of lid strips with both PCR strips and some SARSTEDT plates.
- Production under clean room conditions and independently conducted biological tests allow for outstanding PCR Performance Tested and Biosphere® plus purity certifications.

8-well PCR strip without attached lid

Description	Color	Purity	Packaging (SP/OC)	Order no
8-well PCR strip without attached lid	<input checked="" type="checkbox"/>		120 / 480	72.985.002
8-well PCR strip without attached lid	<input type="checkbox"/>		120 / 480	72.985.092
8-well PCR strip without attached lid	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>		120 / 480	72.985.992
High-transparent lid strips	<input checked="" type="checkbox"/>		120 / 480	65.989.002

Additional colors on request.

Key

- Color**
- ☒ Red
 - ☒ Green
 - ☒ Blue
 - ☒ Purple
 - ☐ White
 - ☒ Transparent
- Packaging**

- SP smallest sub-packaging of an article
- IB Inner box, the SP is packed in the IB
- OC Outer carton, the outer carton is usually also the minimum order quantity



PCR strips with separate lid strip

Features and benefits

- Compatible lid strips and PCR strips optimized to ensure a tight seal.
- Highly uniform and thin well walls ensure consistently even and quickest possible transfer of heat. This guarantees reliable and reproducible results.
- Production under clean room conditions and independently conducted biological tests allow for outstanding PCR Performance Tested purity certification.
- Combi-pack including lid strip.

PRODUCT INFORMATION

- > Profile: Low profile
- > Maximum well volume: 0.1 ml



8-well PCR strip, low profile, without attached lid strip

Description	Color	Purity	Packaging (SP/OC)	Order no
8-well PCR strip, low profile, without attached lid strip	<input checked="" type="checkbox"/>		125 / 1250	72.982.002
8-well PCR strip, low profile, without attached lid strip	<input type="checkbox"/>		125 / 1250	72.982.092



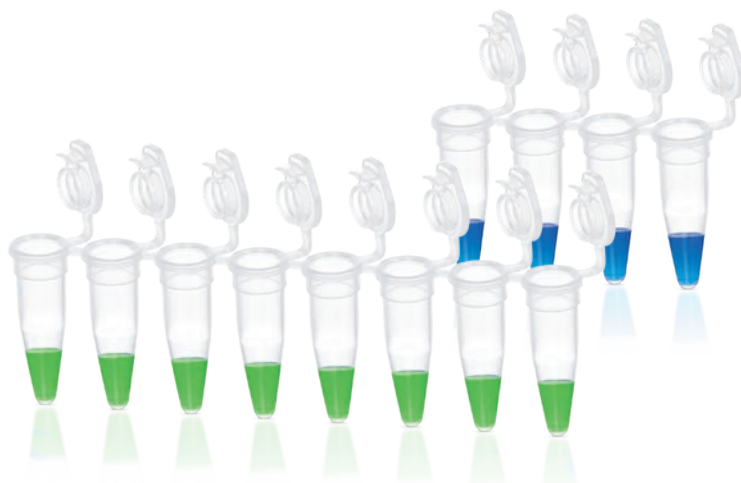
PCR strips with individually attached lid

Features and benefits

- Increased security with no handling interference – integrated anti-contamination shield prevents accidental contact with the inner surface of the lid.
- Strengthened connectors prevent strip warping, bending, breaking, and sagging.
- Flat lid with large writing surface.
- Highly uniform and thin well walls ensure consistently even and quickest possible transfer of heat. This guarantees reliable and reproducible results.
- Production under clean room conditions and independently conducted biological tests allow for outstanding PCR Performance Tested and Biosphere® plus purity certifications.

PRODUCT INFORMATION

- > Profile: High profile
- > Maximum well volume: 0.2 ml



PCR strips with individually attached lids

Description	Color	Purity	Packaging (SP/OC)	Order no
8-well PCR strip with attached lids	☒		120 / 480	72.991.002
8-well PCR strip with attached lids	■ ■ ■ ■		120 / 480	72.991.992
4-well PCR strip with attached lids	☒		120 / 480	72.990.002
4-well PCR strip with attached lids	☒		120 / 480	72.990
4-well PCR strip with attached lids	■ ■ ■ ■		120 / 480	72.990.992

Low-profile PCR strips (0.1 ml) with attached lids

Description	Color	Purity	Packaging (SP/OC)	Order no
8-well PCR strip with attached lids	☒		120 / 480	72.991.103





PCR single tubes with attached lid

Features and benefits

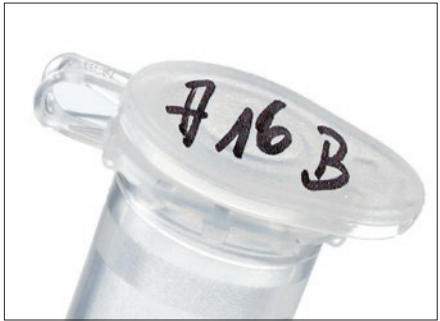
- Increased security with no handling interference – integrated anti-contamination shield prevents accidental contact with the inner surface of the lid.
- 0.5 ml tubes suitable for use with the Qubit™ fluorometer
- Flat lid with large writing surface.
- Highly uniform and thin well walls ensure consistently even and quickest possible transfer of heat. This guarantees reliable and reproducible results.
- Production under clean room conditions and independently conducted biological tests allow for outstanding PCR Performance Tested and Biosphere® plus purity certifications.

