CK-MB – DGKC and IFCC Method
Instructions for use (IFU)

IVD CE

ORDERING INFORMATION

	Code	Composition
OPEN KONELAB INDIKO	REF B75182568	n° 10 vials x 8 mL (R.A) n° 2 vials x 10 mL (R.B)
	REF B75182569	n° 8 vials x 2,4 mL (R.A) n° 1 vials x 5 mL (R.B)

INTENDED USE
Product for use in the quantitative determination in vitro of the concentration of CK MB serum or plasma. The results of the test must always be interpreted in conjunction with the clinical context. FOR PROFESSIONAL USE ONLY.

CLINICAL SIGNIFICANCE
Creatine kinase (CK) is an enzyme made up of isoenzymes – mainly muscular (CK-M) – and cerebral tissue (CK-B). CK exists in the human body in dimeric form as CK-MM, CK-MB and CK-BB and as macro-enzymes. Measurement of CK-MB is a specific test to individuate damage to the heart muscle and is utilized for diagnosis and monitoring of myocardial infarction.

PRINCIPLE OF THE METHOD
UV test UV optimized according to DGKC (German Society of Clinical Chemistry) and IFCC (International Federation of Clinical Chemistry and Laboratory Medicine) specifications.

$$\text{creatine phosphate} + \text{ADP} \xrightarrow{\text{CK}} \text{Creatine} + \text{ATP}$$

$$\text{Glucose} + \text{ATP} \xleftrightarrow{\text{HK}} \text{Glucose} - 6 - \text{phosphate} + \text{ADP}$$

$$\text{Glucose} - 6 - \text{phosphate} + \text{NADP}^{+} \xleftrightarrow{\text{G6P-DH}} 6 - \text{phosphoglu conolacton e} + \text{NADPH} + \text{H}^{+}$$

Storage and stability
= **Storage temperature 2-8 °C**

If stored closed at the indicated temperature, avoiding direct light, evaporation and contamination of any kind, the intact reagents are stable until the expiration date, printed on the label.

Concentration

Reagent A			
	Conc.	**U.M.**	
Imidazole buffer	120	mmol/L	GHS08*
Glucose	25	mmol/L	
N - Acetylcysteine	25	mmol/L	
Magnesium Acetate	12.5	mmol/L	
EDTA-Na_2	2	mmol/L	
NADP	2.5	mmol/L	
Hexokinase	≥ 5	kU/L	
Anti-CK-M monoclonal ab	2500	U/L	
Reagent B			
Imidazole buffer	90	mmol/L	GHS08*
ADP	10	mmol/L	
AMP	28	mmol/L	
Glucose-6-phosphate dehydrogenase	≥ 15	kU/L	
Di-Adenosine 5 phosphate	50	µmol/L	
Creatine phosphate	150	mmol/L	

*Signal word: **DANGER**
Contains: imidazole (CAS 288-32-4)
H360D- May damage the unborn child.
P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P280 - Wear protective gloves/protective clothing/eye protection/ face protection/hearing protection.
P308+P313 - IF exposed or concerned: Get medical advice/attention.
P501- Dispose of contents/container in accordance with local/ Regional /national /international regulations.

Reagents included in the kit
The reagent is described above.

Materials required but not supplied in the kit
Controls, calibrators and pipettes with adequate volume.

PRECAUTIONS and WARNINGS
1. Reagents and waste materials shall be disposed of in accordance with Community waste provisions or national or regional provisions.
2. Reagents may contain non-active components such as preservatives and detergents. The total concentration of these components is below the limits set out in Regulation 1272/2008 EC and subsequent amendments and additions.
3. It is recommended that the reagent be handled in accordance with the rules of good laboratory practice and that appropriate personal protective equipment be used.
4. Do not use the reagent if it is visibly degraded (e.g. presence of corpuscles).
5. All human samples shall be handled and disposed of as potentially infectious material.
6. The kit should only be used by qualified and properly trained technical personnel.
7. Diagnoses shall be carried out exclusively by authorised and qualified personnel.
8. Comply with national directives on occupational safety and quality assurance.
9. Use equipment that complies with current regulations.

Reporting 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.

PROCEDURE
Quality control
Control serum with a known titer of CK-MB is commercially available for quality control, with values and confidence limits included. The dedicated control serum "Isocontrol Serum CK-MB" Sclavo Code B35181359 is available. The values obtained must be contained within the acceptability range.

