

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 13485:2016

This is to certify that:

Eastern Business Forms Inc.
530 Old Sulphur Springs Road
Greenville
South Carolina
29607
USA

Holds Certificate No:

FM 618733

and operates a Quality Management System which complies with the requirements of ISO 13485:2016 for the following scope:

Manufacture, assembly and distribution of paper based specimen receptacles.

For and on behalf of BSI:



Carlos Pitanga, SVP, System Certification and Compliance

Original Registration Date: 2014-12-05

Latest Revision Date: 2017-11-09

Effective Date: 2017-12-05

Expiry Date: 2020-12-04

Page: 1 of 1



...making excellence a habit.™



To whom it may concern,

The EBF 903 Collection Paper is sold as a CE marked "In-Vitro Diagnostic" device in Europe in compliance with the EU 98/79/EC IVD Directive.

With regards to the IVD Directive, EBF has conducted a Conformity Assessment of the EBF 903 Collection Paper and CE marked the device accordingly.

Therefore, there is no EC Certificate from an accredited Notified Body associated with this device due to EBF's self-declaration of conformity.

EBF can provide the following documentation to support your regulatory requirements:

- Declaration of Conformity
- ISO 13485 Certificate
- Technical Documentation (upon request and possibly through EBF Non-Disclosure Agreement due to proprietary reasons).

Regards,

Rick Haines
Quality/Regulatory Manager
Eastern Business Forms, Inc.

EU DECLARATION OF CONFORMITY

Manufacturer's name and address:

Eastern Business Forms, Inc.
 530 Old Sulphur Springs Rd.
 Greenville, SC 29607

Hereby declares under our sole responsibility that the product:

Product Trade Name – as it appears on the device(s):	903™
Product Family/Common Name:	903 Filter Paper
Model:	Neonatal and Adult/Child
REF (Catalog/Article No.)	Product is a device customized to suit needs of newborn screening programs or customer needs. Catalog/Article Number(s) are specific to customer product(s).
Serial Number:	Not applicable
Class:	IVD General
GMDN Code:	P 45522


to which this declaration relates, is in conformity and fulfills all the relevant provisions of the in vitro diagnostic medical device directive 98/79/EC (Annex III excluding Section 6) which apply to it.

This conformity is based on the following elements:

- Technical Documentation F-730-002-A and F-730-002-B, of the product to which this declaration relates
 - List of harmonized standards applied for CE Marking
- EN ISO 13485:2012 Medical devices – Quality management systems – Requirements for regulatory purposes
 EN ISO 14971:2012 Medical devices – Application of risk management to medical device
 CLSI NBS01-A6 Clinical and Laboratory Standards Institute – Blood Collection on Filter Paper for Newborn Screening Programs
 EN 13612:2002 Performance evaluation of in vitro diagnostic medical devices
 EN ISO 18113-1:2013 European Norm - In vitro diagnostic medical devices – Information supplied by the manufacturer (labelling) – Part 1: Terms, definitions and general requirements
 EN ISO 15223-1:2012 European Norm – Medical Devices – Symbols for Use with Medical Device Labels, Labelling and Information to be Supplied

Date and place of issue:
 11/4/2015 – Greenville, SC (USA)

Name, position and signature of authorized person:


 Rick Haines
 Quality/Regulatory Manager

EC Authorized Representative: CMC, C/ Horacio Lengo N18, CP 29006, Malaga, Spain, +34951214054

QUALITY SYSTEM

EC-CERTIFICATE

Directive 98/79/EC

Manufacturer: Labsystems Diagnostics Oy
Tiilitie 3
FI-01720 Vantaa
Finland

Coverage of Certificate: Design, manufacture and final inspection

Product category: Reagents and reagent products for detection and quantification of toxoplasmosis, for diagnosing phenylketonuria, and for determining chlamydia

Valid until: 24th April 2019

The manufacturer's quality system for the design, manufacture and final inspection of the aforesaid product category has been evaluated and meets the provisions of Council Directive 98/79/EC as set out in Annex IV Section 3. This approval is valid until the expiry date provided that the manufacturer fulfils the obligations imposed by Annex IV in Directive 98/79/EC. Products covered by the certificate are specified in the attachment(s).

Tampere, 24th April 2014


Aliisa Siljander





Markku Helminen



Certificate no.
VTT-C-11133-02-1172-515-14

Notified Body no. 0537:
VTT Expert Services Ltd.
P.O. Box 345 (Tekniikankatu 1)
FI-33101 TAMPERE
FINLAND
Tel.+358 20 722 111

Attachment 2 to the Certificate number: VTT-C-11133-02-1172-515-14

Manufacturer:	Labsystems Diagnostics Oy Tiilitie 3, FI-01720 Vantaa Finland		
Activity and product category:	Design, manufacture and final inspection; reagents and reagent products for diagnosing phenylketonuria		
Products:	The certificate covers the following products:		
	<i>Name</i>	<i>GMDN code</i>	<i>Product code</i>
	- Neonatal Phenylalanine	58960	6199895 6199896 6199897
	- Neonatal Phenylalanine calibrators	53512	6190940
	- Neonatal Phenylalanine controls	53513	6190930
	- NeoMass AAAC	58190	7100100
Date:	Tampere, 11 th November 2015		
			
	 Tuomas Toivonen	 Mikko Soikkeli	

VTT Expert Services Ltd is Notified Body no. 0537 under Council Directive 98/79/EC.

AmnioMAX™ C-100 and AmnioMAX™ II Complete Media

Description

AmnioMAX™ products have been formulated and qualified for the *in vitro* propagation of primary cultures of human amniotic fluid cells and chorionic villus samples for use in prenatal diagnostic testing. AmnioMAX™ products have been optimized to maximize colony attachment, growth rates, pH stability, and to provide prolific metaphasic yield. AmnioMAX™ C-100 Complete Medium consists of an optimized basal medium, AmnioMAX™ C-100 Basal Medium, and supplement, AmnioMAX™ C-100 Supplement, containing an appropriate amount of antibiotics (gentamicin) and growth supplements to eliminate the need for further supplementation. AmnioMAX™ II Complete media is a second-generation formulation to improve cell morphology and provide cleaner cultures in a ready-to-use and convenient format which already containing antibiotics (gentamicin), L-glutamine and FBS. Every manufactured lot of AmnioMAX™ product is tested against rigorous standards to ensure clinical performance.

Product	Catalog No.	Amount	Storage	Shelf Life*
AmnioMAX™ C-100 Complete Medium, kit Kit contains:	12558-011	Kit		
AmnioMAX™ C-100 Basal Medium (1X), liquid	17001-082	90 mL	2°C to 8°C; Protect from light	—
AmnioMAX™ C-100 Supplement	12556-015	15 mL	-20°C to -5°C; Protect from light	—
AmnioMAX™ C-100 Basal Medium (1X), liquid	17001-082 17001-074	90 mL 450 mL	2°C to 8°C; Protect from light	16 months
AmnioMAX™ C-100 Supplement	12556-015 12556-023	15 mL 75 mL	-20°C to -5°C; Protect from light	16 months
AmnioMAX™ II Complete Medium	11269-016	100 mL	-20°C to -5°C; Protect from light	18 months

* Shelf Life duration is determined from Date of Manufacture. Do not use beyond labeled expiration date.

Intended Use

For *in vitro* diagnostic use.

Important Information

Do not use products if:

- Packaging has been compromised
- Product was received completely thawed
- AmnioMAX™ C-100 Basal or AmnioMAX™ II Complete Medium appears cloudy

Safety Information

For every chemical, read the Safety Data Sheets (SDSs) and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

Prepare Media

AmnioMAX™ II Complete Medium is supplied frozen, ready to use upon thawing. Thaw at 2°C to 8°C, mix by gently swirling to ensure homogeneity. **Do not thaw** at 37°C. This may result in formation of a precipitate and should be avoided.

Note: AmnioMAX™ Media contain Fetal Bovine Serum (FBS); flocculent debris may develop upon thawing and storage.

- Thawed unopened AmnioMAX™ II Complete Medium can be stored in the dark at 2° to 8°C for up to two months within the labeled expiration date.
- Once opened, use AmnioMAX™ products within 7–10 days for maximal growth performance. Repeated warming/cooling and prolonged exposure to light should be avoided.
- **Do not use** beyond labeled expiration date.

Supplement Media

AmnioMAX™ II Complete Medium requires no further supplementation.

AmnioMAX™ C-100 Basal requires supplementation with AmnioMAX™ C-100 Supplement.

1. Aseptically add entire contents (15 mL) of AmnioMAX™ C-100 Supplement to 90 mL AmnioMAX™ C-100 Basal Medium before use.
2. Mix by gently swirling to ensure homogeneity.
3. Store in the dark at 2°C to 8°C until use.

Additional supplementation to AmnioMAX™ products is NOT recommended. **Note:** Addition of Fungizone® may be toxic.












Related Products

Product	Catalog No.
Lab Armor™ Beads	A12543
KaryoMAX® Colcemid™ Solution, liquid (10 µg/mL), in HBSS	15210
KaryoMAX® Colcemid™ Solution, liquid (10 µg/mL), in PBS	15212
KaryoMAX® Giemsa Stain Stock Solution	10092
Gurr Buffer Tablets (pH 6.8)	10582
Phytohemagglutinin (M Form)	10576-015
PB-MAX™ Karyotyping Medium	12557
MarrowMAX™ Bone Marrow Medium	12260

Each clinician/scientist must make an independent judgment on whether this medium is suitable for use in *In Vitro* Diagnostic applications conducted in their laboratory. Life Technologies does not guarantee the successful outcome of any diagnostic testing based solely on the use of GIBCO® medium. Life Technologies contribution to these procedures is simply at the step of providing a culture or handling medium for these procedures.

Explanation of Symbols and Warnings

The symbols present on the product label are explained below:

			
Caution, consult accompanying documents	<i>In vitro</i> diagnostic medical device	Sterilized using aseptic processing techniques	Protect from light
			
Use By:	Catalog number	Manufacturer	Batch Code
			
European Community	Consult instructions for use	Temperature Limitation	

Limited Use Label License

No right to resell this product or any of its components is conveyed expressly, by implication, or by estoppel. For information on obtaining additional rights, please contact outlicensing@lifetech.com or Out Licensing, Life Technologies, 5791 Van Allen Way, Carlsbad, California 92008.

Limited Product Warranty

Life Technologies Corporation and/or its affiliate(s) warrant their products as set forth in the Life Technologies' General Terms and Conditions of Sale found on Life Technologies' website at www.lifetechnologies.com/termsandconditions. If you have any questions, please contact Life Technologies at www.lifetechnologies.com/support.

For additional technical information such as Safety Data Sheets (SDS), Certificates of Analysis, visit www.lifetechnologies.com/support. For further assistance, email techsupport@lifetech.com

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GIBCO® media and culture supplements for cytogenetic analysis

- Optimized and prequalified for cytogenetics
- Provide high mitotic index
- Deliver excellent chromosomal morphology
- Produce clear, reproducible results that are easy to analyze and interpret

Every day, you make critical decisions based on what you see through a microscope. When your cytogenetics analysis is supported by GIBCO® media and culture supplements, you can be confident in the conclusions you reach.

You'll get clear, reproducible results that are simple to analyze and interpret when you use the most trusted cell culture media and reagents for cytogenetics: MarrowMAX™, AminoMAX™, and PB-MAX™ products.

Superior performance

- High mitotic index and superior chromosomal morphology (Figure 1)
- Outperforms commercially available giant cell tumor conditioned medium (GCT-CM) (Figure 2)
- Consistent lot-to-lot performance (Figure 3)

Convenience

- Complete, ready-to-use medium
- Fully supplemented with serum, gentamicin, and L-glutamine
- Store either frozen or refrigerated

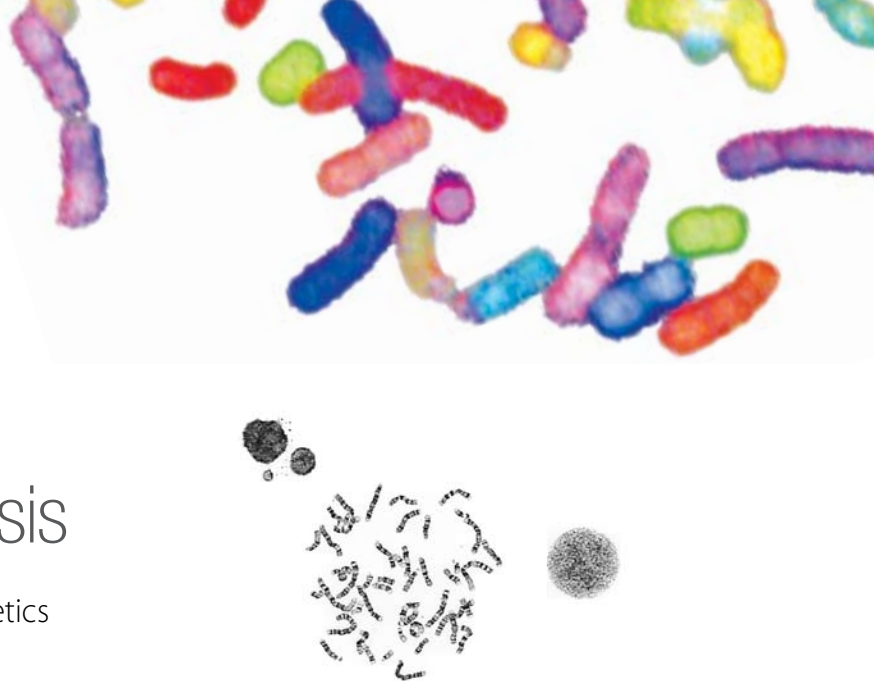


Figure 1—Chromosome spread from bone marrow cells. Cells were cultured in MarrowMAX™ Medium for 24 hours, and G-banding analysis was performed.

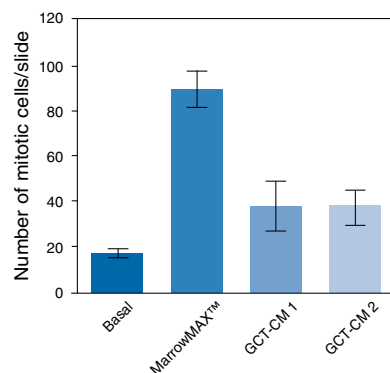


Figure 2—Performance of MarrowMAX™ Medium. Cells were cultured in: basal medium without conditioned medium; MarrowMAX™ Medium; Supplier 1 Medium (GCT-CM 1); and Supplier 2 medium (GCT-CM 2) (both Supplier 1 and Supplier 2 media contain GCT-conditioned medium). Mitotic cells were assayed 24 hours after plating.

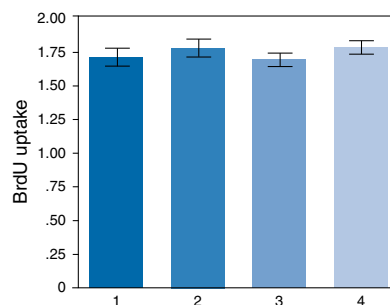


Figure 3—Consistency of MarrowMAX™ Medium. Normal bone marrow mononuclear cells were seeded at 1×10^5 cell/ml in 4 different lots of MarrowMAX™ Medium. BrdU uptake was measured by absorbance at 405 nm. Results are mean \pm SEM for n = 10.



