i-STAT Alinity v
Hospital Resource Guide
The i-STAT Alinity v delivers blood gas, acid-base, electrolyte, chemistry, and hematology measurements in a completely portable, handheld package. Accuracy is ensured by extensive quality checks and calibrations that occur automatically with each cartridge run. Results are obtained in as little as three minutes - making it the ideal solution for critical care situations, anesthetic monitoring, and fieldwork.

**Cartridge Storage:**
Refrigerate at 2 °C to 8 °C (35 °F to 46 °F).

**Cartridge Stability:**
Cartridges may be stored at room temperature 18-30 °C (64-86 °F), but this will decrease the shelf life. Refer to the cartridge box for room storage shelf life information. Once a cartridge has been warmed to room temperature, do not return it to the refrigerator.

Allow the cartridge to warm for 5 minutes at room temperature before removing from the pouch for analysis.

Use cartridges immediately after opening pouch.

**Sample Preparation and Considerations:**
- Whole blood samples without anticoagulant or whole blood collected into a lithium heparin tube may be used.
- Blood may be either venous or arterial, depending on the analytes to be measured.
- Venous samples are typically performed for acid-base, electrolyte, and hematologic studies.
- Samples for iCa should be collected in balanced heparin.
- For most accurate results, run samples immediately after collection.
  - Samples for pH, pCO₂, pO₂, TCO₂, and iCa should be tested within 10 minutes if stored anaerobically.
  - All other analytes should be tested within 30 minutes.

For additional information regarding individual cartridges and tests sample collection and handling, see Cartridge & Test Information sheets: [www.pointofcare.abbott](http://www.pointofcare.abbott)
Acid-base analysis is vital to your diagnostic protocols. Chemical reactions, especially those occurring in vivo, are dependent on many factors, none more important than optimal pH. Illness, whether acute or chronic, often results in pH abnormalities. Failure to recognize and address these abnormalities may result in:

- Missed diagnoses
- Inappropriate treatment
- Delayed or poor patient response to therapy
- Increased time in hospital
- Frequent relapse
- Inability to thrive
- Patient death

### Acid-base definitions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>Measurement of the H⁺ ion concentration</td>
</tr>
<tr>
<td>pCO₂</td>
<td>Partial pressure of the carbon dioxide; reflects the amount of carbonic acid present</td>
</tr>
<tr>
<td>HCO₃⁻</td>
<td>Bicarbonate, the body’s major buffer</td>
</tr>
<tr>
<td>Anion Gap</td>
<td>Represents the concentration of all unmeasured anions in the plasma; the difference between measured cations and measured anions (Na⁺ + K⁺)-(Cl⁻ + HCO₃⁻); helpful in determining the cause of acid-base abnormalities.</td>
</tr>
<tr>
<td>Base Excess</td>
<td>mEq/L of strong base or acid needed to return the pH to 7.40.</td>
</tr>
<tr>
<td>Electrolytes</td>
<td>Na⁺, K⁺, Cl⁻</td>
</tr>
<tr>
<td>TCO₂</td>
<td>Total carbon dioxide, which is primarily HCO₃⁻ (95%)</td>
</tr>
<tr>
<td>pO₂</td>
<td>Partial pressure of oxygen; measurement of the tension or pressure of oxygen dissolved in blood</td>
</tr>
</tbody>
</table>

Note: A venous sample is acceptable for interpretation of acid-base parameters. For detailed information on pO₂, an arterial sample is recommended.
Acid-Base Diagnostic Chart

**Low pH: Acidemia**
- pH < 7.35 (canine and equine)
- pH < 7.25 (feline)

**Normal**
- pH 7.35 - 7.45 (canine and equine)
- pH 7.25 - 7.40 (feline)

**High pH: Alkalemia**
- pH > 7.45 (canine and equine)
- pH > 7.40 (feline)

**Note:** With compensation, the pH may trend toward normal even in the presence of an acidosis.

**Step 1**
Determine whether the pH is high or low

**Step 2**
Determine the primary disturbance

**Step 3**
Determine whether there is metabolic or respiratory compensation

- **Mixed acidosis**
  - HCO₃⁻ Low
  - pCO₂ High
  - Respiratory acidosis
  - Metabolic acidosis

- **Mixed alkalosis**
  - HCO₃⁻ High
  - pCO₂ Low
  - Respiratory alkalosis
  - Metabolic alkalosis

- **Compensated metabolic acidosis**
  - HCO₃⁻ Low
  - pCO₂ High
  - Normal

- **Compensated metabolic alkalosis**
  - HCO₃⁻ High
  - pCO₂ Low
  - Normal

- **Organic acid accumulation**
  - Renal failure
  - Lactic acidosis
  - Ketoacidosis
  - Ethylene glycol toxicity

- **Anion gap**
  - High

- **HCO₃⁻ Loss**
  - Normal

- **pCO₂ Low**
  - Respiratory acidosis
  - Normal

- **pCO₂ High**
  - Metabolic acidosis
  - Normal

- **pCO₂ Normal**
  - Compensated metabolic acidosis
  - Normal

- **pCO₂ Low**
  - Respiratory alkalosis
  - Normal

- **pCO₂ High**
  - Metabolic alkalosis
  - Normal

- **pCO₂ Normal**
  - Normal

- **HCO₃⁻ Low**
  - Normal

- **HCO₃⁻ High**
  - Normal

- **Upper GI obstruction**
  - Iatrogenic (Sodium bicarbonate therapy)
  - Medications (diuretics)

- **Renal failure**
  - Hypoventilation
  - Anesthesia/narcotic
  - Airway obstruction
  - Cardiopulmonary arrest
  - Pulmonary disease
  - Restrictive disease (diaphragmatic hernia, pneumothorax, etc).