SAMPLE
Sample types and storage
Serum and plasma with heparin or EDTA.

In serum / plasma	2 days	20-25 °C
	7 days	4-8 °C
	4 weeks	-20 °C

PREPARATION OF THE REAGENT
Slight variations in coloration among batches will not affect test results.
Procedure (monoreactive)
Add 1 volume of RB + 4 volumes RA, shake gently. The reagent thus prepared is ready to use. The reagent is stable for 2 weeks at 2 – 8 °C or 24 hours at 15 – 25 °C.

Automation
The kit can be used with all automatic analyzers that can meet the operating conditions of the reagent while maintaining the volumetric ratios R1 / R2 / C. Validated applications are available for Sclavo Konelab® - Indiko® instruments. Applications not approved by Sclavo Diagnostics do not guarantee the performance of the reagent and must therefore be approved under the responsibility of the user.

MANUAL METHOD
The kit, in Open format, can be used manually through the use of spectrophotometer or photometer with the following parameters:
Reaction conditions
Wavelength (primary): 340 nm
Temperature: 37°C
Reaction Kinetic (increasing reaction)

Technique – Monoreactive
Bring the reagents to reaction temperature and operate away from direct light.

	U.M.	Blank	Sample
Reagent (A+B)	µL	1000	1000
Sample	µL	-	40
Water	µL	40	-

Mix well and after 5 minutes carry out reading at 37°C. Read the absorbances of the sample within 5 minutes (take at least 5 readings at 60 -second intervals). Determine the average of Δ D.O./min.
The reaction volumes can be varied proportionally without altering the result.

Calculation of results obtained against multiplication factor
Δ D.O./min x K-factor* = U/L di CK-MB

$$\text{K-factor} = \frac{TV \times 1000}{6{,}3 \times SV \times P} \times 2 = 8254$$

TV = Total reaction volume in ml
SV = Sample volume in ml
6,3 = Absorption coefficient in millimoles of NADH at 340 nm
P = Cuvette Diameter (1 cm)
2 = Multiplying by 2 determines the estimation of CK-MB activity

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REFERENCE RANGE

Myocardial infarction: the risk of myocardial infarction is high if following three conditions are fulfilled:

CK (Male)	< 190 U/L	3,12 µkat/L
CK (Female)	< 167 U/L	2,87 µkat/L
CK-MB	< 16 U/L	0.40 µkat/L

CK-MB activity is between 6% and 25 % of total CK activity.

If myocardial infarction is suspected and the conditions are not fulfilled, the infarction may be fresh. In this case the measurements should be repeated after 4 hours with fresh samples. In healthy individuals' different values are found depending on race and age. Each laboratory should check if the reference ranges are transferable to its own patient population and determine own reference ranges if necessary. For diagnostic purposes CK values should always be assessed in conjunction with the anamnesis, the clinical examination, and other findings.

ANALYTICAL CHARACTERISTICS/PERFORMANCES

Linearity

The method is linear up to 2000 U/L of CK MB

Accuracy - Recovery

Commercial control sera were analyzed with the kit in question following the guidelines of the CLSI protocol. The data obtained are shown in the table below.

Range	Replicates	Mean (U/L)	DS	CV%
Low	5	6.4	1	15.63
High	5	18.1	1.92	10.61

Interferences

Interference	Limits
Ascorbic Acid	**30 mg/dL**
Bilirubin	**25 mg/dL**
Lipids	**900 mg/dL**

Precision of the method

Accuracy in the series (Within-run precision) – Repeatability					
Range	U.M.	Average	S.D.	C.V. (%)	N
Low	U/L	26.7	0.70	2.61	20
High	U/L	106	1.03	0.97	20
Total precision (Within-lab precision)					
Range	U.M.	Average	S.D.	C.V. (%)	N
Basso	U/L	28.2	1.05	3.72	20
Alto	U/L	109	2.32	2.13	20

Limits of sensitivity

The Sensitivity limit has been measured using serial dilutions of high concentrated sera. The smallest detectable concentration is of about 2 U/L of CK-MB in the conditions established for this test.

Comparison between methods

The method was compared with a similar commercially available method, analyzing 90 human samples. The correlation data between the two methods are reported in the table below.

Parameter	Estimation
Intercept	2.08
Slope	1.00
Correlation Coeff. (R)	1.00

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
Rev.B	05/2025	Out of production of chemilab line

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