Cytogenetic and Diagnostic Testing

Peace of mind with each product

- Manufactured in compliance with the FDA's Quality System regulation (cGMP) and the current requirements of ISO 9001
- Application-tested by an independent, certified cytogenetics laboratory to deliver clear, reproducible results in standard clinical cytogenetic protocols
- Extended shelf life of 18 months when stored unopened at -20°C and 60 days stored at 4°C

We know what matters

At Invitrogen, we understand the high level of service and support required in cytogenetics laboratories, so we strive to help you in every way possible. Have questions? Need data? Contact Invitrogen's cytogenetics specialists at 1 800 955 6288 or visit www.invitrogen.com/cytogenetics.

Ordering Information

Product	Size	Cat. no.
MarrowMAX™ Bone Marrow Medium* (contains gentamicin)	100 ml	12260-014
AmmioMAX™-II Complete Medium (contains gentamicin)	100 ml	11269-016
AmnioMAX™-C100 Complete Medium (system) The system contains both the basal medium (90 ml) and the supplement (15 ml) (supplement contains gentamicin)	1 set	12558-011
AmnioMAX™-C100 Basal Medium, liquid	90 ml 450 ml	17001-082 17001-074
AmnioMAX™-C100 Supplement, liquid (contains gentamicin)	15 ml 75 ml	12556-015 12556-023
PB-MAX™ Karyotyping Medium (contains gentamicin)	100 ml 500 ml	12557-013 12557-021
KaryoMAX™ Colcemid® Solution, liquid (10 mg/ml), in HBSS	10 ml	15210-040
KaryoMAX™ Colcemid® Solution, liquid (10 mg/ml), in PBS	10 ml	15212-012
KaryoMAX™ Giemsa Stain Stock Solution	100 ml	10092-013
Fungizone® Antimycotic, liquid	20 ml	15290-018
Phytohemagglutinin (M Form) (PHA), lyophilized †	10 ml	10576-015

* This product is subject to Limited Use Label License No. 31. These products are for in vitro use and are not intended for human or animal therapeutic use. Uses other than the labeled intended use may be a violation of federal law. † The noted products are for laboratory use only and not for diagnostic use. The safety and efficacy of these products in diagnosis or other clinical uses has not been established. Colcemid® is a registered trademark of CIBA-GEIGY Corporation.

Visit us at www.invitrogen.com/cytogenetics to learn about related reagents for cytogenetic cell culture.

GIBCO® media and culture supplements for cytogenetic analysis

- Optimized and prequalified for cytogenetics
- Provide high mitotic index
- Deliver excellent chromosomal morphology
- Produce clear, reproducible results that are easy to analyze and interpret

Every day, you make critical decisions based on what you see through a microscope. When your cytogenetics analysis is supported by GIBCO® media and culture supplements, you can be confident in the conclusions you reach.

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Superior performance

- High mitotic index and superior chromosomal morphology (Figure 1)
- Outperforms commercially available giant cell tumor conditioned medium (GCT-CM) (Figure 2)
- Consistent lot-to-lot performance (Figure 3)

Convenience

- Complete, ready-to-use medium
- Fully supplemented with serum, gentamicin, and L-glutamine
- Store either frozen or refrigerated

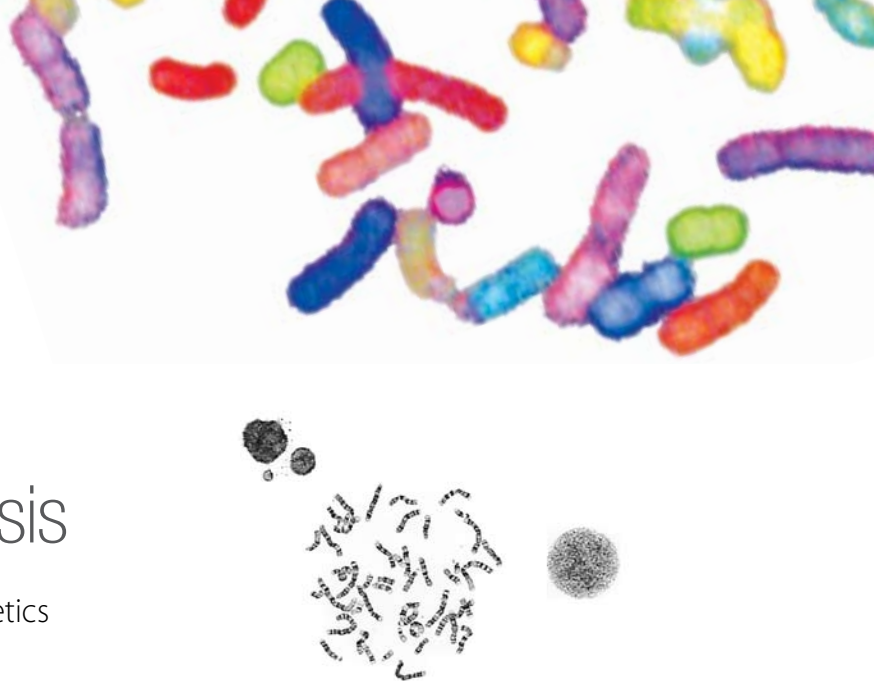


Figure 1—Chromosome spread from bone marrow cells. Cells were cultured in MarrowMAX™ Medium for 24 hours, and G-banding analysis was performed.

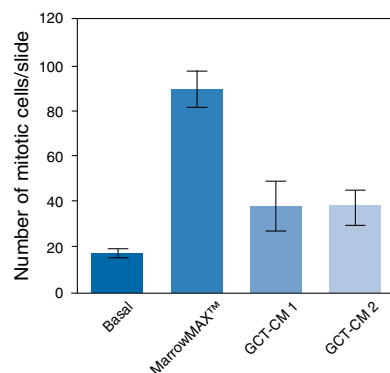


Figure 2—Performance of MarrowMAX™ Medium. Cells were cultured in: basal medium without conditioned medium; MarrowMAX™ Medium; Supplier 1 Medium (GCT-CM 1); and Supplier 2 medium (GCT-CM 2) (both Supplier 1 and Supplier 2 media contain GCT-conditioned medium). Mitotic cells were assayed 24 hours after plating.

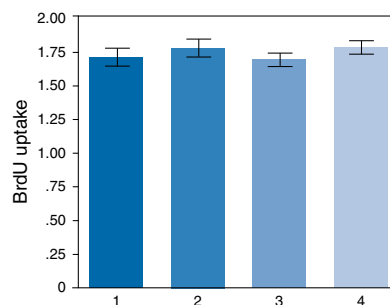


Figure 3—Consistency of MarrowMAX™ Medium. Normal bone marrow mononuclear cells were seeded at 1×10^5 cell/ml in 4 different lots of MarrowMAX™ Medium. BrdU uptake was measured by absorbance at 405 nm. Results are mean \pm SEM for $n = 10$.



Cytogenetic and Diagnostic Testing

Peace of mind with each product

- Manufactured in compliance with the FDA's Quality System regulation (cGMP) and the current requirements of ISO 9001
- Application-tested by an independent, certified cytogenetics laboratory to deliver clear, reproducible results in standard clinical cytogenetic protocols
- Extended shelf life of 18 months when stored unopened at -20°C and 60 days stored at 4°C

We know what matters

At Invitrogen, we understand the high level of service and support required in cytogenetics laboratories, so we strive to help you in every way possible. Have questions? Need data? Contact Invitrogen's cytogenetics specialists at 1 800 955 6288 or visit www.invitrogen.com/cytogenetics.

Ordering Information

Product	Size	Cat. no.
MarrowMAX™ Bone Marrow Medium* (contains gentamicin)	100 ml	12260-014
AmmioMAX™-II Complete Medium (contains gentamicin)	100 ml	11269-016
AmnioMAX™-C100 Complete Medium (system) The system contains both the basal medium (90 ml) and the supplement (15 ml) (supplement contains gentamicin)	1 set	12558-011
AmnioMAX™-C100 Basal Medium, liquid	90 ml	17001-082
	450 ml	17001-074
AmnioMAX™-C100 Supplement, liquid (contains gentamicin)	15 ml	12556-015
	75 ml	12556-023
PB-MAX™ Karyotyping Medium (contains gentamicin)	100 ml	12557-013
	500 ml	12557-021
KaryoMAX™ Colcemid® Solution, liquid (10 mg/ml), in HBSS	10 ml	15210-040
KaryoMAX™ Colcemid® Solution, liquid (10 mg/ml), in PBS	10 ml	15212-012
KaryoMAX™ Giemsa Stain Stock Solution	100 ml	10092-013
Fungizone® Antimycotic, liquid	20 ml	15290-018
Phytohemagglutinin (M Form) (PHA), lyophilized †	10 ml	10576-015

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Visit us at www.invitrogen.com/cytogenetics to learn about related reagents for cytogenetic cell culture.

MarrowMAX™ Bone Marrow Medium

P R O D U C T N E W S

- *Optimized for cytogenetic analysis*
- *High mitotic index*
- *Excellent chromosomal morphology*
- *Consistent performance*



Figure 1. Chromosome spread from normal bone marrow cells. Cells were cultured in MarrowMAX™ Medium for 24 h.

Analysis of human tumors and hematopoietic cells for diagnosis of malignancies is a rapidly growing area of clinical cytogenetics. For the short-term culture of bone marrow, peripheral blood, and hematopoietic cells required for these analyses, many labs use Giant Cell Tumor (GCT) conditioned media containing a variety of hematopoietic growth factors to supplement serum-containing cultures. However, it is difficult to achieve consistent high levels of analyzable cells with commercially available or homemade formulations supplemented with GCT.

GIBCO™ MarrowMAX™ Bone Marrow Medium is a fully supplemented medium developed specifically to support bone marrow and peripheral blood cell culture for *in vitro* cytogenetic analysis of hematological disease.

MarrowMAX™ Bone Marrow Medium contains a novel human stromal cell conditioned medium. This conditioned medium is composed of a unique blend of hematopoietic growth factors for optimal cell growth. The medium is manufactured under strict controls ensuring consistent performance and superior chromosomal

morphology (*figure 1*). Using MarrowMAX™ Medium results in cultures with a high mitotic index and an increased number of analyzable cells.

Superior Performance

- Outperforms commercially available media containing GCT (*figure 2, reverse*).
- Higher mitotic index and superior chromosomal morphology.
- Consistent lot-to-lot performance (*figure 3, reverse*).

Convenience

- Complete, ready-to-use medium.
- Fully supplemented with serum, antibiotics, and L-glutamine.
- Store either frozen or refrigerated.

Quality Assurance

- Manufactured in compliance with the FDA's Quality System Regulation (cGMP) and the current requirements of ISO 9001.
- Application tested by an independent certified cytogenetics laboratory using human bone marrow cells.
- Extended shelf life of 18 months when stored unopened at -20°C and 60 days stored at 4°C.

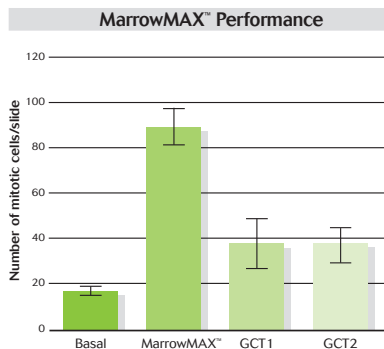


Figure 2. Comparison of media for stimulation of mitotic cells. Cells were cultured in basal medium without conditioned medium (Basal), MarrowMAX[™] Medium which contains stromal cell-conditioned medium (MarrowMAX[™]), Supplier 1 Medium containing GCT-conditioned medium (GCT 1), and Supplier 2 Medium containing GCT-conditioned medium (GCT 2). Mitotic cells were assayed 24 h after plating. Results are mean ± SEM for N = 10 with up to 30 donors.

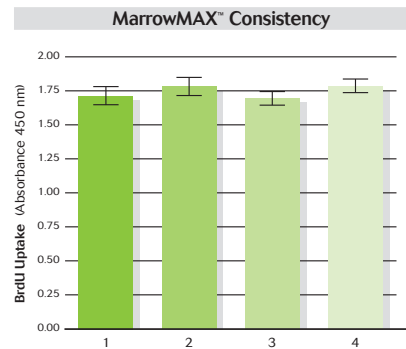


Figure 3. MarrowMAX[™] Medium consistency. Normal bone marrow mononuclear cells were seeded at 1×10^5 cells/ml in 4 different lots of MarrowMAX[™] Medium. Results are mean ± SEM for N = 10.

Ordering Information

Description	Cat. No.	Size
MarrowMAX [™] Bone Marrow Medium** (contains gentamicin)	12260-014	100 ml
Related Products		
Complete Media		
AmnioMAX [™] -II Complete Medium (contains gentamicin)	11269-016	100 ml
AmnioMAX [™] -C100 Complete Medium (system) — The system contains both the medium (90 ml) and the supplement (15 ml) (supplement contains gentamicin)	12558-011	1 Set
AmnioMAX [™] -C100 Basal Medium, liquid	17001-082 17001-074	90 ml 450 ml
AmnioMAX [™] -C100 Supplement, liquid (supplement contains gentamicin)	12556-015 12556-023	15 ml 75 ml
PB-MAX [™] Karyotyping Medium (supplement contains gentamicin)	12557-013 12557-021	100 ml 500 ml
Reagents		
KaryoMAX [®] Colcemid [®] Solution, liquid (10 µg/ml), in HBSS	15210-040	10 ml
KaryoMAX [®] Colcemid [®] Solution, liquid (10 µg/ml), in PBS	15212-012	10 ml
KaryoMAX [®] Giemsa Stain Stock Solution	10092-013	100 ml
Gurr Buffer Tablets (pH 6.8)*	10582-013	50 × 1 L
Phytohemagglutinin (M Form) (PHA), lyophilized*	10576-015	10 ml

See Chapter 3 of the 2003 GIBCO[™] Catalog for more related products.



www.invitrogen.com

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European Headquarters: Invitrogen Ltd • 3 Fountain Drive • Inchinnan Business Park • Paisley PA4 9RF, UK
Tel: +44(0) 141 814 6100 • Fax: +44(0) 141 814 6260 • E-mail: eurotech@invitrogen.com



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TaqMan QSY probes

New quencher available for your qPCR probes

Applied Biosystems™ TaqMan™ QSY™ probes incorporate a proprietary nonfluorescent 3' QSY quencher to provide maximal PCR performance in a multiplex format (Figure 1). Experience the sensitivity and specificity you know and expect from TaqMan™ Assays, with another great option for your real-time PCR assay designs.

QSY probes are comparable to BHQ probes

Your current Black Hole Quencher™ (BHQ™) probe designs can easily be converted to QSY probes. Identical sequence designs can be used with similar performance using FAM dye (Figure 2) and improved performance using our ABY™ dye (Figure 3).



