

# XDive® : 5-minute Superfast Real Time PCR Machine



ONSITE  
GENE



Developed in collaboration with Prof. Carl Wittwer, co-founder of BioFire and a pioneer of ultrafast PCR

Perform 40-cycle real time PCR in approximately 5 minutes

Integrated with the Xtractor™ rapid nucleic acid extractor, enabling sample-to-result PCR testing in just 15 minutes

Powered by Xfast™ superfast qPCR reagents, compatible with conventional qPCR chemistries

## Product Introduction

The OnsiteGene XDive® 5-Minute Superfast Real Time PCR System has overall workflow integrating rapid thermal cycling, ultra-fast PCR reaction reagents, and a real-time fluorescence data acquisition function. It can complete a 40-cycle qPCR reaction in under 5 minutes, while maintaining the sensitivity and dynamic range of traditional PCR instruments.

The XDive® system performs up to 16 ultra-fast reactions per experiment, offering moderate sample throughput and maximum workflow flexibility. It utilizes a proprietary heating block, sensors, and algorithms to achieve ultra-fast ramp rates and exceptional temperature control precision. Its optical system consists of 4 fluorescence channels (expandable to 6), enabling detection via multiplex real-time PCR analysis within minutes.



## Innovation Drives Quality



- XDive® has successfully won recognition from Multiple Parties, XDive™ has been recognized by Carl Wittwer, Co-Founder and Chairman of Biofire and Filmarray.
- XDive® development was funded by NIH RADx program.
- XDive® has been cleared by FDA EUA.

# Key Features of XDive® Superfast Real-Time PCR Machine

## Rapid Multi-Mode Temperature Control System

XDive® features both an ultra-fast and a standard temperature control mode, giving users the flexibility to optimize for speed or conventional protocols. In ultra-fast mode, XDive completes 40 cycles of fluorescence-based qPCR in just 5 minutes.

## Flexible Application

XDive® supports up to 4 fluorescent channels (customizable to 6 channels) and accommodates 1 to 16 reaction tubes per run, enabling simultaneous detection of up to 64 targets.

## Simple Sample Operation

XDive®'s ultra-fast capillary PCR tubes are compatible with user sample handling in conventional qPCR workflows (using a pipettor and a centrifuge).

## Accurate Detection Results

XDive® combines high-performance hardware and software with ultra-fast fluorescent qPCR reagents to deliver sensitivity, uniformity, repeatability, and dynamic range on par with conventional qPCR instruments.

## Friendly GUI and Analysis Software

The XDive® control software features an intuitive graphic user interface (GUI) that enables instrument operation, thermal cycling setup, real-time data acquisition, analysis, and automated reporting.

## Sample-to-answer Option

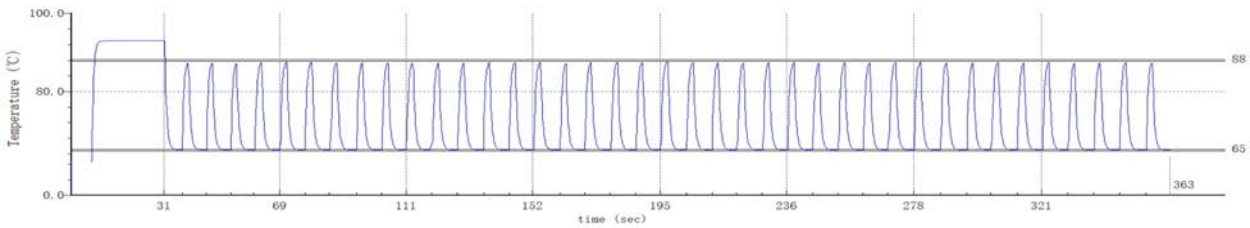
Seamlessly integrates with the Xprep™ Extraction and Reagent Preparation Module, enabling fully automated sample-to-result analysis of up to 16 samples in under 15 minutes.

# Specifications of XDive® Superfast Real-Time PCR Machine

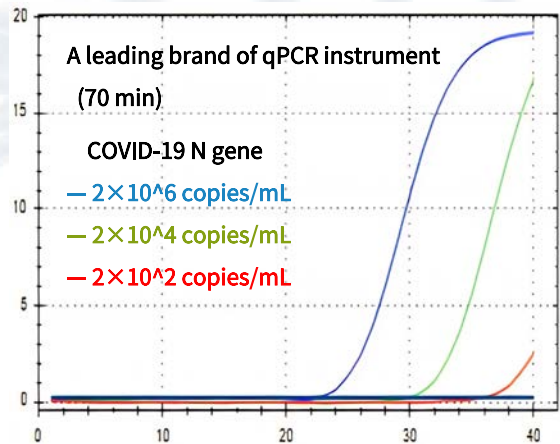
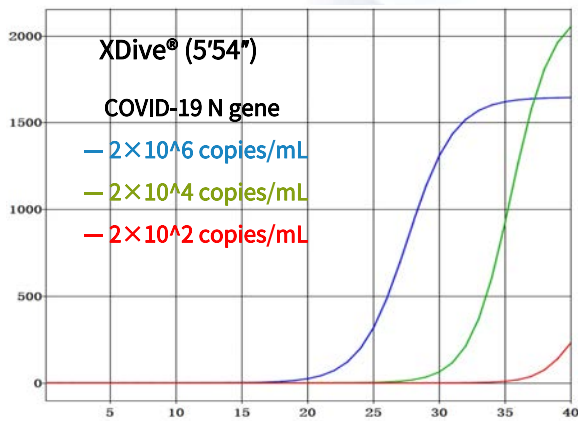
Dynamic Range	9 log Concentrations
Fluorescence Channel	Fam, Hex, Rox, Cy5 (expandable to 6 fluorescent channels)
Reaction Wells	1-16
PCR Detection Methods	TaqMan® Probe and other probe-based detection methods
Reaction Volume	5-30 µL
Single-Tube Multiplex	Supports 4 Targets per Reaction (customizable to 6 targets)
Panel Detection	Support up to 64 targets per Reaction over 16 PCR tubes
Thermal Cycling Method	Translational movement of PCR tubes among heating baths
qPCR Time (40 Cycles)	~5 minutes (Superfast mode)
Temperature Ramp Down Rate	67°C/s (Outside PCR Tube) , 17.5°C/s (Inside PCR Tube)
Temperature Ramp Up Rate	82°C/s (Outside PCR Tube) , 28.5°C/s (Inside PCR Tube)
Temperature accuracy	± 0.25°C
Size (mm)	450×342×357 (L x W x H)
Weight	24.5 kg
Operating System	Win7 and above in an external computer

