

TaqMan® OpenArray® Real-Time PCR Plates Protocol

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Contents

	About This Guide	7
	Safety information	7
	Safety alert words	7
	SDSs	7
PROTOCOL	TaqMan® OpenArray® Real-Time PCR Plates Protocol	9
	Section 1 Product Information	9
	Product overview	9
	OpenArray® 384-Well Sample Plate	9
	TaqMan® OpenArray® Real-Time PCR Plate	10
	For more information	10
	Workflow	11
	Section 2 Prepare the OpenArray® 384-Well Sample Plate	13
	Required materials	14
	Prepare the cDNA or gDNA samples	15
	Quantity of starting material	15
	RNA quality	15
	Prepare cDNA from RNA	16
	Determine the layout of the sample plate	17
	About the sample plate	17
	Determine the layout of the sample plate	17
	Prepare the sample plate	20
	Prepare the PCR mix	20
	Add sample and PCR mix to the sample plate	21
	Section 3 Prepare the TaqMan® OpenArray® Real-Time PCR Plate	23
	Required materials	24
	TaqMan® OpenArray® Real-Time PCR Plates	24
	Other consumables and equipment	26
	Storage conditions	27
	Prepare for loading	28
	Place an OpenArray® plate in a plate holder	29
	Important guidelines for handling the OpenArray® plate	29
	Place the OpenArray® plate in the plate holder	29
	Load the OpenArray® AutoLoader Tip Blocks	31

	Run the OpenArray® AutoLoader	33
	Set up the AutoLoader	33
	Load the sample	36
	Seal the OpenArray® Case	37
	Insert the loaded OpenArray® plate into a prepared OpenArray® Case	37
	Seal the OpenArray® Case	37
	Clean the OpenArray® Case	39
	Frame the OpenArray® Case	39
	Guidelines for high-throughput loading	41
	Before you begin loading	41
	During and after loading	41
APPENDIX A	Create a sample information file (*.csv) for sample tracking ..	43
	Overview	43
	Include no template controls	43
	Use the Sample Tracking Tool	44
	About the Sample Tracking Tool	44
	Standard vs. modified spreadsheet	44
	Edit the spreadsheet	45
	Generate the *.csv file	48
	Use a spreadsheet or simple text program	49
	Export sample information from an existing *.ncx file	51
	Select the sample information to export	51
	Open the *.csv file	52
APPENDIX B	Calculator Tool	55
	About the Calculator Tool	55
	Calculate the starting concentration of gDNA	55
	Example	56
	Calculate the volume of master mix and water	57
	Example	57
APPENDIX C	Prevent Contamination	59
	General guidelines	59
	PCR good laboratory practices	59
APPENDIX D	Safety	61
	Instrumentation safety	62
	Symbols on instruments	62
	Locations of safety labels on instruments	63
	General instrument safety	64
	Physical hazard safety	65

Electrical safety	66
Barcode scanner laser safety	66
Workstation safety	67
Safety and electromagnetic compatibility (EMC) standards	67
Chemical safety	69
General chemical safety	69
SDSs	69
Chemical waste safety	70
Biological hazard safety	71
Documentation and Support	73
Product documentation	73
OpenArray® Real-Time PCR System	73
TaqMan® OpenArray® Genotyping System	74
Related documentation	74
Genotyping experiments	74
Obtaining support	75


About This Guide


Safety information


For general safety information, see this section and [Appendix D, “Safety” on page 61](#).


Safety alert words

Four safety alert words appear in Applied Biosystems user documentation at points in the document where you need to be aware of relevant hazards. Each alert word—**IMPORTANT, CAUTION, WARNING, DANGER**—implies a particular level of observation or action, as defined below:

 **IMPORTANT!** – Indicates information that is necessary for proper instrument operation, accurate chemistry kit use, or safe use of a chemical.


 **CAUTION!** – Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

 **WARNING!** – Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

 **DANGER!** – Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

SDSs

The Safety Data Sheets (SDSs) for any chemicals supplied by Applied Biosystems or Ambion are available to you free 24 hours a day. For instructions on obtaining SDSs, see [“SDSs” on page 69](#).

 **IMPORTANT!** For the SDSs of chemicals not distributed by Applied Biosystems or Ambion contact the chemical manufacturer.

TaqMan® OpenArray® Real-Time PCR Plates Protocol

Section 1 Product Information

This section covers:

- Product overview 9
- Workflow 11

Product overview

The TaqMan® OpenArray® Real-Time PCR Plates allow you to perform gene expression experiments on the OpenArray® Real-Time PCR System. The OpenArray system uses fluorescence-based polymerase chain reaction (PCR) reagents to detect targets of interest.

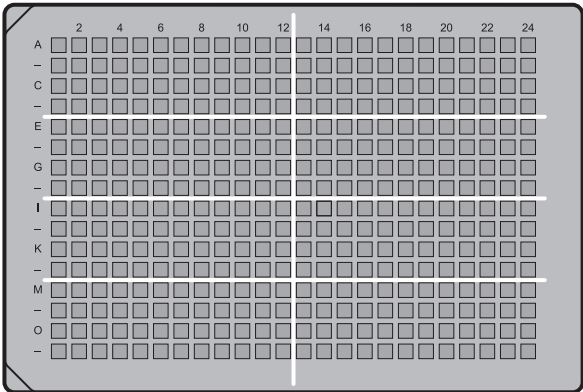
To perform gene expression experiments, the OpenArray system requires two plate types:

- OpenArray® 384-Well Sample Plate (*sample plate*) (this page)
- TaqMan® OpenArray® Real-Time PCR Plate (*OpenArray plate*) ([page 10](#))

OpenArray® 384-Well Sample Plate

The OpenArray 384-Well Sample Plate is a 384-well reaction plate. You prepare the PCR mix and combine it with cDNA or gDNA sample in the sample plate, then use the OpenArray® AutoLoader to transfer the mixture from the sample plate to the OpenArray plate.

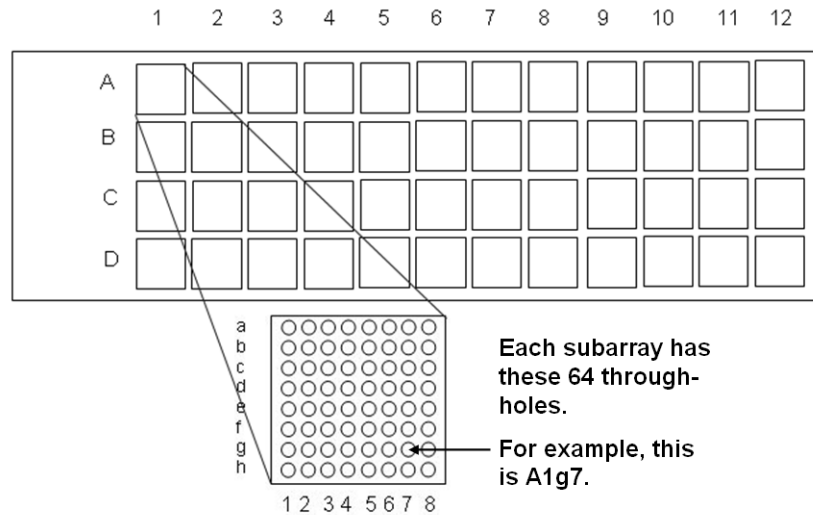
! **IMPORTANT!** The well dimensions of the OpenArray 384-Well Sample Plates are specifically suited for use with the OpenArray AutoLoader. Applied Biosystems does not recommend the use of other microtiter plates with the AutoLoader.



TaqMan® OpenArray® Real-Time PCR Plate

The TaqMan® OpenArray® Real-Time PCR Plate is a 63-mm × 19-mm mid-density reaction plate. There are 3072 reaction through-holes in each plate. Individual through-holes are preloaded with a TaqMan® gene expression assay; each through-hole can accommodate a 33-nL reaction volume.

As shown in the figure below, the OpenArray plate is divided into 48 subarrays; each subarray consists of 64 through-holes. Hydrophilic and hydrophobic coatings allow reagents to be held within the through-holes.



Available TaqMan® assays

When you order an OpenArray plate, you select the TaqMan assays to include in the plate. The assays are dried-down and preloaded into the OpenArray plate. You can select any combination of Inventoried TaqMan® Gene Expression Assays.

Available formats

Each through-hole in an OpenArray plate contains a single assay. The number of assays in the OpenArray plate and the number of samples you can load in the plate depend on the OpenArray plate format that you order.

For ordering information, see [“Required materials” on page 24](#).

For more information

For more information, refer to the OpenArray system product documentation suite. See [“Product documentation” on page 73](#).

Workflow

Prepare the OpenArray® 384-Well Sample Plate (Section 2)

1. Prepare the cDNA or gDNA samples.
2. Determine the layout of the OpenArray® 384-Well Sample Plate.
3. Prepare the sample plate (add sample and PCR mix).



Prepare the TaqMan® OpenArray® Real-Time PCR Plate (Section 3)

1. Prepare for loading.
2. Place an OpenArray® plate in an OpenArray® AutoLoader Plate Holder.
3. Load the OpenArray® AutoLoader Tip Blocks.
4. Run the OpenArray® AutoLoader.
5. Seal the OpenArray® Case.



Perform real-time imaging and analyze the run data

1. Load the OpenArray® plates into the OpenArray® instrument, then start the run. The OpenArray instrument performs thermal-cycling and real-time imaging.
2. Use the OpenArray® Real-Time qPCR Analysis Software to analyze and (if needed) modify the run data.



Note: For procedures, refer to the *OpenArray® Real-Time PCR System User Guide*. See “Documentation and Support” on page 73.

Section 2 Prepare the OpenArray® 384-Well Sample Plate

In this section, you prepare your cDNA or gDNA samples, prepare the OpenArray® 384-Well Sample Plates, then load your sample into the sample plates. In [Section 3](#), you will use the OpenArray® AutoLoader to transfer sample from the prepared sample plates to TaqMan® OpenArray® Real-Time PCR Plates.

This section covers:

■ Required materials	14
■ Prepare the cDNA or gDNA samples	15
■ Determine the layout of the sample plate	17
■ Prepare the sample plate	20

Required materials

Item	Source	Part number
For cDNA preparation (cDNA from RNA)		
High Capacity cDNA Reverse Transcription Kit	Applied Biosystems	4322171
RNase-free water	Major Laboratory Supplier (MLS)	---
Total RNA	User-supplied	---
Incubator or thermal cycler	MLS	---
For sample plate layout and preparation		
OpenArray® 384-Well Sample Plates	Applied Biosystems	4406947
(Optional) Fine-tip marker	MLS	---
TaqMan® OpenArray® Gene Expression Master Mix	Applied Biosystems	4362070
5X TaqMan® REMix Solution (Supplied in the TaqMan® OpenArray® Real-Time PCR Accessories Kit)	Applied Biosystems	4453993
RNase-free water	MLS	---
(For gDNA samples only) Albumin, bovine (BSA) [†]	Sigma	A7906
cDNA or gDNA sample	User-supplied	---
Corning® 96 Well Microplate Aluminum Sealing Tape, Nonsterile	Corning Life Sciences	6570
For general use		
Powder-free nitrile gloves	MLS	---
Lint-free wipes	MLS	---
Disposable transfer pipettes	MLS	---
Pipettes, P10 to P1000	MLS	---
Pipette tips, 10 to 100 µL	MLS	---
Centrifuge with plate adaptor	MLS	---
Vortexer	MLS	---

[†] For the SDS of any chemical not distributed by Applied Biosystems, contact the chemical manufacturer. Before handling any chemicals, refer to the SDS provided by the manufacturer, and observe all relevant precautions.

Prepare the cDNA or gDNA samples

Quantity of starting material

Applied Biosystems recommends the following amounts of starting material:

- **Total RNA**, for preparing cDNA – 10 µL at a concentration of 250 ng/µL (2.5 µg total). To prepare cDNA from RNA, see [page 16](#).
- **gDNA** – 10 µL at a concentration of 108 ng/µL.

RNA quality

Be sure that the RNA you use for gene expression experiments:

- Is extracted from the raw material of interest using an optimized protocol
- Does not contain PCR inhibitors
- Has an $A_{260/230}$ ratio between 1.7 and 1.9
- Has an $A_{260/280}$ ratio between 1.7 and 1.9
- Is intact as visualized by gel electrophoresis
- Has an RNA Integrity Number (RIN) that is between 6.5 and 10

Prepare cDNA from RNA

If the starting material is total RNA, follow this procedure to prepare cDNA.

