diatron

CK-MB

CREATINE KINASE-MB

Specifically for use with Diatron PICTUS® 700 and PICTUS® 500 Analyzers

2°C – 8°C REF 1419-0299 **Packaging:** 2 x 16 mL (R1) + 2 x 4 mL (R2) Σ 130

INTENDED USE

Reagents for In Vitro quantitative automated determination of Creatine Kinase-MB (CK-MB) in samples of human serum or plasma from the general patient population. Measurements of CK-MB are to be used as an aid to diagnosis and monitoring of conditions that require physicians to distinguish between skeletal muscle and heart muscle damage.

This reagent is formulated specifically for use with Diatron Pictus® P700 and P500 analyzers.
For in vitro diagnostic use only by trained laboratory professionals.

CLINICAL SIGNIFICANCE

Creatine Kinase consists of M and B subunits and is found in the MM, MB and BB isoforms. The CK- MB isoform is found mainly in the cardiac muscle. CK-MB activity is raised in patients with renal failure, in concurrent skeletal muscle and myocardial injuries, as well as in many other conditions, such as non -cardiac surgery, chest trauma, asthma, malignancies and pulmonary embolism. Also presence in patient serum of Macro-CK and/or CK-BB isoform due to brain injury will lead to falsely elevated CK-MB results, so increase of CK-MB activity is not specific enough for the laboratory diagnosis of myocardial infarction; additional *in Vitro* (Troponin, FABP, Myoglobin etc.) and *in Vivo* (ECG) tests are required.

METHOD PRINCIPLE

The enzymatic Immunoinhibition of the M subunit is applied. The anti-CK-M antibody present in the CK-MB reagent inhibits the catalytic activity of the M subunit of CK-MB enzyme. The observed activity is only due to the B subunit of the enzyme. The activity is measured as the increase of the signal at 340/650 nm observed during the following reactions:

$$\text{Phosphocreatine} + \text{ADP} \xrightarrow{\text{CK}} \text{Creatine} + \text{ATP}$$

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

$$\text{Glucose-6- Phosphate} + \text{NADP}^+ \xrightarrow{\text{G6PDH}} \text{6-Phosphoglyconolactone} + \text{NADPH} + \text{H}^+$$

CK: Creatine Kinase **HK**: Hexokinase **G6PDH**: Glucose 6- Phosphate Dehydrogenase
The increase of absorption at 340nm is proportional to the CK-MB concentration in the sample.

METHOD LIMITATIONS

This method also measures the CK-BB isoenzyme. Although Its activity is usually negligible, the presence of CK-BB may give falsely elevated CK-MB values. A macro morph of the CK-BB isoenzyme may be present during the determination of CK-MB. If the activity of the CK-B isoenzyme surpasses the 20% of total CK activity, then the presence of CK-B macro morph may be supposed. Overestimation of CK-MB may occur in cases of CK macro morph presence in the sample. This reagent is formulated specifically for use with Diatron Pictus® P700 and P500 analyzers. For additional information please contact customer support at Diatron or Medicon.

REAGENT COMPOSITION

Reagent 1 (R1)		Reagent 2 (R2)	
Imidazole buffer (pH 6.7):	100 mmol/L	Diadenosine pentaphosphate:	10 mmol/L
Hexokinase:	4.0 kU/L	EDTA:	2.0 mmol/L
NADP+:	2.0 mmol/L	D-Glucose:	20 mmol/L
G6PDH:	≥ 2.8 kU/L	Creatine Phosphate:	30 mmol/L
ADP:	2.0 mmol/L	N-Acetyl Cysteine:	0.2 mmol/L
Magnesium Acetate:	10 mmol/L	Anti-CK-M antibody:	Variable
AMP:	5.0 mmol/L	Preservative	

WARNINGS – PRECAUTIONS

- The reagent is designed for in vitro diagnostic use only. In vitro diagnostic reagents can be hazardous. They should be handled according to good laboratory practices and techniques. Avoid inhalation and contact with eyes and skin.
- Samples should be considered as potentially infectious. Handle according to the universal precautions and good laboratory practices.
- The reagent contains sodium azide ($NaN_3 \leq 0.1\%$). Avoid swallowing and contact of the reagent with skin and mucous membrane.
- Any serious incident that may occur in relation to this device must be reported by the user to the manufacturer and the competent authority of the country in which the user and/or the patient is established!
- Dispose all waste according to national laws.
- MSDS is available by Diatron or MEDICON upon request.

PREPARATION

Reagents are liquid, ready-to-use, and are placed on the corresponding positions of the analyzer. Vials bear barcode for recognition by Diatron Pictus® P700 / P500 analyzers.

REAGENT DETERIORATION

The reagents should not be used:

- When they do not exhibit *the* specified linearity or control values lie outside the acceptable range after recalibration.
- After prolonged exposure to direct sunlight or high temperature.

SHELF LIFE

Unopened, the reagent is stable up to the stated expiry date when stored at 2 – 8°C. Once opened, it remains stable for 4 weeks when stored refrigerated on Diatron Pictus® P700 or P500 analyzers.

