



en

CK-MB

REF 6K25-30

307233/R04

B6K250

FOR USE WITH

ARCHITECT

CK-MB

Package insert instructions must be carefully followed. Reliability of assay results cannot be guaranteed if there are any deviations from the instructions in this package insert.

Read Highlighted Changes: Revised March 2017.

INTENDED USE

The MULTIGENT CK-MB assay is intended for the kinetic determination of the CK-MB and CK-BB isoenzymes of creatine kinase in serum or plasma on the ARCHITECT cSystems.

SUMMARY AND EXPLANATION OF TEST

Creatine kinase (CK) catalyzes the reversible phosphorylation of creatine by ATP. CK is a dimer composed of two subunits which form three active isoenzymes: BB (CK-1), MB (CK-2), and MM (CK-3). CK-BB isoenzyme only rarely appears in serum. Elevated CK values are due to muscle damage and associated pathologies. CK determination, usually performed with CK2 (also called CK-MB), is used for the diagnosis and follow-up of AMI (acute myocardial infarction) and some muscle diseases.

PRINCIPLES OF PROCEDURE

Creatine kinase catalyzes the reaction between creatine phosphate and ADP with formation of creatine and ATP. The ATP formed, in the presence of glucose and hexokinase (HK), yields ADP and glucose-6-phosphate. The glucose-6-phosphate formed in the presence of glucose-6-phosphate dehydrogenase (G6P-DH) reacts with β -NADP⁺ forming 6-phosphogluconate and β -NADPH. The presence of mouse antibodies that inhibit CK-MM activity in the reaction mixture allows the determination of the residual activity of CK-B isoenzymes (CK-MB and CK-BB). The CK-MB activity is obtained by multiplying the CK-B activity by two. By measuring the variation of the absorbance due to transformation of β -NADP⁺ into β -NADPH in a time interval at 340 nm, it is possible to calculate the residual activity in the examined sample.

Methodology: IFCC Method/Immunoinhibition

REAGENTS

Reagent Kit

REF 6K25-30 MULTIGENT CK-MB is supplied as a liquid, ready-to-use, two-reagent kit which contains:

R1 2 x 53 mL

R2 2 x 16 mL

Estimated tests per kit: 500

Calculation is based on the minimum reagent fill volume per kit.

Reactive Ingredients	Concentration
R1 Imidazole buffer (pH 6.1)	125 mmol/L
Glucose	25 mmol/L
N-acetyl-L-cysteine	25 mmol/L
Hexokinase (phosphorylating)	$\geq 52 \mu\text{kat/L}$
EDTA	2.5 mmol/L
Magnesium acetate	12.5 mmol/L
NADP	2.5 mmol/L
Anti-CK-M monoclonal antibodies (mouse)	$\geq 2,000 \text{ U/L}$
R2 Creatine phosphate (pH 9.5)	100 mmol/L
ADP	10 mmol/L
AMP	25 mmol/L
Diadenosine 5-phosphate	0.05 mmol/L
G6P-DH	$\geq 125 \mu\text{kat/L}$

Nonreactive Ingredients: R1 and R2 contain sodium azide (< 0.1%).

REAGENT HANDLING AND STORAGE

Reagent Handling

- R1 Ready for use.
- R2 Ready for use.
- Remove air bubbles, if present in the reagent cartridge, with a new applicator stick. Alternatively, allow the reagent to sit at the appropriate storage temperature to allow the bubbles to dissipate. To minimize volume depletion, do not use a transfer pipette to remove the bubbles.

CAUTION: Reagent bubbles may interfere with proper detection of reagent level in the cartridge, causing insufficient reagent aspiration that could impact results.

CK-MB

REF 6K25-30

Customer Service: Contact your local representative or find country-specific contact information on www.abbottdiagnostics.com.

  SENTINEL CH. SpA
Via Robert Koch, 2
Milan 20152 Italy

 Abbott

March 2017

Key to Symbols

CONTAINS: AZIDE

Contains sodium azide. Contact with acids liberates very toxic gas.

