

### PACKAGING

Ref: 101-0645	Cont.: 1 x 500 / 1 x 125 mL
---------------	-----------------------------

Store at 2-8° C

### CLINICAL SIGNIFICANCE

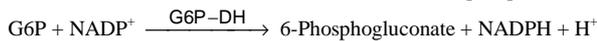
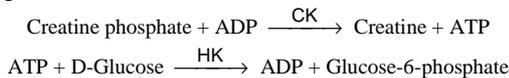
Creatine kinase is a cellular enzyme with wide tissue distribution in the body. Its physiological role is associated with adenosine triphosphate (ATP) generation for contractile or transport systems. Elevated CK values are observed in diseases of skeletal muscle and after myocardial infarction<sup>1,5,6</sup>.

Clinical diagnosis should not be made on a single test result; it should integrate clinical and other laboratory data.

### PRINCIPLE OF THE METHOD

Kinetic determination of the creatine kinase based upon IFCC and DGKC recommendations.

Creatine kinase (CK) catalyses the reversible transfer of a phosphate group from phosphocreatine to ADP. This reaction is coupled to those catalysed by hexokinase (HK) and glucose-6-phosphate dehydrogenase (G6P-DH):



The rate of NADPH formation, measured photometrically, is proportional to the catalytic concentration of CK present in the sample<sup>1,2</sup>.

### REAGENTS

<b>R 1</b>	Imidazol, pH 6.7	125 mmol/L
	D-Glucose	25 mmol/L
	N-Acetyl-L-Cysteine	25 mmol/L
	Magnesium acetate	12.5 mmol/L
	NADP	mmol/L
	EDTA	2.52 mmol/L
	Hexokinase	2.02 mmol/L ≥6 800 U/L
<b>R 2</b>	ADP	15.2 mmol/L
	AMP	25 mmol/L
	di-Adenosine-5- pentaphosphate	103 mmol/L
	Glucose-6-phosphate dehydrogenase	≥8 800 U/L
	Creatine phosphate	250 mmol/L

### Optional (not included in the kit)

Contro-N	Ref.: 101-0252	4 x 5 mL	Lyophilized human control serum
	Ref.: 101-0083	20 x 5 mL	
Contro-P	Ref.: 101-0253	4 x 5 mL	Lyophilized human control serum
	Ref.: 101-0084	20 x 5 mL	

### PREPARATION

Mix 4 volumes of reagent 1 with 1 volume of reagent 2.  
Stability: 2 weeks at 2-8° C or 48 hours at room temperature (15-25° C).

### STORAGE AND STABILITY

All the components of the kit are stable until the expiration date on the label when stored tightly closed at 2-8° C, protected from light and contaminations prevented during their use.

Do not use the tablets if appears broken.

### Signs of reagent deterioration:

- Presence of particles and turbidity.
- Blank absorbance (A) at 340 nm ≥ 1.60.

### ADDITIONAL EQUIPMENT

- Spectrophotometer or colorimeter measuring at 340 nm.
- Thermostatic bath at 25° C, 30° C or 37° C (± 0.1° C).
- Matched cuvettes 1.0 cm light path.
- General laboratory equipment.

### SAMPLES

Serum free of hemolysis or heparin plasma.

Stability 7 days at 2-8° C, protected from light.

The creatin kinase activity decreases 10% after 1 day at 2-5° C or after 1 hour at 15-25° C.

### PROCEDURE

**Notes:** CHRONOLAB SYSTEMS has instruction sheets for several automatic analyzers. Instructions for many of them are available on request.

1. Assay conditions:

Wavelength: ..... 340 nm

Cuvette: ..... 1 cm light path

Constant temperature ..... 25° C / 30° C / 37° C

2. Adjust the instrument to zero with distilled water.

3. Pipette into a cuvette:

	25 - 30° C	37° C
WR (mL)	1.0	1.0
Sample (µL)	40	20

3. Mix and incubate 2 minutes.

4. Read initial absorbance (A) of the sample, start the stopwatch and read absorbances at 1 minute intervals thereafter for 3 minutes.

5. Calculate the difference between absorbances and the average absorbance differences per minute (ΔA/min).

### CALCULATIONS

$$25^{\circ}\text{C} - 30^{\circ}\text{C} \quad \Delta A / \text{min} \times 4127 = \text{U/L CK}$$

$$37^{\circ}\text{C} \quad \Delta A / \text{min} \times 8095 = \text{U/L CK}$$

**Units:** One international unit (IU) is the amount of enzyme that transforms 1 µmol of substrate per minute, in standard conditions. The concentration is expressed in units per litre of sample (U/L).

### Temperature conversion factors

To correct results to other temperatures multiply by:

Assay temperature	Conversion factor to		
	25° C	30° C	37° C
25° C	1.00	1.56	2.44
30° C	0.64	1.00	1.56
37° C	0.41	0.63	1.00

### QUALITY CONTROL

Control sera are recommended to monitor the performance of assay procedures.

If control values are found outside the defined range, check the instrument, reagents and technique for problems.

Each laboratory should establish its own Quality Control scheme and corrective actions if controls do not meet the acceptable tolerances.

**REFERENCE VALUES<sup>1</sup>**

	25° C	30° C	37° C
Men, up to	80 U/L	130 U/L	195 U/L
Women, up to	70 U/L	110 U/L	170 U/L

These values are for orientation purpose; each laboratory should establish its own reference range.

**PERFORMANCE CHARACTERISTICS**

**Measuring range:** From detection limit of 2.2 U/L to linearity limit of 2000 U/L.

If the results obtained were greater than linearity limit, dilute the sample 1/10 with NaCl (9 g/L) and multiply the result by 10.

**Precision:**

Mean (U/L)	Intra-assay		Inter-assay	
	147	494	145	485
SD	1.23	3.60	2.91	8.97
CV (%)	0.84	0.73	2.01	1.85

**Sensitivity:** 1 U/L = 0.0012  $\Delta$ A/min.

**Accuracy:** Results obtained using CHRONOLAB reagents (y) did not show systematic differences when compared with other commercial reagents (x).

The results obtained were the following:

Correlation coefficient (r): 0.9995

Regression equation:  $y = 1.0846x - 0.3512$ .

The results of the performance characteristics depend on the analyzer used.

**INTERFERENCES**

No interferences were observed with glucose until 7 g/L, hemoglobin until 5 g/L and triglycerides 7 mmol/L. A list of drugs and other interfering substances with CK determination has been reported<sup>3,4</sup>.

**BIBLIOGRAPHY**

1. Abbot B et al. Creatinine kinase. Kaplan A et al. Clin Chem The C.V. Mosby Co. St Louis. Toronto. Princeton 1984: 1112-1116.
2. Gerhardt W et al. Creatine kinase B-Subunit activity in serum after immunohinhibition of M-Subunit activity. Clin Chem 1979;(25/7): 1274-1280.
3. Young DS. Effects of drugs on Clinical Lab. Tests, 4th ed AACC Press, 1995.
4. Young DS. Effects of disease on Clinical Lab. Tests, 4th ed AACC 2001.
5. Burtis A et al. Tietz Textbook of Clinical Chemistry, 3rd ed AACC 1999.
6. Tietz N W et al. Clinical Guide to Laboratory Tests, 3rd ed AACC 1995.
7. Mathieu M. et coll. Recommandation pour la mesure de la concentration catalytique de la créatinine kinase dans la sérum humain. Ann. Biol. Clin.,40, (1482), 87.