CK-NAC – Instructions for use (IFU)

Distributed by: ISE S.r.l. CUSTOMISED SOLUTIONS FOR YOUR LABORATORY

R1: 4 x 50 mL – R2: 4 x 20 mL • REF A-R0200000301

R1: 2 x 18,5 mL – R2: 1 x 18,5 mL • REF R3330000017

IVD CE

INTENDED USE
Product used for the quantitative invitro determination of creatinkinase (CK) in human serum and plasma. The test results should always be interpreted with reference to the clinical picture. For professional use only.

INTRODUCTION
Creatine kinase exists in 3 cytoplasmic forms: CK-MB (in cardiac muscle only), CK-MM (in striated and cardiac muscle) and CK BB (especially in brain).
Determination of CK in serum is used for the diagnosis and the follow-up of cardiac muscle damages. In myocardial infarction, the rates of total CK and CK-MB increase quickly until reaching a peak 10-24h after the onset of the infarction. The levels return to normal within 3 to 4 days. CK-MB levels higher than normal can also be observed after muscle damages.

PRINCIPLE
Metodo IFCC - Cinetica. La creatina chinasi catalizza la reazione tra creatina fosfato e ADP con la formazione di creatina e ATP. L'ATP formato, in presenza di glucosio ed esochinasi (HK), dà ADP e glucosio-6-fosfato. Il glucosio-6fosfato formatosi in presenza di glucosio-6-fosfato deidrogenasi (G6P-DH), reagisce con la formazione di ß-NADP+6-fosfogluconato e ß-NADPH. L'aumento dell'assorbanza dovuto alla reazione ß-NADP+--> ß-NADPH è proporzionale all'attività CK nel campione. La presenza di N-acetil-L-cisteina (Nac) nella miscela di reazione consente un'attivazione ottimale dell'enzima CK.

$$\text{Creatine Phosphate} + \text{ADP} \xrightarrow{\text{Creatine Kinase}} \text{Creatine} + \text{ATP}$$

$$\text{ATP} + \text{D-Glucose} \xrightarrow{\text{Hexokinase}} \text{D-Glucose-6- Phosphate} + \text{ADP}$$

$$\text{G-6-P} + \text{NADP+} \xrightarrow{\text{G-6-PDH}} \text{D-Gluconate-6- Phosphate} + \text{NADP} + \text{H+}$$

G-6-P: D-Glucose-6-Phosphate

G-6-PDH: Glucose-6-Phosphate Dehydrogenase.

The rate of increase in NADPH concentration measured at 340 nm is directly proportional to the enzymatic activity of CK.

REAGENTS
A-R0200000301 – R1: 4 x 50 mL – R2: 4 x 20 mL
Reagent 1: n° 4 vials x 41.5 mL ready to use
Reagent 2: n° 4 vials x 10.5 mL ready to use
R3330000017 – R1 :2 x 18,5 mL – R2: 1 x 18,5
Reagent 1: n° 2 vials x 16.7 mL ready to use
Reagent 2: n° 1 vials x 8,5 mL ready to use

Concentration

Reagent A			
	Conc.	**U.M.**	
Imidazole buffer pH 6.1	125	mmol/L	
D-glucose	25	mmol/L	
NADP	2.5	mmol/L	
Hexokinase	≥ 6800	U/L	GHS08*
Sodium Azide	< 0.1	%	
Reagent B			
Imidazole buffer pH 8.9	125	mmol/L	
Creatine phosphate	250	mmol/L	
ADP	15.2	mmol/L	
G6PDH	≥ 8800	U/L	GHS08*
Sodium azide	< 0.1	%	
Contains also Magnesium salts, N-Acetyl-L-Cysteine, EDTA, Diadenosine pentaphosphate, and AMP			

*** Warning: DANGER** – *Contains Imidazole (CAS 288-32-4)*
H360D - May damage the unborn child.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P202 - Do not handle until all safety precautions have been read and understood.
P308 + P313 - IF exposed or concerned: Get medical advice/attention.

Precautions
Kit for professional laboratory use, used only by qualified and properly trained technical personnel, under the supervision of a doctor in charge of the laboratory. In addition to any risk statements relating to active components, reagents may contain non-active components such as preservatives and detergents. The total concentration of these components are below the limits set out in EU Regulation1272/2008 EC and subsequent amendments and additions. However, it is recommended to handle the reagents according to the rules of good laboratory practice.

Reports of serious incidents
In the event of a serious incident in relation to the use of the device, please inform the manufacturer (via your distributor) and the competent authority of the European Union member state where the incident occurred. For other jurisdictions, reporting must be made in accordance with regulatory requirements. Reporting serious incidents helps provide more information about the safety of the diagnostic medical device.