DANGER: REPRODUCTIVE HAZARD

Danger: Reproductive Hazard

FOR USE WITH

Identifies products to be used together

IVD

In Vitro Diagnostic Medical Device

LOT

Batch code/Lot number

PRODUCT OF ITALY

Product of Italy

R1

Reagent 1

R2

Reagent 2

REF

Catalog number/List number

SN

Serial number



Consult instructions for use



Manufacturer



Sufficient for



Temperature limitation



Use by/Expiration date

SPECIMEN COLLECTION AND HANDLING

Suitable Specimens

- **Serum:** Use serum collected by standard venipuncture techniques into plastic tubes with or without gel barriers. Ensure complete clot formation has taken place prior to centrifugation. Centrifuge according to tube manufacturer’s instructions to ensure proper separation of serum from blood cells. Glass tubes were not tested. Some specimens, especially those from patients receiving anticoagulant or thrombolytic therapy, may take longer to complete their clotting processes. Fibrin clots may subsequently form in these sera and the clots could cause erroneous test results.
- **Plasma:** Use plasma collected by standard venipuncture techniques into plastic tubes. The acceptable anticoagulants are lithium heparin with gel barrier and EDTA. Ensure centrifugation is adequate to remove platelets. Centrifuge according to tube manufacturer’s instructions to ensure proper separation of plasma from blood cells. Glass tubes were not tested.

NOTE: Do not use hemolyzed samples.

For total sample volume requirements, refer to the ASSAY PARAMETERS section of this package insert and *Section 5* of the **ARCHITECT System Operations Manual**.

Specimen Storage

Serum and Plasma

Temperature	Maximum Storage	Bibliographic Reference
20 to 25°C	2 days	5
2 to 8°C	7 days	5, 6
-20°C	4 weeks	5

Guder et al.⁵ suggest storage of frozen specimens at -20°C for no longer than the time interval cited above. However, limitations of laboratory equipment make it necessary in practice for clinical laboratories to establish a range around -20°C for specimen storage. This temperature range may be established from either the freezer manufacturer’s specifications or your laboratory standard operating procedure(s) for specimen storage.

NOTE: Stored specimens must be inspected for particulates. If present, mix and centrifuge the specimen to remove particulates prior to testing.

PROCEDURE

Materials Provided

[REF] 6K25-30 MULTIGENT CK-MB Kit

Materials Required but not Provided

- [REF] 6K25-10 MULTIGENT CK-MB Calibrator
- [REF] 6K25-20 MULTIGENT CK-MB Control
- Saline (0.85% to 0.90% NaCl) for specimens that require dilution

Assay Procedure

For a detailed description of how to run an assay on the ARCHITECT cSystems, refer to *Section 5* of the **ARCHITECT System Operations Manual**.

Specimen Dilution Procedure

The ARCHITECT cSystems have an automatic dilution feature; refer to *Section 2* of the **ARCHITECT System Operations Manual** for additional information.

Serum and Plasma: Specimens with CK-MB values exceeding 1,000 U/L (16.67 µkat/L) are flagged and may be diluted by following either the Automated Dilution Protocol or the Manual Dilution Procedure.

Automated Dilution Protocol

If using the Automated Dilution Protocol, the system performs a dilution of the specimen and automatically corrects the concentration by multiplying the result by the appropriate dilution factor.

Manual Dilution Procedure

- Use saline (0.85% to 0.90% NaCl) to dilute the sample.
- The operator must enter the dilution factor in the patient or control order screen. The system uses this dilution factor to automatically correct the concentration by multiplying the result by the entered factor.
- If the operator does not enter the dilution factor, the result must be multiplied by the appropriate dilution factor before reporting the result.

NOTE: If a diluted sample result is flagged indicating it is less than the linear low limit, do not report the result. Rerun using an appropriate dilution.

For detailed information on ordering dilutions, refer to *Section 5* of the **ARCHITECT System Operations Manual**.

CALIBRATION

Calibration is stable for 42 days (1,008 hours) and is required with each change in reagent lot number. Verify calibration curve with at least two levels of controls according to the established quality control requirements for your laboratory. If control results fall outside acceptable ranges, recalibration may be necessary.

For a detailed description of how to calibrate an assay, refer to *Section 6* of the **ARCHITECT System Operations Manual**.

For information on calibrator standardization, refer to the [REF] 6K25-10 MULTIGENT CK-MB Calibrator package insert.

QUALITY CONTROL

As appropriate, refer to your laboratory standard operating procedure(s) and/or quality assurance plan for additional quality control requirements and potential corrective actions:

- Two levels of controls (normal and abnormal) are to be run every 24 hours.
- If more frequent control monitoring is required, follow the established quality control procedures for your laboratory.
- If quality control results do not meet the acceptance criteria defined by your laboratory, patient values may be suspect. Follow the established quality control procedures for your laboratory. Recalibration may be necessary.
- Review quality control results and acceptance criteria following a change of reagent or calibrator lot.

RESULTS

Refer to *Appendix C* of the **ARCHITECT System Operations Manual** for information on results calculations.

To convert results from U/L to µkat/L, multiply U/L by 0.01667.⁷

Representative performance data are given in the EXPECTED VALUES and SPECIFIC PERFORMANCE CHARACTERISTICS sections of this package insert. Results obtained in individual laboratories may vary.