# Performance of XDive® Superfast Real-Time PCR Machine

5'32" (40 cycles) , 10  $\mu$ L reaction volume of in each PCR tube

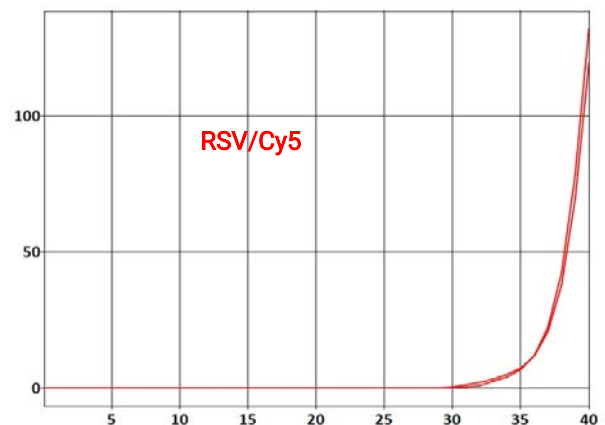
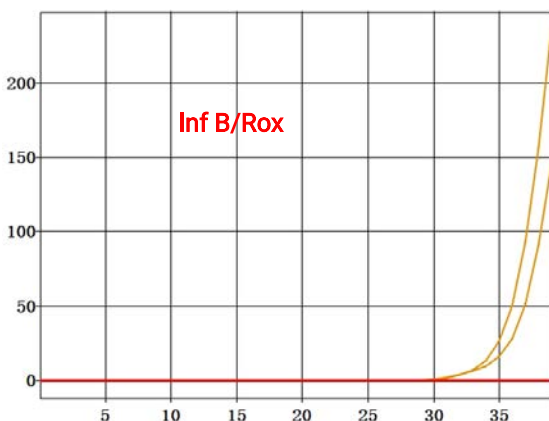
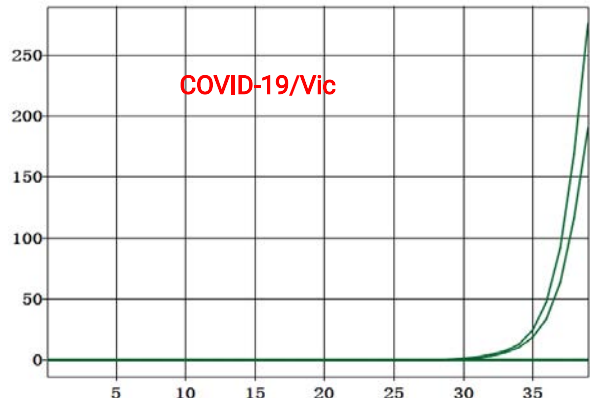
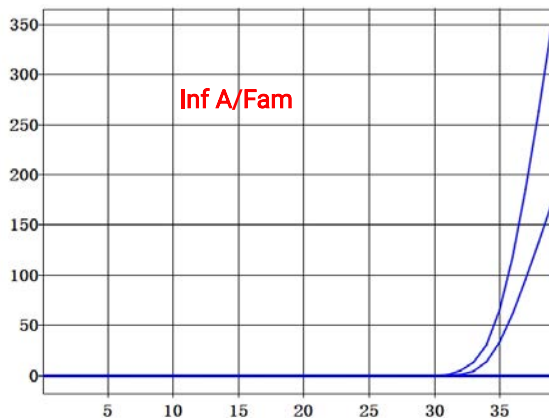


## Comparison of amplification performance between XDive® and conventional PCR instrument



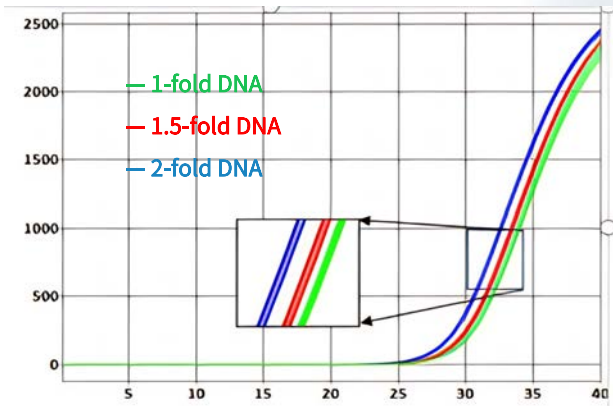
## Excellent Analytical Sensitivity

The analytical sensitivity for detecting four RNA viruses using a quadruplex ultra-fast RT-qPCR kit on the XDive® platform is as follows: Influenza A (400 copies/mL), COVID-19 (500 copies/mL), Influenza B (300 copies/mL), and RSV (320 copies/mL). The results meet the analytical sensitivity requirements of relevant FDA or NMPA guidelines.