Figure 1. QSY probe. The newly developed QSY quencher can be used in multiplex qPCR with FAM™, VIC™, ABY™, and JUN™ reporter dyes. The QSY quencher is nonfluorescent, leading to less background and improved quenching efficiency.

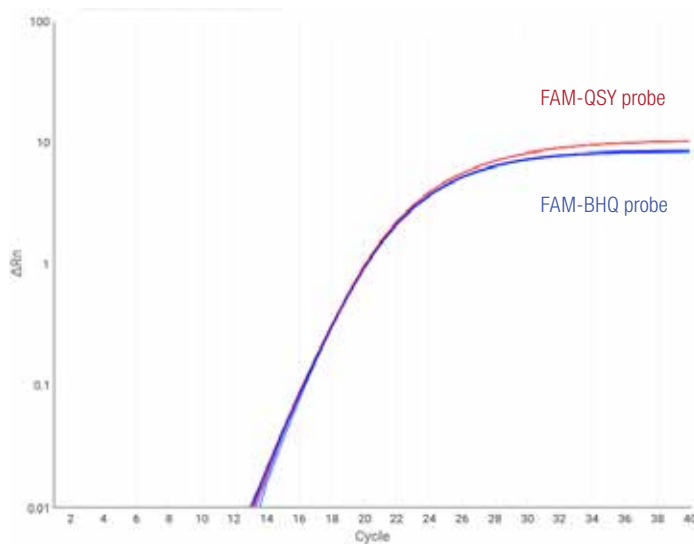


Figure 2. QSY probes have performance similar to that of BHQ probes. A FAM-QSY probe and a FAM-BHQ probe with identical oligonucleotide sequences and master mixes have similar C_t values.

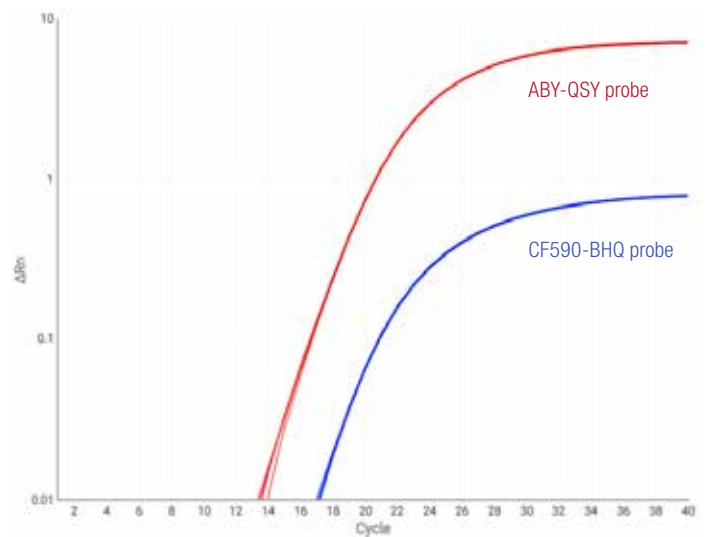


Figure 3. Improved performance in multiplex qPCR. In this multiplex experiment, the ABY-QSY probe shows a significantly lower C_t than the CF590-BHQ probe with an identical oligonucleotide sequence and master mix.

Four dye options optimized with our instruments for better sensitivity

TaqMan QSY probes can be ordered with FAM, VIC, and our proprietary ABY and JUN dyes, allowing amplification of up to 4 targets in a single reaction. All 4 dyes are optimized for the filter sets on Applied Biosystems™ real-time PCR instruments (Figure 4) and work together with minimal spectral overlap for optimal performance.

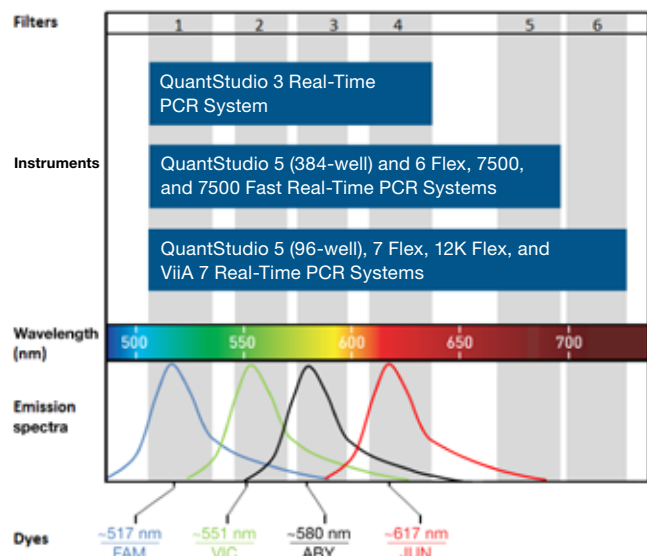


Figure 4. Fluorescence emission wavelengths used for multiplex real-time PCR. Emission spectra for FAM, VIC, ABY, and JUN dyes are shown in relation to regions of the spectrum detected by six filters available on Applied Biosystems real-time PCR instruments.

Ordering information

Product	Quantity	Cat. No.
TaqMan QSY Probe	6,000 pmol	4482777
TaqMan QSY Probe	20,000 pmol	4482778
TaqMan QSY Probe	50,000 pmol	4482779

Performance without compromise

Multiplexing with TaqMan QSY probes enables cost savings and preservation of limited samples, and also yields comparable results between reactions performed in individual tubes and in 4-plex reactions, for a gene quantification experiment (Figure 5).

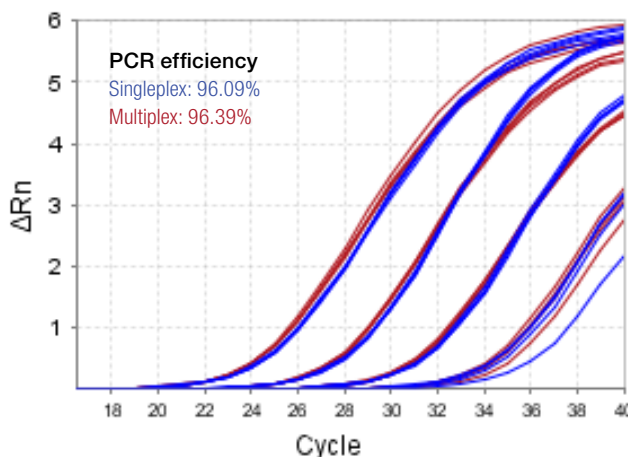


Figure 5. Comparable results for singleplex and multiplex assays. The amplification plot shows linear portions of the curves for 4 EGFR assays amplified in singleplex (blue) and 4-plex reactions (red) in a dilution series from 20,000 pg to 2 pg of reference colon cDNA per 10 μ L reaction. PCR efficiencies are 96.09% for EGFR singleplex and 96.39% for EGFR 4-plex reactions.

Product	Quantity	Cat. No.
TaqMan Multiplex Master Mix (2X)	5 mL	4461882
TaqPath 1-Step Multiplex Master Mix (4X)	5 x 1 mL	A28526
TaqPath 1-Step Multiplex Master Mix, No ROX (4X)	5 x 1 mL	A28522
Spectral Calibration Plate for Multiplex qPCR	1 plate	Various

Find out more at thermofisher.com/multiplexqpcr

Phusion High-Fidelity DNA Polymerases

Thermo Scientific™ Phusion™ High-Fidelity DNA Polymerases offer very high fidelity, speed, and yield for all PCR applications.

General instructions

- Due to the unique nature of Phusion DNA polymerases, always use the T_m calculator on our website to determine optimal annealing temperature (thermofisher.com/tmcalculator).
- Use 98°C for denaturation.
- Use 15–30 sec/kb for extension. Do not exceed 1 min/kb.
- Use Phusion DNA polymerases at 0.5–1.0 U per 50 µL reaction volume. Do not exceed 2 U per 50 µL reaction volume.
- Use 200 µM of each dNTP.
- If uracil is present in the dNTP mix or DNA template, use Thermo Scientific™ Phusion™ U Hot Start DNA Polymerase.

Note: Phusion DNA polymerases produce blunt-end DNA products.

Choosing the right Phusion product

		Phusion High-Fidelity DNA Polymerase (Cat. No. F530S)	Phusion Hot Start II High-Fidelity DNA Polymerase (Cat. No. F549S)	Phusion Flash High-Fidelity DNA Polymerase (Cat. No. F548S)	Phusion U Hot Start DNA Polymerase (Cat. No. F555S)	Phusion U Multiplex PCR Master Mix (Cat. No. F562S)
Characteristics	Blunt or 3'-A end	Blunt	Blunt	Blunt	Blunt	Blunt
	Target length, genomic/phage DNA	≤16/20 kb	≤16/20 kb	≤16/20 kb	≤7.5/20 kb	≤2.5/2.5 kb
	Hot start	No	Yes	Yes	Yes	Yes
	Recommended extension time	15–30 sec/kb	15–30 sec/kb	15 sec/kb	15–30 sec/kb	15–30 sec/kb
	Fidelity vs. <i>Taq</i>	52x	52x	25x	25x	NA
	dUTP tolerance	No	No	No	Yes	Yes
Formats	Enzyme*	✓	✓		✓	
	Green buffer**	✓	✓			
	Master mix†	✓	✓	✓	✓	✓
	Complete kit‡	✓				

* DNA polymerase, buffer, DMSO, and MgCl₂.

** DNA polymerase supplied with Phusion Green Buffer, which includes a density reagent and two tracking dyes for direct loading on gel.

† 2X master mix format.

‡ All the necessary PCR components, including control template and primers.

Reaction setup

Component	50 μ L reaction	20 μ L reaction	Final concentration
5X Phusion buffer*	10 μ L	4 μ L	1X
10 mM dNTPs*	1 μ L	0.4 μ L	200 μ M each
Primer A	x μ L	x μ L	0.5 μ M
Primer B	y μ L	y μ L	0.5 μ M
Template DNA	z μ L	z μ L	–
DMSO (optional)	(1.5 μ L)	(0.6 μ L)	(3%)
Phusion DNA polymerase	0.5 μ L	0.2 μ L	0.02 U/ μ L
Water	To 50 μ L total	To 20 μ L total	–

* If you are using any of the Phusion PCR master mix products, add 25 or 10 μ L of the 2X master mix (depending on the final reaction volume). Do not add dNTPs.

Cycling instructions for Phusion and Phusion Hot Start II High-Fidelity DNA Polymerases

Cycle step	2-step protocol		3-step protocol		Cycles
	Temperature	Time	Temperature	Time	
Initial denaturation	98°C	30 sec	98°C	30 sec	1
Denaturation	98°C	5–10 sec	98°C	5–10 sec	25–35
Annealing*	–	–	X°C*	10–30 sec	
Extension	72°C	15–30 sec/kb	72°C	15–30 sec/kb	
Final extension	72°C	5–10 min	72°C	5–10 min	1
	4°C	Hold	4°C	Hold	

* Depends on the primer T_m values. Use the T_m calculator at thermofisher.com/tmcalculator

Cycling instructions for Phusion Flash High-Fidelity PCR Master Mix

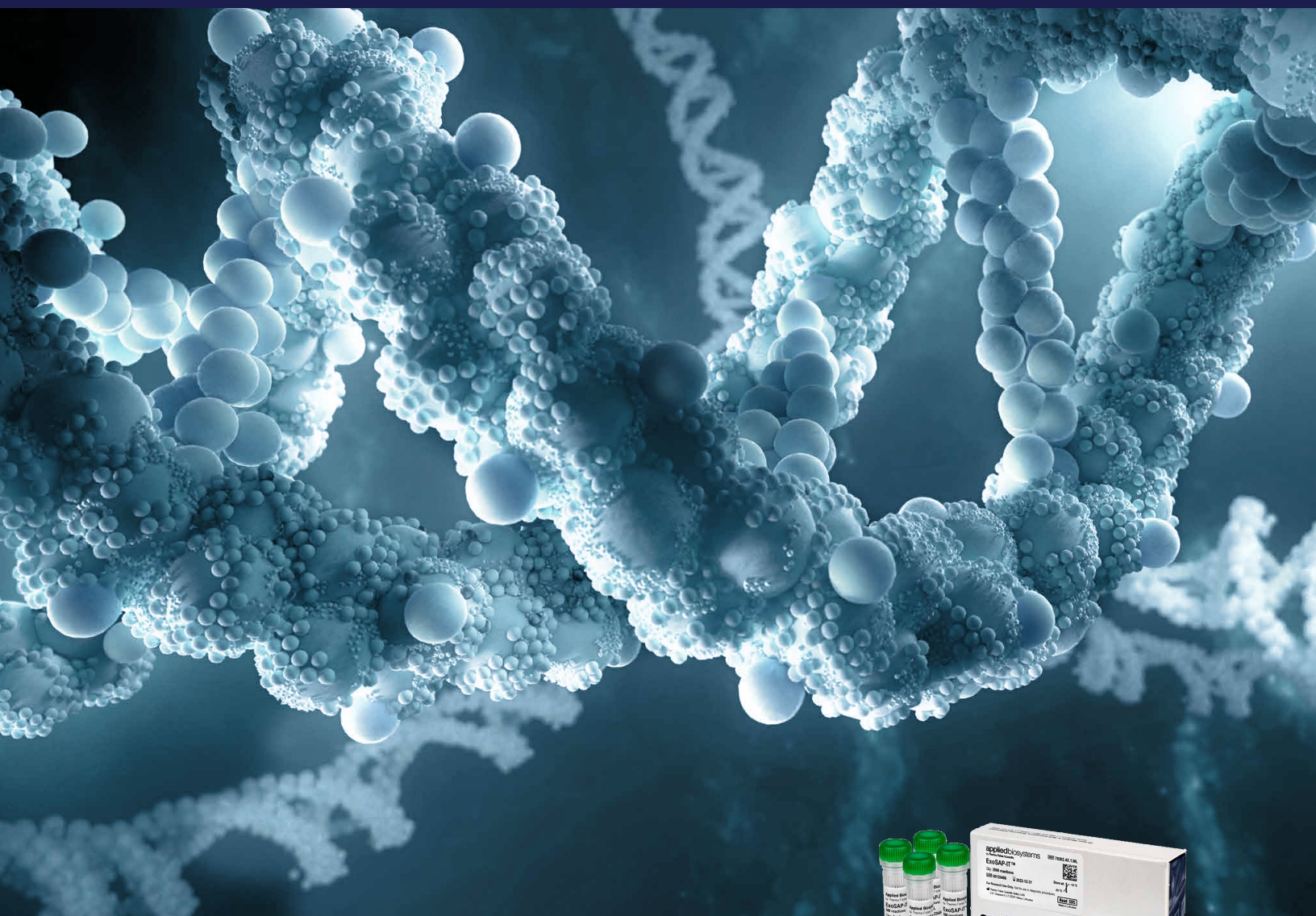
Cycle step	2-step protocol		3-step protocol		Cycles
	Temperature	Time	Temperature	Time	
Initial denaturation	98°C	10 sec	98°C	10 sec	1
Denaturation*	98°C	0 or 1 sec	98°C	0 or 1 sec	30
Annealing**	–	–	50–72°C	5 sec	
Extension	72°C	15 sec/kb	72°C	15 sec/kb	
Final extension	72°C	1 min	72°C	1 min	1
	4°C	Hold	4°C	Hold	

* A very short denaturation step is recommended. If the PCR instrument used does not accept 0 sec as a value, then a 1 sec value can be programmed.

