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# Pyrophosphatase, Inorganic, GMP-Grade

## Catalog #GMP- PYR-YE101

**Storage Condition** -20°C ± 5°C for 24 months. Avoid repeated freeze/thaw cycles.
**Form** Liquid
**Source** An *E. coli* strain that carries the gene for pyrophosphatase, Inorganic from *Saccharomyces cerevisiae*
**Storage Buffer** 20 mM Tris-HCl, 100 mM KCl, 0.1 mM EDTA, 1 mM DTT, and 50% Glycerol, pH 8.0
**Concentration** 0.1U/µL
**Unit Definition** One unit is defined as the amount of enzyme that will generate 1µmol of orthophosphate per minute from inorganic pyrophosphate (PPi) in a 10 min standard reaction at 25°C containing 20 mM Tris-HCl, pH 8.0, 2 mM MgCl2, and 2 mM PPi.

### Product Contents

- Pyrophosphatase, Inorganic (0.1U/µL)

### Product Description

Pyrophosphatase, Inorganic catalyzes the hydrolysis of inorganic pyrophosphate to form two orthophosphates. Pyrophosphatase, Inorganic enhances RNA or DNA synthesis by preventing the accumulation of byproduct PPi generated in the reaction.

### Applications

- Improving RNA yield in *In vitro* transcription (IVT)
- Enhancing DNA amplification reaction
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### Quality Control Statement

KACTUS manufactures this product according to GMP guidelines and performs stringent quality control testing before release. It is suitable for mRNA therapeutics and manufacturing of mRNA vaccines. Regulatory support documents are available. Please contact support@kactusbio.us for more information.

### Quality Control Release Criteria

| Assay | Criteria |
|---|---|
| Activity (Enzyme Catalytic Efficiency) | ≥ 126U/mL |
| Purity (SEC-HPLC) | ≥ 95% |
| Residual Endonuclease | Negative |
| Residual Exonuclease | Negative |
| Endotoxin | ≤ 10EU/mL |
| Residual RNase | Negative |
| Residual DNase | Negative |
| Residual Protease | Negative |
| Residual Host Cell Protein | ≤ 20ng/mg |
| Residual Host Cell DNA | ≤ 100pg/mL |
| Bioburden | ≤ 1CFU/10mL |

### Protocol for *In Vitro* Transcription

1. Prepare the following reaction mixture:

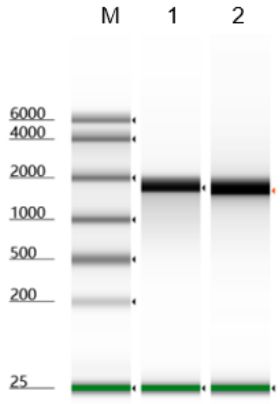
| Reagent | Quantity |
|---|---|
| 5X Transcription Buffer-1 (included with T7 RNA Polymerase) | 4µL |
| CTP/GTP/ATP/UTP (100mM each) | 2µL each |
| Murine RNase Inhibitor | 1µL |
| Pyrophosphatase, Inorganic | 1µL |
| T7 RNA Polymerase | 2µL |
| Template DNA | 1µg |
| RNase-free Water | Up to 20µL |

2. Incubate at 37°C for 1-2 hours.
3. After transcription, add 2U DNase I to digest DNA template for 15 minutes at 37°C.
4. Inactivate DNase I by phenol/chloroform extraction.

### Notes

- Pyrophosphatase, Inorganic works well in any buffer containing $Mg^{2+}$ (1-10 mM)
- The hydrolysis of PPi is a proportional to the concentration of enzyme.

### Performance Validation




The addition of Pyrophosphatase, Inorganic to IVT reactions improves mRNA yield. Lane 1: Without Pyrophosphatase, Inorganic; Lane 2: With Pyrophosphatase, Inorganic.