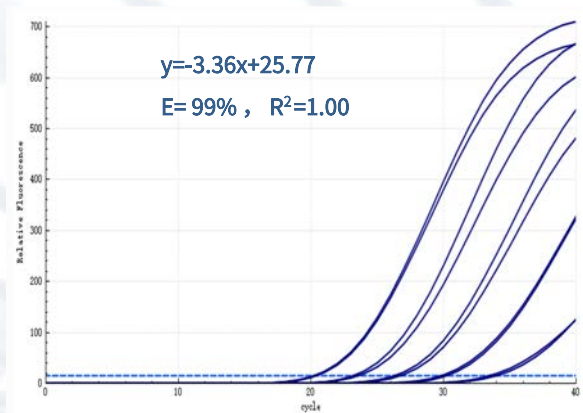


# Performance of XDive® Superfast Real-Time PCR Machine

## Sensitive Template Discrimination

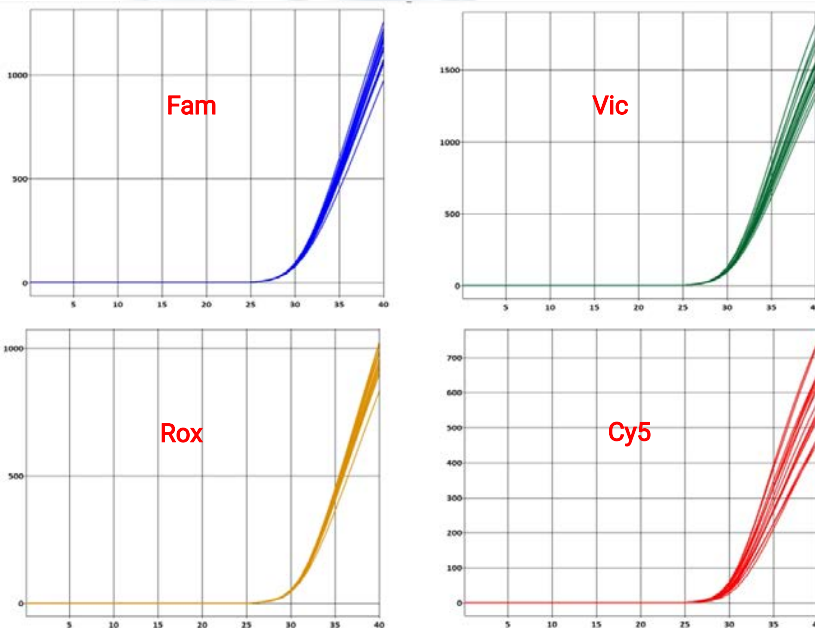


## Good Absolute Quantification



## Excellent well-to-well Uniformity

As shown in the figure below, all four fluorescence channels across the 16 wells of XDive® demonstrate excellent homogeneity.