PRODUCT INFORMATION

- > Profile: High profile
- > Maximum well volume: 0.2 ml & 0.5 ml

Tip

In principle, you should always fill up the block of your cyclor symmetrically, to ensure uniform distribution of pressure on the PCR tubes by the cyclor lid and an even distribution of heat.



PCR single tubes with attached lid

Description	Color	Purity	Packaging (SP/OC)	Order no
0.2 ml PCR single tube with attached lid	☒		500 / 2000	72.737.002
0.2 ml PCR single tube with attached lid	☒		250 / 2000	72.737
0.2 ml PCR single tube with attached lid	■ ■ ■ ■		500 / 3000	72.737.992
0.5 ml PCR single tube with attached lid	☒		500 / 2000	72.735.002
0.5 ml PCR single tube with attached lid	☒		100 / 1000	72.735.100
0.5 ml PCR single tube with attached lid	■ ■ ■ ■		500 / 3000	72.735.992

Intelligent rack and pipetting system

Reliable refrigeration of your valuable samples – the IsoFreeze® PCR rack

Sample preparation often requires consistent and reliable refrigeration of samples. SARSTEDT offers a pipetting and storage station with reliable temperature control for temperature-sensitive applications, in the form of the IsoFreeze® PCR rack.

Features and benefits

- Noticeable color change from purple to pink when temperature moves outside the optimum range (above 7 °C).
- Minimizes the risk of contamination, as there is no need to store samples on ice.
- At normal ambient temperature, the temperature of samples is held in the optimum range for up to three hours (with lid on)
- 8 x 12 format for 0.1 ml and 0.2 ml PCR plates, strips and tubes, or 6 x 4 format, suitable for 1.5 ml & 2 ml micro tubes

IsoFreeze®

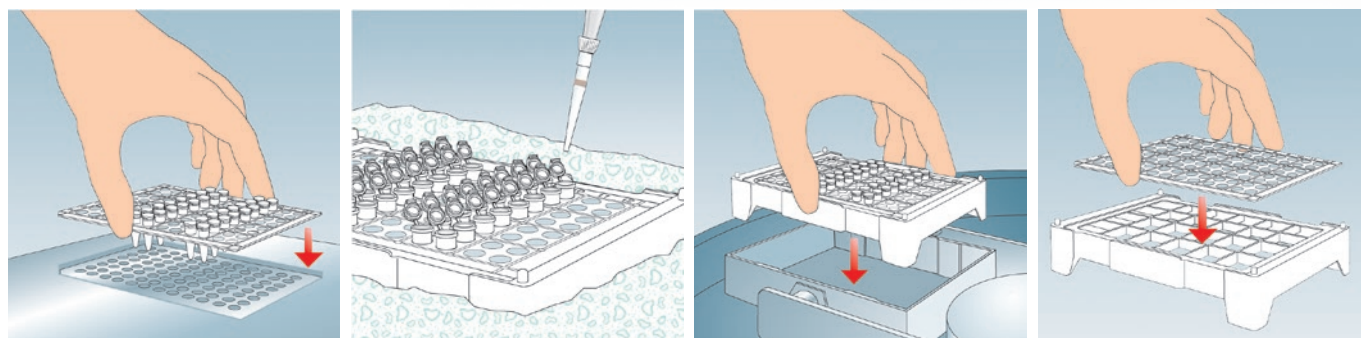
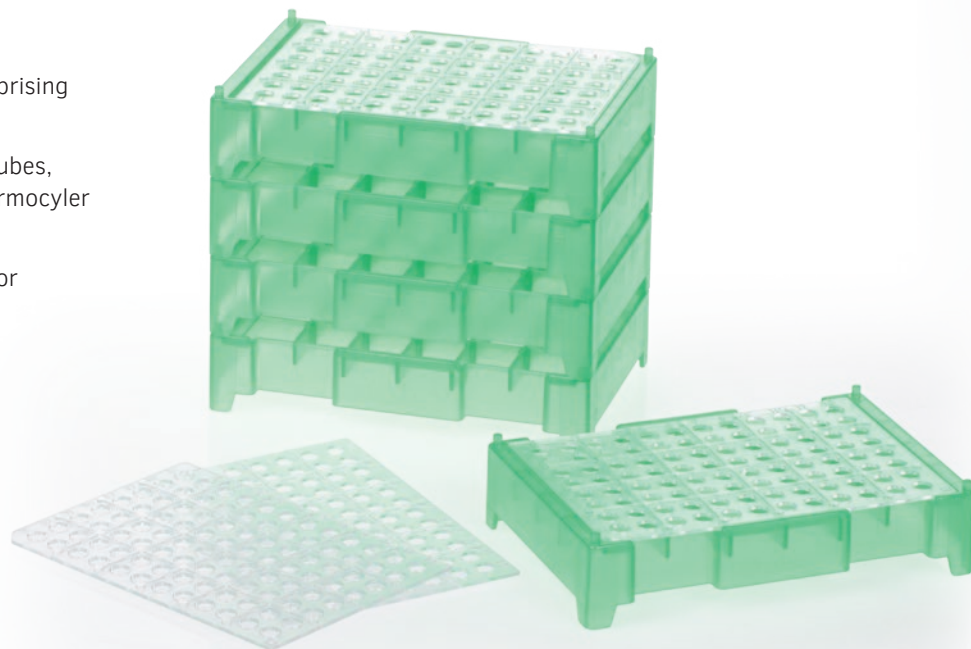
Description	Packaging (IB/OC)	Order no
IsoFreeze® PCR rack, 96-well format	2 / 1	95.984
IsoFreeze® MCT rack, 24-well format	1 / 1	95.983