1. Thaw the High Capacity cDNA Reverse Transcription Kit components and the total RNA on ice.
2. Combine the following components to prepare the reverse-transcription mix:

Component		Volume (µL) for 1 reaction	Stock concentration	Final concentration (2× mix)
High Capacity cDNA Reverse Transcription Kit	10× RT Buffer	2.0	10	2
	10× RT Random Primers	2.0	10	2
	25× dNTP Mix	0.8	25	2
	MultiScribe™ Reverse Transcriptase	1.0	50	5
RNase-free water		4.2	---	---
Final volume of reverse-transcription mix		10.0	---	---

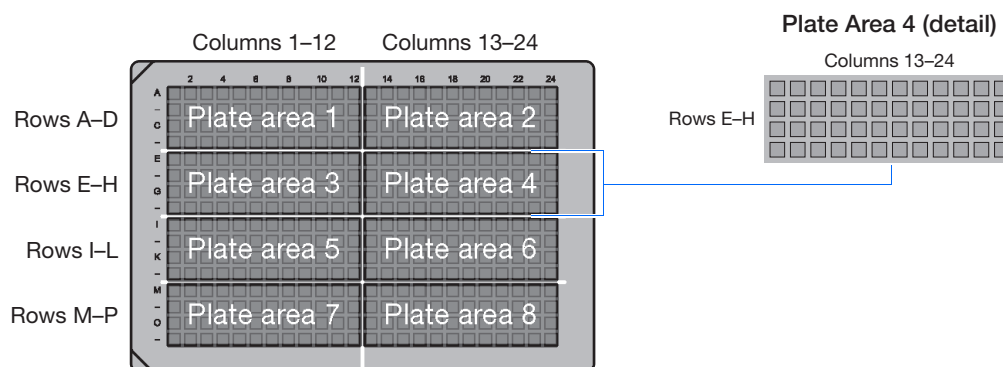
3. Add an equal volume of total RNA to the 2× reverse-transcription mix (10 µL per reaction).
4. Incubate at room temperature for 10 minutes.
5. Incubate at 37 °C for 2 hours, place on ice for 5 minutes, then spin down.
6. Incubate at 75 °C for 10 minutes, place on ice for 5 minutes, then spin down.

If needed, you can store the cDNA -20 °C for at least 2 months. Otherwise, proceed to [“Determine the layout of the sample plate”](#) on page 17.

Determine the layout of the sample plate

About the sample plate

The OpenArray 384-Well Sample Plate is divided into eight areas; each sample plate area is 12 wells × 4 wells (48 wells). During each load, the OpenArray® AutoLoader transfers sample from *one area* of a single sample plate to TaqMan® OpenArray® Real-Time PCR Plates.



! **IMPORTANT!** The way you set up the sample plates in this section depends on the format of the OpenArray plate that you will be transferring the cDNA or gDNA samples to in [Section 3](#).

Determine the layout of the sample plate

1. Label the sample plate with a unique identifier.



Note: You will enter this unique identifier when you set up the project file (*.ncx) in the OpenArray® Real-Time qPCR Analysis Software. Refer to the *OpenArray® Real-Time PCR System User Guide*.

2. Determine which sections of the sample plate you will load with sample. Each 12-well × 4-well rectangular area corresponds to one TaqMan OpenArray Real-Time PCR Plate. You may find it helpful to mark the sample plates with a fine-tip marker.



! **IMPORTANT!** Be sure to track where the samples are in each sample plate. For each sample plate, Applied Biosystems recommends creating a sample information file (*.csv). See [Appendix A on page 43](#).

Applied Biosystems recommends the arrangements illustrated on the next page.

OpenArray plate	Load...	Example
Format 18	Samples 1 to 48 in one area of the sample plate, in triplicate.	<p>The diagram illustrates the layout for Format 18. At the top, a 'Sample plate' is shown with 8 plate areas (1-8). Below it, a 48-well 'Sample plate' is shown with wells labeled 'Sample 1' to 'Sample 48'. The main 'OpenArray plate' is a 96-well plate with 48 wells containing samples in triplicate. Callouts show 'Subarray A1' with 'Sample 1' and 'Assays (copy 1)', 'Assays (copy 2)', and 'Assays (copy 3)'. Another callout shows 'Subarray D12' with 'Sample 48'.</p>
Format 56	Samples 1 to 48 in one area of the sample plate.	<p>The diagram illustrates the layout for Format 56. At the top, a 'Sample plate' is shown with 8 plate areas (1-8). Below it, a 48-well 'Sample plate' is shown with wells labeled 'Sample 1' to 'Sample 48'. The main 'OpenArray plate' is a 96-well plate with 48 wells containing samples. Callouts show 'Subarray A1' with 'Sample 1' and 'Subarray D12' with 'Sample 48'.</p>
Format 112	Samples 1 to 24 in one area of the sample plate.	<p>The diagram illustrates the layout for Format 112. At the top, a 'Sample plate' is shown with 8 plate areas (1-8). Below it, a 24-well 'Sample plate' is shown with wells labeled 'Sample 1' to 'Sample 24'. The main 'OpenArray plate' is a 96-well plate with 24 wells containing samples in triplicate. Callouts show 'Subarray A1' with 'Sample 1', 'Subarray B1' with 'Sample 1', 'Subarray C12' with 'Sample 24', and 'Subarray D12' with 'Sample 24'.</p>

Section 2 Prepare the OpenArray® 384-Well Sample Plate
Determine the layout of the sample plate

OpenArray plate	Load...	Example
Format 168	Samples 1 to 16 in one area of the sample plate.	<p>The diagram illustrates the loading of 16 samples into an OpenArray plate using Format 168. At the top right, a 'Sample plate' is shown with 8 plate areas. Below it, a 4x8 grid of wells is shown, with 'Sample 1' in the first well and 'Sample 16' in the last well. The OpenArray plate below has six subarrays: A1, A2, A3, D10, D11, and D12. Each subarray contains three wells. In subarrays A1, A2, and A3, the first well of each subarray contains 'Sample 1'. In subarrays D10, D11, and D12, the last well of each subarray contains 'Sample 16'. This results in 16 samples being loaded in a single area of the OpenArray plate.</p>
Format 224	Samples 1 to 12 in one area of the sample plate.	<p>The diagram illustrates the loading of 12 samples into an OpenArray plate using Format 224. At the top right, a 'Sample plate' is shown with 8 plate areas. Below it, a 4x8 grid of wells is shown, with 'Sample 1' in the first well and 'Sample 12' in the last well. The OpenArray plate below has eight subarrays: A1, B1, C1, D1, A12, B12, C12, and D12. Each subarray contains one well. In subarrays A1, B1, C1, and D1, the well contains 'Sample 1'. In subarrays A12, B12, C12, and D12, the well contains 'Sample 12'. This results in 12 samples being loaded in a single area of the OpenArray plate.</p>

Prepare the sample plate

Prepare the PCR mix

1. Mix the TaqMan® OpenArray® Gene Expression Master Mix by gently inverting the tube 10 times.
2. Combine the following components:

Component	Volume (µL) for 1 area of the sample plate [†]	Stock concentration	Final concentration	Units
For cDNA samples				
TaqMan® OpenArray® Gene Expression Master Mix	132.0	2	1	×
5X TaqMan® REmix Solution (Supplied in the TaqMan® OpenArray® Real-Time PCR Accessories Kit)	52.8	5	1	×
RNase-free water	15.8	---	---	---
Final volume of PCR mix	200.6	---	---	---

For gDNA samples				
TaqMan® OpenArray® Gene Expression Master Mix	132.0	2	1.00	×
5X TaqMan® REmix Solution (Supplied in the TaqMan® OpenArray® Real-Time PCR Accessories Kit)	52.8	5	1.00	×
BSA	1.3	10	0.05	mg/mL
RNase-free water	14.5	---	---	---
Final volume of PCR mix	200.6	---	---	---

[†] One area of a sample plate corresponds to one TaqMan® OpenArray® Real-Time PCR Plate.

3. Mix well by pipetting up and down.
4. Proceed immediately to [“Add sample and PCR mix to the sample plate”](#) on page 21.

Add sample and PCR mix to the sample plate

1. At room temperature, thaw the cDNA or gDNA samples. Mix the samples by vortexing, then centrifuge for 1 minute @ 1000 rpm.
2. Review the concentration of the normalized samples. The recommended starting concentration for human cDNA and gDNA samples is 108 ng/μL. See [Appendix B, “Calculator Tool” on page 55](#).
3. Add the normalized cDNA or gDNA sample to the appropriate wells of the OpenArray 384-Well Sample Plate (as determined in [“Determine the layout of the sample plate” on page 17](#)). For human cDNA and gDNA samples, use the amounts listed below *per well of the sample plate*.

Component	Volume (μL) per sample plate well [†] , when transferring to...				
	Format 18 (in triplicate)	Format 56	Format 112	Format 168	Format 224
Normalized human cDNA or gDNA sample	1.2	1.2	1.2	1.2	1.2

[†] One well of a sample plate corresponds to one subarray of a TaqMan® OpenArray® Real-Time PCR Plate. The number of subarrays required depends on the format of the OpenArray plate.

STOPPING POINT If needed, you can store the sample plate at room temperature for up to 1 hour before you add the PCR mix (step 4). Cover the sample plate to prevent evaporation.

4. Add the prepared PCR mix (from [page 20](#)) to each well that contains cDNA or gDNA sample.

Component	Volume (μL) per sample plate well [†] , when transferring to...				
	Format 18 (in triplicate)	Format 56	Format 112	Format 168	Format 224
PCR mix	3.8	3.8	3.8	3.8	3.8
Total volume (sample + PCR mix)	5.0	5.0	5.0	5.0	5.0

[†] One well of a sample plate corresponds to one subarray of a TaqMan® OpenArray® Real-Time PCR Plate. The number of subarrays required depends on the format of the OpenArray plate.

5. Mix well by gently pipetting up and down.
6. Cover the sample plate with sealing tape.
7. Centrifuge the sample plate for 1 minute @ 1000 rpm to eliminate bubbles, then place the sample plate on ice.

Proceed to [Section 3, “Prepare the TaqMan® OpenArray® Real-Time PCR Plate” on page 23](#).

Section 3 Prepare the TaqMan® OpenArray® Real-Time PCR Plate

In this section, you use the OpenArray® AutoLoader to transfer your cDNA or gDNA samples from the OpenArray® 384-Well Sample Plates (prepared in [Section 2](#)) to TaqMan® OpenArray® Real-Time PCR Plates.

This chapter covers:

■ Required materials	24
■ Storage conditions	27
■ Prepare for loading	28
■ Place an OpenArray® plate in a plate holder	29
■ Load the OpenArray® AutoLoader Tip Blocks	31
■ Run the OpenArray® AutoLoader	33
■ Seal the OpenArray® Case	37
■ Guidelines for high-throughput loading	41

Required materials

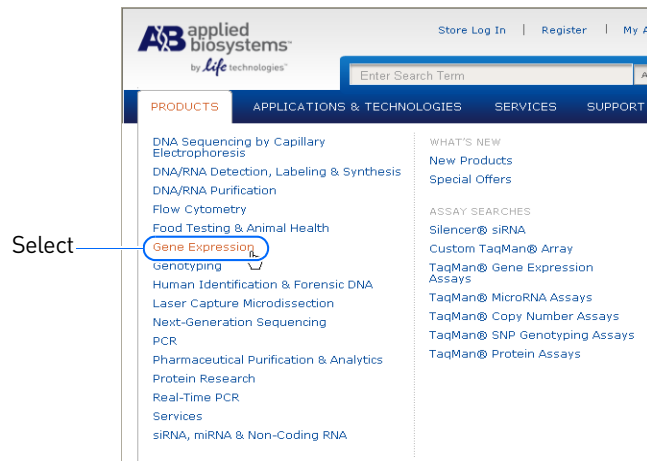
TaqMan® OpenArray® Real-Time PCR Plates

The following table provides a list of available formats for the TaqMan® OpenArray® Real-Time PCR Plates.

OpenArray plate	Part number	No. of preloaded assays	Maximum no. of samples
Format 18	4456272	18 (in triplicate)	48
Format 56	4456276	56	48
Format 112	4456268	112	24
Format 168	4456270	168	16
Format 224	4456274	224	12

Ordering the OpenArray® plates

1. Go to www.appliedbiosystems.com.
2. From the menu bar, select **PRODUCTS** ▶ **Gene Expression**.



3. On the Gene Expression page, click **Plates with More Than 384 Wells**.

Products > Gene Expression

Gene Expression

- **Custom Primers & Probes**
 - Custom Probes
 - Custom Unlabeled Primers
- **MicroRNA Assays**
 - Arrays
 - Custom TaqMan® Small RNA Assays (Early-Access)
 - TaqMan® Pri-miRNA Assays
 - TaqMan® MicroRNA Assays
 - Reverse Transcriptase Reagents
- **Controls, Reagents & Kits**
 - DNA Methylation Analysis Kits (DNA Sequencing Based)
 - Other Reagents
 - Real-Time PCR Reagents & Kits
- **Gene Expression Analysis Instruments**
 - Systems with More Than 384 Wells
 - Real-Time PCR Instruments, 48-Well
 - Real-Time PCR Instruments, 96-Well
 - Real-Time PCR Instruments, 96- & 384-Well
- **Gene Expression Assays, Plates & Arrays**
 - **Plates with More Than 384 Wells** Click
 - TaqMan® Custom Plating Service
 - Assays
 - TaqMan® Arrays (384-Well Micro Fluidic Cards)
- **Software**
 - DataAssist™ Software

4. Click **TaqMan® OpenArray® Real-Time PCR Plates**.

Plates with More Than 384 Wells

- SYBR® OpenArray® Pathway Panels
- **TaqMan® OpenArray® Real-Time PCR Plates** Click
- SYBR® OpenArray® Real-Time PCR Plates

5. (Optional) On the product page, click the **Product Description** tab for more information about the OpenArray plates.

