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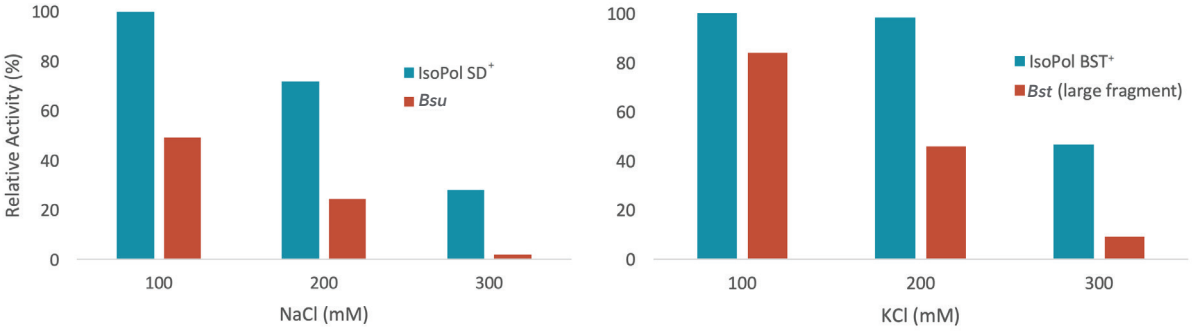
ArcticZymes®
Enzyme innovations from the Arctic

IsoPol Isothermal Polymerases

The IsoPol™ family of isothermal polymerases was developed to address the stringent molecular needs of isothermal sequence-specific amplification applications in molecular research and diagnostics. Engineered on the backbone of DNA Pol I polymerases with a high degree of strand displacement activity, IsoPol enzymes were designed using directed molecular evolution technology to create unique homologues with high salt tolerance, a more flexible temperature range, and an even greater strand displacement activity, to meet the demands of evolving isothermal applications.



Strand Displacement Activity in the Presence of Increasing Concentrations of Monovalent Salt. IsoPol SD+ has considerably higher strand displacement activity than *Bsu* polymerase. At 100 mM and 200 mM salt, a 2-fold and 3 fold higher strand displacement activity is observed, respectively (left). IsoPol BST+ shows better strand displacement than *Bst* wild type at 100 mM salt and above, 3-fold higher activity at 300 mM (right).

In addition to strand displacement activity, reaction temperature, inhibitor tolerance, and sample size are of particular importance in point of care diagnostics.

Reaction Temperature

Many diagnostic applications such as loop-mediated isothermal amplification (LAMP) or nicking enzyme-mediated amplification (NEMA), currently require elevated temperatures (> 50°C) and, for these, a thermophilic DNA polymerase with high temperature tolerance is desired. IsoPol BST+, an *in silico* designed homologue of *Bst* DNA Polymerase (large fragment), was engineered with enhanced strand displacement activity and high salt tolerance, while maintaining thermostability at 65°C.

Increasingly, molecular diagnostic testing requires functionality at moderate temperatures. IsoPol SD+ and IsoPol DNA Polymerase are ideal for amplification at temperatures between 20°C and 37°C.

Inhibitor Tolerance

Minimally processed samples that contain impurities such as salt or serum can interfere or inhibit the polymerase amplification process. IsoPol BST+ and IsoPol SD+ were specifically designed to tolerate high salt concentrations (up to 350 mM) over wild type DNA Pol I polymerases. IsoPol SD+ and IsoPol DNA Polymerase possess high serum tolerance. Up to 80% activity in the presence of 10% human serum has been observed with IsoPol DNA Polymerase.

High salt tolerance also allows for flexibility where multiple enzymes with distinct buffer conditions are required, such as with helicase-dependent amplification (HDA) or NEMA.

Limited Sample

Small sample size and low sample concentration are often limitations in molecular diagnostic testing. In addition to enhanced inhibitor tolerance, the high quality and purity of IsoPol polymerases make them ideal for amplification of most sample types, especially, small, impure samples.

IsoPol Isothermal Polymerase Selection Guide

	Catalogue Number	Units/ Size	Temperature Range	Optimal Temperature	Strand Displacement with Salt	Salt Tolerance (NaCl/KCl) (mM)	Specific Activity (U/mg)	Applications
IsoPol BST$^+$	71502-201 71502-100	200U/40µl Custom	25-65°C	65°C	++++	50-350	40,000	LAMP, RAM, NEMA, HDA, MDA/ SDA, RCA, RPA
IsoPol SD$^+$	71501-201 71501-100	200U/40µl Custom	20-42°C	37°C	++++	100-350	10,000	MDA/SDA, RPA, HDA
IsoPol DNA Polymerase	71500-201 71500-100	200U/40µl Custom	20-40°C	37°C	++	25-110	15,000	MDA/SDA, RPA, HDA

++++ Optimal, recommended product for selected application
++ Works well for selected application

RCA: Rolling Circle Amplification
RPA: Recombinase Polymerase Amplification
LAMP: Loop Mediated Isothermal Amplification
RAM: Ramification Amplification
HDA: Helicase-Dependent Amplification
NEMA: Nicking Enzyme-Mediated Amplification
MDA/SDA: Multiple/Strand Displacement Amplification

ArcticZymes IsoPol enzymes possess 5´→3´ DNA polymerase activity, but lack 5´→3´ and 3´→5´ exonuclease activity.

Optimal performance is achieved in a pH 8.5 buffer supplemented with 4-6 mM $MgCl_2$ and 100-350 mM salt (IsoPol BST$^+$ and IsoPol SD$^+$) or 25-110 mM salt (IsoPol DNA Polymerase).

One unit is defined as the amount of enzyme that will incorporate 10 nmol of dNTP into acid insoluble material in 30 minutes at 37°C for IsoPol DNA Polymerase and IsoPol SD$^+$ and at 65°C for isoPol BST$^+$.

Quality Control

ArcticZymes is dedicated to the quality of our products. IsoPol isothermal polymerases are manufactured at our ISO 13485 certified facility in Norway.

Additional Information

We are pleased to provide further information. Available data includes; ssDNA and dsDNA endonuclease and exonuclease activity, purity, Mg^{2+}, pH, processivity, activity, and strand displacement data.

Your OEM Partner to deliver novel solutions for genomics and proteomics.

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