** Depends on the primer T_m values. Use the T_m calculator at thermofisher.com/tmcalculator

Find out more at thermofisher.com/phusion

applied biosystems



ExoSAP-IT PCR cleanup reagents

One step to superior sequencing results

ThermoFisher
SCIENTIFIC

ExoSAP-IT *Express* reagent: PCR cleanup in as little as 5 minutes

Our one-step Applied Biosystems™ ExoSAP-IT™ *Express* PCR Product Cleanup Reagent enables quality sequencing results in a fraction of the time.

- **5 min protocol**—fastest enzymatic cleanup of PCR product
- **One-tube, one-step PCR cleanup**—add reagent directly to PCR product
- **Novel enzyme technology**—enzymes irreversibly inactivated in just 1 min at 80°C
- **Conserve PCR samples**—100% recovery of PCR products, regardless of amplicon length
- **Scalable**—treat PCR reaction in volumes from 5 µL to 5 mL
- **Eliminate spin columns or magnetic beads**—helps decrease time and expense while increasing yield

High-quality, accurate results

Compared with alternative PCR cleanup methods, ExoSAP-IT *Express* PCR Product Cleanup Reagent helps to ensure the availability of purified samples ready for downstream applications in just 5 minutes. This unique, highly stable one-tube solution allows for 100% recovery of DNA and longer read lengths for greater confidence, consistency, and accuracy. PCR products give superior sequencing results when treated with ExoSAP-IT *Express* reagent (Figure 1).

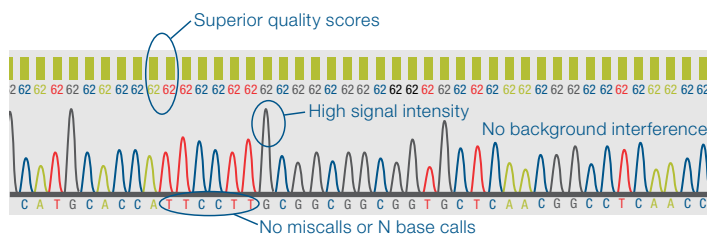


Figure 1. Sequencing results of a 1 kb PCR product treated with ExoSAP-IT *Express* reagent. Treatment with ExoSAP-IT *Express* reagent prior to sequencing eliminates miscalls and improves sequencing scores (numbers and bars above sequence; quality score >60, probability of error ≤0.0001%). Sequence shown is approximately 400 bases from the primer binding site.

Fastest PCR cleanup method

ExoSAP-IT *Express* reagent includes a novel exonuclease I that removes unincorporated primers and nucleotides with a reduced purification time. Only one pipetting step is required, simplifying the workflow and producing a sample ready for downstream applications in only 5 minutes (Figure 2).

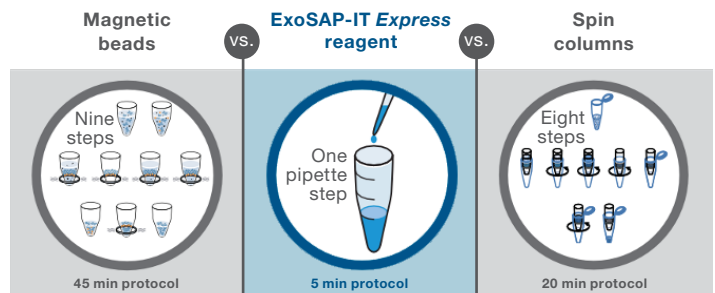


Figure 2. Comparison of cleanup methods. Use of ExoSAP-IT *Express* reagent eliminates spin columns, magnetic beads, filtration, and gel purification. With a 5 min protocol, ExoSAP-IT *Express* reagent is the fastest and easiest method for PCR cleanup, helping to minimize pipetting errors and contamination.

Conserve PCR samples—simple one-step, 100% recovery

The ExoSAP-IT *Express* enzymatic cleanup method helps minimize errors by reducing your protocol to a single pipetting step, allowing for automated or manual processing. ExoSAP-IT *Express* reagent outperforms the competition with 100% recovery of all amplicon sizes, from short to long (Table 1).

Table 1. DNA recovery after purification.

Amplicon size	Agencourt™ AMPure™ XP beads	ExoSAP-IT reagent
86 bp	10%	100%
103 bp	12%	100%
545 bp	63%	100%
1,007 bp	88%	100%

ExoSAP-IT *Express* reagent enables 100% recovery and provides effective cleanup of all amplicon sizes. In contrast, Agencourt AMPure XP beads were ineffective at purifying small amplicons, whether determined by image analysis or by the Invitrogen™ Quant-iT™ PicoGreen™ assay.

Overview

ExoSAP-IT reagents are a proprietary mixture of exonuclease I combined with shrimp alkaline phosphatase (SAP) in a specially formulated buffer that removes excess primers and dNTPs following a PCR reaction (Figure 3). Exonuclease I removes residual single-stranded primers and any single-stranded DNA produced during PCR. SAP removes the remaining dNTPs from the PCR mixture that may interfere with subsequent reactions.

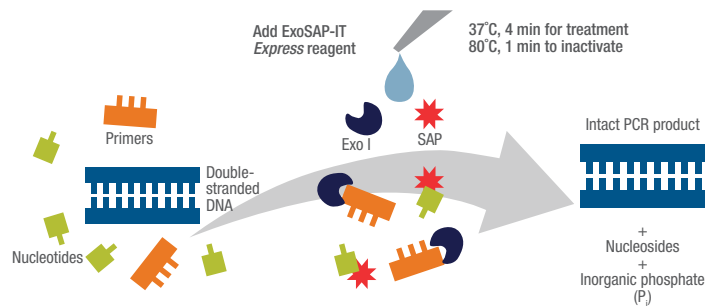


Figure 3. How ExoSAP-IT reagent works. Treat 5 μ L of PCR product with 2 μ L of ExoSAP-IT reagent. Treatment is carried out at 37°C followed by an incubation period at 80°C to completely inactivate both enzymes. Once contaminants are removed, your PCR products are ready for downstream applications such as Sanger sequencing, next-generation sequencing (NGS), fragment analysis, single-nucleotide polymorphism (SNP) analysis, *in vitro* transcription, or single-base extension.

The original ExoSAP-IT reagent formulation

Applied Biosystems™ ExoSAP-IT™ PCR Product Cleanup Reagent has been cited in over 10,000 publications. Thermo Fisher Scientific is the only manufacturer of ExoSAP-IT reagents, assuring your lab of product consistency and integrity.

- 30 min cleanup protocol
- Recommended for processing 1–96 samples at a time
- Best cost-per-reaction value

Also available in a high-throughput formulation

Applied Biosystems™ HT ExoSAP-IT™ Fast High-Throughput PCR Product Cleanup Reagent is an alternative formulation of the original ExoSAP-IT reagent, specifically designed for the unique requirements of high-throughput, automated platforms and multichannel pipettes. HT ExoSAP-IT Fast reagent quickly provides high-quality purified samples. This formulation offers decreased viscosity and is ideal for automated liquid handling platforms, with the same convenience and stability you have come to expect from ExoSAP-IT reagent.

- 14 min cleanup protocol
- Stable at 4°C for 1 month and at room temperature for 2 days
- Scalable for PCR cleanup ranging from a single tube up to a 384-well plate



Which ExoSAP-IT PCR cleanup reagent is right for you?

ExoSAP-IT reagents offer a unique one-tube, one-step enzymatic method for PCR cleanup. All ExoSAP-IT reagents provide 100% recovery of PCR products regardless of the fragment sizes. This PCR cleanup method removes excess primers and dNTPs and does not interfere

with downstream applications. Achieve superior results with ExoSAP-IT reagent—improve accuracy with higher yields and full PCR product recovery.

Use our selection guide to determine which formulation is best for your next experiment (Table 2).

Table 2. Selection guide for ExoSAP-IT reagents.

	ExoSAP-IT <i>Express</i> reagent	ExoSAP-IT reagent (original formulation)	HT ExoSAP-IT <i>Fast</i> High-Throughput reagent
Protocol time	5 min	30 min	14 min
Format	Single tube 8-tube strip	Single tube	Single tube 8-tube strip 96-well plate
Throughput level	Low to high; recommended for processing any sample size	Low to medium; recommended for processing 1–96 samples at a time	High; recommended for processing ≥96 samples at a time
Platform	Single- or multichannel pipette, automated liquid handling platforms	Single-channel pipette	Automated liquid handling platforms (lower viscosity for better handling)
Freezes at –20°C	No	No	Yes
Stability	–20°C for up to 2 years	–20°C for up to 2 years	–20°C for up to 2 years; once thawed, stable at 4°C for 1 month and room temperature for 2 days

Ordering information

Product	Quantity	Cat. No.
ExoSAP-IT <i>Express</i> PCR Product Cleanup Reagent	100 reactions	75001.200.UL
	480 reactions (8-tube strips)	75001.1.EA
	500 reactions	75001.1.ML
	2,000 reactions	75001.4X.1.ML
	5,000 reactions	75001.10.ML
ExoSAP-IT PCR Product Cleanup Reagent	100 reactions	78200.200.UL
	500 reactions	78201.1.ML
	2,000 reactions	78202.4X.1.ML
	5,000 reactions	78205.10.ML
HT ExoSAP-IT <i>Fast</i> High-Throughput PCR Product Cleanup Reagent	20 reactions	7859520RXN
	1,000 reactions	785951000RXN
	5,000 reactions	785955000RXN
	480 reactions (8-tube strips)	785951EA
	5,760 reactions (12 x 8-tube strips in a tray)	785951PK
	23,040 reactions (48 x 8-tube strips in a tray)	785954PK

Find out more at thermofisher.com/exosapit

GeneScan™ 1200 LIZ® Size Standard



Product P/N 4379950
Insert P/N 4379957 REV B
Printed in USA

For Research Use Only.
Not for use in diagnostic procedures.

Product Description:

GeneScan™ 1200 LIZ® Size Standard is an internal lane size standard developed for use with the Applied Biosystems fluorescence-based DNA electrophoresis systems. The use of an internal lane size standard enables automated data analysis and is also essential for achieving high run to run precision in sizing DNA fragments by electrophoresis.

GeneScan™ 1200 LIZ® Size Standard is designed for sizing DNA fragments in the 20-1200 bp range and provides 68 single-stranded LIZ® dye labeled fragments of 20, 30, 40, 60, 80, 100, 114, 120, 140, 160, 180, 200, 214, 220, 240, 250, 260, 280, 300, 314, 320, 340, 360, 380, 400, 414, 420, 440, 460, 480, 500, 514, 520, 540, 560, 580, 600, 614, 620, 640, 660, 680, 700, 714, 720, 740, 760, 780, 800, 820, 840, 850, 860, 880, 900, 920, 940, 960, 980, 1000, 1020, 1040, 1060, 1080, 1100, 1120, 1160 and 1200 bases. Each of the DNA fragments is labeled with a proprietary fluorophore, which results in a single peak when run under denaturing conditions.

Each kit contains two-200 µL tubes of the size standard. This is sufficient for 800 analyses when using the recommended loading amount of 0.5 µL.

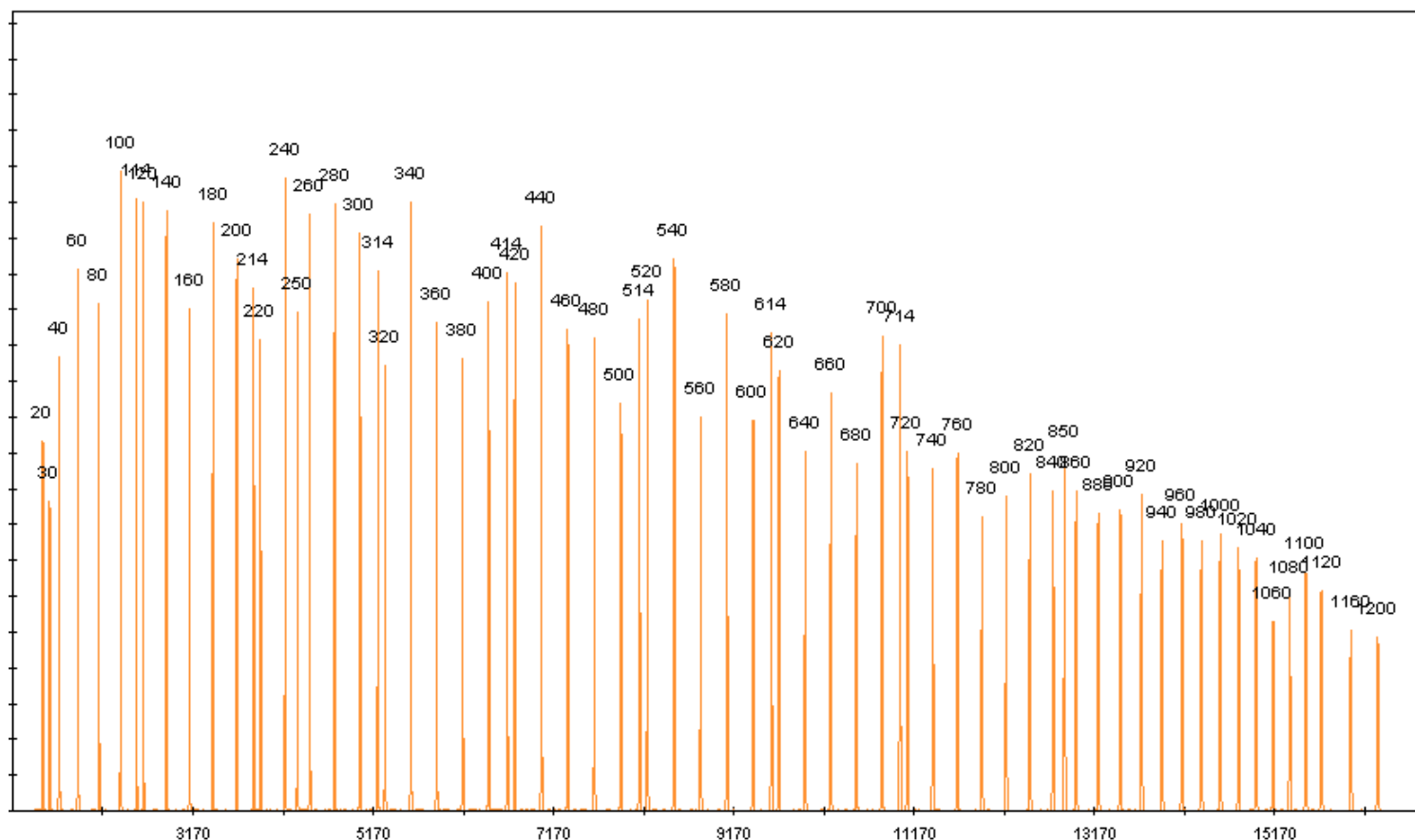
Storage Conditions:

Store the kit at 2°C to 8°C until ready to use. Do not freeze this product.