LIMITATIONS OF THE PROCEDURE

CK-MM activities up to 2,000 U/L (33.34 µkat/L) are completely inhibited. Therefore, samples with total CK activities above 2,000 U/L (33.34 µkat/L) require dilution because complete inhibition is no longer assured.

Sulfasalazine at elevated (200 mg/L) levels may lead to falsely low results.

Refer to the SPECIMEN COLLECTION AND HANDLING and SPECIFIC PERFORMANCE CHARACTERISTICS sections of this package insert.

EXPECTED VALUES

Reference Range

	Range (U/L)	Range (µkat/L)
Serum ⁸ and Plasma	< 25	< 0.42

It is recommended that each laboratory establish its own reference range based upon its particular locale and population characteristics.

For diagnostic purposes, the patient’s medical history and other clinical findings should be considered when evaluating CK-MB results.

SPECIFIC PERFORMANCE CHARACTERISTICS

Reportable Range

The reportable range (analytical measurement range) for MULTIGENT CK-MB is 3 to 1,000 U/L (0.05 to 16.67 µkat/L).

Limit of Detection (LOD)

The LOD for MULTIGENT CK-MB is 3 U/L (0.05 µkat/L). The LOD sensitivity for MULTIGENT CK-MB was calculated on 20 replicates of normal saline and reported as the mean zero value + 3 SD.

Interfering Substances

Interference studies were conducted using an acceptance criteria of ± 10% or 2.5 U/L deviation, whichever is greater, from the target value. MULTIGENT CK-MB assay is not affected by the presence of the following interferents up to the concentrations indicated below.

Interfering Substance	Interferent Concentration
Ascorbic acid	60 mg/dL (3,406.8 µmol/L)
Bilirubin, conjugated	6.6 mg/dL (113 µmol/L)
Bilirubin, unconjugated	53 mg/dL (906 µmol/L)
Intralipid	600 mg/dL (6 g/L)
Sulfapyridine	300 mg/L (1204.8 µmol/L)
Temozolomide	20 mg/L (103.1 µmol/L)

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Precision				
The precision of the MULTIGENT CK-MB assay is ≤ 7.5% Total CV for concentrations > 25 U/L (0.42 µkat/L) and SD ≤ 2.5 U/L (0.04 µkat/L) for concentrations < 25 U/L (0.42 µkat/L). Studies were performed using Clinical and Laboratory Standards Institute (CLSI) protocol NCCLS EP5-A. ⁹ Representative results are summarized below.				
Control		Level 1	Level 2	Level 3
N		80	80	80
Mean (U/L)		7.3	30.1	79.3
Within Run	SD	0.58	0.49	0.54
	%CV	7.9	1.6	0.9
Between Run	SD	0.14	0.14	0.46
	%CV	1.9	0.5	0.4
Total	SD	0.64	0.57	0.33
	%CV	8.7	1.9	1.7

Method Comparison

Correlation studies were performed using CLSI protocol NCCLS EP9-A.¹⁰ Serum results from the MULTIGENT CK-MB assay on an ARCHITECT cSystem were compared with the results from a commercially available methodology.

Serum results from the MULTIGENT CK-MB assay on an ARCHITECT cSystem were compared with the results on the AEROSET System.

	ARCHITECT vs. Comparative Method	ARCHITECT vs. AEROSET
N	75	60
Y - Intercept	0.14	-0.87
Correlation Coefficient	0.992	0.999
Slope	1.04	0.98
Range (U/L)	4.5 to 231.3	3.9 to 648.0

BIBLIOGRAPHY

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9. Kennedy JW, Carey RN, Coolen RB, et al. *Evaluation of Precision Performance of Clinical Chemistry Devices; Approved Guideline (EP5-A)*. Wayne, PA: The National Committee for Clinical Laboratory Standards, 1999.
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TRADEMARKS

The ARCHITECT cSystem family of instruments consists of c 4000, c 8000, and c 16000 instruments. AEROSET, ARCHITECT, c 4000, c 8000, c 16000, cSystem, MULTIGENT, and SmartWash are trademarks of Abbott Laboratories in various jurisdictions. All other trademarks are property of their respective owners.