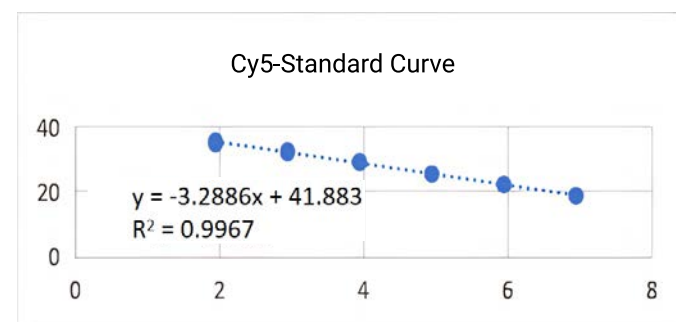
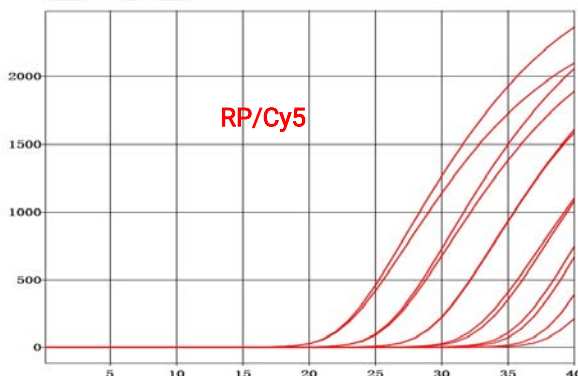
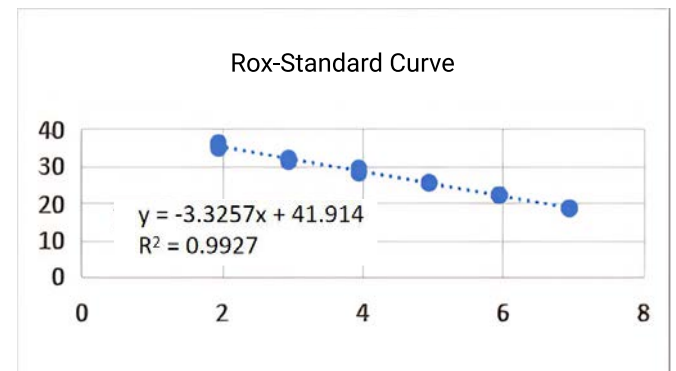
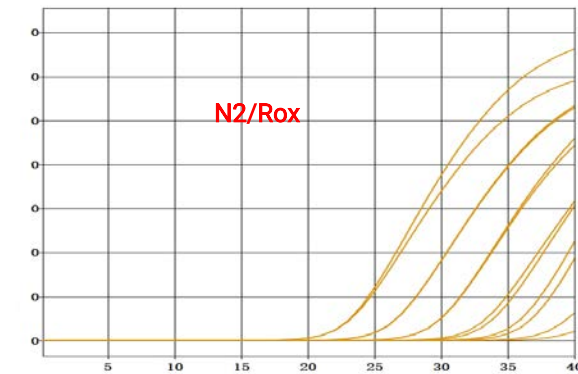
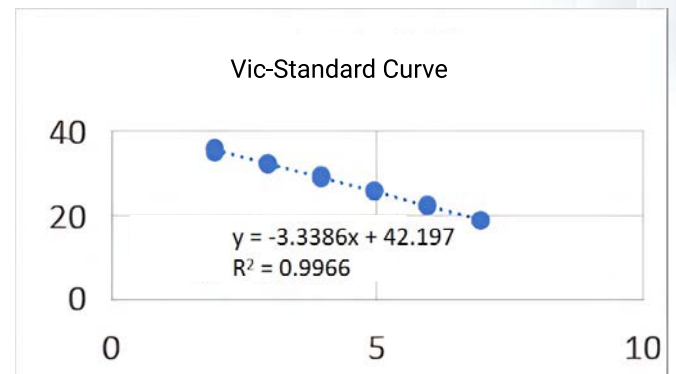
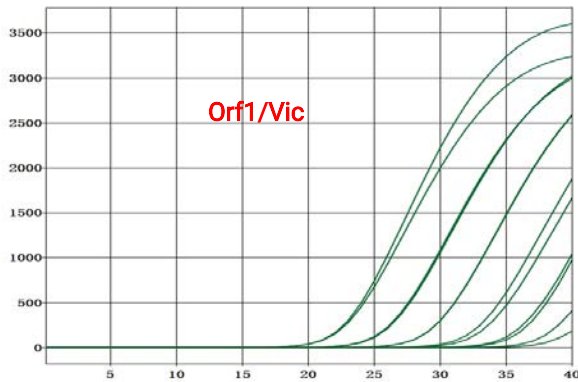
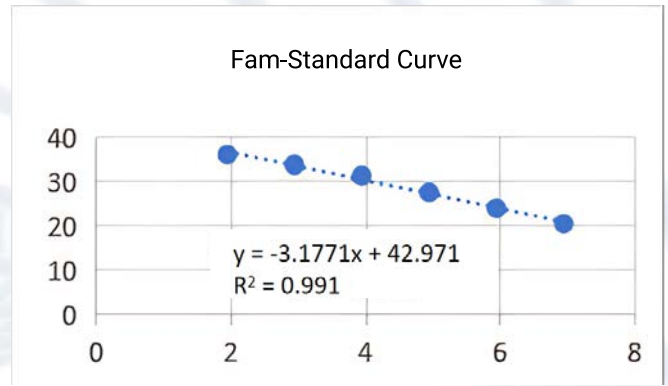
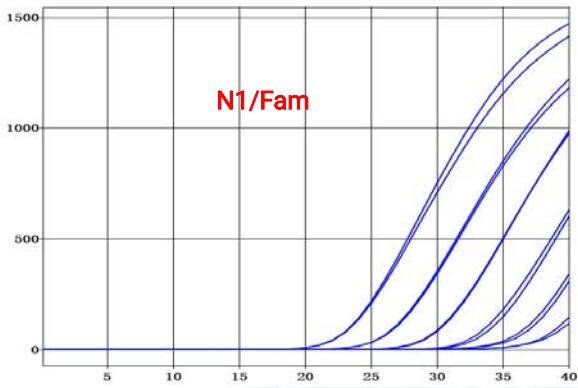
<input checked="" type="checkbox"/> Show	Sample	Reagent	Ct_s			
			<input type="checkbox"/> FAM	<input type="checkbox"/> HEX	<input type="checkbox"/> ROX	<input type="checkbox"/> CY5
P01	<input checked="" type="checkbox"/>	-8	33.1	31.2	31.0	31.0
P02	<input checked="" type="checkbox"/>	-8	33.0	31.1	30.6	30.6
P03	<input checked="" type="checkbox"/>	-8	32.3	30.7	30.2	30.3
P04	<input checked="" type="checkbox"/>	-8	33.9	30.8	30.8	30.8
P05	<input checked="" type="checkbox"/>	-8	32.6	31.0	30.4	30.5
P06	<input checked="" type="checkbox"/>	-8	33.0	31.1	31.0	31.0
P07	<input checked="" type="checkbox"/>	-8	33.2	31.3	31.4	30.9
P08	<input checked="" type="checkbox"/>	-8	33.0	31.1	31.2	30.6
P09	<input checked="" type="checkbox"/>	-8	33.1	30.8	30.5	30.1
P10	<input checked="" type="checkbox"/>	-8	32.3	30.5	30.0	30.2
P11	<input checked="" type="checkbox"/>	-8	32.4	30.8	30.4	30.4
P12	<input checked="" type="checkbox"/>	-8	32.6	30.8	30.2	30.4
P13	<input checked="" type="checkbox"/>	-8	33.0	31.3	30.7	30.8
P14	<input checked="" type="checkbox"/>	-8	33.5	31.5	31.3	31.1
P15	<input checked="" type="checkbox"/>	-8	33.2	31.2	30.8	30.7
P16	<input checked="" type="checkbox"/>	-8	33.0	30.9	30.1	30.2

