

## Alkaline Phosphatase (ALP) -Liquizyme (9+1) IFCC

REF: 214 001 (4 x 20 ml) 80 test  
REF: 214 002 (10 x 10 ml) 100 test  
REF: 214 003 (9 x 20 ml) 180 test  
REF: 214 004 (4 x 60 ml) 240 test  
REF: 214 005 (5 x 20 ml) 100 test  
ZL -214 001 80 test

### Intended Use

Spectrum liquizyme Alkaline Phosphatase reagent is intended for the in-vitro quantitative, diagnostic determination of ALP in human serum on both automated and manual systems.

### Background

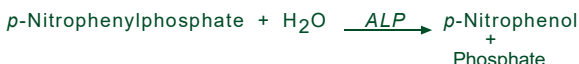
Alkaline phosphatase (ALP) catalyzes the hydrolysis of a wide variety of physiologic and non-physiologic phosphoric acid esters in alkaline medium (pH optimum 10). The liver and biliary tract are the source of alkaline phosphatase in normal sera. Normal alkaline phosphatase levels are age dependent being higher in children and adolescents in comparison to adults. ALP is one of the tests of choice for evaluating cholestasis and obstructive jaundice. Elevated levels are found in many diseases including hepatitis, cirrhosis, malignancy and in bone diseases.

### Method

Kinetic method according to the International Federation of Clinical Chemistry (IFCC).

### Assay Principle

Alkaline phosphatase (ALP) hydrolyzes *p*-Nitrophenylphosphate (*p*-NPP) to *p*-Nitrophenol and phosphate.



The increase of absorbance per minute at 405 nm is proportional to the enzyme activity.

### Reagents

#### Reagent 1 (R1 Buffer)

2-Amino-2-Methyl-1-Propanol (pH 10.3) 2.0 mol/L  
MgCl<sub>2</sub> 2.0 mmol/L

#### Reagent 2 (R2 Substrate)

*p*-Nitrophenylphosphate 16 mmol/L

For further information, refer to the Alkaline phosphatase reagent material safety data sheet.

### Precautions and Warnings

Do not ingest or inhale. In case of contact with eyes or skin; rinse immediately with plenty of soap and water. In case of severe injuries; seek medical advice immediately.

### Reagent Preparation

Prepare working solution as following:

REF: 214 001: add 2 ml from R2 to one bottle of R1; mix gently.  
REF: 214 002: add 1 ml from R2 to one bottle of R1; mix gently.  
REF: 214 003: add 2 ml from R2 to one bottle of R1; mix gently.  
REF: 214 004: add 6 ml from R2 to one bottle of R1; mix gently.  
REF: 214 005: add 2 ml from R2 to one bottle of R1; mix gently.

Or prepare the working solution according to the number of tests required by mixing 9 volumes of reagent 1 (R1) and 1 volume of reagent 2 (R2), e.g. 900 µl R1 + 100 µl R2.

### SYMBOLS IN PRODUCT LABELLING

	Authorised Representative		Use by/Expiration Date
	For in-vitro diagnostic use		CAUTION. Consult instructions for use
	Batch Code/Lot number		Manufactured by
	Catalogue Number		(Xi) - Irritant
	Consult instructions for use		Temperature Limitation

### Reagent Storage and Stability

All reagents are stable until expiration date stated on label when stored refrigerated at 2 - 8 °C.  
Open vial is stable for 2 month at 2 - 8 °C.  
Working solution is stable for 4 weeks at 2 - 8 °C or 5 days at 15 - 25 °C.

### Deterioration

Do not use liquizyme ALP reagent if it is turbid or if the absorbance of the working reagent is more than 2.2 at 405 nm. Failure to recover control values within the assigned range may be an indication of reagent deterioration.

### Specimen Collection and Preservation

#### Serum and Plasma

Nonhaemolyzed fresh serum is the preferred specimen. Heparin is the only acceptable anticoagulant. Complexing anticoagulants such as citrate, oxalate and EDTA must be avoided.  
Alkaline phosphatase activity may slowly increase in serum samples stored at room temperature. Previously frozen or lyophilized sera may show a marked decrease in values immediately upon thawing or reconstitution. The activity then increases to the initial values, and the rate of this increase is time and temperature dependant.