Shelf life:

Refer to the expiration date on the label. It is important that the product be stored at the recommended storage condition.

Electropherogram of the GeneScan™ 1200 LIZ® Size Standard



Instructions for use:

For the best results, a 50 cm capillary is recommended. Parameters for running the 1200 size standard are listed below. Optimization of these parameters for good sizing results may be needed.

Sample Preparation:

- 1) Before use, mix the contents of each tube thoroughly and centrifuge briefly to collect the liquid at the bottom of the tube. Typical loading cocktails are described below.

	310	3130/3100 Series	3500 Series	3730 Series
Sample	0.5 µL	0.5 µL	0.5 µL	0.5 µL
Size Standard	0.5 µL	0.5 µL	0.5 µL	0.5 µL
Hi-Di™ Formamide	11.0 µL	9.0 µL	9.0 µL	9.0 µL

Note: Applied Biosystems highly recommends using the above ratios of DNA sample (PCR product) and size standard as a starting point only. Optimize these ratios if necessary, based on your experimental results. Hi-Di™ Formamide (P/N 4311320 or P/N 4440753) is not included in the kit.

- 2) Heat the loading cocktail for 3 minutes at 95°C. Immediately chill on ice for a few minutes and load samples.
- 3) If you are using GeneMapper® Software v4.0 (or previous versions), or GeneMapper® *ID* Software v3.2 (or previous versions), it is necessary to download a size standard definition file. To access the product web page and file please go to the following link - http://www.appliedbiosystems.com/support/software/genescan_sizestandards/definition.cfm
- 4) For versions of Data Collection Software that do not contain the necessary run module, please go to the following link to download the appropriate run module - http://www.appliedbiosystems.com/support/software/genescan_sizestandards/modules.cfm

The modules listed below are available. Please select the appropriate module for your instrument and array combination.

310_POP-4_GS1200LIZ
 3100_36cm_POP-4_GS1200LIZ
 3130_36cm_POP-7_GS1200LIZ
 3130_50cm_POP-7_GS1200LIZ
 3130x/36cm_POP-7_GS1200LIZ
 3130x/50cm_POP-7_GS1200LIZ
 3730x/36cm_POP-7_GS1200LIZ
 3730x/50cm_POP-7_GS1200LIZ

Note: 3730x/ modules can be used for both 3730 (48 capillary) and 3730x/ (96 capillary) instruments.

NOTE: Discard any unused reagent that has been diluted in Hi-Di™ Formamide.

Safety warning:

Please read safety data sheets for further details.

Notice to Purchaser: Disclaimer of License

This product is optimized for use in the DNA sequencing or fragment analysis methods covered by patents owned or licensable by Life Technologies Corporation. No license under these patents to use the DNA sequencing or fragment analysis methods is conveyed expressly or by implication to the purchaser by the purchase of this product. A license to use the DNA sequencing or fragment analysis methods for certain research and development activities accompanies the purchase of certain Applied Biosystems reagents when used in conjunction with an authorized DNA sequencing machine, or is available from Life Technologies Corporation. Further information on purchasing licenses to practice the DNA sequencing or fragment analysis methods may be obtained by contacting Out Licensing, Life Technologies, 5791 Van Allen Way, Carlsbad, California 92008, or outlicensing@lifetech.com.

TaqMan SNP Genotyping Assays

Applied Biosystems™ TaqMan™ SNP Genotyping Assays from Thermo Fisher Scientific provide a highly flexible technology for detection of polymorphisms within any genome. Applied Biosystems™ TaqMan™ Assays have the simplest workflow available and are the quickest way to generate genotyping data. Based on powerful Applied Biosystems™ TaqMan™ probe and primer chemistry and designs, and coupled to dependable Applied Biosystems™ instruments and software, these made-to-order assays produce high-confidence results. TaqMan Assays are ideal for genotyping applications, including screening, association, candidate region, candidate gene, and fine-mapping studies.

Content-rich marker selection tools simplify study design and help you select from a library of human and mouse assays. This library includes over 7 million genome-wide human assays (of which 3.5 million are HapMap SNP-based assays, 160,000 are validated assays, and over 950,000 are coding region assays) and 10,000 mouse assays. We also offer 2,700 inventoried drug metabolism genotyping assays. Additionally, with Applied Biosystems™ Custom TaqMan™ SNP Genotyping Assays you can confidentially submit target SNP sequences for any genome to create your own assays. Let TaqMan SNP Genotyping Assays accelerate the pace of your discovery by eliminating time-consuming experimental design and optimization.

Powerful, proven chemistry

Whether your genotyping studies require targeted detection of essential SNPs, or the flexibility to choose SNPs for mapping, TaqMan SNP Genotyping Assays are the technology of choice. Proven TaqMan

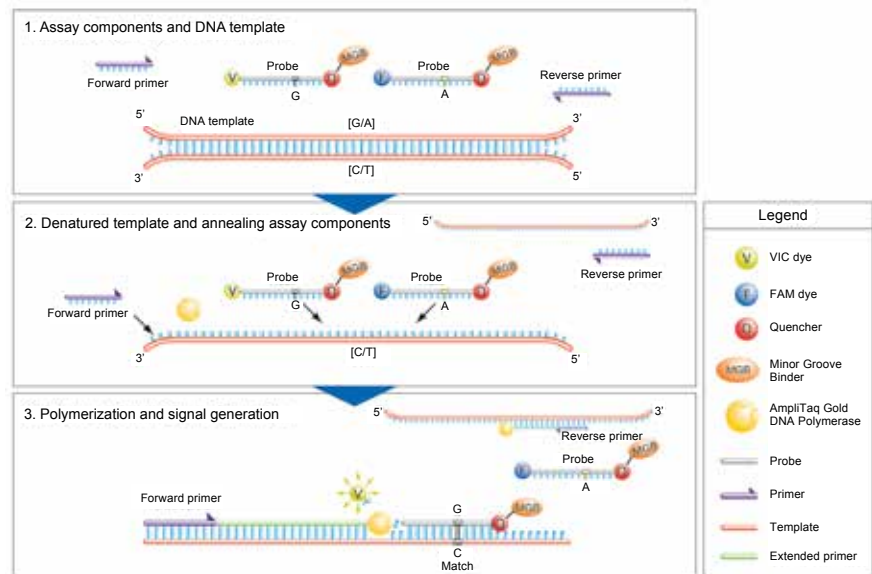


Figure 1. Allelic discrimination is achieved by the selective annealing of TaqMan MGB probes.

probes, which incorporate minor groove binder (MGB) technology at the 3' end, deliver superior allelic discrimination. The MGB molecule binds to the minor groove of the DNA helix, improving hybridization-based assays by stabilizing the MGB probe–template complex. This increased binding stability permits the use of probes as short as 13 bases for improved mismatch discrimination and greater flexibility when designing assays for difficult or variable sequences. In addition to SNP detection, TaqMan probes can be designed to detect multiple nucleotide polymorphisms (MNPs) and insertion/deletions (indels).

Detection is achieved with proven 5' nuclease chemistry by means of exonuclease cleavage of an allele-specific 5' dye label, which generates the permanent assay signal (Figure 1). All MGB probes include a nonfluorescent

quencher (NFQ) that virtually eliminates the background fluorescence associated with traditional quenchers, and provides a greater signal-to-noise ratio for superior assay sensitivity.

TaqMan SNP Genotyping Assays collection

TaqMan SNP Genotyping Assays are the world's largest collection of single-tube, ready-to-use SNP assays available. The TaqMan SNP Genotyping Assays library consists of two collections of human assays and one of mouse assays, and can be supplemented with assays designed using our Custom TaqMan SNP Genotyping Assays Service.

Over 7 million human SNP genotyping assays

This assay group contains over 7 million genome-wide SNPs, providing unprecedented marker coverage. Included in this collection are 160,000 validated assays that have approximately 10 kb spacing across gene regions. These assays were subjected to an extensive minor allele frequency test in 2–4 ethnic populations (45 individual samples per ethnic group) and as a result, offer the highest success rate. Also included are over 600,000 assays for the detection of nonsynonymous SNPs in coding regions, including many putative functional SNPs. Visit thermofisher.com/taqmansnp for more information.

Over 10,000 mouse SNP genotyping assays

The Applied Biosystems™ Mouse TaqMan™ Predesigned SNP Genotyping Assays collection consists of over 10,000 assays, and can be supplemented with assays designed using our Custom TaqMan SNP Genotyping Assays Service.

TaqMan Drug Metabolism Genotyping Assays

The collection of Applied Biosystems™ TaqMan™ Drug Metabolism Genotyping Assays includes 2,700 assays that target high-value polymorphisms in 221 drug metabolism genes. These assays have proven performance in four different ethnic population samples, consisting of 45 individuals each. To enable easy identification, these assays have been mapped to the common public allele nomenclature websites where possible. Visit thermofisher.com/taqmandme for more information.

All TaqMan SNP Genotyping Assays are generated using next-generation algorithms from the Thermo Fisher Scientific bioinformatics pipeline. For all predesigned assays, bioinformatics evaluation of target SNP sequences includes the masking of adjacent SNPs and ambiguous bases so that assay design and subsequent performance is not affected by the poor quality of the underlying sequence. Lastly,

the assay designs are aligned to the human genome using BLAST to ensure that each assay binds uniquely to the intended polymorphism. As the Custom TaqMan SNP Genotyping Assay Service is confidential and secure, you simply perform your own bioinformatics analysis prior to submitting your sequence for assay design.

Custom assay service for any possible SNP

Custom TaqMan SNP Genotyping Assays can be developed for any SNP in any organism. This service can generate assays for the detection of SNPs, MNPs, indels of up to 6 bases, or QSY™-labeled probes for multiplexing SNP assays.

Custom TaqMan SNP Genotyping Assays provide you with a complete service that includes secure and confidential ordering, assay design and manufacturing, and quality-control testing for synthesis accuracy and formulation completeness. Additionally, custom human assays are subjected to a functional test on 20 unique DNA samples.

Use the free Applied Biosystems™ Custom TaqMan™ Assay Design Tool to input and submit your sequence for assay design. This easy-to-use online resource lets you quickly submit your sequence information and start the ordering process securely and confidentially. Access the Custom TaqMan Assay Design Tool at thermofisher.com/snpcadt

Quality design and manufacturing

Probes and primers used in TaqMan SNP Genotyping Assays are designed using our rigorous bioinformatics pipeline. This proprietary group of algorithms has generated millions of TaqMan Assay designs by utilizing heuristic design rules deduced from both manufacturing and assay performance data. All assays are designed to perform under universal reaction conditions, as calculated probe and primer melting temperatures are consistent and include contributions from associated probe conjugates (i.e., dyes and MGB).

After manufacturing, assay components undergo extensive laboratory testing at our state-of-the-art manufacturing facility. Quality-control testing includes mass spectrometry for sequence verification and formulation assessments of probe and primer concentrations. Additionally, all human SNP genotyping assays are functionally tested to ensure allelic discrimination.

Simple workflow for quick results

TaqMan SNP Genotyping Assays constitute the simplest SNP genotyping technology available. We deliver your ready-to-use SNP genotyping assay at ambient temperature in a convenient, single-tube format. The rest is easy. Just combine the assay with Applied Biosystems™ TaqMan™ Genotyping Master Mix or TaqMan™ Universal PCR Master Mix and your purified DNA sample (Figure 2). There is no need to optimize probe, primer, salt concentrations, or temperature because all assays use universal reagent concentrations and thermal cycling conditions.

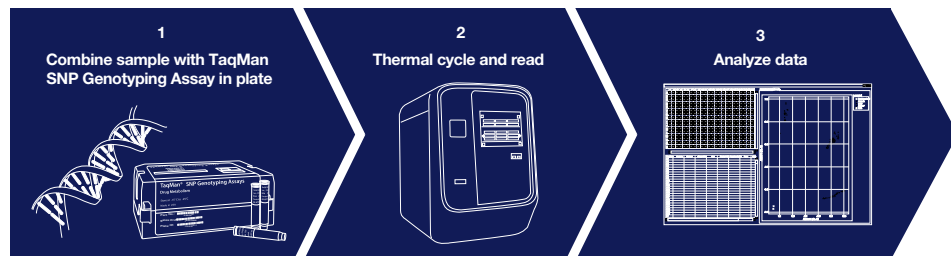


Figure 2. A simple workflow and reliable instruments combine to generate fast, high-confidence results.

After generating an endpoint read using a thermal cycler or real-time PCR instrument, no transfers, washes, or additional reagents are required, and the plate remains sealed; just read the plate and analyze the genotypes. This reduces the chance of contamination, sample mix-up, and sample loss. The simplicity of the chemistry allows you to easily automate the reaction for massively parallel genotyping studies, readily increasing the number of assays, number of samples, or both. Additionally, the analysis software allows you to auto-call genotypes, minimizing manual intervention.

Reliable real-time PCR platforms

A suite of superior Applied Biosystems instrument platforms is available for processing and analyzing TaqMan SNP Genotyping Assays (Table 1). These instruments, which meet all throughput needs and budgets, include the 7500, 7500 Fast, 7900HT Fast, ViiA™ 7, StepOne™, and StepOnePlus™ Real-Time PCR Systems, and the QuantStudio™ 3, 5, 6, 7, and 12K Flex Real-Time PCR Systems (Figure 3). Following PCR amplification, an endpoint read can be performed on any Applied Biosystems real-time PCR system. All of these dependable instruments offer the advanced multicolor detection capabilities required for highly accurate and reproducible allelic discrimination assays.

Data analysis software

The sophisticated SDS software package provided with all Applied Biosystems real-time PCR systems facilitates experimental setup, data collection, and assay performance analysis. The SDS software uses an advanced multicomponent algorithm to calculate the distinct signal contribution of each allele of a marker from the fluorescence measurements of each sample well during the assay plate read. The multicomponent data collected from the plate read are stored as SDS files, ready for genotype determination by the SDS software or optional Applied Biosystems™ TaqMan™ Genotyper Software (Figure 4).

Table 1. Applied Biosystems instrument capacities.

Instrument	Capacity
7500/7500 Fast Real-Time PCR System	96-well block (standard or Fast)
7900HT Fast Real-Time PCR System	96- and 384-well blocks (standard or Fast)
ViiA 7 Real-Time PCR System	96-well (standard or Fast), 384-well, and TaqMan Array Card blocks
StepOne Real-Time PCR System	48-well block (standard or Fast)
StepOnePlus Real-Time PCR System	96-well block (standard or Fast)
QuantStudio 3 Real-Time PCR System	96-well block (standard or Fast)
QuantStudio 5 Real-Time PCR System	96-well (standard or Fast) and 384-well blocks
QuantStudio 6 Real-Time PCR System	96-well (standard or Fast) and 384-well blocks
QuantStudio 7 Real-Time PCR System	96-well (standard or Fast), 384-well, and TaqMan Array Card blocks
QuantStudio 12K Flex Real-Time PCR System	96-well (standard or Fast), 384-well, TaqMan Array Card, and OpenArray plate blocks



Figure 3. The QuantStudio 5 Real-Time PCR System (left) and the QuantStudio 12K Flex Real-Time PCR System (right), which offers the highest throughput of all Applied Biosystems real-time PCR instruments.

