

## Bicarbonate FS\*

Diagnostic reagent for quantitative in vitro determination of bicarbonate/total CO<sub>2</sub> in serum or plasma on DiaSys respons<sup>®</sup>910

### Order Information

Cat. No. 1 0950 99 10 923

4 twin containers for 200 tests each

### Method

Enzymatic test using phosphoenolpyruvate carboxylase (PEPC) and a stable NADH analog

### Principle



The reaction disturbs the following equilibrium:



This results in a conversion of CO<sub>2</sub> to bicarbonate (HCO<sub>3</sub><sup>-</sup>) which then is included in the reaction. Therefore, the total CO<sub>2</sub> concentration is measured.

The decrease of reduced cofactor concentration is measured at 405 nm and is proportional to the concentration of total carbon dioxide in the sample.

### Reagents

#### Components and Concentrations

Buffer	pH 7.5	
Phosphoenolpyruvate (PEP)		12.5 mmol/L
Phosphoenolpyruvate carboxylase (PEPC)		> 400 U/L
Malate dehydrogenase (MDH)		> 4100 U/L
NADH analog		0.6 mmol/L
Activators, stabilizers, surfactant, preservative		
Standard		30 mmol/L

#### Storage Instructions and Reagent Stability

Reagents are stable up to the end of the indicated month of expiry, if stored at 2 - 8 °C, protected from light and contamination is avoided. DiaSys respons containers provide protection from light. Do not freeze the reagents!

The standard is stable up to the end of the indicated month of expiry, if stored at 2 - 25 °C and protected from light. Once opened, the standard is stable for 3 months, if recapped immediately after use.

#### Warnings and Precautions

- In very rare cases, samples of patients with gammopathy might give falsified results.
- Please refer to the safety data sheets and take the necessary precautions for the use of laboratory reagents. For diagnostic purposes, the results should always be assessed with the patient's medical history, clinical examinations and other findings.

#### Waste Management

Please refer to local legal requirements.

#### Reagent Preparation

Reagent and standard are ready to use. The reagent bottles are placed directly into the reagent rotor.

#### Specimen

Serum or heparin plasma

Serum or plasma should be separated from cells immediately and stored at 2 - 8 °C. Exposure of samples to air should be avoided. Samples should be stored tightly sealed to prevent loss of carbon dioxide and assayed as soon as possible after collection.

Stability [1]:

1 day	at	20 - 25 °C
7 days	at	4 - 8 °C
2 weeks	at	-20 °C

Discard contaminated specimens. Freeze only once.

### Calibrators and Controls

For calibration DiaSys Bicarbonate Standard FS is recommended. This method has been standardized against a primary standard on basis of sodium carbonate. For internal quality control DiaSys TruLab Bicarbonate control should be assayed. Each laboratory should establish corrective action in case of deviations in control recovery.

	Cat. No.	Kit size
Bicarbonate Standard FS	1 0950 99 10 030	6 x 3 mL
TruLab Bicarbonate	5 9700 99 10 065	3 x 3 mL

### Performance Characteristics

Measuring range up to 50 mmol/L bicarbonate (in case of higher concentrations re-measure samples after manual dilution or use rerun function).	
Limit of detection**	4 mmol/L bicarbonate
On-board stability	3 weeks
Calibration stability	2 weeks

Interfering substance	Interferences < 10%	Bicarbonate [mmol/L]
Ascorbate	up to 30 mg/dL	18.3
Hemoglobin	up to 500 mg/dL	19.1
	up to 500 mg/dL	38.2
Bilirubin, conjugated	up to 60 mg/dL	22.7
	up to 60 mg/dL	42.6
Bilirubin, unconjugated	up to 55 mg/dL	17.6
	up to 55 mg/dL	38.8
Lipemia (triglycerides)	up to 1700 mg/dL	19.2
	up to 1700 mg/dL	34.7
For further information on interfering substances refer to Young DS [2].		

Precision			
Within run (n=20)	Sample 1	Sample 2	Sample 3
Mean [mmol/L]	19.5	30.7	44.7
Coefficient of variation [%]	1.44	1.62	1.63
Between run (n=20)	Sample 1	Sample 2	Sample 3
Mean [mmol/L]	19.5	29.3	41.7
Coefficient of variation [%]	3.63	4.70	2.53

Method comparison (n=109)	
Test x	DiaSys Bicarbonate FS (Hitachi 911)
Test y	DiaSys Bicarbonate FS (respons <sup>®</sup> 910)
Slope	0.983
Intercept	0.190 mmol/L
Coefficient of correlation	0.999

\*\* according to NCCLS document EP17-A, vol. 24, no. 34

### Conversion factor

Bicarbonate [mmol/L] = Bicarbonate [mEq/L]

### Reference Range [3]



Adults: 22 - 29 mmol/L (mEq/L)

Each laboratory should check if the reference ranges are transferable to its own patient population and determine own reference ranges if necessary.