6. Click the **Ordering Information** tab, then click **Configure**.

<input type="checkbox"/>	Product Name	Part Number	Quantity / Package	List Price ?
<input type="checkbox"/>	TaqMan® OpenArray® Real-Time PCR Plates, Inventoried Assays Format	TOA_RT_INV	10 plates	*
	Configure Click			

7. If you are not already logged in, the Store Log In page appears. On the Store Log In page, enter your user name and password. If you are not a registered user, click **Register Now**, then follow the prompts.



Note: If you are already logged in, the Store Log In page does not appear. Go to the next step.

8. In the Configurator, follow the prompts to place your order.

Other consumables and equipment

Product	Source	Part number
For loading the TaqMan® OpenArray® Real-Time PCR Plates		
OpenArray® Plate Guide Set	Applied Biosystems	20292
OpenArray® AutoLoader Tip Block	Applied Biosystems	20322
Finnpipette® Multichannel Digital Pipettor, 5 to 50 µL	Applied Biosystems	4452470
OpenArray® Loader Tips	Applied Biosystems	4404571
OpenArray® Loader Tips 10 Pack	Applied Biosystems	4404604
OpenArray® AutoLoader Plate Holder	Applied Biosystems	20384
OpenArray® AutoLoader	Applied Biosystems	4409360
For sealing the TaqMan® OpenArray® Real-Time PCR Plates		
OpenArray® Accessories Kit The accessories kit contains: <ul style="list-style-type: none"> • OpenArray® Case • OpenArray® Sealing Glue • OpenArray® Immersion Fluid 	Applied Biosystems	4404572
OpenArray® Case Sealing Station	Applied Biosystems	4409361
Ethanol†	Major Laboratory Suppliers (MLS)	---
Razor blade	MLS	---
25 Slide Holder	Applied Biosystems	4407056
OpenArray® Frame	Applied Biosystems	4453942
OpenArray® Frame Adhesive	Applied Biosystems	4453940
For general use		
Powder-free nitrile gloves	MLS	---
Laboratory-grade wipes	MLS	---
Tweezers or forceps	MLS	---
3 Plastic bins (medium to large) for washing the tip blocks and plate holders	MLS	---
(Optional) Filtered 100% compressed nitrogen gas or residue-free compressed air canister, for drying the plate holder, tip blocks, and plate guides.	MLS	---
(Optional) Hand-held spray attachment for the compressed gas/air canister	MLS	---


† For the SDS of any chemical not distributed by Applied Biosystems, contact the chemical manufacturer. Before handling any chemicals, refer to the SDS provided by the manufacturer, and observe all relevant precautions.

Storage conditions

The following materials require special storage conditions:

Item		Storage Conditions
TaqMan® OpenArray® Real-Time PCR Plate		
If the OpenArray plate is...	Frozen, unopened	Store at -20 °C until the expiration date provided on the product label.
	Thawed, unopened	Store at room temperature for up to 24 hours.
	Thawed, opened	Store at room temperature for up to 1 hour.
	Loaded and sealed	Store at room temperature, in the dark, for up to 1 hour.
OpenArray® Immersion Fluid		See the product label for storage conditions and expiration date. After you open the package, do not store any remaining immersion fluid; use the amount required, then discard the remainder.
OpenArray® Loader Tips		See the product label for storage conditions and expiration date. After you open the package, discard unused tips after 2 weeks.
OpenArray® Sealing Glue		Store the glue in a dark place; ambient light can cure the glue in the tip. If the glue has been open more than 2 weeks, discard it and use a new tube.

Prepare for loading

1. Be sure that the OpenArray® AutoLoader, OpenArray® Plate Guide Set, OpenArray® AutoLoader Tip Blocks, and OpenArray® AutoLoader Plate Holder are completely clean and dry. For cleaning procedures, refer to the *OpenArray® Real-Time PCR System User Guide*.
 - ⚠ **IMPORTANT!** Residual water prevents correct loading of the samples into the TaqMan® OpenArray® Real-Time PCR Plates.
2. Remove the OpenArray plates from the freezer, *but do not open the packaging*. Allow the OpenArray plates to thaw at room temperature (approximately 5 minutes).
 -  **Note:** Unopened OpenArray plates can remain at room temperature for up to 24 hours.
 - ⚠ **IMPORTANT!** Thaw only the OpenArray plates you will need for the current loading session.
3. Fill the appropriate number of OpenArray® Cases with OpenArray® Immersion Fluid:
 - a. Using scissors, open a container of immersion fluid.
 - b. Place the case in the case rack, then fill approximately 3/4 of the case with immersion fluid.
 - ⚠ **IMPORTANT!** *Within 1 hour after opening the container of immersion fluid, fill the case with immersion fluid, insert a loaded OpenArray plate, then seal the case.*

Proceed immediately to [“Place an OpenArray® plate in a plate holder” on page 29.](#)

Place an OpenArray® plate in a plate holder

Important guidelines for handling the OpenArray® plate

- Wear gloves that are one size smaller than the size you typically wear, to help prevent excess glove material from contacting the OpenArray plate while loading.
- Hold the OpenArray plate by the edges, at the end opposite from the barcode. Do not touch the through-holes.
- *Within 1 hour after opening the plate packaging*, load the OpenArray plate with sample, place the loaded plate in an OpenArray Case, then seal the case.
- If you drop a loaded OpenArray plate, discard it in the appropriate waste container.

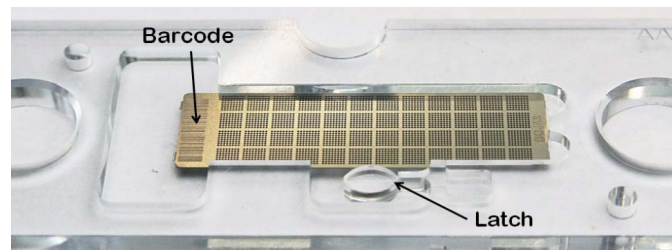
Place the OpenArray® plate in the plate holder

1. Remove a thawed OpenArray plate from its packaging.

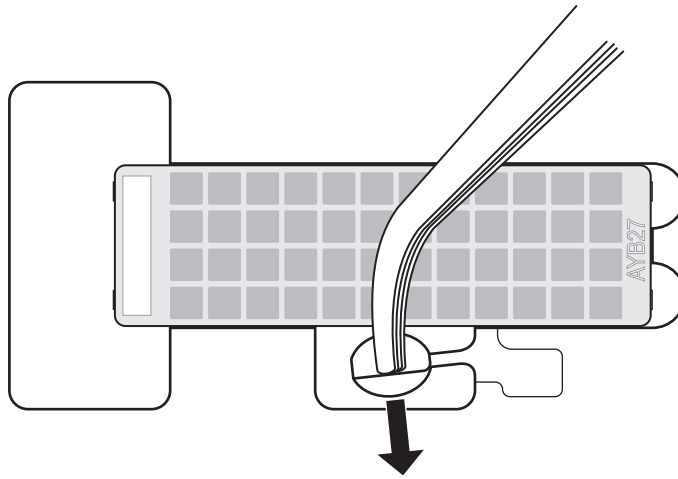


Note: You may want to save the OpenArray plate packaging, because you can scan the barcode on the package to enter the OpenArray plate serial number into the OpenArray® Real-Time qPCR Analysis Software. Refer to the *OpenArray® Real-Time PCR System User Guide*.

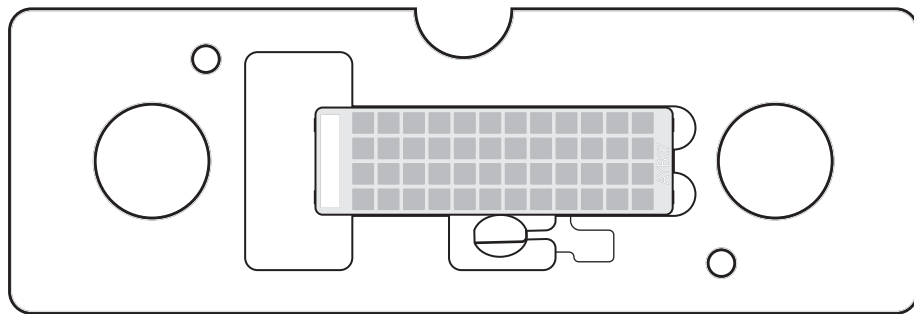
2. Orient the OpenArray® AutoLoader Plate Holder so that the latch is towards you.
3. Orient the OpenArray plate so that the barcode faces up and to your left.



4. Pull the latch on the plate holder towards you, as shown below. The OpenArray plate drops into place. Be sure that the OpenArray plate reaches all the way to the right of the plate holder, then release the latch.



5. With clean tweezers, push the OpenArray plate flat. Push the tweezers against all four corners and the edges, carefully avoiding the through-holes. The numbered side of the OpenArray plate should be level with the plate holder.



- ⚠ **IMPORTANT!** Proceed immediately to [“Load the OpenArray® AutoLoader Tip Blocks”](#) on page 31.

Load the OpenArray® AutoLoader tip blocks

1. Using tweezers, peel the sealing tape from the area of the sample plate that contains the samples to be transferred.
2. From the OpenArray® Plate Guide Set, select the plate guide that aligns with the 12-well × 4-well areas in the sample plate:
 - One plate guide is for sample plate areas 1, 3, 6, and 8 (shown below).
 - One plate guide is for sample plate areas 2, 4, 5, and 7.



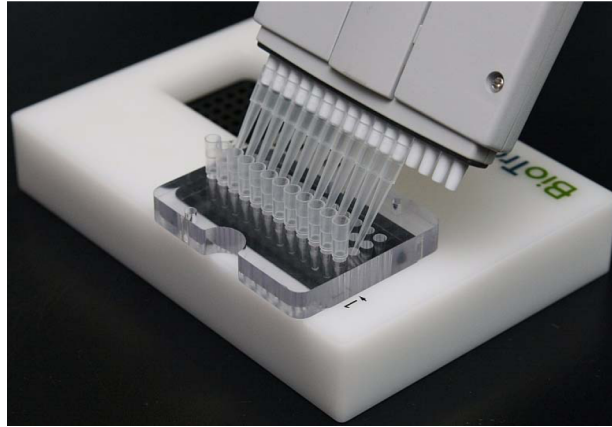
3. Place the plate guide over the sample plate.
 - ⓘ **IMPORTANT!** Be sure that the plate guide sits flat on the benchtop. The plate guide should not be tilted by the sample plate beneath it. To check the plate guide position, gently slide the plate guide across the benchtop. If the plate guide is not aligned correctly, it slips toward the base of the sample plate.
4. Place the tip block into the appropriate area of the plate guide.

For example, place the tip block in position 1 to load the tips with samples from sample plate area 1. Sample plate area 1 includes wells A1 to A12, B1 to B12, C1 to C12, and D1 to D12. For an illustration of the sample plate areas, refer to [“Determine the layout of the sample plate”](#) on page 17.



- Using the Finnpipette® Multichannel Digital Pipettor (or by hand), place 12 OpenArray® Loader Tips in each hole of the tip block (one row). Release the tips when they are submerged.

⚠ **IMPORTANT!** Do not press firmly when inserting the tips into the tip block. Let the tips drop into the tip block slots.

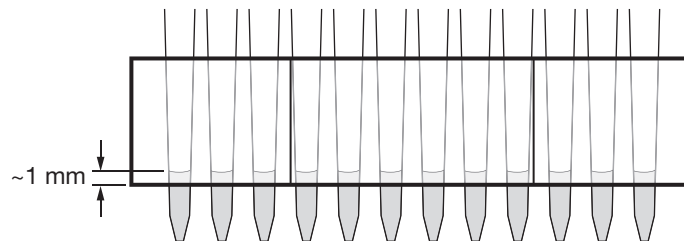


Place 12 tips into the tip block as shown. If you are using the digital pipettor, four channels will be empty.

- Slide the tip block up and down (25 to 50 times), until the tips:
 - Are filled to 1 mm above the bottom edge of the tip block.
 - Have no air bubbles.

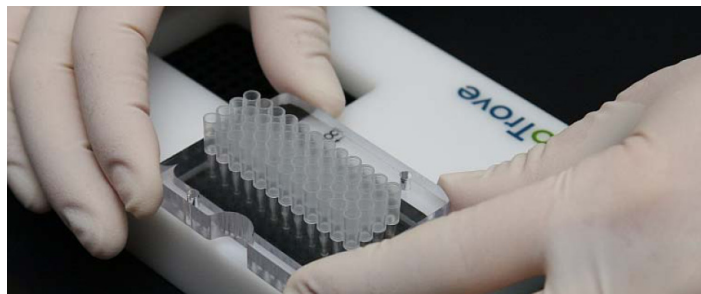
You can remove the tip block to look at the tips. When you replace the tip block to load more sample, be sure to:

- Level the tip heights.
- Keep the tip block in the same orientation. If you turn the tip block around, the samples will mix together and become contaminated.



⚠ **IMPORTANT!** If the tips are not filled correctly, product performance may be adversely affected.

- Leave the tip block with the loaded tips in the plate guide, keeping the tips submerged in sample, until the OpenArray plate is ready for loading.