**Stability:** 2 months at -20 °C ; 4 weeks at 4 - 8 °C;  
7 days at 20 - 25 °C

### System Parameters

Wavelength	405 nm (400 - 420 nm)
Optical path	1 cm
Assay type	Kinetic
Direction	Increase
Sample : Reagent Ratio	1 : 100
e.g.: Reagent volume	1 ml
Sample volume	10 µl
Temperature	37 °C or 30 °C
Equilibration time	1 minute
Read time	1 to 3 minutes
Zero adjustment	Against air
Reagent Blank Limits	Low 0.2 AU High 2.2 AU
Sensitivity	5 U/L
Linearity	750 U/L

### Procedure

Pipette in a test tube:

Working solution 1.0 ml

Specimen 10 µl

Mix, read initial absorbance after 1 minute and start timer simultaneously. Read again after 1, 2 and 3 minutes.  
Determine the mean absorbance change per minute (ΔA/min).

### Calculation

To calculate the alkaline phosphatase (ALP) activity, Use the following formula U/L = 5454 × ΔA 405 nm/min

## Quality Control

Normal and abnormal commercial control serum of known concentrations should be analyzed with each run.

## Performance Characteristics

### Precision

Within run (Repeatability)

	Level 1	Level 2
n	20	20
Mean (U/L)	177.7	359.7
SD	1.71	1.5
CV%	0.96	0.43

Run to run (Reproducibility)

	Level 1	Level 2
n	20	20
Mean (U/L)	178.5	365.5
SD	1.82	1.86
CV%	1.02	0.51

## Methods Comparison

A comparison between Spectrum ALP reagent and a commercial reagent of the same methodology was performed on 200 human sera. A correlation of 0.988 was obtained.

## Sensitivity

When run as recommended, the minimum detection limit of this assay is 5.0 U/L.

## Linearity

The reaction is linear up to alkaline phosphatase concentration of 750 U/L; specimens showing higher concentration should be diluted 1+5 with physiological saline and repeat the assay (result × 6).

## Interfering Substances

### Haemolysis

A 200 mg/dL haemoglobin results in a 10 % negative bias.

### Icterus

No significant interference up to bilirubin level of 40 mg/dL.

### Lipemia

No significant interference from lipemia up to 1000 mg/dL.

## Expected Values

	30°C	37°C
Males (20 - 50) years	30 - 90 U/L	53-128 U/L
Males (> 60) years	30 - 90 U/L	56-119 U/L
Females (20 - 50) years	20 - 80 U/L	42-98 U/L
Females (> 60) years	40 - 111 U/L	53-141 U/L
Children (1 - 12) years	≤ 350 U/L	≤ 460 U/L

Temperature conversion factor is 1.22 (25 → 30 °C) and 1.52 (25 → 37 °C).

**Spectrum Diagnostics does not interpret the results of a clinical laboratory procedure; interpretation of the results is considered the responsibility of qualified medical personnel. All indications of clinical significance are supported by literature references.**

## Analytical Range

5 – 750 U/L.

## Waste Disposal

This product is made to be used in professional laboratories. Please consult local regulations for a correct waste disposal.

**S56:** dispose of this material and its container at hazardous or special waste collection point.

**S57:** use appropriate container to avoid environmental contamination.

**S61:** avoid release in environment. refer to special instructions/safety data sheets.

## References

1. Moss DW. Alkaline phosphatase isoenzymes. Clin Chem. 1982;28:2007-2016.
2. Moss DW, Henderson AR, Kachmar JF. Enzymes in: Tietz NW, ed. Fundamentals of clinical chemistry. 3rd ed. Philadelphia: WB Saunders; 1987:346-421.
3. Tietz NW, Rinker AD, Shaw LM. IFCC methods for the measurement of catalytic concentration of enzymes. Part 5. IFCC method for alkaline phosphatase. J Clin Chem Clin Biochem. 1983;21:731-748.
4. Zawta B, Klein G, Bablok W. Temperaturumrechnung in der Klinischen Enzymologie? Klin lab. 1994;40:23-32. Sensitivity



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