### Literature

- Guder WG, Zawta B et al. The Quality of Diagnostic Samples. 1<sup>st</sup> ed. Darmstadt: GIT Verlag; 2001; p. 18-9.
- Young DS. Effects of Drugs on Clinical Laboratory Tests. 5th. ed. Volume 1 and 2. Washington, DC: The American Association for Clinical Chemistry Press, 2000.
- Müller-Plathe O. Acid base balance and blood gases. In: Thomas L, editor. Clinical laboratory diagnostics. 1<sup>st</sup> ed. Frankfurt: TH-Books Verlagsgesellschaft; 1998. p. 318-329.
- Norris KA, Atkinson AR, Smith WG. Colorimetric enzymatic determination of serum total carbon dioxide as applied to the Vickers multichannel 300 discrete analyser. Clin Chem 1975; 21: 1093-1101.
- US patent #5,801,006

### Manufacturer

  DiaSys Diagnostic Systems GmbH  
Alte Strasse 9 65558 Holzheim Germany

## Bicarbonate FS

### Application for serum and plasma samples

This application was set up and evaluated by DiaSys. It is based on the standard equipment at that time and does not apply to any equipment modifications undertaken by unqualified personnel

Identification	
This method is usable for analysis:	Yes
Name:	HCO3
Shortcut:	
Reagent barcode reference:	017
Host reference:	

Technic	
Type:	Fixed Time Kinetic
First reagent:[μL]	200
Blanc correction	Yes
Second reagent:[μL]	0
Blanc correction	No
Main wavelength:[nm]	405
Secondary wavelength:[nm]	508
Polychromatic factor:	1.000
1 st reading time [min:sec]	0:36
Last reading time [min:sec]	7:48
Reaction way:	Decreasing
Linear Kinetics	
Substrate depletion: absorbance limit	
Linearity: Maximum deviation [%]	
Fixed Time Kinetics	
Substrate depletion: absorbance limit	0.16
Endpoint	
Stability: largest remaining slope	
Prozone Limit [%]	

Sample	
Diluent	NaCl
Concentration technical limits-Lower	1.5
Concentration technical limits-Upper	50
SERUM	
Normal volume [μL]	2
Normal dilution (factor)	1
Below normal volume [μL]	3
Below normal dilution (factor)	1
Above normal volume [μL]	2
Above normal dilution (factor)	6
URIN	
Normal volume [μL]	2
Normal dilution (factor)	1
Below normal volume [μL]	3
Below normal dilution (factor)	1
Above normal volume [μL]	2
Above normal dilution (factor)	6
PLASMA	
Normal volume [μL]	2
Normal dilution (factor)	1
Below normal volume [μL]	3
Below normal dilution (factor)	1
Above normal volume [μL]	2
Above normal dilution (factor)	6
CSF	
Normal volume [μL]	2
Normal dilution (factor)	1
Below normal volume [μL]	3
Below normal dilution (factor)	1
Above normal volume [μL]	2
Above normal dilution (factor)	6

Results	
Decimals	1
Units	mmol/L
Correlation factor-Offset	0.000
Correlation factor-Slope	1.000

Range	
Genre	All
Age	
SERUM	>=22.0 <=29.0
URINE	
PLASMA	>=22.0 <=29.0
CSF	
Genre	
Age	
SERUM	
URINE	
PLASMA	
CSF	

Contaminants	
Contaminant 1	
Wash with	
Cycle	
Volume [μL]	
Contaminant 2	
Wash with	
Cycle	
Volume [μL]	

Calibrators details		
Calibrator list		Concentration
Cal. 1		0
Cal. 2		*
Cal. 3		*
Cal. 4		*
Cal. 5		*
Cal. 6		*
		Max delta abs.
Cal. 1		0.015
Cal. 2		0.025
Cal. 3		
Cal. 4		
Cal. 5		
Cal. 6		
Drift limit [%]		0.8

Calculations	
Model	X degree
Degree	1

\* Enter calibrator value