Storage and stability
Store at 2 - 8°C and protect from direct light. When correctly stored, the reagents are stable up to the expiry date reported on the label. A slight variation in the composition of the reagents may occur between batches, but this has no effect on the test results.

Reagent Preparation
The reagents are liquid, ready to use. The solutions must be limpid with no evident precipitate. Pay attention to avoid bacterial contamination during use. The stability of the reagents are 30 days if closed, stored at 2 - 8°C and protect from direct light.
Preparation: mix 4 volumes of Reagent R1 with 1 volume of Reagent R2. The working reagent is stable 7 days if stored refrigerated. Do not use the product if there is physical evidence of deterioration (ex. particle matter)

SAMPLE COLLECTION
Type of sample and storage
Use serum or plasma containing heparin. Samples can be stored 8 hours at room temperature, for 48 hours at 2 - 8°C and for at least 1 month at - 20°.

Precautions
All human samples must be handled and disposed of as potentially infectious materials.

Procedure
Quality control
Human control sera with known levels of CK NAC are commercially available for quality control purposes. Data sheets are included, listing the values and the confidence limits. Normal and abnormal control sera are available as "Normal control serum" code R0400000006 and "Pathological control serum" code R0400000106. The values obtained must be contained within the acceptability range. In case of incorrect results check the following points:
- Cleanliness of glassware.
- Wavelength setting.
- Expiration date of reagents.

Automation
Although this device has been developed and manufactured to be used by manual method and instrumental systems, it can also be used in combination with other instrumental devices that are able to meet the requirements indicated in the paragraph "Reaction conditions / Technique".
All applications that are not explicitly approved cannot be guaranteed in terms of performance and will therefore have to be evaluated by the user.

Calibration
For calibration use the kit "Multicalibrator" code R0300000006. For ISE s.r.l. series instrumentation, it is recommended to perform calibration every 2 weeks. Repeat calibration at any reagent batch variation.

Reaction Conditions
Wavelenght: 340 nm
Temperature 37°C
Read against distilled water

	U.M.	**Blank**	**Calibr. Serum.**	**Sample**
Reagent	µL	1000	1000	1000
Calibration Serum	µL	-	40	-
Sample	µL	-	-	40
Water	µL	40	-	-

Mix well and after 2 minutes of incubation at 37°C. Read the absorbances of the sample at 60 seconds intervals during 3 minutes (Δ D.O./min). The reaction volumes can be varied proportionately, the calculation remains unchanged.

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Conversion Factor
CK [U/L] x0. 01667 = CK [µkat/L]

NORMAL VALUES
Serum / Plasma
Men ≤ 171 (U/L) ≤ 2.85 µcat/L
Women ≤ 145 (U/L) ≤ 2.41 µcat/L
Each laboratory should establish its own normal values according to the population in which it operates.

Reagents included in the kit
The reagents are described above.

Materials required but not supplied in the kit
Calibrators and controls.

ANALYTICAL CHARACTERISTICS/PERFORMANCE
Linearity
Reaction is linear up to 1714 U/L (28.57 µkat/L). Samples having grater concentrations should be diluted 1:10 with normal saline and re-assayed. This procedure extends the measuring range up to 17140 U/L.

Interference
Haemolysed samples should not be used since significant hemolysis may led to falsely increased CK concentration because of adenylate kinase release.
No significant interference is defined by a recovery <±10% of the initial value: triglycerides up to 3000 mg/dl (33.9 mmol/L); Unconjugated bilirubin up to 30 mg/dl (513 µmol/L); Conjugated bilirubin up to 29.5 mg/dl (505 µmol/L); Ascorbic Acid up to 20 mg/dl; Acetaminophen up to 30 mg/dl; Acetylsalycilic Acid up to 200 mg/dl.

Precision of the method

Within series				
Range	U.M.	Average	C.V. (%)	N
Low	U/L	147	0.7	80
Medium	U/L	406	1.1	80
High	U/L	1154	1.1	80
Between series				
Range	U.M.	Average	C.V. (%)	N
Low	U/L	147	1.7	80
Medium	U/L	406	2.4	80
High	U/L	1154	3.9	80

Sensitivity
At λ340 nm a concentration of about 5 U/L of CK in conditions established for this test.

Comparative method
The CK MB reagent has been compared with a similar method on the market using samples ranging from 10 to 1819 U/L. The results of the comparison were a regression line y = 1,012x – 2 U/L; Correlation Coefficient r = 0.998; number of samples analyzed n = 100.

Disposal of reagents
Disposal of reagents must be performed in accordance with the EC regulations regarding waste, or the local national or regional legislation.

Manufacturer:
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Symbols used in IFU and Packaging	
IVD In vitro diagnostic medical device vitro	Manufacturer
REF Catalogue Number	Instruction for use
LOT Lot Number	Temperature limitation
Expiration date	

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REVISION	DATE	CHANGE
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