ARCHITECT cSystems Assay Parameters

CK-MB Serum/Plasma—Conventional and SI Units

Configure assay parameters — General

☒ General

☐ Calibration

☐ SmartWash

☐ Results

☐ Interpretation

Assay: CKMB Type: Photometric Version: †

Number: 2979

Run controls for onboard reagents by:* Lot

☒ Reaction definition

☐ Reagent / Sample

☐ Validity checks

Reaction mode: Rate up

Primary

Secondary

Read times

Wavelength: 340 / ** Main: 28 – 33

Last required read: 33 Flex: — – —

Absorbance range: -0.1000 – 1.7000 Color correction: — – —

Sample blank type: None

☐ Reaction definition

☒ Reagent / Sample

☐ Validity checks

Reagent: CKMB9

Reagent volume: 180

Diluent: Saline

Water volume: —

Diluent dispense mode: Type 0

Dispense mode: Type 0

Dilution name

Sample

Diluted sample

Diluent

Water

Dilution factor

Default dilution

STANDARD : 11.0 = 1:1.00 ●

DIL 1 : 10.0 11.0 90 = 1:10.00 O

☐ Reaction definition

☐ Reagent / Sample

☒ Validity checks

Reaction check: None

Rate linearity %: 10

Configure assay parameters — Calibration

☐ General

☒ Calibration

☐ SmartWash

☐ Results

☐ Interpretation

Assay: CKMB Calibration method: Linear

☒ Calibrators

☐ Volumes

☐ Intervals

☐ Validity checks

Calibrator set: CKMC Calibrator level: Concentration: 0.00‡

Blank: Water Cal 1: CKMC1 ‡‡

Replicates: 3 [Range 1 – 3]

☐ Calibrators

☒ Volumes

☐ Intervals

☐ Validity checks

Calibrator: CKMC

Calibrator level

Sample

Diluted sample

Diluent

Water

Blank: Water 11.0 — — —

Cal 1: CKMC1 11.0 — — —

☐ Calibrators

☐ Volumes

☒ Intervals

☐ Validity checks

Calibration intervals:

Full interval: 1008 (hours)

Calibration type:

Adjust type: None

☐ Calibrators

☐ Volumes

☐ Intervals

☒ Validity checks

Blank absorbance range: -0.0100 – 0.0100

Span: Blank – Blank

Span absorbance range: — – —

Expected cal factor: 0.00

Expected cal factor tolerance %: 0

Configure assay parameters — SmartWash

☐ General

☐ Calibration

☒ SmartWash

☐ Results

☐ Interpretation

Assay: CKMB

COMPONENT	REAGENT / ASSAY	WASH	Volume	Replicates
R1	DIG00	Detergent A	345	1
R1	AMIK9	Detergent A	345	1
R1	VANCO	Detergent A	345	1
R1	GENT9	Detergent A	345	1
R1	TOBRA	Detergent A	345	1
R1	DGT0B	Detergent A	345	1
R2	DIG00	Detergent A	345	1
R2	AMIK9	Detergent A	345	1
R2	VANCO	Detergent A	345	1
R2	GENT9	Detergent A	345	1
R2	TOBRA	Detergent A	345	1
R2	DGT0B	Detergent A	345	1
Cuvette	Trig***	10% Detergent B	345	

***Not required for ARCHITECT Software version 7.00 and above.

CK-MB Serum/Plasma—Conventional Units

Configure assay parameters — Results

☐ General

☐ Calibration

☐ SmartWash

☒ Results

☐ Interpretation

Assay: CKMB Assay number: 2979

Dilution default range:

Low-Linearity: 3 Result units: U/L

High-Linearity: 1000

Gender and age specific ranges:

GENDER	AGE (UNITS)	NORMAL	EXTREME
Either	0 – 130 (Y)	0 – 24	

Configure result units

Assay: CKMB

Version: †

Result units: U/L

Decimal places: 0 [Range 0 – 4]

Correlation factor: 1.0000

Intercept: 0.0000

CK-MB Serum/Plasma—SI Units

Configure assay parameters — Results

☐ General

☐ Calibration

☐ SmartWash

☒ Results

☐ Interpretation

Assay: CKMB Assay number: 2979

Dilution default range:

Low-Linearity: 0.05 Result units: ukat/L

High-Linearity: 16.67

Gender and age specific ranges:

GENDER	AGE (UNITS)	NORMAL	EXTREME
Either	0 – 130 (Y)	0.00 – 0.40	

Configure result units

Assay: CKMB

Version: †

Result units: ukat/L

Decimal places: 2 [Range 0 – 4]

Correlation factor: 1.0000

Intercept: 0.0000

† Due to differences in instrument systems and unit configurations, version numbers may vary.

* Parameter is available in ARCHITECT Software version 7.00 and above.

** c8000 Secondary Wavelength is 444 nm; c4000 and c16000 Secondary Wavelength is 450 nm.

‡ Displays the number of decimal places defined in the decimal places parameter field.

‡‡ Refer to the concentration specified on calibrator labeling or value sheet. In ARCHITECT Software version 5.00 and above, these values are defined on the Configure calibrator set screen.

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