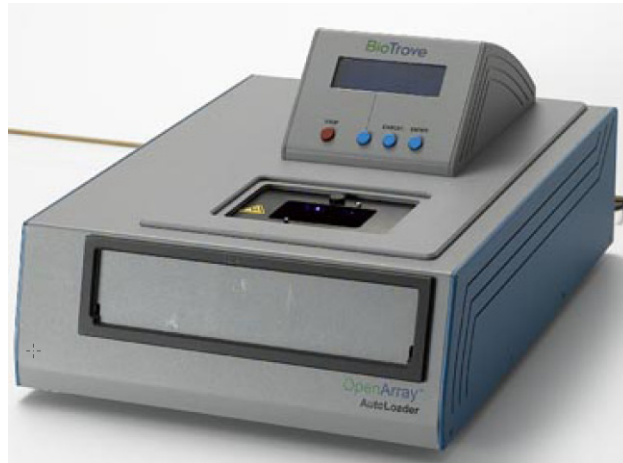


8. If you are transferring samples from additional sample plates, repeat this procedure for each sample plate.

⚠ **IMPORTANT!** Proceed immediately to “Run the OpenArray® AutoLoader” below.

Run the OpenArray® AutoLoader

Use the OpenArray® AutoLoader to load the TaqMan® OpenArray® Real-Time PCR Plates (that is, transfer samples from the sample plate onto OpenArray plates).



Set up the AutoLoader

For the following hazards, see the complete safety alert descriptions in [Appendix D, “Safety”](#):



WARNING! PHYSICAL INJURY HAZARD. Moving parts can crush and cut. Keep hands clear of moving parts while operating the instrument.

1. Power on the AutoLoader. The AutoLoader homes the platform, then displays: “Welcome, AutoLoader Ready! Press Enter to Start”.
2. Press ENTER. The screen displays:
Samples/Subarray:
ENTER: #
NEXT: More Choices
where # is the number of loads the AutoLoader will perform: **ONE, TWO, or THREE**

3. Press **ENTER** to accept the current number, *or* press **NEXT** until the correct number is displayed, then press **ENTER**. Be sure to select the correct number of loads for your OpenArray plate:

OpenArray plate	No. of loads
Format 18	ONE
Format 56	ONE
Format 112	ONE
Format 168	ONE
Format 224	ONE



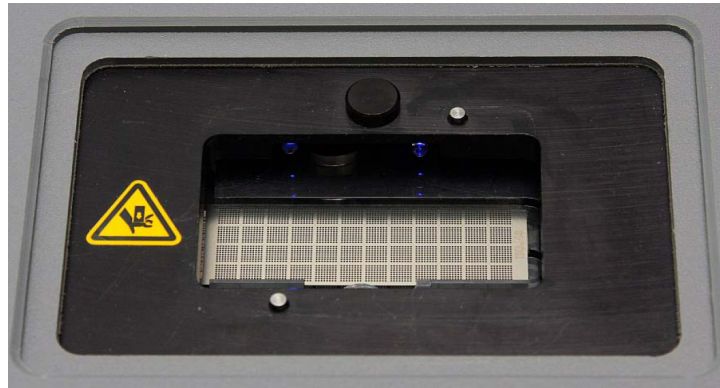
Note: To change the number of loads that you entered, press **CANCEL**, then at the “Continue with the Cancel” prompt, press **ENTER**.

4. At the “Insert OpenArray Holder” prompt, place the OpenArray plate and plate holder on the AutoLoader platform. Be sure that the:
- Notch in the plate holder faces the instrument.
 - Holes in the plate holder are aligned with the circular guides on the AutoLoader platform.



5. Gently push the plate holder all the way down. Be sure that there is no rocking motion when you apply pressure.

6. Press **ENTER** to send the platform to the load position, then press **ENTER** again.



7. At the “Please Insert Tip Block #1” prompt, insert the loaded tip block (from step 7 on page 32):

ⓘ **IMPORTANT!** Insert the loaded tip block only when prompted. Otherwise, the AutoLoader will calibrate and return to the Welcome screen.

- a. Place the loaded tip block above the OpenArray plate.
- b. Align the tip block with the metal guide pins on the AutoLoader.
- c. Bring the tip block straight down, without tilting it. Slowly position the tip block over the metal guide pins.

ⓘ **IMPORTANT!** Perform this step slowly and evenly to prevent improper sample loading (for example, too much sample or not enough sample).

8. Be sure that the tip heights are level:

- Gently slide your finger across the tops of the tips so that the tip heights are level.
- or*
- Gently rest another tip block on top of the tips until the tip heights are level, then remove the tip block.


ⓘ **IMPORTANT!** For the AutoLoader to properly load the OpenArray plate with sample, the tip heights must be level.

Load the sample

- ❗ **IMPORTANT!** Be sure that you have prepared the OpenArray Cases before performing this procedure (see step 3 on [page 28](#)). After an OpenArray plate is loaded with sample, you must immediately place the plate into a case.
- ❗ **IMPORTANT!** After you press **ENTER** (step 1 below), you cannot stop the AutoLoader. To stop the AutoLoader *before you begin loading sample*, press **STOP** now. The AutoLoader ends the current operation, calibrates, then returns to the Welcome screen. If you are prompted to remove the tip block, you must remove the tip block to proceed.

1. On the AutoLoader, press **ENTER**. The AutoLoader transfers the samples to the the OpenArray plate. Each tip fills 64 through-holes in one subarray, as follows:

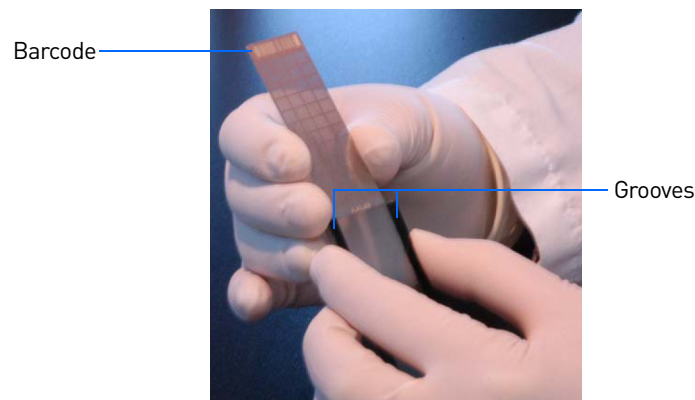
OpenArray plate	OpenArray plate subarray locations
Format 18	Through-holes A1 through H8
Format 56	
Format 112	
Format 168	
Format 224	

2. At the “Please Remove Tip Block. Hit Enter to Continue” prompt, remove the tip block:
 - a. Slowly pull the tip block straight up, without any rocking motion. To prevent rocking, it may be helpful to hold the tip block with your index finger and thumb, and press your remaining fingers against the AutoLoader surface.
 -  **Note:** To ensure that the samples are uniformly loaded in the OpenArray plate, remove the tip block slowly and evenly.
 - b. Press **ENTER**.
 3. Follow the prompts to remove the plate holder from the AutoLoader platform.
 4. Remove the OpenArray plate from the plate holder:
 - a. Place the plate holder on a flat surface.
 - b. With one hand, push the latch down.
 - c. With the other hand, grasp the edge of the OpenArray plate and lift it out.
 - ❗ **IMPORTANT!** Hold the OpenArray plate by the edges, at the end opposite from the barcode. Do not touch the through-holes. If you drop a loaded OpenArray plate, discard it in the appropriate waste container.
- ❗ **IMPORTANT!** To prevent evaporation of the samples, proceed *immediately* to “[Seal the OpenArray® Case](#)” on [page 37](#).

Seal the OpenArray® Case

Insert the loaded OpenArray® plate into a prepared OpenArray® Case

1. Hold the OpenArray plate by its edges, at the end opposite from the barcode, with the barcode facing up.
 - ⚠ **IMPORTANT!** Do not touch the through-holes. If you drop a loaded OpenArray plate, discard it in the appropriate waste container.
2. Slide the OpenArray plate into a prepared OpenArray Case. Be sure that the:
 - OpenArray plate barcode is at the top of the case and facing the black side of the case.
 - Plate aligns with the grooves in the case. Misalignment may cause surface rubbing, loss of samples, and/or contamination.



3. Push the OpenArray plate all the way down into the case, using tweezers if needed. The bottom of the plate should touch the bottom of the case; there should be ~1 cm of space at the top.
4. The immersion fluid should be level with the OpenArray plate. If needed, add or remove immersion fluid with a pipette.

Seal the OpenArray® Case

Use the OpenArray® Sealing Glue and the OpenArray® Case Sealing Station to seal the OpenArray Case so that immersion fluid does not leak during the real-time imaging run.

- ⚠ **IMPORTANT!** If the glue has been open more than 2 weeks, discard it and use a new tube. Store the glue in a dark place; ambient light can cure the glue in the tip.

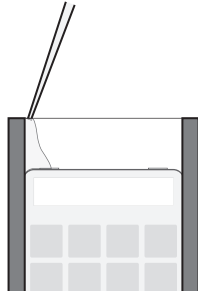
For the following hazards, see the complete safety alert descriptions in [Appendix D, "Safety"](#):



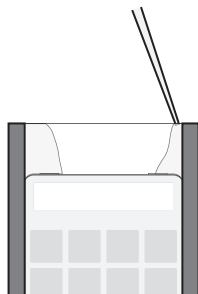
WARNING! ULTRAVIOLET LIGHT HAZARD.

1. Fill the case with glue:

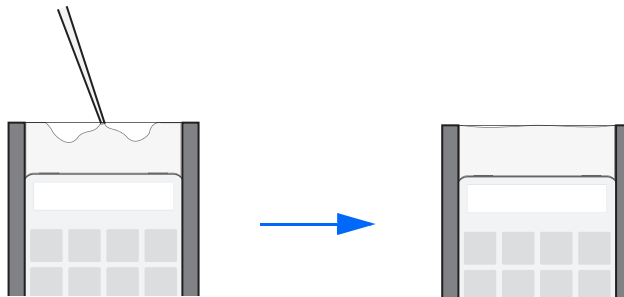
- a. Place a drop of glue on one edge of the OpenArray Case opening, then fill the opening until the glue reaches the top of the case. Angle the tip so that the glue reaches the inside rail.



- b. Repeat step 1a on the other edge of the case opening.

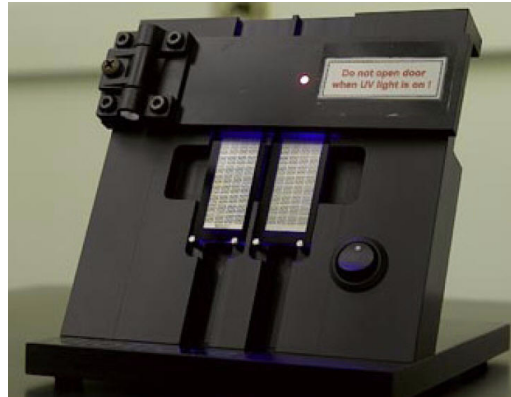


- c. Continue adding glue on each side until the glue runs together in the middle. Fill the case to the top. Be sure that both the left and right sides are covered with glue.



2. If you see air bubbles in the immersion fluid underneath the glue, use a small pipette to carefully aspirate the bubbles.
3. With a lint-free wipe, wipe any excess glue from the surface of the glass.

4. Cure the glue:
 - a. Place the case(s) in the sealing station so that the barcode faces out, then close the door. You can place up to two cases at a time in the sealing station.
 - b. Turn the switch to **ON**, allow the glue to cure for 3 minutes, then turn the switch to **OFF**.
 - c. Open the door, turn the case(s) over, then repeat step 4b.
 - d. Remove the cases.



Clean the OpenArray® Case

- ⓘ **IMPORTANT!** Be sure to clean each OpenArray Case thoroughly. Dust, glue, or excess sample on the case may interfere with thermal uniformity and may fluoresce. While cleaning, do not squeeze the case; gently hold the case to ensure that the glass does not touch the OpenArray plate through-holes.
1. If there is any glue on a case, carefully remove the glue with a razor blade. Be sure not to scratch the glass.
 2. Moisten a lint-free wipe with ethanol, then gently wipe the case surface.
 3. Allow the case to air-dry, or spray each side of the case with compressed air for 2 seconds.

Frame the OpenArray® Case

To ensure that the loaded OpenArray Case tightly contacts the heat block in the OpenArray instrument, attach an OpenArray® Frame to the case.

1. Be sure that the frame is clean (there should be no residual adhesive from previous runs).
2. Place the loaded OpenArray Case on a lint-free wipe, with the black side of the case facing up.
3. Using scissors, cut two ~3-mm rectangles from the OpenArray® Frame Adhesive.

4. Using tweezers, remove the backing from one side of the frame adhesive, then stick the adhesive to the frame: one piece of adhesive in the middle of each long side.



5. Using tweezers, remove the backing from the other side the frame adhesive.
6. Align two corners of the frame with two corners of the case, then bring the other corners of the frame down onto the case. Flatten the frame against the case for 10 seconds.



Proceed to real-time imaging and analysis with the OpenArray® instrument. For procedures, refer to the *OpenArray® Real-Time PCR System User Guide*.



Note: After the loaded OpenArray plate is sealed, you can store it at room temperature, in the dark, for up to 1 hour.

Guidelines for high-throughput loading

For optimal efficiency when loading large numbers (>6) of OpenArray plates, follow the guidelines below.

Before you begin loading

- If possible, obtain a tip block for each OpenArray plate to load during the high-throughput loading session.
- Be sure that all the tip blocks are clean and dry, then stack the tip blocks next to the AutoLoader. For cleaning procedures, refer to the *OpenArray® Real-Time PCR System User Guide*.
- Fill all OpenArray Cases with immersion fluid, then place the cases in a vertical slide rack.
- Insert all of the OpenArray plates into plate holders, then stack the plate holders to one side.
- Load the tip blocks with cDNA or gDNA samples. Be sure that the tips are filled to 1 mm above the bottom edge of the tip block and that there are no air bubbles.