The SARSTEDT rack system – the flexible storage and pipetting station

Features and benefits

- Flexible two-component system comprising work tray and base station
- Efficient handling of PCR strips and tubes, as they can be transferred to the thermocycler in the work tray
- Different base station color options for easy laboratory organization



Accessories

Description	Packaging (SP/OC)	Order no
96-well work tray	5 / 100	95.987.002
Transparent base station	5 / 75	95.988
Red base station	5 / 75	95.988.001
Blue base station	5 / 75	95.988.002
Green base station	5 / 75	95.988.003
Yellow base station	5 / 75	95.988.004

Tips / guidelines for successful PCR reactions

General recommendations

- To prevent degradation, always store DNA in Tris-EDTA buffer (pH 8) and not in water.
- Use filtered pipette tips and wear gloves to prevent (cross) contamination.
- Avoid pipetting reaction mixtures in ventilated clean benches, as this increases the risk of cross contamination.
- Pipette reaction mixtures in a clean area that is used for the lowest number of other molecular biology applications possible.
- When pipetting the reaction mixture, DNA polymerases should be the last component added.
- Avoid repeatedly thawing and refreezing nucleotides (dNTPs), because this can destroy them. It is advisable to aliquot nucleotides (and primers) and to store the aliquots at -70°C .
- For amplification, calculate one minute extension time per 1 kb DNA template.
- Use consumables that have been certified as free from DNA, DNases, RNases, and PCR inhibitors. Avoid autoclaving consumables before use, because this introduces the risk of contaminating products with unwanted biomolecules.
- When cutting PCR products out of gel, ensure they are exposed to UV light for the shortest time possible, to avoid DNA sequencing errors.

Guidelines for using the primer

- Rule of thumb: Use a final primer concentration of $0.05\text{--}1\text{ }\mu\text{M}$ per primer. Higher primer concentrations increase the occurrence of non-specific PCR products, as a result of non-specific binding of the primer. A concentration of $0.2\text{ }\mu\text{M}$ per primer is often best in the final reaction.
- Ideally, primers should be between 20 and 30 nucleotides in length.
- The GC content of the primer should ideally be between 40% and 60%, and the GC molecules should be evenly distributed along the length of the primer. To optimize the amplification of PCR products with a high GC content, you can add the reaction mixture DMSO. When using additives such as DMSO, the annealing temperatures may need to be adapted, because high concentrations can weaken the primer bond. In this case, use the lowest possible concentration and do not exceed 10% in experiments.
- The annealing temperatures (T_m) of the applied primer pair should not differ by more than 5°C , and should be in a temperature range of between 50°C and 72°C .
- Use an annealing temperature that is $0\text{--}5^{\circ}\text{C}$ below the calculated T_m of the primer with the lower T_m .

Guidelines for using the DNA template

- To detect the PCR product in 25–30 cycles, approximately 100 template copies are required. Use at least 40 cycles if it is likely that there are fewer than ten copies of the template DNA.
- Rule of thumb: When using plasmid DNA, use template concentrations of $1\text{ pg--}1\text{ ng}$. When using genomic DNA, use template concentrations of $1\text{ ng--}1\text{ }\mu\text{g}$. Higher template concentrations reduce the specificity of the reaction and thus increase the occurrence of non-specific PCR products.
- Check the purity of the DNA template photometrically (the $260/280\text{ nm}$ ratio should be larger than or the same as 1.8) to ensure that the template is not contaminated with PCR inhibitors, and use a DNA isolation kit or perform ethanol precipitation if contamination is detected.
- If necessary, use gel electrophoresis to check whether the DNA template is degraded.

