

AMPLIFYME

SG Universal Mix



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The **AMPLIFYME** SG Universal Mix is a convenient enzyme mixture for fast and reliable quantitative Real-Time PCR, using intercalating dsDNA-binding dye.

Ready-to-use, 2x concentrated Master Mix contains *TaqNovaHS* polymerase which is a mixture of recombinant *Taq* polymerase over-expressed in *E. coli* and a highly specific monoclonal anti-*Taq* antibody. The *TaqNovaHS* polymerase enables easy set-up of a hot-start PCR reaction at room temperature. The antibody binds reversibly to the enzyme, inhibiting polymerase activity at ambient temperatures, what prevents extension of non-specifically annealed primers and primer-dimers formed at low temperatures during PCR set-up. The antibody is released from the polymerase during initial DNA denaturation step, thus providing full DNA polymerase activity during standard cycling conditions.

Precisely optimized buffer components, reliable DNA polymerase and the appropriate selection of PCR enhancers provide a high performance, sensitivity and specificity over a broad dynamic range and give consistent results across all commonly-used Real-Time PCR platforms.

Features and advantages

- **Versatile** – excellent for various PCR conditions using different Real-Time PCR instruments
- **Sensitive** – reliable detection of low copies DNA or cDNA targets
- **Reproducible** – consistent amplification across a wide dynamic range (6 logs)
- **Specific** – precisely selected anti-Taq antibody eliminates non-specific amplification (tested up to 45 cycles)
- **Fast** – accurate detection of molecular targets in as fast as 30 minutes (with either two- or three-step cycling profiles)
- **Stable** – no loss of activity after 8 successive freeze/thaw cycles

Applications

- qPCR / Real-Time PCR
- gene expression analysis
- mass screening
- pathogen detection
- characterization of genetically modified organisms (GMO)
- copy number variation analysis

Formulation

2x concentrated mix: *TaqNovaHS* polymerase, dNTPs, 6 mM MgCl₂, PCR enhancers, stabilizers, optimized buffer.

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Protocol

1. Prior to use, thaw the reagents completely, mix thoroughly by pipetting or vortexing and spin briefly. Avoid direct light during next steps.
2. Prepare the qPCR Master Mix by combining the following reaction reagents in a sterile nuclease-free tube:

Reagent	Suggested amount per reaction	Acceptable final concentrations in reaction mixture
2x AMPLIFYME SG Mix	10 µl	1x
Forward primer (10 µM)	0.6 µl (0.3 µM)	0.1 – 0.8 µM
Reverse primer (10 µM)	0.6 µl (0.3 µM)	0.1 – 0.8 µM
50x ROX solution*	0.4 µl	1x
DNA or cDNA template	1 – 100 ng	1 pg – 0.5 µg
PCR-grade water	fill up to 20 µl	

TABLE 1. Real-Time PCR reaction mixture content

* Addition of ROX passive dye depends on the type of Real-Time PCR instrument. Please refer to the table 4 “Real-Time PCR instrument compatibility” and add appropriate volume of 50x High ROX solution, 50x Low ROX solution or omit this reagent.

3. Determine the total volume for the appropriate number of reactions, plus 10% overage and prepare the Master Mix of all reagents except DNA template. Mix the components by pipetting or inverting the tube and spin briefly.

4. Aliquot the contents into qPCR tubes or multiple wells of qPCR reaction plate.
5. Add DNA templates to qPCR tubes/plate.
6. Seal the plate with qPCR foil or cap qPCR tubes with optical caps.
7. Spin qPCR tubes/plate for 1–2 min to remove air bubbles and collect liquid to the bottom of the tube.
8. Transfer qPCR tubes/plate to a thermal cycler block and run qPCR reaction.
9. Program your qPCR instrument with the following conditions:
 - 1) If possible, select FAST cycling option.
 - 2) Select the SYBR® Green or FAM detection channel of the qPCR instrument.
 - 3) Set a thermal cycling profile according to the tables below (note that the following conditions are suitable for amplicons of up to 250 bp and may vary depending on different instrument-specific protocols).

Step	Temperature	Time	Cycle
Activation and denaturation	95°C	180 s	
Denaturation	95°C	5 s	
Annealing	60°C	10 s	35–45 cycles
Extension / Fluorescence Detection	72°C	5–20 s	
Melt curve analysis	according to the qPCR instrument manual		

TABLE 2. Three-step thermal cycling profile

Step	Temperature	Time	Cycle
Activation and denaturation	95°C	180 s	
Denaturation	95°C	5 s	
Annealing / Extension / Fluorescence Detection	60°C	15–30 s*	35–45 cycles
Melt curve analysis	according to the qPCR instrument manual		

TABLE 3. Two-step thermal cycling profile

* It is not recommended to use annealing/extension times longer than 30 seconds.