During and after loading

- To help avoid mistakes when entering sample information in the OpenArray® Real-Time qPCR Analysis Software, run the OpenArray plates in the AutoLoader in alphanumeric order (per the OpenArray plate serial number).
- Seal the OpenArray Cases as time permits. You can:
 - Seal all the cases at once, after the loading session is completed.
 - Seal the cases in batches, while other OpenArray plates are being loaded.
- ⓘ **IMPORTANT!** To avoid evaporation, insert the OpenArray plate into a case and cover it with immersion fluid immediately after loading. However, the cases can be left unsealed for up to 8 hours.
- Use a carrying case to transport several loaded OpenArray plates from the case sealing station to the OpenArray® instrument.
- After loading is complete, you can use a large bin to clean several tip blocks at a time. For cleaning procedures, refer to the *OpenArray® Real-Time PCR System User Guide*.


Create a sample information file (*.csv) for sample tracking

This appendix covers:

- Overview 43
- Use the Sample Tracking Tool. 44
- Use a spreadsheet or simple text program 49
- Export sample information from an existing *.ncx file 51

Overview

Most researchers maintain stocks of cDNA or gDNA samples in individual tubes or in 96-well stock plates. However, samples to be used with the OpenArray® Real-Time PCR System must be transferred first to an OpenArray® 384-Well Sample Plate, and then to a TaqMan® OpenArray® Real-Time PCR Plate.

 **IMPORTANT!** To ensure accurate data results, you must correctly track the sample IDs from plate to plate (stock plate to sample plate to OpenArray plate).

Applied Biosystems recommends that you create a sample information file (*.csv) to track your samples. Prior to imaging the OpenArray plates, you can import the *.csv file into the OpenArray® Real-Time qPCR Analysis Software.

You can create a sample information file in one of three ways:

- (Recommended) [Use the Sample Tracking Tool \(page 44\)](#)
- [Use a spreadsheet or simple text program \(page 49\)](#)
- [Export sample information from an existing *.ncx file \(page 51\)](#)

Include no template controls

Applied Biosystems strongly recommends that you include at least one no template control (NTC) per OpenArray plate. NTCs serve as negative controls, and they are useful in data analysis. When adding NTCs to the 96-well stock plate, place one NTC in each section of the stock plate to ensure that the NTCs are plated in the correct location in the OpenArray plate. Also follow this procedure for any positive controls (for example, CEPH DNA).

Use the Sample Tracking Tool

About the Sample Tracking Tool

The Sample Tracking Tool is a spreadsheet created with the Microsoft® Excel® Software that Applied Biosystems provides during training.

Applied Biosystems recommends that you use the Sample Tracking Tool to convert the sample IDs to the appropriate format. When you use the tool, you only need to enter the sample IDs once, then the process of transferring the sample information from plate to plate is automatic.

Standard vs. modified spreadsheet

Applied Biosystems provides a standard spreadsheet in the Sample Tracking Tool. The standard spreadsheet applies to the Format 64 (64 × 48) TaqMan® OpenArray® Genotyping Plate. You need to modify the standard spreadsheet to create the correct *.csv file for the TaqMan OpenArray Real-Time PCR Plates. How you modify the spreadsheet depends on:

- The TaqMan OpenArray Real-Time PCR Plate format that you are loading the samples into (Format 18, 56, 112, 168, or 224)
- The method that you use to transfer the samples



Note: If you are unfamiliar with the Excel software, contact Applied Biosystems Technical Support for help with modifying the spreadsheet.

Example in this section

The standard spreadsheet was used for the example experiment illustrated in this section. The example experiment used:

- The Format 64 (64 × 48) TaqMan® OpenArray® Genotyping Plate.
- A 12-channel pipette with 9-mm spacing. The 384-well sample plates have 4.5-mm spacing; due to the 9-mm spacing of the pipette, sample was added to every other well in the 384-well sample plate. That is, all samples from row A of the 96-well plate were transferred to the odd-numbered wells of row A in the 384-well sample plate; all samples from row B of the 96-well plate were transferred to the even-numbered wells of row A in the 384-well sample plate, and so on.

Edit the spreadsheet

1. Open the Sample Tracking Tool to start the Excel software.
2. Select the **Entry for Samples – List Format** tab.

1	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	96 well plate #	Well Location	Sample ID		96 well plate #	Well Location	Sample ID		96 well plate #	Well Location	Sample ID		96 well plate #	Well Location	Sample ID
2	1	A01			2	A01			3	A01			4	A01	
3	1	A02			2	A02			3	A02			4	A02	
4	1	A03			2	A03			3	A03			4	A03	
5	1	A04			2	A04			3	A04			4	A04	
6	1	A05			2	A05			3	A05			4	A05	
7	1	A06			2	A06			3	A06			4	A06	
8	1	A07			2	A07			3	A07			4	A07	
9	1	A08			2	A08			3	A08			4	A08	
10	1	A09			2	A09			3	A09			4	A09	
11	1	A10			2	A10			3	A10			4	A10	
12	1	A11			2	A11			3	A11			4	A11	
13	1	A12			2	A12			3	A12			4	A12	
14	1	B01			2	B01			3	B01			4	B01	
15	1	B02			2	B02			3	B02			4	B02	
16	1	B03			2	B03			3	B03			4	B03	
17	1	B04			2	B04			3	B04			4	B04	
18	1	B05			2	B05			3	B05			4	B05	
19	1	B06			2	B06			3	B06			4	B06	
20	1	B07			2	B07			3	B07			4	B07	
21	1	B08			2	B08			3	B08			4	B08	
22	1	B09			2	B09			3	B09			4	B09	
23	1	B10			2	B10			3	B10			4	B10	
24	1	B11			2	B11			3	B11			4	B11	
25	1	B12			2	B12			3	B12			4	B12	
26	1	C01			2	C01			3	C01			4	C01	
27	1	C02			2	C02			3	C02			4	C02	
28	1	C03			2	C03			3	C03			4	C03	
29	1	C04			2	C04			3	C04			4	C04	
30	1	C05			2	C05			3	C05			4	C05	
31	1	C06			2	C06			3	C06			4	C06	
32	1	C07			2	C07			3	C07			4	C07	
33	1	C08			2	C08			3	C08			4	C08	
34	1	C09			2	C09			3	C09			4	C09	
35	1	C10			2	C10			3	C10			4	C10	
36	1	C11			2	C11			3	C11			4	C11	
37	1	C12			2	C12			3	C12			4	C12	

3. Enter the sample IDs next to the appropriate well locations. You can enter up to four 96-well plates per spreadsheet (four 96-well plates are equal to one 384-well sample plate).

	A	B	C
1	96 well plate #	Well Location	Sample ID
2	1	A01	N1
3	1	A02	N2
4	1	A03	N3
5	1	A04	N4
6	1	A05	N5
7	1	A06	NTC
8	1	A07	N6
9	1	A08	N7
10	1	A09	N8
11	1	A10	N9
12	1	A11	N10
13	1	A12	NTC
14	1	B01	N11
15	1	B02	N12
16	1	B03	N13
17	1	B04	N14
18	1	B05	N15
19	1	B06	N16
20	1	B07	N17
21	1	B08	N18
22	1	B09	N19
23	1	B10	N20
24	1	B11	N21
25	1	B12	N22

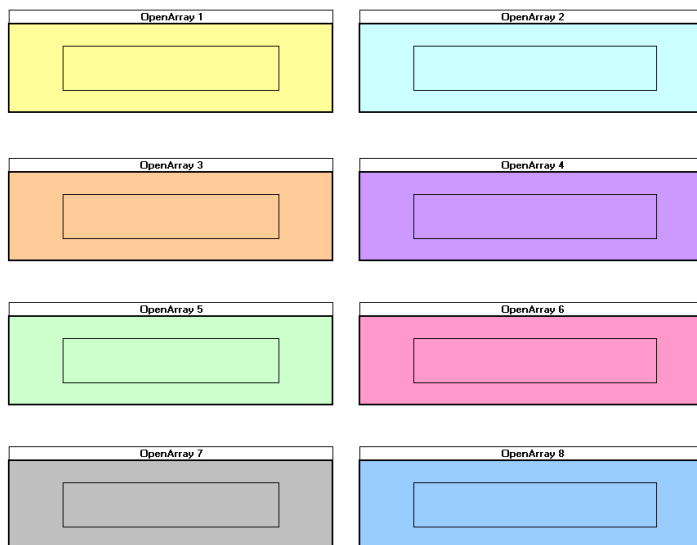
For each 96-well plate in the spreadsheet, the sample IDs are color-coded in groups of six, using alternate colors.

4. Select the **Entry for Samples – Plate Format** tab, then confirm that the three plate views correspond to the layout of your stock gDNA plate:

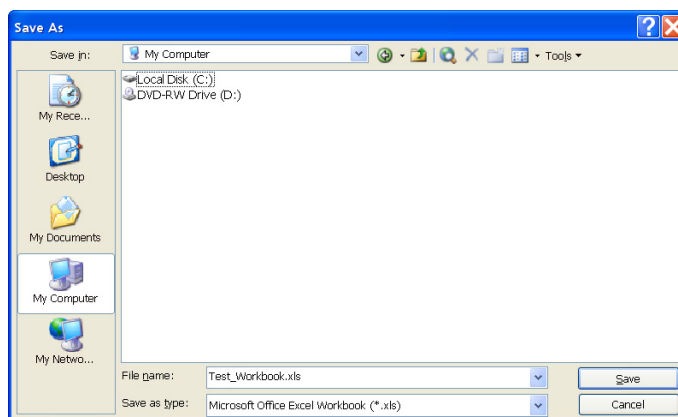
Plate view	Example																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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5. (Optional) Enter barcodes to track the eight plate areas of the 384-well sample plate to the eight OpenArray plates. The barcode is located on the OpenArray plate and on its packaging.

(For your records, scan or type in your barcodes into the corresponding boxes)



6. Save your changes to a new spreadsheet file (*.xls):
 - a. Select **File** ► **Save As**.
 - b. Browse to a save location, enter a file name, then select *.xls as the file type.
 - c. Click **Save**.

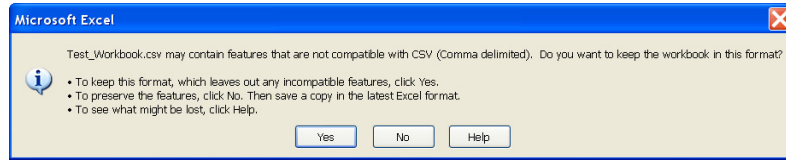


Generate the *.csv file

1. In the saved spreadsheet (from step 6 on page 47), select the **CSV Format** tab, then confirm that all of the information you entered (including sample ID, OpenArray plate barcode and, if applicable, sample plate barcode) appears as text in the appropriate columns.

