

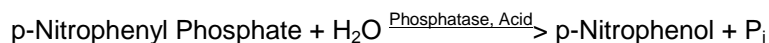


## Product Information

### SIGMA QUALITY CONTROL TEST PROCEDURE

#### Enzymatic Assay of PHOSPHATASE, ACID (EC 3.1.3.2)

##### PRINCIPLE:



Abbreviation:

P<sub>i</sub> = Inorganic phosphate

**CONDITIONS:** T = 37°C, pH = 4.8, A<sub>410nm</sub>, Light path = 1 cm

**METHOD:** Spectrophotometric Stop Rate Determination

##### REAGENTS:

- A. 90 mM Citrate Buffer, pH 4.8 at 37°C  
(Prepare 100 ml in deionized water using Citric Acid, Trisodium, Dihydrate, Sigma Prod. No. C-7254, or Citrate Buffer Solution, Sigma Stock No. 104-4. Adjust to pH 4.8 at 37°C with 1 M NaOH or 1 M HCl.)
- B. 15.2 mM p-Nitrophenyl Phosphate (PNPP)  
(Prepare 5 ml in deionized water using Sigma 104 Phosphatase Substrate, Sigma Stock No. 104-0.)
- C. 100 mM Sodium Hydroxide Solution (NaOH)  
(Prepare 50 ml in deionized water using Sodium Hydroxide, Anhydrous, Sigma Prod. No. S-5881.)
- D. Acid Phosphatase Enzyme Solution  
(Immediately before use, prepare a solution containing 0.15 - 0.25 unit/ml of Phosphatase, Acid in cold deionized water.)

##### PROCEDURE:

Pipette (in milliliters) the following reagents into suitable containers:

	<u>Test</u>	<u>Blank</u>
Reagent A (Buffer)	0.50	0.50
Reagent B (PNPP)	0.50	0.50

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**PROCEDURE:** (continued)

Mix by inversion and equilibrate to 37°C. Then add:

	<u>Test</u>	<u>Blank</u>
Reagent D (Enzyme Solution)	0.10	-----

Immediately mix by inversion and incubate at 37°C for exactly 10 minutes. Then add:

Reagent C (NaOH)	4.00	4.00
Reagent D (Enzyme Solution)	-----	0.10

Mix by inversion and record the  $A_{410\text{nm}}$  for both the Test and Blank in a suitable spectrophotometer.

**CALCULATIONS:**

$$\text{Units/ml enzyme} = \frac{(A_{410\text{nm}} \text{ Test} - A_{410\text{nm}} \text{ Blank})(5.1)(\text{df})}{(10)(18.3)(0.1)}$$

5.1 = Total volume (in milliliters) of solution

df = Dilution factor

10 = Time of assay (in minutes) as per the Unit Definition

18.3 = Millimolar extinction coefficient of p-Nitrophenol at 410 nm

0.1 = Volume (in milliliter) of enzyme used

$$\text{Units/mg solid} = \frac{\text{units/ml enzyme}}{\text{mg solid/ml enzyme}}$$

$$\text{Units/mg protein} = \frac{\text{units/ml enzyme}}{\text{mg protein/ml enzyme}}$$

**UNIT DEFINITION:**

One unit will hydrolyze 1.0  $\mu\text{mole}$  of p-nitrophenyl phosphate per minute at pH 4.8 at 37°C.

**FINAL ASSAY CONCENTRATION:**

In a 1.10 ml reaction mix, the final concentrations are 41 mM citric acid, 6.9 mM p-nitrophenyl phosphate and 0.015 - 0.025 unit phosphatase, acid.

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**REFERENCE:**

Bergmeyer, H.U., Gawehn, K., and Grassl, M. (1974) in *Methods of Enzymatic Analysis* (Bergmeyer H.U.) Volume I, 2nd ed., 495-496, Academic Press, Inc., New York, NY

**NOTES:**

1. This assay is based on the cited reference.
2. Where Sigma Product or Stock numbers are specified, equivalent reagents may be substituted.

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