Real-time PCR Instrument Compatibility

Instrument	ROX reference dye
Applied Biosystems™ 5700, 7000, 7300, 7700, 7900, 7900HT, 7900HT Fast, StepOne™ and StepOne™ Plus	50x High ROX solution 0.4 µl / 20 µl rxn
Applied Biosystems™ 7500, 7500 Fast, ViiA7™, QuantStudio™ instruments, Agilent MX3000P®, MX3005P®, MX4000P® and Fluidigm BioMark™	50x Low ROX solution 0.4 µl / 20 µl rxn
Qiagen Rotor-Gene™ instruments, Bio-Rad® Opticon™, Opticon™ instruments, Chromo 4™, CFX96™, CFX384™, Eppendorf Mastercycler® instruments, Cepheid® SmartCycler®, Roche LightCycler® 480, 96, Nano, 1.5/2.0*, Illumina® Eco™, Thermo Piko Real®, TaKaRa Thermal Cycler Dice®, Analytik Jena qTOWER, Techne® Quantica®, PrimeQ and ITS International MyGo®	without ROX dye

TABLE 4. Real-Time PCR instrument compatibility

* For glass capillaries, non-acetylated BSA should be added to the mixture to a final concentration of 250 ng/µl

Trademark and licensing information:

SYBR® is a registered trade mark of Molecular Probes Inc.

QuantStudio™, StepOne™, ViiA7™, (Applied Biosystems), Thermo Piko Real® (ThermoFisher), MX3000P® MX3005P®, MX4000P® (Agilent), BioMark™ (Fluidigm), Opticon™, Opticon™ instruments, Chromo 4™, CFX96™, CFX384™ (Bio-Rad), Mastercycler® (Eppendorf), SmartCycler® (Cepheid), LightCycler® (Roche), Eco™ (Illumina), Thermal Cycler Dice® (TaKaRa), Quantica®, PrimeQ (Techne), MyGo® (ITS International), Qiagen Rotor-Gene™ (Qiagen).

Additional information

- The **AMPLIFYME** SG Universal Mix has been optimized for use with variety of qPCR instrument types, including those that use no passive reference normalization and those that use a low or high concentration of passive reference dye (ROX). The mixture is supplied as a ready-to-use, versatile solution without a passive dye ROX, which is supplied in separate tubes. The list of qPCR instruments that do not require the use of ROX or require it at the appropriate concentration is given in the table 4.
 - The mixture's extreme sensitivity means that it is highly susceptible to DNA contamination. Therefore, disposable gloves should be worn at all times. Special attention should be also paid to PCR products from previous reactions since they represent the greatest danger of contamination. In order to prevent carry-over DNA contamination, it is recommended that the preparing and portioning of the qPCR Master Mix, addition of DNA template, DNA amplification and any post-PCR analysis are carried out in separate areas with the use of separate pipettes. It is very important that any tubes containing amplified PCR products are not opened in the PCR set-up area.
- ⚠ While analysing similarities between the sensitivity of *AMPLIFYME* Mixes with competitors' mixes, it is highly advisable to carry out the amplification process with a 10-fold template dilution series. Loss of signal for low copy targets is the only, distinct survey of sensitivity. Please note that an early Ct value is a determinant of the amplification speed, but not its sensitivity.**
- Always include a non-template control reaction, replacing DNA or cDNA with PCR-grade water.
 - When amplifying cDNA, the usage of intron-spanning primers is strongly recommended to avoid amplification of genomic DNA (common DNA contamination from RNA extraction steps).

AMPLIFYME SG Universal Mix

Components	AM02-020 200 rxns (20 µl)	AM02-200 2000 rxns (20 µl)	AM02-S 20 rxns (20 µl)
2x AMPLIFYME SG Mix	2 x 1 ml	20 x 1 ml	200 µl
50x High ROX solution	80 µl	800 µl	8 µl
50x Low ROX solution	80 µl	800 µl	8 µl
PCR-grade water	2 x 1.5 ml	20 x 1.5 ml	300 µl

Quality Control

The **AMPLIFYME** SG Universal Mix is extensively tested for its performance in different Real-Time PCR assays. Free of deoxyribonuclease contamination.

Storage & shipping

Storage conditions

Long-term storage: -20°C, after thawing store at 2-8°C for up to 1 month. The **AMPLIFYME** SG Universal Mix does not lose its activity after eight successive freeze/thaw cycles. Keep in dark.

Shipping conditions

Shipping on dry or blue ice

 For research use only