	A	B	C	D	E	F	G
1	SamplePlate_SelectedAreaIndex	SamplePlate_SerialNumber	SampleInfo_Address	SampleInfo_SampleID			
2	0		A1	N1			
3	0		A2	N11			
4	0		A3	N2			
5	0		A4	N12			
6	0		A5	N3			
7	0		A6	N13			
8	0		A7	N4			
9	0		A8	N14			
10	0		A9	N5			
11	0		A10	N15			
12	0		A11	NTC			
13	0		A12	N16			
14	0		A13	N6			
15	0		A14	N17			
16	0		A15	N7			
17	0		A16	N18			
18	0		A17	N8			
19	0		A18	N19			
20	0		A19	N9			
21	0		A20	N20			
22	0		A21	N10			
23	0		A22	N21			
24	0		A23	NTC			
25	0		A24	N22			
26	0		B1	N23			
27	0		B2	N35			
28	0		B3	N24			
29	0		B4	N36			
30	0		B5	N25			
31	0		B6	N37			
32	0		B7	N26			
33	0		B8	N38			
34	0		B9	N27			
35	0		B10	N39			
36	0		B11	N28			
37	0		B12	N40			
38	0		B13	N29			
39	0		B14	N41			
40	0		B15	N30			
41	0		B16	N42			
42	0		B17	N43			
43	0		B18	N44			
44	0		B19	N45			
45	0		B20	N46			
46	0		B21	N47			
47	0		B22	N48			
48	0		B23	N49			
49	0		B24	N50			
50	0		B25	N51			
51	0		B26	N52			
52	0		B27	N53			
53	0		B28	N54			
54	0		B29	N55			
55	0		B30	N56			
56	0		B31	N57			
57	0		B32	N58			
58	0		B33	N59			
59	0		B34	N60			
60	0		B35	N61			
61	0		B36	N62			
62	0		B37	N63			
63	0		B38	N64			
64	0		B39	N65			
65	0		B40	N66			
66	0		B41	N67			
67	0		B42	N68			
68	0		B43	N69			
69	0		B44	N70			
70	0		B45	N71			
71	0		B46	N72			
72	0		B47	N73			
73	0		B48	N74			
74	0		B49	N75			
75	0		B50	N76			
76	0		B51	N77			
77	0		B52	N78			
78	0		B53	N79			
79	0		B54	N80			
80	0		B55	N81			
81	0		B56	N82			
82	0		B57	N83			
83	0		B58	N84			
84	0		B59	N85			
85	0		B60	N86			
86	0		B61	N87			
87	0		B62	N88			
88	0		B63	N89			
89	0		B64	N90			
90	0		B65	N91			
91	0		B66	N92			
92	0		B67	N93			
93	0		B68	N94			
94	0		B69	N95			
95	0		B70	N96			
96	0		B71	N97			
97	0		B72	N98			
98	0		B73	N99			
99	0		B74	N100			
100	0		B75	N101			
101	0		B76	N102			
102	0		B77	N103			
103	0		B78	N104			
104	0		B79	N105			
105	0		B80	N106			
106	0		B81	N107			
107	0		B82	N108			
108	0		B83	N109			
109	0		B84	N110			
110	0		B85	N111			
111	0		B86	N112			
112	0		B87	N113			
113	0		B88	N114			
114	0		B89	N115			
115	0		B90	N116			
116	0		B91	N117			
117	0		B92	N118			
118	0		B93	N119			
119	0		B94	N120			
120	0		B95	N121			
121	0		B96	N122			
122	0		B97	N123			
123	0		B98	N124			
124	0		B99	N125			
125	0		B100	N126			
126	0		B101	N127			
127	0		B102	N128			
128	0		B103	N129			
129	0		B104	N130			
130	0		B105	N131			
131	0		B106	N132			
132	0		B107	N133			
133	0		B108	N134			
134	0		B109	N135			
135	0		B110	N136			
136	0		B111	N137			
137	0		B112	N138			
138	0		B113	N139			
139	0		B114	N140			
140	0		B115	N141			
141	0		B116	N142			
142	0		B117	N143			
143	0		B118	N144			
144	0		B119	N145			
145	0		B120	N146			
146	0		B121	N147			
147	0		B122	N148			
148	0		B123	N149			
149	0		B124	N150			
150	0		B125	N151			
151	0		B126	N152			
152	0		B127	N153			
153	0		B128	N154			
154	0		B129	N155			
155	0		B130	N156			
156	0		B131	N157			
157	0		B132	N158			
158	0		B133	N159			
159	0		B134	N160			
160	0		B135	N161			
161	0		B136	N162			
162	0		B137	N163			
163	0		B138	N164			
164	0		B139	N165			
165	0		B140	N166			
166	0		B141	N167			
167	0		B142	N168			
168	0		B143	N169			
169	0		B144	N170			
170	0		B145	N171			
171	0		B146	N172			
172	0		B147	N173			
173	0		B148	N174			
174	0		B149	N175			
175	0		B150	N176			
176	0		B151	N177			
177	0		B152	N178			
178	0		B153	N179			
179	0		B154	N180			
180	0		B155	N181			
181	0		B156	N182			
182	0		B157	N183			
183	0		B158	N184			
184	0		B159	N185			
185	0		B160	N186			
186	0		B161	N187			
187	0		B162	N188			
188	0		B163	N189			
189	0		B164	N190			
190	0		B165	N191			
191	0		B166	N192			
192	0		B167	N193			
193	0		B168	N194			
194	0		B169	N195			
195	0		B170	N196			
196	0		B171	N197			
197	0		B172	N198			
198	0		B173	N199			
199	0		B174	N200			
200	0		B175	N201			
201	0		B176	N202			
202	0		B177	N203			
203	0		B178	N204			
204	0		B179	N205			
205	0		B180	N206			
206	0		B181	N207			
207	0		B182	N208			
208	0		B183	N209			
209	0		B184	N210			
210	0		B185	N211			
211	0		B186	N212			
212	0		B187	N213			
213	0		B188	N214			
214	0		B189	N215			
215	0		B190	N216			
216	0		B191	N217			
217	0		B192	N218			
218	0		B193	N219			
219	0		B194	N220			
220	0		B195	N221			
221	0		B196	N222			
222	0		B197	N223			
223	0		B198	N224			
224	0		B199	N225			
225	0		B200	N226			
226	0		B201	N227			
227	0		B202	N228			
228	0		B203	N229			
229	0		B204	N230			
230	0		B205	N231			
231	0		B206	N232			
232	0		B207	N233			
233	0		B208	N234			
234	0		B209	N235			
235	0		B210	N236			
236	0		B211	N237			
237	0		B212	N238			
238	0		B213	N239			
239	0		B214	N240			
240	0		B215	N241			
241	0		B216	N242			
242	0		B217	N243			
243	0		B218	N244			
244	0		B219	N245			
245	0		B220	N246			
246	0		B221	N247			
247	0		B222	N248			
248	0		B223	N249			
249	0		B224	N250			

4. If you are prompted to keep the workbook in the current format (*.csv), click **Yes**.



The software saves and closes the new *.csv file. Prior to imaging the OpenArray plates, you can import the *.csv file into the OpenArray software, as described in the *OpenArray® Real-Time PCR System User Guide*.


Use a spreadsheet or simple text program

1. Open a new file in a simple text program or in a spreadsheet program (such as Microsoft® Excel® Software).
2. In Row 1, enter column headings, as described below.


- a. Include the following columns:

Column heading	Column description
SampleInfo.Address	The well address of the sample on the sample plate (for example, A1)
SampleInfo.SampleID	Identifying information for the sample (user-defined)
SampleInfo.Description	A description of the sample (user-defined)

- b. (Optional) Add new columns (user-defined) to the right of the required columns.
3. In the remaining rows, enter information for each sample in the sample plate. Follow these guidelines:
 - Include all samples and all NTCs in the sample plate.
 - Enter information for only one sample per row.

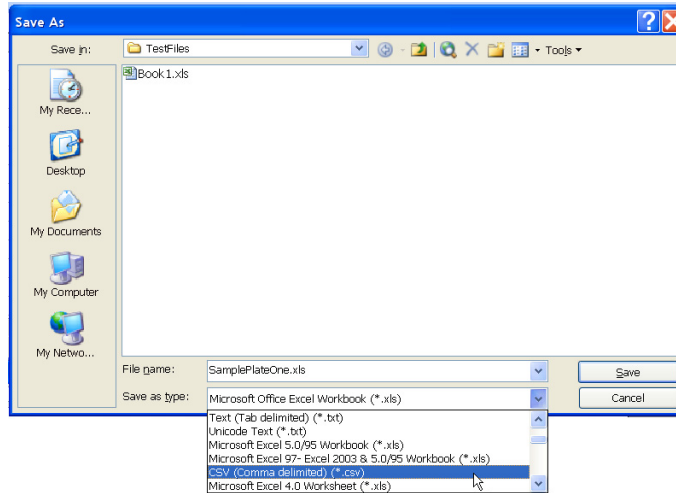
 **Note:** You can have a maximum of 385 rows: One row for the column headings, and up to 384 rows with sample information.

4. Save the spreadsheet as a *.csv file:
 - a. Select **File** ▶ **Save As**.
 - b. Browse to a save location, enter a file name, then select *.csv as the file type.

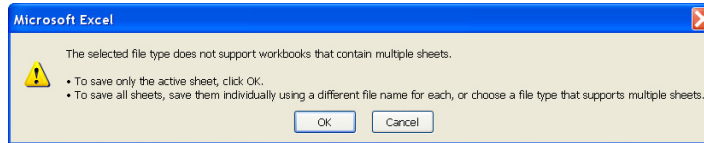
 **Note:** Applied Biosystems recommends that you name the file with the same unique identifier as the sample plate.

Appendix A Create a sample information file (*.csv) for sample tracking
Use a spreadsheet or simple text program

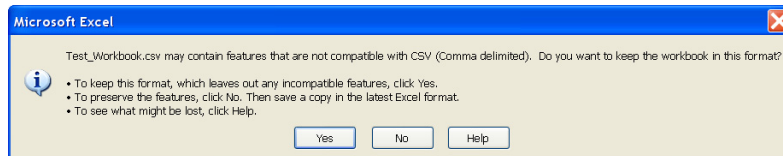
c. Click Save.



5. At the prompt, click OK to save only the active sheet.



6. If you are prompted to keep the workbook in the current format (*.csv), click Yes.



The software saves and closes the new *.csv file. Prior to imaging the OpenArray plates, you can import the *.csv file into the OpenArray software, as described in the *OpenArray® Real-Time PCR System User Guide*.

Export sample information from an existing *.ncx file

Select the sample information to export

1. Start the OpenArray® Real-Time qPCR Analysis Software. The software displays a new (empty) project file (*.ncx).
2. Select **File** ▶ **Open**, then browse to and select the project file (*.ncx) of interest.



Note: Applied Biosystems does not recommend exporting sample information from one type of OpenArray plate format to create a *.csv file for a different type of format. For example, to create a *.csv file for Format 18, select a *.ncx file that contains sample information from a Format 18 OpenArray plate.

3. In the Sample Data pane, select any sample from an OpenArray plate that contains the information to export.

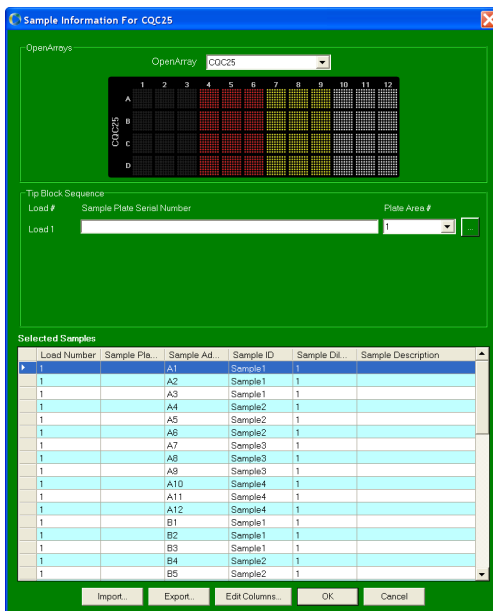


Note: You can export sample information from only one OpenArray plate at a time. If you select more than one sample, the software will export information for the OpenArray plate that contains the last sample you selected.

OpenArray ...	Sample ID	Ct	Ct Confiden...	Concentrati...	Concentrati...	Tm
CQC29	Sample1	25.819	1215.51			78.27
CQC29	Sample2	26.388	891.69			78.62
CQC29	Sample3	24.867	1587.28			78.82
CQC29	Sample4		0.00			77.26
CQC25	Sample1		32.63			72.65
CQC25	Sample2		28.30			78.37
CQC25	Sample3		25.48			75.06
CQC25	Sample4		103.05			78.45
CQC27	Sample1	24.491	917.12			78.70
CQC27	Sample2	25.239	1032.39			78.94
CQC27	Sample3	24.864	1055.50			78.75
CQC27	Sample4		0.00			84.61

4. In the Settings pane, click **Edit Sample Info**.

- In the Sample Information dialog box, click **Export**.



- In the Export Sample Plates dialog box, browse to a save location, enter a file name, then click **Save**. The software exports the sample information to a *.csv file.



Note: The software exports only the rows required for the selected plate areas. The software does not export all 384 rows for each of the sample plates.

Open the *.csv file

- Open the new *.csv file, using a spreadsheet or simple text program (such as Microsoft® Excel® Software). The *.csv file should include the column headings and data exported from the software.
- (Optional) Edit the sample information in the following columns:

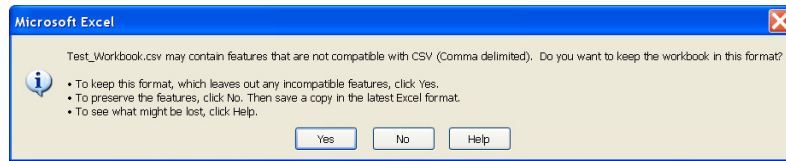
Column heading	Column description
SampleInfo.SampleID	Identifying information for the sample (user-defined)
SampleInfo.Description	A description of the sample (user-defined)



Note: The software exports several columns. Do not alter the column headings or data for any of the remaining exported columns.

- (Optional) Add new columns (user-defined) to the right of the exported columns.

4. Save and close the file. If you are prompted to keep the workbook in the current format (*.csv), click **Yes**.



Prior to imaging the OpenArray plates, you can import the *.csv file into the OpenArray software, as described in the *OpenArray® Real-Time PCR System User Guide*.

Appendix A Create a sample information file (*.csv) for sample tracking

*Export sample information from an existing *.ncx file*

Calculator Tool

This appendix covers:

- About the Calculator Tool 55
- Calculate the starting concentration of gDNA 55
- Calculate the volume of master mix and water 57

About the Calculator Tool

Before you load the OpenArray® 384-Well Sample Plate with samples (page 13), calculate the required:

- Starting concentration of the genomic DNA (gDNA) sample (this page)



Note: The *starting concentration* is the concentration of the gDNA sample prior to adding it to the sample plate.

- Volume of master mix and (if needed) water (page 57)

The Calculator Tool is a spreadsheet created with the Microsoft® Excel® Software. You can use the tool to quickly calculate the required amounts of gDNA and master mix. Applied Biosystems provides the Calculator Tool during training.

Calculate the starting concentration of gDNA

Applied Biosystems recommends that you add 250 haploid copies of gDNA to each through-hole of a TaqMan® OpenArray® Real-Time PCR Plate. To calculate the required concentration:

1. Determine the genome size in megabases (Mb) or the picogram (pg) quantity:
 - **Genome size** – For humans, 1 haploid copy of human genome is equal to 3300 Mb.
 - **Picogram (pg) quantity (C-value)** – For humans, the pg quantity is 3.3.