	Fam	Vic	Rox	Cy5
Mean	32.95	31.00	30.66	30.6
SD	0.416833	0.256098	0.422604	0.306186
CV	1.27%	0.83%	1.38%	1.00%

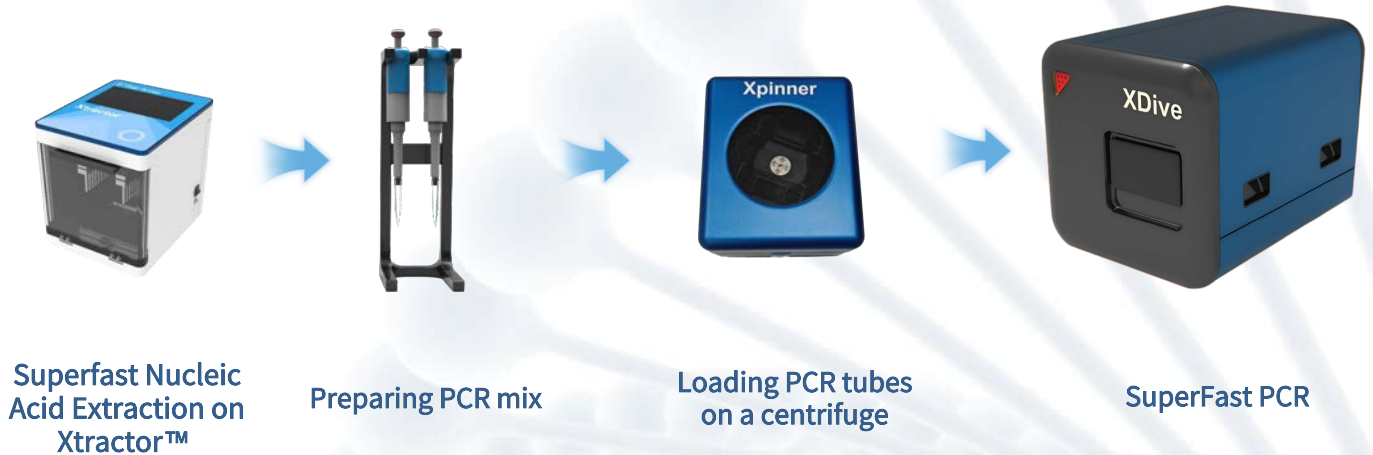
# Performance of XDive® Superfast Real-Time PCR Machine

## XDive® Linearity Analysis

The four fluorescence channels of XDive® exhibit a broad and accurate detection range.



# Workflow of XDive® Superfast Real-Time PCR



## Sample-to-Answer Superfast Open PCR Platform

The Xprep™ module utilizes an automated pipetting system and pre-packaged reagents, enabling the automatic completion of the entire process—from nucleic acid extraction and sample loading to the preparation of amplification reagents, transfer to PCR reaction tubes, and sealing—for 16 samples with a single addition.

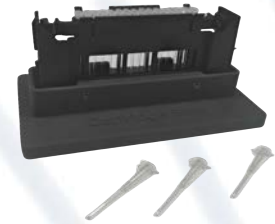
When used in conjunction with the Xprep™ module, the XDive® is upgraded into a **"Sample-to-Answer"** instrument.

- 01 Sample throughput: 1-16
- 02 Sample-to-Answer: 12 minutes
- 03 Sample type: Swab, blood, sputum, urine, tissue, etc.
- 04 6 optical channels
- 05 Multiplexing with two XDive units
  - 1 sample: Up to 192 targets
  - 16 sample: up to 12 targets



# Reagent for Superfast Real-Time PCR

**Time is Precious, So is Sensitivity.  
Achieving Both with Our 5-Minute qPCR Solution!**



**- Superfast real-time PCR within 5 minutes**

Supports amplification on XDiver™ 5-minute real time PCR analyzer, completing qPCR detection of DNA pathogens in just 5 minutes with high sensitivity.

**- Dried and dryable reagent formulation**

Transport and store at room temperature, greatly improving convenience and reducing operating cost.

**- Support multiplex PCR amplification**

High-efficiency Taq enzyme and buffer systems support single-tube multiple primer probe combinations and multi-target testing.

**- Customizable solutions**

We assist customers in developing reagents for specific applications in their fields.

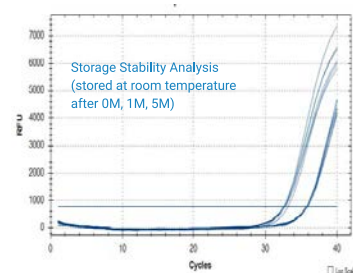
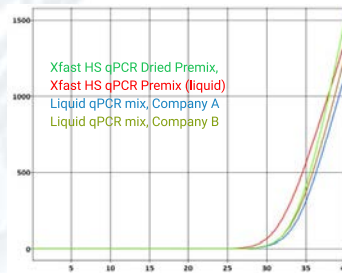
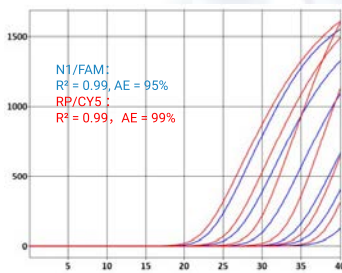


Fig 1. Performed on XDiver™ 5-minute real time PCR instrument in 4'50", Xfast™ HS qPCR Dried Premix of 20µl reaction volume shows excellent sensitivity and linearity.

Fig 2. Xfast™ HS qPCR Dried Premix shows the same amplification result compared to liquid qPCR premix.