PCR troubleshooting checklist

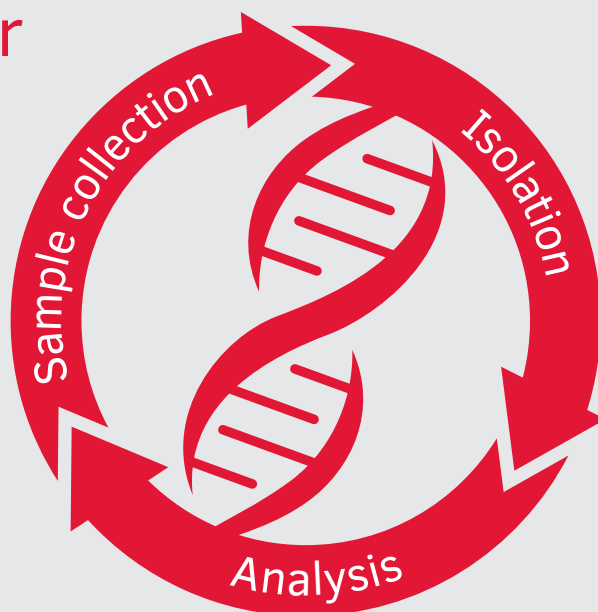
Problem	Potential cause	Solution
No amplification product	PCR inhibitors in reaction mix	Use consumables that have been certified as free from DNA, DNases, RNases and PCR inhibitors. Check the purity of the DNA templates photometrically to determine whether the template is contaminated with PCR inhibitors (phenol, proteinase K, K ⁺ , N ^{a+} , etc.). If the 260/280 nm ratio is below 1.8, use a DNA purification kit or perform ethanol precipitation to eliminate any PCR inhibitors. Dilute the template (and thus the PCR inhibitors) and increase the DNA polymerase concentration alternately.
	PCR template is degraded	Use gel electrophoresis to check whether the PCR template is degraded. If there are signs that the initial DNA is degraded (DNA smearing, bands are too small, etc.), repeat template isolation. Minimise DNA shearing during isolation. To prevent the template DNA from degrading, store it in Tris-EDTA buffer (pH 8).
	Suboptimum reaction conditions	The annealing temperature may have been too high, the denaturation time may have been too long, or the number of cycles may have been too low. Optimise the annealing temperature by incrementally reducing it in steps of 1–2 °C; denature the DNA for 3 minutes initially (denaturation times that are too long can degrade the DNA) and for 30 seconds during the reaction cycles; and/or increase the number of cycles by 5 cycles.
	Forgotten elements in reaction mixture	Repeat the PCR.
Non-specific amplification products	Contaminated reagents (e.g. water)	PCR reagents (often the water used) can accidentally become contaminated during previous pipetting processes. Use fresh PCR reagents.
	Suboptimum reaction conditions	The annealing temperature may have been too low, the number of cycles may have been too high, or the extension time may have been too long. Annealing temperatures that are too low promote non-specific primer binding. Use a temperature gradient to try to determine the optimum annealing temperature that produces the cleanest PCR product. If cycle numbers are too high, this can also sometimes cause the amplification of non-specific PCR products. If non-specific PCR products occur, try reducing the number of cycles by 5. Long extension times also promote non-specific amplification. Based on the size of the PCR product, use the most precise extension time possible (for amplification per 1 kb DNA template, taq polymerases require an extension time of approximately one minute).
	Too much Mg ²⁺ in reaction mixture	If Mg ²⁺ concentrations are too high, this increases the likelihood that non-specific binding of the primer will occur and thus that unwanted PCR products will be formed. In this situation, reduce the amount of Mg ²⁺ used.
	PCR template is degraded	Use gel electrophoresis to check whether the PCR template is degraded. If there are signs that the initial DNA is degraded (DNA smearing, bands are too small, etc.), repeat template isolation. Minimize DNA shearing during isolation. To prevent the template DNA from degrading, store it in Tris-EDTA buffer (pH 8).

If you have any questions,
we'll be happy to help!

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www.sarstedt.com

The SARSTEDT molecular diagnostics workflow

Benefit from the advantages of
our coordinated consumables!



SARSTEDT, Inc.

1025 St. James Church Road
P.O. Box 468
Newton, NC 28658 - 0468

Toll free: +1 800 257 5101

customerservice.us@sarstedt.com
www.sarstedt.com



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