Note: To obtain the genome size or pg quantity for other species, go to www.genomesize.com, or use another trusted source.

2. Browse to and open the Calculator Tool to start the Excel software.
3. Select the **gDNA Calculator** tab.

4. In the spreadsheet, enter the:

- Genome size in the yellow box.

or

- Picogram quantity in the blue box.

How do I determine the starting concentration?				
Step 1a:	Enter the size of the genome (in terms of length) in the yellow box, or			
Step 1b:	Enter the pg quantity of haploid genome from www.genomesize.com (C value) in the blue box			
Step 2:	Convert the size of 1 haploid copy from length to mass			
Step 3:	Convert the mass of 1 haploid copy from pg to ng			
Step 4:	Multiply the mass of 1 haploid copy by the # of copies required per through-hole (250 copies)			
Step 5:	Divide the mass of 250 copies by the volume per through-hole			
Step 6:	Multiply the concentration of gDNA required per through-hole by the dilution factor constant (2)			
Step 7:	Result = required starting concentration in (ng/uL) (round to the nearest whole number)			
			Result	Result
				Units
Genome Size (enter number)			0	Mb
Conversion from length to mass	978Mb = 1pg		0.0000	pg
Conversion from pg to ng	1pg = 0.001ng		0.0000	ng
Multiply mass by # of copies	250 copies		0.0000	ng
Divide mass by through-hole volume	0.033uL		0.0000	ng/uL
Multiply concentration by dilution factor	2		0.0000	ng/uL
Result = Required starting ng/uL			0	ng/uL

The Calculator Tool calculates the required starting concentration (in ng/uL) of the gDNA sample, rounded to the nearest whole number.

Example

The figures below show the results for human DNA.



Note: The final result may vary slightly due to rounding off by the calculator.

					Result	Result	Units
Genome Size (enter number)					3300		Mb
Conversion from length to mass	978Mb = 1pg				3.3742	0.0000	pg
Conversion from pg to ng	1pg = 0.001ng				0.0034	0.0000	ng
Multiply mass by # of copies	250 copies				0.8436	0.0000	ng
Divide mass by through-hole volume	0.033uL				25.5624	0.0000	ng/uL
Multiply concentration by dilution factor	2				51.1247	0.0000	ng/uL
Result = Required starting ng/uL						51	ng/uL

Entered genome size

Calculated result

					Result	Result	Units
Genome Size (enter number)					0		Mb
Conversion from length to mass	978Mb = 1pg				0.0000	3.3000	pg
Conversion from pg to ng	1pg = 0.001ng				0.0000	0.0033	ng
Multiply mass by # of copies	250 copies				0.0000	0.8250	ng
Divide mass by through-hole volume	0.033uL				0.0000	25.0000	ng/uL
Multiply concentration by dilution factor	2				0.0000	50.0000	ng/uL
Result = Required starting ng/uL						50	ng/uL

Entered pg quantity

Calculated result

Calculate the volume of master mix and water

The Master Mix Calculator aids in determining:

- The volume of gDNA and water required per subarray
- The total volume of master mix and water required for the project

1. Browse to and open the Calculator Tool to start the Excel software.
2. Select the **Master Mix Calculator** tab.
3. In the spreadsheet, enter the required values in Steps 1 through 3.



Note: The tool automatically enters the gDNA value from the gDNA Calculator.

How much Master Mix should I prepare?			
Step 1:	Enter total number of samples		0
Step 2:	Enter the overage for pipetting error (e.g., 10% = 1.1)		0
Step 3:	Enter your gDNA concentration		0
Component	Starting Concentration	uL per Reaction	Total uL (including overage)
TaqMan OpenArray Master Mix	2x	2.50	0.0
Nuclease Free Water		#DIV/0!	#DIV/0!
gDNA*	50	#DIV/0!	
Total Volume		5.00	0.0
*Takes the ng/uL from the gDNA calculator			

The Calculator Tool calculates the required volumes.



Note: The calculated results are the volumes required for the overall project, *not* the volumes required per subarray.

Example

The figure below shows the results for 48 samples, a 10% overage, and a stock gDNA concentration at 100 ng/μL (thus, requiring a dilution).

Since the gDNA is double the required concentration, only 1.25 μL of gDNA is required; 1.25 μL of nuclease-free water is required to bring the final sample volume to 2.5 μL.

Appendix B Calculator Tool

Calculate the volume of master mix and water

Entered values

How much Master Mix should I prepare?			
Step 1:	Enter total number of samples		48
Step 2:	Enter the overage for pipetting error (e.g., 10% = 1.1)		1.1
Step 3:	Enter your gDNA concentration		100
Component	Starting Concentration	uL per Reaction	Total uL (including overage)
TaqMan OpenArray Master Mix	2x	2.50	132.0
Nuclease Free Water		1.25	66.0
gDNA*	50	1.25	264.0
Total Volume		5.00	264.0
*Takes the ng/uL from the gDNA calculator			

Calculated results

Prevent Contamination

This appendix covers:

- General guidelines 59
- PCR good laboratory practices 59

General guidelines

PCR assays require special laboratory practices to avoid false positive amplifications. The high throughput and repetition of these assays can lead to amplification of one DNA molecule.



Note: After a TaqMan® OpenArray® Real-Time PCR Plate has been sealed in an OpenArray® Case, it is less likely to spread contamination than other types of reaction plates.

PCR good laboratory practices

When preparing samples for PCR amplification:

- Wear a clean lab coat (not previously worn while handling amplified PCR products or used during sample preparation) and clean gloves.
- Change gloves whenever you suspect that they are contaminated.
- Maintain separate areas and dedicated equipment and supplies for:
 - Sample preparation
 - PCR setup
 - PCR amplification
 - Analysis of PCR products
- Never bring amplified PCR products into the PCR setup area.
- Open and close all sample tubes carefully. Try not to splash or spray PCR samples.
- Keep reactions and components capped as much as possible.
- Use a positive-displacement pipette or aerosol-resistant pipette tips.
- Clean lab benches and equipment periodically with 10% bleach solution.

Safety

This appendix covers:

■ Instrumentation safety	62
Symbols on instruments	62
Locations of safety labels on instruments	63
General instrument safety	64
Physical hazard safety	65
Electrical safety	66
Barcode scanner laser safety	66
Workstation safety	67
Safety and electromagnetic compatibility (EMC) standards	67
■ Chemical safety	69
General chemical safety	69
SDSs	69
Chemical waste safety	70
Biological hazard safety	71











Instrumentation safety

Symbols on instruments




Electrical symbols on instruments







The following table describes the electrical symbols that may be displayed on Applied Biosystems instruments.

Symbol	Description
	Indicates the On position of the main power switch.
	Indicates the Off position of the main power switch.
	Indicates a standby switch by which the instrument is switched on to the Standby condition. Hazardous voltage may be present if this switch is on standby.
	Indicates the On/Off position of a push-push main power switch.
	Indicates a terminal that may be connected to the signal ground reference of another instrument. This is not a protected ground terminal.
	Indicates a protective grounding terminal that must be connected to earth ground before any other electrical connections are made to the instrument.
	Indicates a terminal that can receive or supply alternating current or voltage.
	Indicates a terminal that can receive or supply alternating or direct current or voltage.

Safety symbols


The following table describes the safety symbols that may be displayed on Applied Biosystems instruments. Each symbol may appear by itself or with text that explains the relevant hazard. These safety symbols may also appear next to DANGERS, WARNINGS, and CAUTIONS that occur in the text of this and other product-support documents.

Symbol	Description
	Indicates that you should consult the manual for further information and to proceed with appropriate caution.
	Indicates the presence of an electrical shock hazard and to proceed with appropriate caution.
	Indicates the presence of a hot surface or other high-temperature hazard and to proceed with appropriate caution.

Symbol	Description
	Indicates the presence of a laser inside the instrument and to proceed with appropriate caution.
	Indicates the presence of moving parts and to proceed with appropriate caution.
	Indicates the presence of a biological hazard and to proceed with appropriate caution.
	Indicates the presence of a radiological hazard and to proceed with appropriate caution.
	Indicates the presence of a slipping hazard and to proceed with appropriate caution.
	Indicates the presence of an ultraviolet light and to proceed with appropriate caution.


Environmental symbols on instruments

The following symbol applies to all Applied Biosystems electrical and electronic products placed on the European market after August 13, 2005.

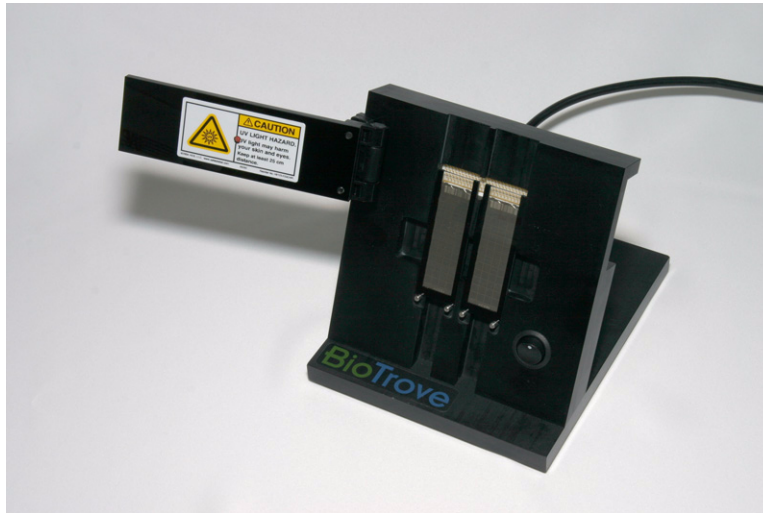
Symbol	Description
	Do not dispose of this product as unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provisions to reduce the environmental impact of waste electrical and electronic equipment (WEEE). European Union customers: Call your local Applied Biosystems Customer Service office for equipment pick-up and recycling. See www.appliedbiosystems.com for a list of customer service offices in the European Union.

Locations of safety labels on instruments

The OpenArray[®] platform includes the following warning on the OpenArray[®] Case Sealing Station:

Hazard symbol	English	Français
	CAUTION! UV LIGHT HAZARD. UV light may harm your skin and eyes. Keep at least 25 cm distance.	ATTENTION! Dangers liés aux rayons UV. Les rayons UV peuvent endommager votre peau et vos yeux. Gardez une distance de plus de 25 cm.





General instrument safety

WARNING! PHYSICAL INJURY HAZARD. Use this product only as specified in this document. Using this instrument in a manner not specified by Applied Biosystems may result in personal injury or damage to the instrument.

WARNING! PHYSICAL INJURY HAZARD. Using the instrument in a manner not specified by Applied Biosystems may result in personal injury or damage to the instrument.

CAUTION! For safety information related to the centrifuge and thermal cycler, refer to the manufacturer's documentation.

Moving and lifting the instrument

CAUTION! PHYSICAL INJURY HAZARD. The instrument is to be moved and positioned only by the personnel or vendor specified in the applicable site preparation guide. If you decide to lift or move the instrument after it has been installed, do not attempt to lift or move the instrument without the assistance of others, the use of appropriate moving equipment, and proper lifting techniques. Improper lifting can cause painful and permanent back injury. Depending on the weight, moving or lifting an instrument may require two or more persons.

CAUTION! Do not tip the OpenArray[®] instrument on end. Tipping damages the instrument hardware and electronics and is an unsafe practice.

Moving and lifting stand-alone computers and monitors

WARNING! Do not attempt to lift or move the computer or the monitor without the assistance of others. Depending on the weight of the computer and/or the monitor, moving them may require two or more people.

Things to consider before lifting the computer and/or the monitor:

- Make sure that you have a secure, comfortable grip on the computer or the monitor when lifting.
- Make sure that the path from where the object is to where it is being moved is clear of obstructions.
- Do not lift an object and twist your torso at the same time.
- Keep your spine in a good neutral position while lifting with your legs.
- Participants should coordinate lift and move intentions with each other before lifting and carrying.
- Instead of lifting the object from the packing box, carefully tilt the box on its side and hold it stationary while someone slides the contents out of the box.

Operating the instrument

Ensure that anyone who operates the instrument has:

- Received instructions in both general safety practices for laboratories and specific safety practices for the instrument.
- Read and understood all applicable Safety Data Sheets (SDSs). See [“About SDSs” on page 69](#).

Cleaning or decontaminating the instrument



CAUTION! Before using a cleaning or decontamination method other than those recommended by the manufacturer, verify with the manufacturer that the proposed method will not damage the equipment.

Physical hazard safety

Ultraviolet light



WARNING! ULTRAVIOLET LIGHT HAZARD. Looking directly at a UV light source can cause serious eye damage. Never look directly at a UV light source and always prevent others from UV exposure. Follow the manufacturer’s recommendations for appropriate protective eyewear and clothing.

Compressed gases



WARNING! EXPLOSION HAZARD. Pressurized gas cylinders are potentially explosive and can cause severe injury if not handled properly. Always cap the gas cylinder when it is not in use and attach it firmly to the wall or gas cylinder cart with approved brackets or chains.

Moving parts



WARNING! PHYSICAL INJURY HAZARD. Moving parts can crush and cut. Keep hands clear of moving parts while operating the instrument. Disconnect power before servicing the instrument.