Fig 3. Three batches of Xfast™ HS RT-qPCR Dried Premix, produced on Jan-2023, May-2023、Jun-2023 were kept at room temperature. And storage stability was analyzed on BioRad CFX96 at Jun-2023, low and medium concentrations of the SARS-Cov-2 RNA as templates.

Product	Description	Cat. #
<b>Xfast™ qPCR Premix</b>		
Xfast™ HS qPCR Dried Premix	96 reactions (for 10/20ul reaction volume). Dried powder, for superfast amplification of purified DNA in multiplex qPCR with high sensitivity	RE001103
<b>Xfast™ RT-qPCR Premix</b>		
Xfast™ HS RT-qPCR Dried Premix	96 reactions (for 10/20ul reaction volume). Dried powder for superfast amplification of purified RNA in multiplex RT-qPCR with high sensitivity	RE001303

# Application of XDive® in Genetic Testing

## XDive® Can Shorten the Total Reaction Time of Fluorescent PCR to 5 - 15 Minutes

Multiple commercial fluorescent PCR kits can run on XDive®, and the duration of fluorescent PCR is significantly shortened.

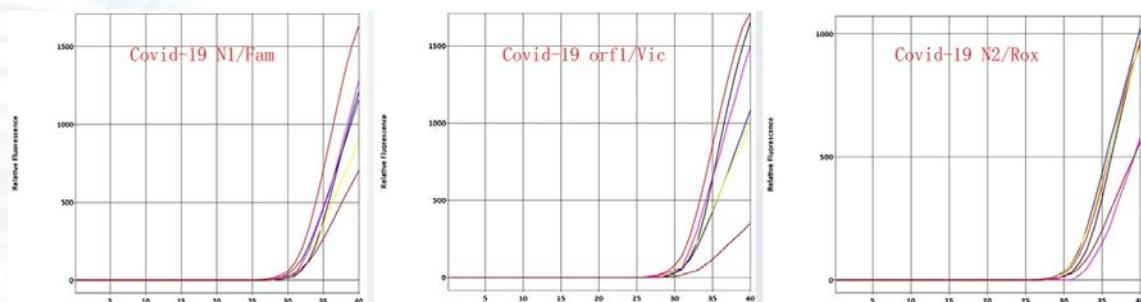
	solution 1	solution 2	solution 3
qPCR Instrument	CFX96	XDive®	XDive®
Thermal Cycle Parameters	50°C reverse transcription for 900s, 95°C hot start for 120s, 95°C denaturation for 15s, 55°C annealing for 15s, 72°C extension for 30s, a total of 45 cycles.		50°C reverse transcription for 180s, 95°C hot start for 30s, 88°C denaturation for 0 s, 65°C extension for 2s, a total of 45 cycles.
Detection Results (Ct Values)			
Fam/Vic/Rox	31.6/32.0/32.1	32.4/32.4/32.5	31.5/31.9/31.3
Total time	90 min	57.5 min	10.5 min

**Table 1: Cases of XDive® Shortening Fluorescent PCR Reaction Time**

A commercialized triple - RT - qPCR kit for the detection of influenza A, influenza B, and respiratory syncytial virus, when run on a BIO - Rad CFX96 instrument according to the recommended thermal cycle parameters, takes 90 minutes to complete the reaction (solution 1 in the table). In contrast, on the XDive® instrument, using the same thermal cycle parameters, the reaction completion time is shortened to 57.5 minutes (solution 2 in the table). After further optimization of the thermal cycle parameters, the reaction time on the XDive® instrument can be further reduced to 10.5 minutes (solution 3 in the table).

## XDive® is Compatible with DNA Polymerases and PCR Premixes of Multiple Brands

XDive® adopts an open - platform design and can be compatible with DNA polymerases and PCR Premixes of various different brands. It supports users to freely choose DNA polymerases and PCR Premixes according to specific experimental needs, without being limited to specific reagents, making the experimental plan more adaptable and meeting the diversified needs of scientific research and application detection.



**Figure 1: Cases of XDive® Being Compatible with Multiple DNA Polymerases**

**Test Method:** Evaluate the compatibility of 6 brands of DNA polymerases on XDive®. The thermal cycle parameters are set as follows: 95°C hot start for 30 seconds, followed by 40 thermal cycles, each cycle including 88°C denaturation for 0 seconds and 65°C extension for 2 seconds. The total reaction time is 5 minutes and 32 seconds.

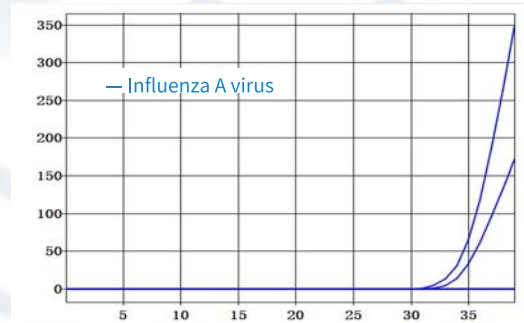
**Conclusion:** The DNA polymerases of 6 brands can all effectively perform qPCR amplification under the ultra - fast procedure of XDive®.

XDive® has high sensitivity and stability and is suitable for all application fields of fluorescent quantitative PCR (TaqMan probe method). The multiple kits developed by XDive® in the fields of viruses, bacteria, SNPs, and identity identification not only have high sensitivity but also the total duration of the PCR reaction is very short.

