CO2 – CARBON DIOXIDE

Intended Use

The Alinity c Carbon Dioxide assay is used for the quantitation of carbon dioxide in human serum or plasma on the Alinity c analyzer.

Clinical Significance

The determination of serum carbon dioxide total (CO2) in conjunction with other clinical and laboratory information is necessary for the evaluation of acid-base status. A high CO2 content may be observed in compensated respiratory acidosis and metabolic alkalosis. A low CO2 content may be observed in compensated respiratory alkalosis and metabolic acidosis. Additional laboratory determinations will permit differentiation between metabolic and respiratory conditions.

Methodology

Carbon dioxide, as bicarbonate (HCO3–), and phospho(enol)pyruvate (PEP) are converted to oxalacetate and phosphate in the reaction catalyzed by phospho(enol)pyruvate carboxylase (PEPC). Malate dehydrogenase (MDH) catalyzes the reduction of oxalacetate to malate with the concomitant oxidation of reduced nicotinamide adenine dinucleotide (NADH) analog.2 The resulting decrease in absorbance at 404 nm is proportional to the CO2 content in the sample.

Methodology: PEP Carboxylase

Specimen

Type of Specimen

Specimen Type	Collection Vessel
• Serum	Serum Tubes (with or without gel barrier)
• Plasma	Collection tubes Acceptable anticoagulants are: Lithium Heparin (with or without gel barrier) Sodium Heparin

Continued on next page

CO2 – CARBON DIOXIDE, *Continued*

Specimen Storage and Stability

1. Tubes of blood are to be kept closed at all times and in a vertical position. It is recommended that the serum or plasma be physically separated from contact with cells within two hours from the time of collection.
2. For accurate results, serum and plasma specimens should be free of fibrin, red blood cells, and other particulate matter. Serum specimens from patients receiving anticoagulant or thrombolytic therapy may contain fibrin due to incomplete clot formation. For accurate results, plasma specimens should be free of platelets and other particulate matter. Ensure centrifugation is adequate to remove platelets. Specimens should be free of bubbles.
3. To ensure consistency in results, recentrifuge specimens prior to testing if they contain fibrin, red blood cells, or other particulate matter. NOTE: If fibrin, red blood cells, or other particulate matter are observed, mix by low speed vortex or by inverting 10 times prior to recentrifugation.

Specimen Type	Temperature	Maximum Storage Time	Special Instructions
Serum/ Plasma	20 to 25°C	SST, LiH, NaH: 2 hours SER,PST: 8 hours	Keep tube tightly capped for storage. A consequent decrease in the CO2 value of up to 6 mEq/L can occur in the course of an hour once the specimen has been exposed to ambient air.
	2 to 8°C	LiH: 2 says SER, SST, PST, NaH: 3 days	
	-20°C	2 weeks	

Continued on next page

CO2 – CARBON DIOXIDE, *Continued*

Sample Dilution Procedures
Serum/Plasma
Samples with CO2 values exceeding 50 mEq/L.
Automated Dilution Protocol
Serum/Plasma
The system performs a 1:2 dilution of the sample and automatically calculates the concentration by multiplying the result by the dilution factor.
Manual Dilution Procedure
Dilute the sample with saline (0.85% to 0.90% NaCl). The operator must enter the dilution factor in the Specimen or Control tab of the Create Order screen. The system will use this dilution factor to automatically calculate the concentration of the sample and report the result.

Reagents

Reagent Handling

- Reagents are shipped refrigerated or on cold packs.
- Upon receipt, place reagent cartridges in an upright position for 1 hour before use to allow bubbles that may have formed to dissipate.
- If a reagent cartridge is dropped, place in an upright position for 1 hour before use to allow bubbles that may have formed to dissipate.
- Reagents are susceptible to the formation of foam and bubbles. Bubbles may interfere with the detection of the reagent level in the cartridge and cause insufficient reagent aspiration that may adversely affect results

Reagent Storage and Stability

	Storage Temperature	Maximum Storage Time	Additional Storage Instructions
Unopened	2 to 8°C	Until expiration date	Store in upright position
Onboard	System Temperature	14 days	

CO2 – CARBON DIOXIDE, *Continued*

Opened	2 to 8°C	Until expiration date	Store in upright position. Do not reuse original reagent caps or replacement caps due to the risk of contamination and the potential to compromise reagent performance.

Calibration

Calibration Required

For instructions on performing a calibration, refer to the Alinity ci-series Operations Manual, Section 5. Calibration is stable for approximately 14 days (336 hours), but is required with each change in reagent cartridge or lot. Verify calibration with at least 2 levels of controls according to the established quality control requirements for your laboratory. If control results fall outside acceptable ranges, recalibration may be necessary. This assay may require recalibration after maintenance to critical parts or subsystems or after service procedures have been performed.

Calibration Preparation

Calibration material is the Alinity c Carbon Dioxide Calibrator Kit. This product is liquid ready-to-use. Prior to each use, mix by gentle inversion.

Calibration Storage and Stability

	Calibrator Storage	Stability Once OPEN
CO2 Cal (CAL 1 and CAL 2)	Unopened: 2 to 8 (until expiration date)	**2 to 8: 30 days**

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CO2 – CARBON DIOXIDE, *Continued*

Calibration Information

1. Calibrator values may be configured using e-files accessed and imported from www.corelaboratory.abbott, or from Abbott Mail.
2. Verify that the correct calibrator values have been entered into the calibration file.
3. Calibration is performed by running a water blank and Alinity c CO2 Calibrator Kit. Water for the blank is provided by the instrument.
4. For information on configuring calibrator data, refer to the Alinity ci-series Operations Manual, Section 2.

Quality Control

See Policy Chemistry Quality Control Policy

Sample Processing

See Policy RIV-PPP-1199

Reference Range

Test unit= mEq/L for all ages and both sexes

Age Day Low	Age Day High	Age Year Low	Age year High	Ref Low	Ref High
0	31			13	22
31			18	20	28
		18	250	19	29

Analytic Range

AMR Low	AMR High	CRR Low	CRR High
5	50	5	100

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Distributions

Kaiser Permanente Riverside Service Area Laboratory

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