Solvents and pressurized fluids



WARNING! PHYSICAL INJURY HAZARD. Always wear eye protection when working with solvents or any pressurized fluids.



Electrical safety



WARNING! ELECTRICAL SHOCK HAZARD. Severe electrical shock can result from operating the OpenArray[®] instrument without its instrument panels in place. Do not remove instrument panels. High-voltage contacts are exposed when instrument panels are removed from the instrument.

Power



WARNING! ELECTRICAL HAZARD. Grounding circuit continuity is required for the safe operation of equipment. Never operate equipment with the grounding conductor disconnected.



WARNING! ELECTRICAL HAZARD. Use properly configured and approved line cords for the voltage supply in your facility.



WARNING! ELECTRICAL HAZARD. Plug the OpenArray[®] platform components into properly grounded receptacles with adequate current capacity.

Overvoltage rating

The OpenArray[®] platform has an installation (overvoltage) category of II, and is classified as portable equipment.

Barcode scanner laser safety

Laser classification

The barcode scanner included with the OpenArray[®] platform is categorized as a Class 2 (II) laser.

Laser safety requirements

Class 2 (II) lasers are low-power, visible-light lasers that can damage the eyes. Never look directly into the laser beam. The scanner is designed to prevent human access to harmful levels of laser light during normal operation, user maintenance, or during prescribed service operations.



WARNING! LASER HAZARD. Class 2 (II) lasers can cause damage to eyes. Avoid looking into a Class 2 (II) laser beam or pointing a Class 2 (II) laser beam into another person's eyes.

Workstation safety

Correct ergonomic configuration of your workstation can reduce or prevent effects such as fatigue, pain, and strain. Minimize or eliminate these effects by configuring your workstation to promote neutral or relaxed working positions.



CAUTION! MUSCULOSKELETAL AND REPETITIVE MOTION HAZARD.

These hazards are caused by potential risk factors that include but are not limited to repetitive motion, awkward posture, forceful exertion, holding static unhealthy positions, contact pressure, and other workstation environmental factors.

To minimize musculoskeletal and repetitive motion risks:

- Use equipment that comfortably supports you in neutral working positions and allows adequate accessibility to the keyboard, monitor, and mouse.
- Position the keyboard, mouse, and monitor to promote relaxed body and head postures.

Safety and electromagnetic compatibility (EMC) standards

This section provides information on:

- U.S. and Canadian safety standards
- Canadian EMC standard
- European safety and EMC standards
- Australian EMC Standards

U.S. and Canadian
safety
standards



The OpenArray[®] AutoLoader, OpenArray[®] Case Sealing Station, and OpenArray[®] instrument have been tested to and comply with the standards:

UL 61010-1:2004, 2nd Edition/CSA-C22.2 No. 61010-1, "Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use: Part 1: General Requirements."

Canadian EMC
standard

The OpenArray[®] AutoLoader, OpenArray[®] Case Sealing Station, and OpenArray[®] instrument have been tested to and comply with ICES-001, Issue 3: "Industrial, Scientific, and Medical Radio Frequency Generators."

European safety and
EMC
standards



Safety

The OpenArray[®] AutoLoader, OpenArray[®] Case Sealing Station, and OpenArray[®] instrument meet European requirements for safety (Low Voltage Directive 73/23/EEC). This instrument has been tested to and complies with standards EN 61010-1:2001, "Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part 1: General Requirements."

The OpenArray[®] instrument has been tested to and complies with the standard:

EN 60825-1, "Radiation Safety of Laser Products, Equipment Classification, Requirements, and User's Guide."



EMC

This instrument meets European requirements for emission and immunity (EMC Directive 89/336/EEC). This instrument has been tested to and complies with standard EN 61326 (Group 1, Class B), "Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements."

Australian EMC Standards



The OpenArray[®] AutoLoader, OpenArray[®] Case Sealing Station, and OpenArray[®] instrument have been tested to and comply with standard AS/NZS 2064, "Limits and Methods Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical (ISM) Radio-frequency Equipment."

Chemical safety

General chemical safety

Chemical hazard
warning



WARNING! CHEMICAL HAZARD. Before handling any chemicals, refer to the Safety Data Sheet (SDS) provided by the manufacturer, and observe all relevant precautions.



WARNING! CHEMICAL STORAGE HAZARD. Never collect or store waste in a glass container because of the risk of breaking or shattering. Reagent and waste bottles can crack and leak. Each waste bottle should be secured in a low-density polyethylene safety container with the cover fastened and the handles locked in the upright position. Wear appropriate eyewear, clothing, and gloves when handling reagent and waste bottles.

Chemical safety
guidelines

To minimize the hazards of chemicals:

- Read and understand the Safety Data Sheets (SDSs) provided by the chemical manufacturer before you store, handle, or work with any chemicals or hazardous materials. (See “About SDSs” on page 69.)
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing). For additional safety guidelines, consult the SDS.
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with adequate ventilation (for example, fume hood). For additional safety guidelines, consult the SDS.
- Check regularly for chemical leaks or spills. If a leak or spill occurs, follow the manufacturer’s cleanup procedures as recommended in the SDS.
- Comply with all local, state/provincial, or national laws and regulations related to chemical storage, handling, and disposal.

SDSs

About SDSs

Chemical manufacturers supply current Safety Data Sheets (SDSs) with shipments of hazardous chemicals to new customers. They also provide SDSs with the first shipment of a hazardous chemical to a customer after an SDS has been updated. SDSs provide the safety information you need to store, handle, transport, and dispose of the chemicals safely.

Each time you receive a new SDS packaged with a hazardous chemical, be sure to replace the appropriate SDS in your files.

Obtaining
SDSs

The SDS for any chemical supplied by Applied Biosystems is available to you free 24 hours a day. To obtain SDSs:

1. Go to www.appliedbiosystems.com, click **Support**, then select **SDS**.
2. In the Keyword Search field, enter the chemical name, product name, SDS part number, or other information that appears in the SDS of interest. Select the language of your choice, then click **Search**.



3. Find the document of interest, right-click the document title, then select any of the following:
 - **Open** – To view the document
 - **Print Target** – To print the document
 - **Save Target As** – To download a PDF version of the document to a destination that you choose



Note: For the SDSs of chemicals not distributed by Applied Biosystems, contact the chemical manufacturer.

Chemical waste safety

Chemical waste hazards



CAUTION! HAZARDOUS WASTE. Refer to Safety Data Sheets and local regulations for handling and disposal.



WARNING! CHEMICAL WASTE HAZARD. Wastes produced by Applied Biosystems instruments are potentially hazardous and can cause injury, illness, or death.



WARNING! CHEMICAL STORAGE HAZARD. Never collect or store waste in a glass container because of the risk of breaking or shattering. Reagent and waste bottles can crack and leak. Each waste bottle should be secured in a low-density polyethylene safety container with the cover fastened and the handles locked in the upright position. Wear appropriate eyewear, clothing, and gloves when handling reagent and waste bottles.

Chemical waste safety guidelines


To minimize the hazards of chemical waste:

- Read and understand the Safety Data Sheets (SDSs) provided by the manufacturers of the chemicals in the waste container before you store, handle, or dispose of chemical waste.
- Provide primary and secondary waste containers. (A primary waste container holds the immediate waste. A secondary container contains spills or leaks from the primary container. Both containers must be compatible with the waste material and meet federal, state, and local requirements for container storage.)
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing). For additional safety guidelines, consult the SDS.
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with adequate ventilation (for example, fume hood). For additional safety guidelines, consult the SDS.
- Handle chemical wastes in a fume hood.
- After emptying a waste container, seal it with the cap provided.
- Dispose of the contents of the waste tray and waste bottle in accordance with good laboratory practices and local, state/provincial, or national environmental and health regulations.

Waste disposal

If potentially hazardous waste is generated when you operate the instrument, you must:

- Characterize (by analysis if necessary) the waste generated by the particular applications, reagents, and substrates used in your laboratory.
- Ensure the health and safety of all personnel in your laboratory.
- Ensure that the instrument waste is stored, transferred, transported, and disposed of according to all local, state/provincial, and/or national regulations.

 **IMPORTANT!** Radioactive or biohazardous materials may require special handling, and disposal limitations may apply.

Biological hazard safety

General biohazard



WARNING! BIOHAZARD. Biological samples such as tissues, body fluids, infectious agents, and blood of humans and other animals have the potential to transmit infectious diseases. Follow all applicable local, state/provincial, and/or national regulations. Wear appropriate protective equipment, which includes but is not limited to: protective eyewear, face shield, clothing/lab coat, and gloves. All work should be conducted in properly equipped facilities using the appropriate safety equipment (for example, physical containment devices). Individuals should be trained according to applicable regulatory and company/institution requirements before working with potentially infectious materials. Read and follow the applicable guidelines and/or regulatory requirements in the following:

- U.S. Department of Health and Human Services guidelines published in *Biosafety in Microbiological and Biomedical Laboratories* found at: www.cdc.gov/biosafety/publications/index.htm
- Occupational Safety and Health Standards, Bloodborne Pathogens (29 CFR§1910.1030; www.access.gpo.gov/nara/cfr/waisidx_01/29cfr1910a_01.html).
- Your company's/institution's Biosafety Program protocols for working with/handling potentially infectious materials.

Additional information about biohazard guidelines is available at: www.cdc.gov



Documentation and Support

Product documentation

Portable document format (PDF) versions of the documents listed in this section are available at www.appliedbiosystems.com

Note: To open the PDF versions, use the Adobe Acrobat Reader software available from www.adobe.com

OpenArray® Real-Time PCR System

Document	Description	Part number
<i>OpenArray® Real-Time PCR System Troubleshooting Guide</i>	Provides troubleshooting information for the OpenArray® Real-Time PCR System.	4458839
<i>OpenArray® Real-Time PCR System User Guide</i>	Provides procedures for imaging and analyzing OpenArray® plates. Provides maintenance information for the OpenArray® Real-Time PCR System.	4458837
<i>OpenArray® Real-Time PCR System Quick Reference Card: Workflow</i>	Describes the overall workflow and provides brief procedures for performing gene expression experiments with the OpenArray® Real-Time PCR System.	4458838
<i>OpenArray® Real-Time PCR System Quick Reference Card: Using the Sample Tracking Tool</i>	Describes how to use the Sample Tracking Tool to create sample information files (*.csv) and import the files into the OpenArray® Real-Time qPCR Analysis Software.	4460957
<i>SYBR® OpenArray® Real-Time PCR Plates Protocol</i>	Provides procedures for preparing the SYBR® OpenArray® Real-Time PCR Plates.	4458869
<i>TaqMan® OpenArray® Real-Time PCR Plates Protocol</i>	Provides procedures for preparing the TaqMan® OpenArray® Real-Time PCR Plates.	4458840

TaqMan® OpenArray® Genotyping System

Document	Description	Part number
<i>TaqMan® OpenArray® Genotyping Getting Started Guide</i>	Provides procedures for performing genotyping experiments with the TaqMan® OpenArray® Genotyping System.	4377476
<i>TaqMan® OpenArray® Genotyping Plates Ordering Guide</i>	Provides ordering information for the TaqMan® OpenArray® Genotyping Plates.	4400403
<i>TaqMan® OpenArray® Genotyping System Quick Reference Card: Using the Sample Tracking Tool</i>	Describes how to use the Sample Tracking Tool to create sample information files (*.csv) and import the files into the OpenArray® SNP Genotyping Analysis Software.	4460657
<i>TaqMan® OpenArray® Genotyping System Quick Reference Card: Workflow</i>	Describes the overall workflow and provides brief procedures for performing genotyping experiments on the TaqMan® OpenArray® Genotyping System.	4400402
<i>TaqMan® OpenArray® Genotyping System Site Preparation Guide</i>	Provides information on preparing the customer site for the TaqMan® OpenArray® Genotyping System.	4401171
<i>TaqMan® OpenArray® Genotyping Troubleshooting Guide</i>	Provides troubleshooting information for the TaqMan® OpenArray® Genotyping System. To be used in conjunction with the <i>TaqMan® OpenArray® Genotyping Getting Started Guide</i> .	4401671

Related documentation

To obtain the documents listed in this section or additional documentation, see [“Obtaining support” on page 75](#).

Genotyping experiments

Document	Part number
<i>Application Note: DNA Genotyping from Human FFPE Samples – Reliable and Reproducible</i>	137AP04-01
<i>Bioinformatic Evaluation of a Sequence for Custom TaqMan® SNP Genotyping Assays</i>	4371003
<i>Ordering TaqMan® SNP Genotyping Assays Quick Reference Card</i>	4374204
<i>TaqMan® SNP Genotyping Assays Protocol</i>	4332856
<i>User Bulletin: Human DNA Sample Quantification Protocol Using the RNase P Kit</i>	4342582

Obtaining support

For the latest services and support information for all locations, go to:

www.appliedbiosystems.com

At the Applied Biosystems web site, you can:

- Access worldwide telephone and fax numbers to contact Applied Biosystems Technical Support and Sales facilities.
- Search through frequently asked questions (FAQs).
- Submit a question directly to Technical Support.
- Order Applied Biosystems user documents, SDSs, certificates of analysis, and other related documents.
- Download PDF documents.
- Obtain information about customer training.
- Download software updates and patches.

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