Step	Temperature (°C)	Duration (sec)
Reverse Transcription	42—50	120—240
Hot Start	93—95	15—30
Denaturation	88—95	0—5
Extension	55—65	1—15
Number of Cycles	40-45个	

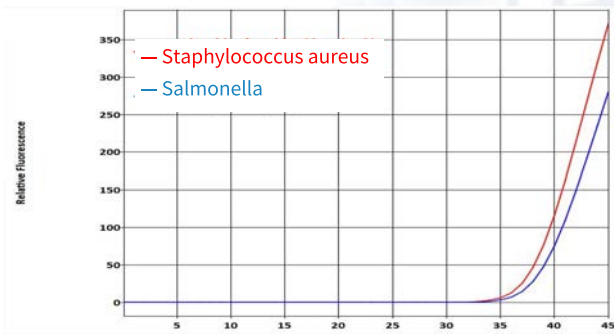
**Figure 1: Common PCR Thermal Cycle Parameters**

The time of each step of the thermal cycle of the fluorescent PCR kit on XDive® is optimized to an extremely short level, making the total PCR duration very short.



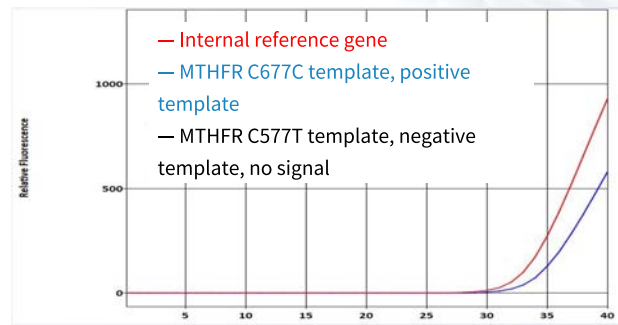
**Figure 2: Application of XDive® in Virus Detection**

A qRT - PCR kit for detecting influenza A virus on the XDive® platform, the total PCR duration is about 11 minutes, and the sensitivity is as high as 400 copies/ml.



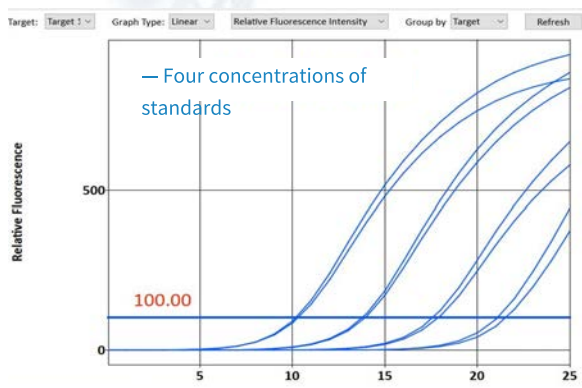
**Figure 3: Application of XDive® in Bacteria Detection**

A dual - qPCR kit for detecting bacteria on the XDive® platform, the total PCR duration is about 9 minutes. Among them, the detection sensitivities for Staphylococcus aureus and Salmonella are 200 copies/ml and 800 copies/ml respectively.



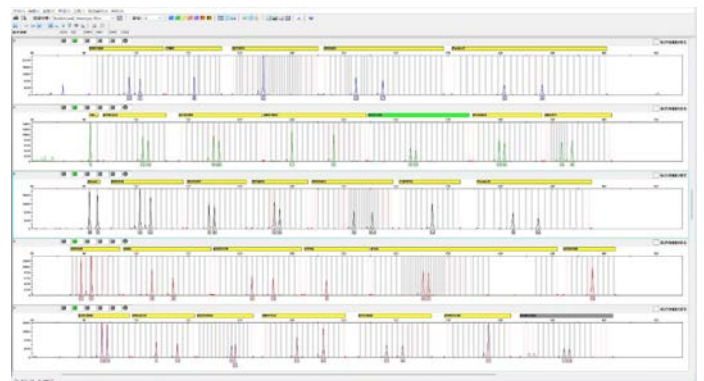
**Figure 4: Application of XDive® in Genotyping**

A wild - type qPCR kit for the MTHFR C677T site of folate metabolism genes, performing typing on the human genome on the XDive® platform, the total PCR duration is about 6 minutes, and it can accurately distinguish between wild - type and mutant templates.



**Figure 5: Application of XDive® in Second - Generation Sequencing**

A commercialized DNA library quantification kit, performing fluorescent PCR amplification on a series of standard products on the XDive® platform. After optimization, the PCR duration is about 12 minutes. According to the amplification results, a high - quality standard curve is obtained, which can accurately perform absolute quantification of DNA library in second - generation sequencing.



**Figure 6: Application of XDive® in Identity Identification**

A commercialized human identity identification kit, transferring from traditional PCR to XDive® to perform 30 -plex PCR reactions on the human genome. After the PCR reaction, capillary electrophoresis is used to analyze the amplified products. Compared with traditional PCR, the PCR duration on XDive® is shortened by about 20 minutes, and all target

## XDive® Application Advantages

### ● Fast PCR Reaction Speed

XDive® achieves a great improvement in reaction speed in two aspects. On the one hand, it significantly shortens the heating and cooling time of the fluorescent PCR instrument itself during the PCR thermal cycle process; on the other hand, by optimizing key components such as reaction tubes, DNA polymerases, primers, and probes, it further shortens the duration of each step in the thermal cycle.

### ● Strong Adaptability to PCR Reagents

XDive® shows strong adaptability to DNA polymerases of multiple brands and fluorescent PCR kits, and can effectively shorten the total duration of these reagents in PCR experiments.

### ● High Sensitivity and Wide Application

XDive® maintains a sensitivity comparable to that of traditional qPCR and expands it to all its application fields.