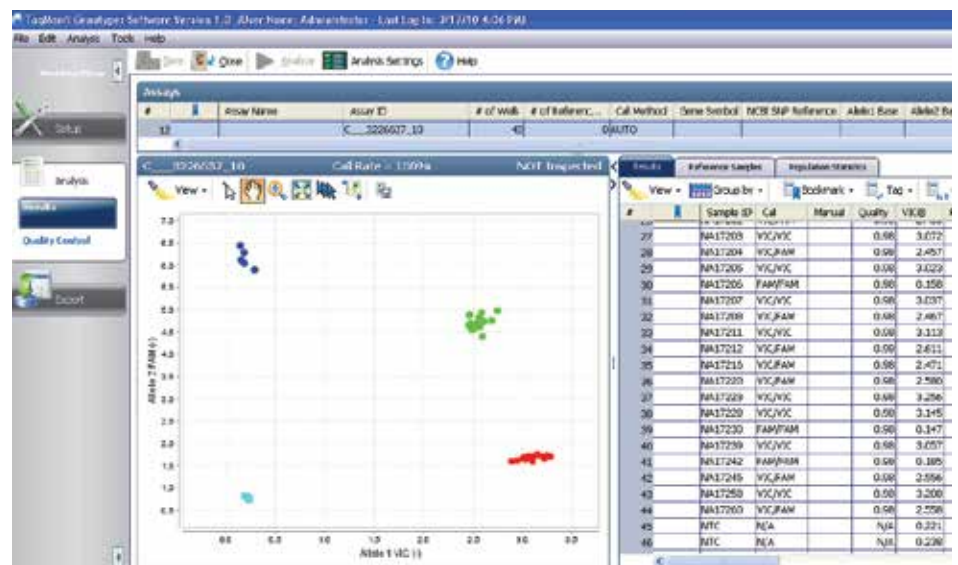


Figure 4. TaqMan Genotyper Software automatically determines sample genotypes and displays data.

TaqMan Genotyper Software is a great resource for fast and accurate genotype calling. It is a free SNP genotyping data analysis tool for use with TaqMan SNP Genotyping Assays performed in 48-, 96-, or 384-well microtiter plates or on Applied Biosystems™ TaqMan™ OpenArray™ Plates. It has a state-of-the-art genotype-calling algorithm, an intuitive user interface, and enhanced study-based analysis features. The software enables multi-plate data analysis for high-throughput workflows and improved accuracy in genotype calling; versatile export features and comprehensive quality-control features facilitate streamlining of the entire workflow. TaqMan Genotyper Software can be downloaded at thermofisher.com/taqmangenotyper

Simple ordering

Selecting and ordering TaqMan SNP Genotyping Assays is as simple as “point and click.” Use SNPbrowser Software to select the most informative SNPs for your genotyping studies. As you identify SNPs of interest, simply upload your selected TaqMan SNP Genotyping Assays to our online ordering tool.

The TaqMan Assay online ordering tool (Figure 5) enables you to search, select, and order from our catalog of over 7 million made-to-order predesigned TaqMan SNP Genotyping Assays. You can search for SNPs using any of several criteria: National Center for Biotechnology Information (NCBI) gene ID, NCBI SNP reference ID (rs#), or gene symbol. You can further refine your search by using SNP type (i.e., intragenic, 5’ or 3’ UTR, chromosome, etc.).

Our Custom TaqMan SNP Genotyping Assays supply you with SNPs that are not available from our predesigned assay collection, including those from any nonhuman organism. This service designs assays for all possible SNP, MNP, and indel targets but without the up-front bioinformatic preparation used for the predesigned made-to-order assays. Our complementary Custom TaqMan Assay Design Tool conveniently formats your target sequence for submission to our manufacturing facilities. To order custom assays, simply prepare your target sequence according to the Design and Ordering Guide, and upload your submission file at thermofisher.com/snpcaadt

The screenshot displays the TaqMan Assay search and order tool interface. On the left, there are search filters for Species (Human), Gene (BRCA1), Assay Type (Functionally Tested), and SNP Type (Intragenic, Silent Mutation, Transition Substitution). The main search results area shows a table with columns for SNP ID, Gene, Location, SNP Type, Assay Type, and Made To Order | Cat #. The selected SNP is rs34844365, located on Chromosome 17 at position 41251811. Below the search results, there are sections for Product Details, Gene Details, and a table of related SNPs.

Transcript Accession	SNP Location	SNP Type	Codon Change	Amino Acid Change	Protein ID
NM_007254.3	760	Silent Mutation	ACA.ACG	T176T	NP_009225.1
NM_007257.3	760	Silent Mutation	ACA.ACG	T129T	NP_009228.2
NM_007258.3	760	Silent Mutation	ACA.ACG	T176T	NP_009229.2
NM_007299.3	760	Silent Mutation	ACA.ACG	T176T	NP_009230.3
NM_007350.3	760	Silent Mutation	ACA.ACG	T176T	NP_009231.2

Figure 5. Our TaqMan Assay search and order tool makes online ordering easy. For convenient online ordering and multiple search options for all our genotyping assays, including keyword, batch, and location searches, visit thermofisher.com/taqmansnp

Ordering information

Size	Human assays (Cat. No.)	Nonhuman assays (Cat. No.)	Number of SNPs	No. of 5 μ L reactions (384-well plate)	No. of 25 μ L reactions (96-well plate)	Assay mix formulation	Assay type
Predesigned TaqMan SNP Genotyping Assays for Human and Mouse							
Small	4351379	4351384*	>4.5 million	1,500	300	40X	made-to-order
Medium	4351376	4351382*	>4.5 million	5,000	1,000	40X	made-to-order
Large	4351374	4351380*	>4.5 million	12,000	2,400	80X	made-to-order
Custom TaqMan SNP Genotyping Assays							
Small	4331349	4332077	∞	1,500	300	40X	made-to-order
Medium	4332072	4332075	∞	5,000	1,000	40X	made-to-order
Large	4332073	4332076	∞	12,000	2,400	80X	made-to-order
TaqMan Drug Metabolism Genotyping Assays							
Small	4362691	NA	2,700	750	150	20X	inventoried

All assays are quality-control tested using a mass spectrometer to verify sequence and yield. All assays have a VIC™ dye-labeled probe, a FAM™ dye-labeled probe, and two target-specific primers. All assays, excluding Custom TaqMan SNP Genotyping Assays, undergo bioinformatics evaluation of target SNP sequences.

Functional testing against 20 unique genomic DNA samples is performed on all custom and predesigned made-to-order human TaqMan SNP Genotyping Assays. Validation testing against four populations (45 samples/population) was performed on all 160,000 validated TaqMan SNP Genotyping Assays, and all TaqMan Drug Metabolism Genotyping Assays.

* Over 10,000 mouse assays available.

applied
biosystems

Find out more at thermofisher.com/taqmansnp


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7500 Real-Time PCR Systems Spectral Calibration Kit II

Catalog Number 4351151

Pub. No. 4351155 Rev. B

 **WARNING!** Read the Safety Data Sheets (SDSs) and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves. Safety Data Sheets (SDSs) are available from thermofisher.com/support.

Contents and storage

Contents	Amount	Storage
Spectral Calibration Plates sealed with optical covers	3	-25°C to -15°C

Related documentation

For detailed information on instrument setup and the calibration process, refer to the *Applied Biosystems™ 7300/7500/7500 Fast Real-Time PCR System Installation and Maintenance Guide* (Pub. no. 4347828).

Limited product warranty

Life Technologies Corporation and/or its affiliate(s) warrant their products as set forth in the Life Technologies' General Terms and Conditions of Sale found on Life Technologies' website at www.thermofisher.com/us/en/home/global/terms-and-conditions.html. If you have any questions, please contact Life Technologies at www.thermofisher.com/support.

For support visit thermofisher.com/support or email techsupport@lifetech.com

The information in this guide is subject to change without notice.

DISCLAIMER

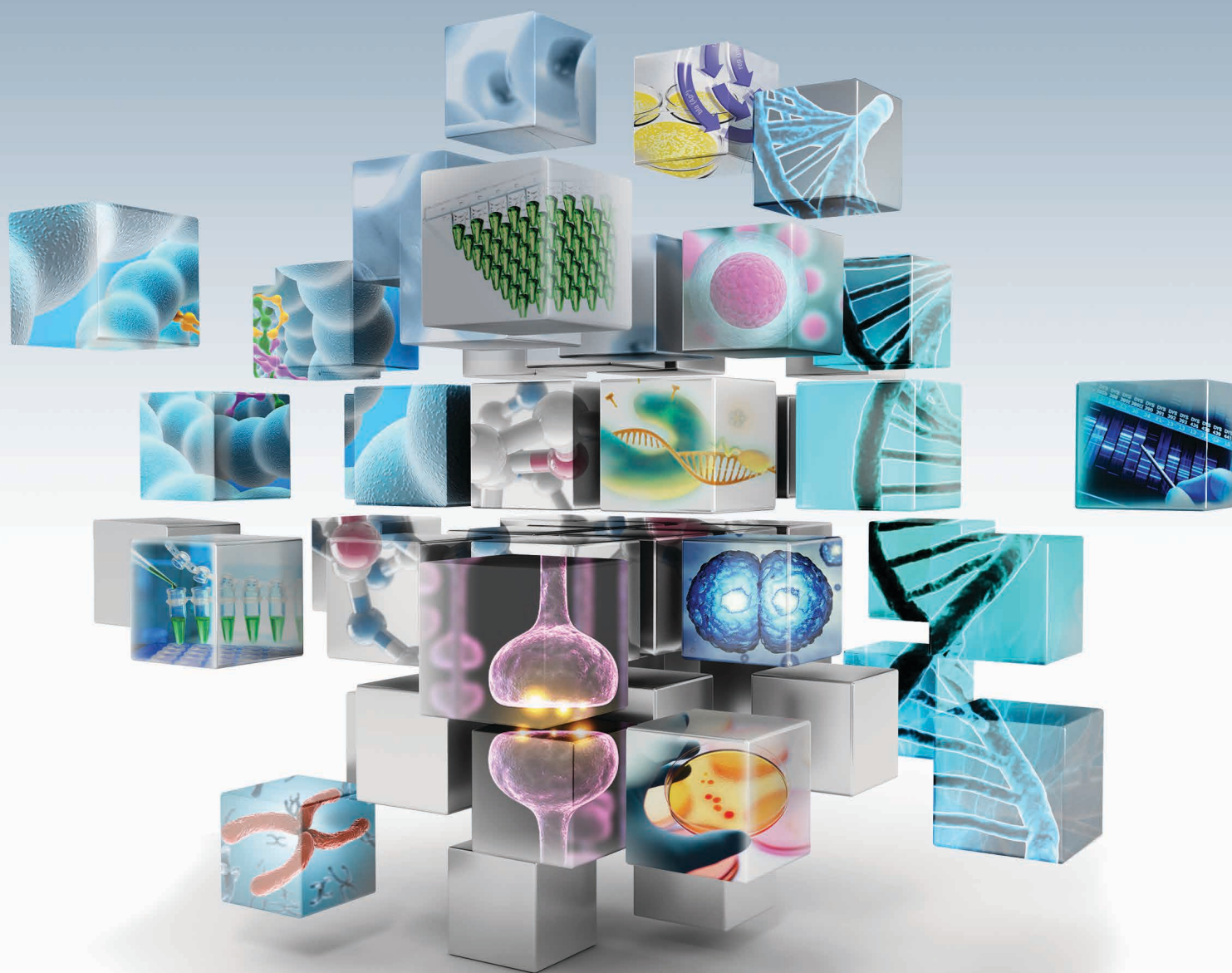
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Thermo Scientific molecular biology workflow solutions

High-quality essentials for everyday applications

Supporting great science through innovation in molecular biology

For over two decades, the Thermo Scientific™ molecular biology portfolio has represented leading technology, enabling reliable performance for every step of the traditional molecular biology workflow. Our innovations include the first single-buffer restriction enzyme collection, the most widely used high-fidelity DNA polymerases, and the most comprehensive selection of PCR plastic consumables.

Today, the people behind our expanding portfolio remain committed to developing tools that deliver the best value for your research, with the performance and affordability that make it easy for you to do more great science.

To learn more, go to

[thermofisher.com/thermoscientificmolbio](https://www.thermofisher.com/thermoscientificmolbio)

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Nucleic acid isolation kits

High yields and exceptional value

Thermo Scientific™ GeneJET™ DNA and RNA purification kits are designed for rapid, efficient, and convenient purification of DNA and RNA from a wide range of samples. The kits utilize a proprietary silica-based membrane technology in the form of a convenient spin column, eliminating the need for expensive resins, toxic phenol-chloroform extractions, or time-consuming alcohol precipitation. Purified DNA or RNA is ready to use in all common molecular biology procedures.

- Efficient nucleic acid extraction and high yields
- High purity of isolated DNA or RNA
- Simple and fast isolation procedure
- Convenient silica-based spin column format



Category	Description	Size	Cat. No.
Plasmid DNA purification	GeneJET Plasmid Miniprep Kit	50 preps/250 preps	K0502/K0503
	GeneJET Plasmid Midiprep Kit	25 preps/100 preps	K0481/K0482
	GeneJET Plasmid Maxiprep Kit	10 preps/25 preps	K0491/K0492
	GeneJET Endo-Free Plasmid Maxiprep Kit	10 preps	K0861
DNA and RNA fragment purification	GeneJET Gel Extraction Kit	50 preps/250 preps	K0691/K0692
	GeneJET PCR Purification Kit	50 preps/250 preps	K0701/K0702
	GeneJET RNA Cleanup and Concentration Micro Kit	50 preps/250 preps	K0841/K0842
	GeneJET Gel Extraction and DNA Cleanup Micro Kit	50 preps/250 preps	K0831/K0832
Genomic DNA purification	GeneJET Genomic DNA Purification Kit	50 preps/250 preps	K0721/K0722
	GeneJET Plant Genomic DNA Purification Mini Kit	50 preps/250 preps	K0791/K0792
	GeneJET Whole Blood Genomic DNA Purification Mini Kit	50 preps/250 preps	K0781/K0782
	GeneJET FFPE DNA Purification Kit	50 preps/250 preps	K0881/K0882
	GeneJET RNA Purification Kit	50 preps/250 preps	K0731/K0732
Total RNA purification	GeneJET Plant RNA Purification Mini Kit	50 preps/250 preps	K0801/K0802
	GeneJET Whole Blood RNA Purification Mini Kit	50 preps	K0761
	GeneJET Stabilized and Fresh Whole Blood RNA Kit	50 preps	K0871

To learn more, go to [thermofisher.com/genejet](https://www.thermofisher.com/genejet)

Reverse transcriptases

For optimal cDNA synthesis performance

Thermo Scientific™ Maxima™ reverse transcriptases (RTs) were developed through molecular evolution, which enabled the introduction and selection of multiple favorable mutations in traditional M-MuLV reverse transcriptase, boosting performance in cDNA synthesis. Maxima RTs are available in multiple formulations supporting a variety of molecular biology applications.