SAMPLE Fresh serum or Li-heparin plasma may be used as specimen. Use established Good Laboratory Practices for sampling, transport and separation from blood cells. Do not use hemolyzed, contaminated or turbid sample specimens. ATP, adenylic kinase and glucose-6-phosphate dehydrogenase are abundant in red blood cells and they may interfere severely in the reaction, if hemolysis exists. Anti-coagulants other than Li-heparin have not been tested and should not be used. Centrifuge sample as soon as possible, and store properly if analysis cannot take place right after sample separation. Do not store samples, to avoid in vitro CK isoform creation.

CALIBRATION Diatron offers MEDICON CK-MB Calibrator (1578-0291) traceable to ERM-AD455 for calibration. Calibrate the assay when a new lot of reagent is installed. The analyzer will automatically perform a Reagent Blank measurement every 2 weeks. Calibration should be repeated when a new lot of reagent is used, after major maintenance is performed on the analyzer, after a critical part is replaced, or when a significant shift in control values occurs.

QUALITY CONTROL Diatron offers MEDICON CK-MB CONTROL (1578-0295) for quality control. Control values and limits should fall within acceptable intervals adjusted to the requirements of each laboratory. Target values for CK-MB should be verified with the corresponding working protocol. Results outside the specified values even after recalibration could be due to reagent deterioration, unsuitable storage conditions or control deterioration, instrument malfunction, or error during test procedure.

MATERIALS REQUIRED BUT NOT PROVIDED WITH THE KIT

- CK-MB calibrator
- Quality control material
- Diatron Pictus® analyzer
- Common laboratory equipment

REFERENCE INTERVALS

Serum:	CK-MB	< 24 U/L when total CK is within normal limits.
CK:	Women:	< 167 U/L (37°C)
	Men:	< 190 U/L (37°C)

A CK-MB fraction more than 6% of the total activity is regarded as diagnostic for myocardial infarction. A fraction less than 6% indicates skeletal muscle damage. A fraction bigger than 25% may indicate the presence of Macro-CK requiring further investigation. If CK-MB is normal for a patient with suspected heart attack, repeat testing with new sample collection 4 hours later.
Each laboratory should determine its own expected values as dictated by good laboratory practice.

WASTE DISPOSAL

This product contains sodium azide (NaN_3), which forms sensitive explosive compounds with copper or lead. Flush waste pipes with water after the disposal of undiluted reagent in order to avoid azide build up in the drain pipes.

SPECIFIC PERFORMANCE CHARACTERISTICS

The following values are representative of the reagent performance on Diatron Pictus® P700 or P500 analyzer. The reagent performance has been evaluated on other types of analyzers, covering all requirements of the 98/79 IVD Directive. A list of analyzers with the corresponding performance characteristics is available in the special leaflet accompanying the insert. The results taken in your laboratory may differ from these values.

Linearity Up to 1700 U/L
Lowest detection limit 3.3 U/L

The lowest detection limit (LDL) is defined as the lowest concentration of analyte that is distinguishable from zero. A sample free of analyte is assayed 20 times within the assay and the LDL is calculated as the absolute mean plus three standard deviations.

Precision: Precision is estimated on two concentration levels of analyte according to CLSI protocol EP-5T (20 consecutive days, 2 runs per day, 2 repeats per run.

Pictus® P700 and P500	
Level (U/L)	**CV%**
72.1	2.53
153.8	1.30
Level (U/L)	**TOTAL %CV**
72.1	3.95
153.8	3.36

INTERFERENCES - Criterion: recovery within ±10% from target value

	(Insignificant up to)
Triglycerides	2700 mg/dL
Hemoglobin	450 mg/dL
Bilirubin	20 mg/dL
Conj. Bilirubin	20 mg/dL
Ascorbate	3 mg/dL

Correlation: A comparison was performed between this reagent on a Diatron Pictus® P700 and P500 analyzer and another commercially available product. The results were as follows:
Y = 0.9236X – 2.14 R=0.9974 N=30 Sample range = 10 – 480 U/L

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LABEL ELEMENTS

Precautionary Statements (P Phrases)	Hazardous Statements (H Phrases)
P201: Obtain special instructions before use.	**H360D:** May damage the unborn child.
P202: Do not handle until all safety precautions have been read and understood.	**EUH032:** Contact with acids liberates very toxic gas.
P280: Wear protective gloves/protective clothing/eye protection/face protection.	**H300:** Fatal if swallowed.
P308+P313: IF exposed or concerned: Get medical advice/attention.	**H400:** Very toxic to aquatic life.
P405: Store locked up.	**H410:** Very toxic to aquatic life with long lasting effects.
P501: Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.	

SYMBOLS

Manufacturer
Temperature Limit
Caution
IVD *In vitro* diagnostic medical device
REF Catalogue Number
Σ Contains sufficient for <n> tests

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MEDICON HELLAS S.A. - Melitona 5-7, 153 44 Gerakas, Greece. Tel: +302106606000 - Fax: +3021066126666 – www.mediconsa.com

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