### ● Good Compatibility with Other PCR Instruments

The fluorescent PCR kits developed on XDive® can be adapted to most conventional PCR instruments, and the analytical performance indicators all meet the requirements of the supervision department.

## Test Kits for XDive® (for human detection)

Infectious Disease Test Kits	Description	Cat. #
Xfast™ Respi Panel 1 (FluA/FluB/RSV/SARS-CoV-2) Detection Kit	Influenza A, Influenza B, Respiratory syncytial virus(A/B), SARS-CoV-2, Internal control	RE002105
Xfast™ Respi Panel 2 (BoV/ADV/PIVs/EV) Detection Kit	Human Bocavirus, Adenovirus, Parainfluenza virus, EV-D68, Internal control	RE002106
Xfast™ Respi Panel 3 (hMPV/ADV/CoV/HPeV) Detection Kit	Human metapneumovirus, Human rhinovirus, Coronavirus, Human parechovirus, Internal control	RE002107
Xfast™ Respi Panel 4 (CP/MP/LP/B. pertussis) Detection Kit	Chlamydomphila pneumoniae, Mycoplasma pneumoniae, , Legionella pneumophila, Bordetella pertussis, Internal control	RE002108
Xfast™ Respi Panel 5 (S. pneumoniae / S. aureus /S. agalactiae /S. pneumoniae ) Detection Kit	Streptococcus pneumoniae ,Streptococcus aureus, Streptococcus agalactiae, Streptococcus pneumoniae, Internal control	RE002109
Xfast™ Respi Panel 6 (ECC/H. influenzae/E. coli./ Acb complex) Detection Kit	Enterobacter cloacae complex, Haemophilus influenzae, Escherichia coli, Acinetobacter calcoaceticus-baumannii complex, Internal control	RE002110
Xfast™ Respi Panel 7 (M. catarrhalis/K. aerogenes /K. oxytoca/K. pneumoniae group) Detection Kit	Moraxella catarrhalis, Klebsiella aerogenes, Klebsiella oxytoca, Klebsiella pneumoniae group, , Internal control	RE002111
Xfast™ Respi Panel 8 (Proteus/P. aeruginosa/ S. marcescens./ B. parapertussis) Detection Kit	Proteus spp., Pseudomonas aeruginosa, Serratia marcescensBordetella parapertussis,Internal control	RE002112
Xfast™ GI Panel 1 (NoV/RVA/Astro/Sapo) Detection Kit	Norovirus (GI/GII), Rotavirus A, Astrovirus, Sapovirus, Internal control	RE002113
Xfast™ GI Panel 2 (C. difficile/P. shigel./Salmonella/ V. cholerae) Detection Kit	Clostridioides difficile, Plesiomonas shigelloides, Salmonella spp., Vibrio cholerae, Internal control	RE002114
Xfast™ GI Panel 3 (L. monocytogenes/Y. enterocolitica / Campylobacter/ Shigella) Detection Kit	Listeria monocytogenes, Yersinia enterocolitica, Campylobacter, Shigella spp., Internal control	RE002115
Xfast™ STI Panel (Neisseria gonorrhoeae/ Chlamydia trachomatis/ Mycoplasma genitalium/ Trichomonas vaginalis) Detection Kit	Detect and differentiate between clinically relevant targets found in sexually transmitted infections.	RE002116
Xfast™ AMR Panel 1 Detection Kit	Rapid detection of antibiotic resistance genes Including KPC, NDM, OXA-48, VIM, Internal Control	RE002117
Xfast™ AMR Panel 2 Detection Kit	Rapid detection of antibiotic resistance genes Including vanA/ B, MCR-1, CTX-M, IMP, Internal Control	RE002118
Xfast™ Made-To-Order Panel Detection Kit	Custom selection of up to four pathogen targets plus Internal control. Contact us for bespoke configurations.	RE002119

# Highlights of XDive® Superfast Real-Time PCR Machine

- The XDive® system enables ultra-fast amplification, completing 40-cycle qPCR reactions in approximately 5 minutes and RT-qPCR reactions in around 7 minutes, with DNA and RNA detection sensitivity comparable to that of conventional qPCR instruments.\*  
*\* Total amplification time is primarily dependent on PCR protocol settings. The stated 5-minute runtime refers to a 40-cycle single-channel qPCR configuration with 10-20ul reaction volume.*
- Supports simultaneous processing of 1 to 16 samples per run and 5-30 µL amplification reaction systems.
- Supports single-tube quadruplex amplification and panel detection of up to 64 targets.
- Compatible with the ultra-fast, fully automated Xtractor™ nucleic acid extraction instrument and rapid extraction reagents.
- Superfast sample-to-answer Option via integration of XDive with Xprep™ Extraction and Reagent Preparation Module for fully automated sample-to-result analysis of up to 16 samples in under 15 minutes.
- Patents granted in major regions, including the United States, China, the European Union, Japan, Australia, India, and Singapore.
- Certified by TÜV for IEC 61010 product safety and IEC 61326-2-6:2020 electromagnetic compatibility.
- The supporting reagent kits—including the COVID-19 RT-qPCR Kit, SalivaDirect™ COVID-19 RT-qPCR Kit, and Monkeypox qPCR Kit—have received Emergency Use Authorization (EUA) from the FDA.
- The production facilities are ISO 13485 certified, ensuring compliance with international standards for medical device quality management systems.



**Onsitegene, Inc.**

**335 Alicia Way Suite A  
Los Altos, CA 94022, USA**

**[www.onsitegene.com](http://www.onsitegene.com)  
[info@onsitegene.com](mailto:info@onsitegene.com)**