- Superior yields of full-length cDNA
- High reaction temperatures for improved transcription
- High transcription efficiency on long RNA templates
- Formats with integrated gDNA removal step for simplified workflows



Format	Description	Size	Cat. No.
Reverse transcriptases	Maxima Reverse Transcriptase	2,000 U/10,000 U	EP0741/EP0742
	Maxima H Minus Reverse Transcriptase	2,000 U/10,000 U	EP0751/EP0752
cDNA synthesis kits	Maxima First Strand cDNA Synthesis Kit for RT-qPCR	50 rxns/200 rxns	K1641/K1642
	Maxima First Strand cDNA Synthesis Kit for RT-qPCR, with dsDNase	50 rxns/200 rxns	K1671/K1672
	Maxima H Minus First Strand cDNA Synthesis Kit	20 rxns/100 rxns	K1651/K1652
	Maxima H Minus First Strand cDNA Synthesis Kit, with dsDNase	20 rxns/100 rxns	K1681/K1682
dsDNA synthesis kits	Maxima H Minus Double-Stranded cDNA Synthesis Kit	10 rxns	K2561

To learn more, go to thermofisher.com/maxima

For routine cDNA synthesis performance

Thermo Scientific™ RevertAid™ reverse transcriptases are based on M-MuLV enzymes and offer routine cDNA synthesis performance in molecular biology applications.

Format	Description	Size	Cat. No.
Reverse transcriptases	RevertAid Reverse Transcriptase	10,000 U/50,000 U	EP0441/EP0442
	RevertAid H Minus Reverse Transcriptase	10,000 U/50,000 U	EP0451/EP0452
cDNA synthesis kits	RevertAid First Strand cDNA Synthesis Kit	20 rxns/100 rxns	K1621/K1622
	RevertAid H Minus First Strand cDNA Synthesis Kit	20 rxns/100 rxns	K1631/K1632

To learn more, go to thermofisher.com/thermoscientificrt

For reliable RNA protection

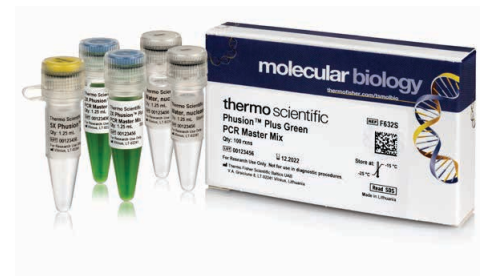
Thermo Scientific™ RiboLock™ RNase Inhibitor is an engineered thermostable enzyme that inhibits the activity of RNases A, B, and C. The enzyme is active under a wide range of reaction conditions and protects RNA at temperatures up to 55°C, helping to ensure successful reverse transcription in RT-PCR and RT-qPCR applications.


DNA polymerases

Trusted performance for high-fidelity PCR

Thermo Scientific™ Phusion™ high-fidelity DNA polymerases are designed to amplify DNA fragments with exceptional robustness and fidelity. Among the available Phusion formats, Thermo Scientific™ Phusion™ Plus DNA Polymerase allows you to skip calculation of annealing temperatures due to its universal annealing feature.

- High fidelity—Phusion Plus DNA Polymerase is >100x more accurate than *Taq* DNA polymerase
- Convenient—simplified PCR preparation and cycling with Phusion Plus DNA Polymerase due to a universal annealing temperature of 60°C



 Green formats for Phusion and DreamTaq polymerases enable direct loading of PCR products on gels.

Format	Description	Size	Cat. No.
Standard	Phusion High-Fidelity DNA Polymerase	100 U/500 U	F530S/F530L
	Phusion High-Fidelity PCR Master Mix with HF Buffer	100 x 50 µL rxns/500 x 50 µL rxns	F531S/F531L
Hot-start	Phusion Hot Start II High-Fidelity DNA Polymerase	100 U/500 U	F549S/F549L
	Phusion Hot Start II High-Fidelity PCR Master Mix	100 x 50 µL rxns/500 x 50 µL rxns	F565S/F565L
	Phusion Plus DNA Polymerase	100 rxn/500 rxn	F630S/F630L
	Phusion Plus PCR Master Mix	100 rxn/500 rxn	F631S/F631L
Uracil-tolerant	Phusion Plus Green PCR Master Mix	100 rxn/500 rxn	F632S/F632L
	Phusion U Hot Start DNA Polymerase	100 U/500 U	F555S/F555L
Multiplex PCR	Phusion U Hot Start PCR Master Mix	100 x 50 µL rxns/500 x 50 µL rxns	F533S/F533L
	Phusion U Multiplex PCR Master Mix	100 x 50 µL rxns/500 x 50 µL rxns	F562S/F562L

To learn more, go to thermofisher.com/phusion

Enhanced *Taq* DNA polymerases for routine PCR

Thermo Scientific™ DreamTaq™ DNA polymerases offer a great balance between performance and value. Available in standard and hot-start formats, they deliver enhanced PCR performance that no conventional *Taq* enzyme can match.

- Featuring increased sensitivity and specificity; minimized optimization; and support of a wide range of amplicon lengths
- Multiple formats for maximum flexibility and reliability



Format	Description	Size	Cat. No.
Standard	DreamTaq DNA Polymerase	500 U/2,500 U	EP0702/EP0703
	DreamTaq Green DNA Polymerase	500 U/2,500 U	EP0712/EP0713
	DreamTaq PCR Master Mix	200 x 50 µL rxns/1,000 x 50 µL rxns	K1071/K1072
	DreamTaq Green PCR Master Mix	200 x 50 µL rxns/1,000 x 50 µL rxns	K1081/K1082
Hot-start	DreamTaq Hot Start DNA Polymerase	200 U/500 U/2,500 U	EP1701/EP1702/EP1703
	DreamTaq Hot Start Green DNA Polymerase	200 U/500 U/2,500 U	EP1711/EP1712/EP1713
	DreamTaq Hot Start PCR Master Mix	200 rxns/1,000 rxns	K9011/K9012
	DreamTaq Hot Start Green PCR Master Mix	200 rxns/1,000 rxns	K9021/K9022

To learn more, go to thermofisher.com/dreamtaq

Solutions for direct PCR

Amplify without purification

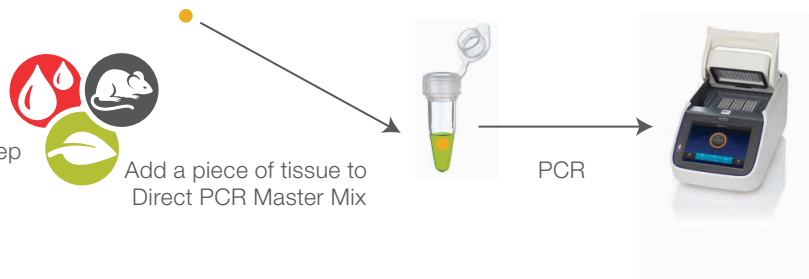
Thermo Scientific™ Direct PCR master mixes offer outstanding convenience for DNA amplification by supporting PCR from unpurified samples. A tiny amount of source material is used in the PCR reaction without any purification steps, providing significant savings in both time and cost. Master mixes include a density reagent and two tracking dyes that allow for direct loading of PCR products on gels for simplified workflows.

- PCR from crude samples—no DNA extraction or purification required
- Very short protocol times—from sample to results in 30 minutes
- Direct loading of PCR products on gels for simplified workflows
- Compatible with a variety of human, animal, and plant tissue samples

Two short protocols for different needs

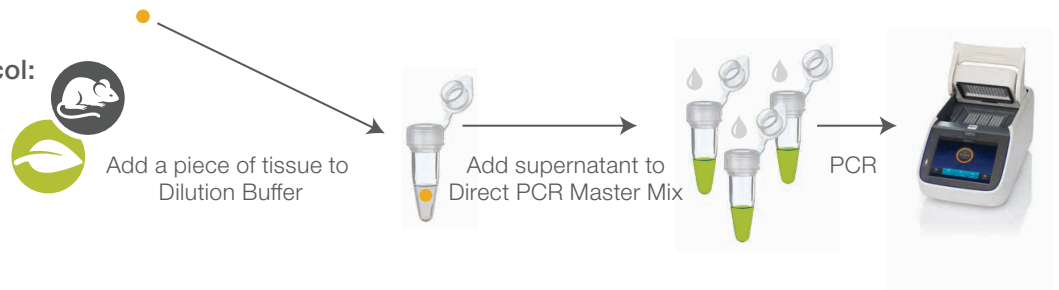
Direct protocol:

- Minimal hands-on time
- From sample to PCR in one step



Dilution and storage protocol:

- For multiple PCR reactions
- For long or difficult amplicons
- For sample storage



Sample type	Description	Size		Cat. No.
		Direct protocol	Dilution and storage protocol	
Animal and human tissues	Phire Tissue Direct PCR Master Mix	100 rxns/500 rxns	250 rxns/1,250 rxns	F170S/F170L
Plant tissues, bacteria, yeast	Phire Plant Direct PCR Master Mix	100 rxns/500 rxns	250 rxns/1,250 rxns	F160S/F160L
Animal and human blood	Phusion Blood Direct PCR Master Mix	100 rxns/500 rxns	NA	F175S/F175L

To learn more, go to thermofisher.com/directpcr

PCR plastic consumables

Not all PCR plastics are created equal

For over 25 years, the Thermo Scientific™ PCR portfolio has been supplying high-quality PCR plastic consumables for molecular biology research. These products are designed to support maximum PCR performance and are manufactured with robust processes and extensive quality controls. The comprehensive portfolio of Thermo Scientific PCR plastic consumables includes individual tubes, tube strips, 96- and 384-well plates, and sealing options compatible with a broad range of PCR and qPCR instruments.

- Clean room production—certified free from DNA, RNases, and DNases
- Specialized solutions for low-, medium-, and high-throughput PCR and qPCR experiments
- Broad PCR and qPCR instrument compatibility including automated platforms
- Barcoded product options



Tubes

Individual PCR tubes with attached caps



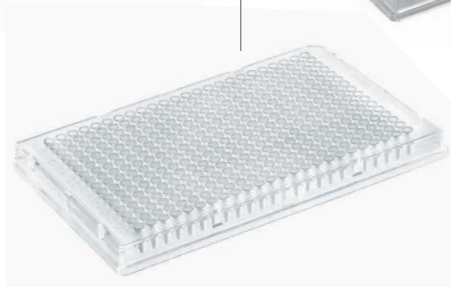
Tube strips

8-tube strips for PCR with separate or attached caps



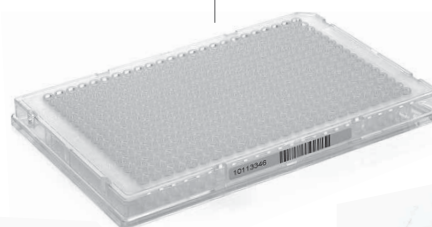
96-well plates

Full-, semi-, or non-skirted 96-well PCR plates with different profiles; ultra-rigid plates for robotic applications



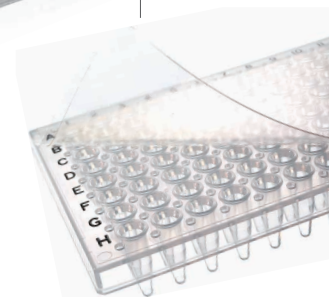
384-well plates

Full-skirted standard or extra-volume 384-well PCR plates; ultra-rigid plates for robotic applications



Barcoded plates

Barcoded 96- or 384-well PCR plates for reliable sample tracking



Sealing options

Cap strips, adhesive seals, and sealing mats compatible with PCR and qPCR applications



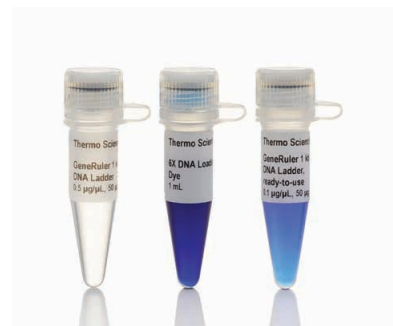
To learn more, go to [thermofisher.com/thermoscientificplastics](https://www.thermofisher.com/thermoscientificplastics)

Electrophoresis reagents

DNA ladders designed with accuracy in mind

Thermo Scientific™ GeneRuler™ DNA ladders are produced from chromatography-purified individual DNA fragments and are used for accurate analysis of DNA in agarose or polyacrylamide gels. They are ideal for sizing and in-gel DNA quantification. GeneRuler DNA ladders are available in conventional as well as ready-to-use formats (premixed with loading dye).

- Broad selection of DNA ladders that produce bright, sharp bands
- Environmentally friendly shipping



Range, bp*	Description	Size	Cat. No.
250–10,000	GeneRuler 1 kb DNA Ladder	5 x 50 µg/25 x 50 µg	SM0311/SM0312
	GeneRuler 1 kb DNA Ladder, ready-to-use	50 µg/5 x 50 µg	SM0314/SM0313
75–20,000	GeneRuler 1 kb Plus DNA Ladder	5 x 50 µg/25 x 50 µg	SM1331/SM1332
	GeneRuler 1 kb Plus DNA Ladder, ready-to-use	50 µg/5 x 50 µg	SM1334/SM1333
100–1,000	GeneRuler 100 bp DNA Ladder	50 µg/5 x 50 µg	SM0241/SM0242
	GeneRuler 100 bp DNA Ladder, ready-to-use	50 µg/5 x 50 µg	SM0243/SM0244
100–3,000	GeneRuler 100 bp Plus DNA Ladder	50 µg/5 x 50 µg	SM0321/SM0322
	GeneRuler 100 bp Plus DNA Ladder, ready-to-use	50 µg/5 x 50 µg	SM0323/SM0324
50–1,000	GeneRuler 50 bp DNA Ladder	50 µg/5 x 50 µg	SM0371/SM0372
	GeneRuler 50 bp DNA Ladder, ready-to-use	50 µg	SM0373

* GeneRuler DNA ladders are also available in ultralow (10–300 bp), low (25–700 bp), and high (10,171–48,502 bp) ranges.

To learn more, go to thermofisher.com/dnaladders

RNA ladders for fragment sizing and in-gel quantification

Thermo Scientific™ RiboRuler™ RNA ladders are produced from chromatography-purified RNA transcripts and are free from degraded RNA or NTPs. They produce sharp bands of uniform intensity and have easy-to-remember band

sizes and quantities allowing for RNA fragment sizing and approximate quantification. RiboRuler RNA ladders are available in conventional as well as ready-to-use formats (premixed with loading dye).

To learn more, go to thermofisher.com/rnaladders

High-quality agarose

Thermo Scientific™ TopVision™ Agarose is a highly purified DNase- and RNase-free agarose that comes in two melting point options (standard and low melting temperature) and two formats (powder and tablets).

- Suitable for DNA and RNA analysis
- Excellent gel transparency



Format	Description	Size	Cat. No.
Powder	TopVision Agarose	100 g/500 g	R0491/R0492
	TopVision Low Melting Point Agarose	25 g	R0801
Tablets	TopVision Agarose Tablets	200/1,000 tablets	R2801/R2802

To learn more, go to thermofisher.com/topvision

Restriction and modifying enzymes

Restriction digestion simplified

Thermo Scientific™ FastDigest™ enzymes are a line of restriction enzymes that are all 100% active in a single buffer. The universal Thermo Scientific™ FastDigest™ and FastDigest™ Green Buffers allow single, double, or multiple DNA digestion within 5–15 minutes, eliminating any need for buffer changes or subsequent DNA cleanup steps. Thermo Scientific™ DNA-modifying enzymes have 100% activity in this buffer as well. The FastDigest Green Buffer includes a density reagent and two tracking dyes that allow for direct loading of digestion reaction products on gels.

- 100% activity of all FastDigest enzymes in one buffer
- Complete DNA digestion in 5–15 minutes
- 100% buffer compatibility with downstream applications



FastDigest Value Pack

The Thermo Scientific™ FastDigest™ Value Pack (Cat. No. K1991) is a collection of 13 popular FastDigest enzymes supplied with FastDigest and FastDigest Green Buffers. Each enzyme is supplied in an amount sufficient for 20 standard restriction digestion reactions. The FastDigest enzymes included in the pack are: BamHI, BglII, EcoRI, EcoRV (Eco321), HindIII, KpnI, NdeI, NotI, PstI, Sall, SmaI, XbaI, and XhoI.

Find all 176 enzymes at thermofisher.com/fastdigest



DNA- and RNA-modifying enzymes

Thermo Scientific™ modifying enzymes are of high quality and purity, and support common modifications of RNA and DNA molecules. These enzymes include phosphatases, kinases, DNA and RNA polymerases, ligases, and other nucleases.

Enzyme type	Description	Size	Cat. No.
Phosphatases and kinases	FastAP Thermosensitive Alkaline Phosphatase (1 U/μL)	1,000 U/5 x 1,000 U/300 U	EF0651/EF0652/ EF0654
	T4 Polynucleotide Kinase (10 U/μL)	500 U/2,500 U	EK0031/EK0032
DNA polymerases	T4 DNA Polymerase (5 U/μL)	100 U/500 U	EP0061/EP0062
	T7 DNA Polymerase (10 U/μL)	300 U	EP0081
	Klenow Fragment (10 U/μL)	300 U/1,500 U	EP0051/EP0052
Deoxyribonucleases (DNases)	Exonuclease I (20 U/μL)	4,000 U/20,000 U	EN0581/EN0582
	DNase I, RNase-free (1 U/μL)	1,000 U	EN0521
Ligases	T4 DNA Ligase (5 U/μL)	200 U/1,000 U	EL0014/EL0011
RNA polymerases	T7 RNA Polymerase, HC (200 U/μL)	25,000 U	EP0113
Ribonucleases (RNases)	RNase A, DNase- and protease-free (10 mg/mL)	10 mg	EN0531
	RNase H (5 U/μL)	100 U/500 U	EN0201/EN0202

Find all modifying enzymes at thermofisher.com/tsmodifyingenzymes

Cloning kits

Universal cloning kit for any type of DNA fragment

The Thermo Scientific™ CloneJET™ PCR Cloning Kit utilizes positive selection for fast and simple cloning. This kit supports highly efficient cloning of PCR products generated with any thermostable DNA polymerase and allows both blunt- or sticky-end phosphorylated or non-phosphorylated DNA fragments to be cloned.

- Fast—ligation in only 5–10 minutes
- High efficiency—more than 99% positive clones
- No cloning background with the positive selection vector
- Eliminates the need for blue/white screening

To learn more, go to thermofisher.com/clonejet



Ligation-independent cloning kits

Streamline and facilitate the process of cloning an insert into an expression vector with the Thermo Scientific™ aLICator™ LIC Cloning and Expression System. The included pLATE bacterial expression vectors are designed for high levels of target protein expression as well as minimized basal (uninduced) expression.

- No need to cut and ligate DNA with traditional methods
- Tight control for protein production
- One-step on-column His-tag removal

To learn more, go to thermofisher.com/alicator



Kits for DNA ligation and end repair

The Thermo Scientific™ Rapid DNA Ligation Kit enables fast sticky-end or blunt-end DNA ligation in only 5 minutes at room temperature. The fast ligation efficiency is equal to that obtained with T4 DNA ligase in a standard 1-hour ligation. The reaction mixture can be used directly for bacterial transformation.

The Thermo Scientific™ Fast DNA End Repair Kit is used for blunting and phosphorylation of DNA ends in just 5 minutes for subsequent use in blunt-end ligation.

Cloning kit	Description	Size	Cat. No.
Universal cloning kit	CloneJET PCR Cloning Kit	20 rxns/40 rxns	K1231/K1232
Ligation-independent cloning kits	aLICator LIC Cloning and Expression Kits	20 rxns	K1241, K1251, K1261, K1281
	aLICator LIC Cloning and Expression Systems	30 rxns	K1271, K1291
Kit for DNA ligation	Rapid DNA Ligation Kit	50 rxns/150 rxns	K1422/K1423
Kit for DNA end repair	Fast DNA End Repair Kit	50 rxns	K0771

To learn more, go to thermofisher.com/cloningtools



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MicroAmp™ plastic consumables compatibility chart for Applied Biosystems™ endpoint PCR systems and genetic analyzers

Product	Cat. No.	3 x 32-well	96-well 0.2 mL		96-well 0.1 mL	384-well		Genetic analyzers		
		ProFlex™	ProFlex, SimpliAmp™, VeritiPro™, Veriti™, MiniAmp™ Plus, MiniAmp	2720	9700	Veriti	ProFlex, Veriti, VeritiPro™	9700	310	3130, 3130xl, 3500, 3500xl, 3730, 3730xl
96-well 0.2 mL reaction plates										
Optical 96-Well Plate	N8010560, 4316813		•	•	•					•
Optical 96-Well Plate with Barcode	4306737, 4326659		•	•	•					•
96-Well Plate with Barcode & Optical Caps	403012		•	•	•					
Optical 96-Well Plate with Barcode & Optical Adhesive Films	4314320		•	•	•					
EnduraPlate Optical 96-Well Clear Plate	A36924		•	•	•					•
EnduraPlate Optical 96-Well Clear Plate with Barcode*	4483354, 4483352		•	•	•					•
TriFlex 3 x 32-Well Reaction Plate	A32810, A32811	•	•	•	•					
96-well 0.1 mL reaction plates										
Fast Optical 96-Well Plate, 0.1 mL	4346907				•				•	•
Fast Optical 96-Well Plate with Barcode, 0.1 mL	4346906, 4366932				•				•	•
EnduraPlate Optical 96-Well Fast Plate	A36930				•				•	•
EnduraPlate Optical 96-Well Fast Clear Plate with Barcode*	4483485, 4483494				•				•	•
384-well reaction plates										
Optical 384-Well Plate	4343370					•	•			•
Optical 384-Well Plate with Barcode	4309849, 4326270, 4343814					•	•			•
EnduraPlate Optical 384-Well Plate	A36931					•	•			•
EnduraPlate Optical 384-Well Clear Plate with Barcode*	4483285, 4483273					•	•			•
Strip tubes and caps										
Fast 8-Tube Strip, 0.1 mL	4358293				•					
Optical 8-Tube Strip with Attached Optical Caps, 0.2 mL	A30588	•	•	•	•					
8-Tube Strip with Attached Domed Caps, 0.2 mL	A30589	•	•	•	•					
8-Tube Strip, 0.2 mL*	N8010580	•	•	•	•				•	
Optical 8-Tube Strip, 0.2 mL	4316567	•	•	•	•					
8-Cap Strip*	N8010535, N8011535	•	•	•	•	•				
Optical 8-Cap Strip	4323032	•	•	•	•	•				
12-Cap Strip*	N8010534, N8011534	•	•	•	•	•				
Single tubes										
Fast Reaction Tube with Cap, 0.1 mL	4358297, 4358293				•					
Reaction Tube with Cap, 0.2 mL*	N8010540, N8010612, N8011540	•	•	•	•					
Reaction Tube without Cap, 0.2 mL*	N8010533, N8011533	•	•	•	•					
Optical Tube without Cap, 0.2 mL	N8010933	•	•	•	•					
Seals and covers										
Clear Adhesive Film	4306311		•	•	•	•	•	•		
Optical Adhesive Film	4360954, 4311971		•	•	•	•	•	•		
96-Well Full Plate Cover	N8010550			•	•					
32-Well Clear Adhesive Film	A32812	•	•	•	•					
Accessories										
Splash-Free 96-Well Base	4312063		•	•	•	•				
96-Well Support Base	4379590		•	•	•	•				•
96-Well Base	N8010531		•	•	•					
96-Well Reaction Tube/Tray/Retainer Set, 0.2 mL	403083, 403086			•	•					

* Multiple colors are available.

Note: Experiments using one or two 8-tube strips with attached caps require blank tube strips to balance lid pressure on the block or the use of the Applied Biosystems™ MicroAmp™ 96-Well Tray/Retainer Set (Cat. No. 4381850)—bottom part of the tray *only*; For use with the 96-well block of the ProFlex, SimpliAmp, Veriti, VeritiPro, MiniAmp Plus, and MiniAmp thermal cyclers.

Find out more at thermofisher.com/pcrplastics

MicroAmp™ plastic consumables compatibility chart for Applied Biosystems™ real-time PCR systems

Product	Cat. No.	48-well		96-well 0.2 mL			96-well 0.1 mL			384-well
		StepOne™	7000	7300, 7500	QuantStudio™ 3, 5, 6, 6 Pro, 7, 7 Pro, 12K; ViiA™ 7; 7900HT		StepOnePlus™	7500	QuantStudio 3, 5, 6, 6 Pro, 7, 7 Pro, 12K; ViiA 7; 7900HT**	
96-well 0.2 mL reaction plates										
Optical 96-Well Plate	N8010560, 4316813		•	•	•					
Optical 96-Well Plate with Barcode	4306737, 4326659		•	•	•					
Optical 96-Well Plate with Barcode & Optical Caps	403012		•	•	•					
Optical 96-Well Plate with Barcode & Optical Adhesive Films	4314320		•	•	•					
EnduraPlate Optical 96-Well Clear Plate	A36924			•	•					
EnduraPlate Optical 96-Well Clear Plate with Barcode*	4483354, 4483352			•	•					
96-well 0.1 mL reaction plates										
Fast Optical 96-Well Plate, 0.1 mL	4346907					•	•	•		
Fast Optical 96-Well Plate with Barcode, 0.1 mL	4346906, 4366932					•	•	•		
EnduraPlate Optical 96-Well Fast Plate	A36930					•	•	•		
EnduraPlate Optical 96-Well Fast Clear Plate with Barcode*	4483485, 4483494					•	•	•		
384-well reaction plates										
Optical 384-Well Plate	4343370									•
Optical 384-Well Plate with Barcode	4309849, 4326270, 4343814									•
EnduraPlate Optical 384-Well Plate	A36931									•
EnduraPlate Optical 384-Well Clear Plate with Barcode*	4483285, 4483273									•
48-well reaction plates										
Fast Optical 48-Well Plate	4375816	•								
Strip tubes and caps										
Fast 8-Tube Strip, 0.1 mL	4358293	•				•	•	•		
Optical 8-Tube Strip with Attached Optical Caps, 0.2 mL	A30588		•	•	•					
Optical 8-Tube Strip, 0.2 mL	4316567		•	•	•					
Optical 8-Cap Strip	4323032	•	•	•	•	•	•	•		
Single tubes and caps										
Fast Reaction Tube with Cap, 0.1 mL	4358297	•				•		•		
Optical Tube without Cap, 0.2 mL	N8010933		•	•						
Seals and covers										
Optical Adhesive Film	4360954, 4311971		•	•	•	•	•	•		•
48-Well Optical Adhesive Film	4375323	•								
Reaction trays										
96-Well Tray/Retainer Set	403081		•							
Fast 48-Well Tray	4375282	•								
96-Well Tray for VeriFlex Blocks	4379983					•				
Accessories										
Splash-Free 96-Well Base	4312063		•	•	•	•	•	•		
96-Well Support Base	4379590		•	•	•	•	•	•		
96-Well Base	N8010531		•	•	•	•	•	•		

* Multiple colors are available.

** 7900HT (0.2 mL and 0.1 mL) instruments are not recommended for use with individual tubes or tube strips.

Note: Experiments using one or two 8-tube strips with attached caps require blank tube strips to balance lid pressure on the block or the use of the MicroAmp 96-Well Tray/Retainer Set (Cat. No. 4381850)—bottom part of the tray *only*. For use with the 96-well block of the 7000, 7300, 7500, and ViiA 7 systems, and the QuantStudio 3, 5, 6, 6 Pro, 7, 7 Pro, and 12K instruments.

Find out more at thermofisher.com/pcrplastics

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 13485:2016 & EN ISO 13485:2016

This is to certify that:

Life Technologies Ltd.
3 Fountain Drive
Inchinnan Business Park
Paisley
PA4 9RF
United Kingdom

Holds Certificate Number:

MD 507152

and operates a Quality Management System which complies with the requirements of ISO 13485:2016 & EN ISO 13485:2016 for the following scope:

The design, manufacture and distribution of In-Vitro Diagnostics and products for cell culture, molecular biology and microbiology.

Gary E Slack

For and on behalf of BSI:

Gary E Slack, Senior Vice President - Medical Devices

Original Registration Date: 2006-10-02

Latest Revision Date: 2021-09-30

Effective Date: 2021-10-02

Expiry Date: 2022-04-01

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Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 13485:2016 & EN ISO 13485:2016

This is to certify that:

Thermo Fisher Scientific Baltics
V.A.Graiciuno 8
Vilnius
LT-02241
Lithuania

Holds Certificate Number:

MD 642790

and operates a Quality Management System which complies with the requirements of ISO 13485:2016 & EN ISO 13485:2016 for the following scope:

Design, development, and manufacturing of reagents, proteins, nucleic acids, nucleotides, antibodies, associated kits, and materials intended for ex-vivo separation of human cells for in vitro diagnostics, for further manufacturing and applied market applications, including processes under aseptic condition.

For and on behalf of BSI:

Gary E Slack, Senior Vice President - Medical Devices

Original Registration Date: 2016-02-15

Latest Revision Date: 2021-11-17

Effective Date: 2021-05-23

Expiry Date: 2024-05-22

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Certificate No: **MD 642790**

Location	Registered Activities
Thermo Fisher Scientific Baltics V. A.Graiciuno 8 Vilnius LT-02241 Lithuania	Design, development, and manufacturing of reagents, proteins, nucleic acids, nucleotides, antibodies, associated kits, and materials intended for ex-vivo separation of human cells for in vitro diagnostics, for further manufacturing and applied market applications, including processes under aseptic condition.
Thermo Fisher Scientific Baltics Molėtų pl. 5 Vilnius LT-08409 Lithuania	Manufacturing of nucleotides for in vitro diagnostics and further manufacturing.



Original Registration Date: 2016-02-15

Latest Revision Date: 2021-11-17

Effective Date: 2021-05-23

Expiry Date: 2024-05-22

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