- **Lactic acidosis**
  - Pain/anxiety
  - Hyperventilation
  - Severe anemia
  - Congestive heart failure

- **Ketoacidosis**
  - Pneumonia
  - Hypoxemia
  - Pulmonary disease

- **Ethylene glycol toxicity**
  - Diarrhea
  - Medications
  - Hypoadrenocorticism
  - Long term administration of 0.9% NaCl

**Note:** With compensation, the pH may trend toward normal even in the presence of an acidosis.
### Common Disease States Where Acid-Base Analysis Is Beneficial

<table>
<thead>
<tr>
<th>Expected Acid-Base Abnormalities (depending on species)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acidemia</strong>&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>pH &lt; 7.35 (canine and equine)</td>
</tr>
<tr>
<td>pH &lt; 7.25 (feline)</td>
</tr>
</tbody>
</table>

**Metabolic acidosis**
- H<sup>+</sup> → pH (Most common presentation)
- HCO<sub>3</sub><sup>-</sup> → pH (rare in small animals)

**Lactic Acidosis**
- An increase in lactic acid production as a result of decreased tissue perfusion and/or decreased oxygenation
- Occurs in many disease states, most commonly:
  - Hypovolemia/shock
  - Vomiting/diarrhea
  - Colic
  - Gastric torsion (GDV)

**Vomiting/Diarrhea**
- Lactic acidosis secondary to hypovolemia
- +/- loss of sodium bicarbonate (NaHCO<sub>3</sub>)
- Electrolyte abnormalities
- Anion gap often normal

**Renal Failure**
- Uremic toxins increase acid levels
- Loss of sodium bicarbonate (NaHCO<sub>3</sub>) OR hydrogen ion retention (H<sup>+</sup>)
- Electrolyte abnormalities
- Lactic acidosis with anemia and/or severe dehydration

**Diabetic Ketoacidosis**
- Ketoacids
- Lactic acidosis
- Electrolyte abnormalities
- High/normal anion gap, depending on severity

**Upper GI Obstruction**
- Loss of Cl<sup>-</sup> in the form of HCl (hydrochloric acid)
- Hypochloremia is common
- Potential loss of free body water

**Respiratory Alkalosis**
- O<sub>2</sub> → hyperventilation → pCO<sub>2</sub> → pH
- Reduced ability to uptake or exchange O<sub>2</sub>

<table>
<thead>
<tr>
<th>Cartridge Choices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CG4+:</strong> Acid-base, lactate, pO&lt;sub&gt;2&lt;/sub&gt;, TCO&lt;sub&gt;2&lt;/sub&gt;</td>
</tr>
<tr>
<td>Helpful with GDV and other severe GI cases</td>
</tr>
<tr>
<td>Diagnosis and monitoring for emergencies and/or severe cases</td>
</tr>
</tbody>
</table>

| **CG8+:** Acid-base, pO<sub>2</sub>, HCT, glucose, Na, K, iCa |
| Helpful for monitoring diabetic and chronic kidney disease patients |
| Diagnosis and monitoring for emergencies and/or severe cases |
| Neoplasia diagnosis |

| **EC8+:** Acid-base, HCT, electrolytes (best if high anion gap expected) |
| Helpful in monitoring renal failure patients and GI disease |

**Disclaimer:** Cartridge examples are for suggestive purposes only. Diagnostic testing choices should be based on medical history, physical examination and the patient’s response to treatment.
The i-STAT Alinity v uses a wide range of disposable, single-use cartridges that contain the necessary reagents to provide reference lab quality results, while improving efficiency throughout the animal health continuum of care.

*Calculated Value. Note TCO2 is a measured value on the CHEM8+ cartridge, but is a calculated value on the CG4+, CG8+, and EC8+ cartridges.
## i-STAT Alinity v System and Reference Interval

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Units</th>
<th>System interval</th>
<th>Reference interval***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematology</td>
<td>% PCV</td>
<td>15 - 75</td>
<td>35 - 57</td>
</tr>
<tr>
<td></td>
<td>g/dL</td>
<td>5.1 - 25.5</td>
<td>12 - 19</td>
</tr>
<tr>
<td>Chemistry</td>
<td>mg/dL</td>
<td>3 - 140</td>
<td>7 - 26</td>
</tr>
<tr>
<td>Blood Urea Nitrogen (BUN)</td>
<td>mg/dL</td>
<td>0.2 - 20.0</td>
<td>0.5 - 1.4</td>
</tr>
<tr>
<td>Blood Glucose (Glu)</td>
<td>mmol/L</td>
<td>0.25 - 2.50</td>
<td>1.21 - 1.45</td>
</tr>
<tr>
<td>Electrolytes</td>
<td>mg/dL</td>
<td>20 - 700</td>
<td>81 - 118</td>
</tr>
<tr>
<td>Cl (Cl)</td>
<td>mEq/L</td>
<td>65 - 140</td>
<td>109 - 121</td>
</tr>
<tr>
<td>Sodium (Na)</td>
<td>mEq/L</td>
<td>100 - 180</td>
<td>141 - 150</td>
</tr>
<tr>
<td>Potassium (K)</td>
<td>mEq/L</td>
<td>2.0 - 9.0</td>
<td>3.3 - 4.9</td>
</tr>
<tr>
<td>Acid-Base</td>
<td>mmHg</td>
<td>6.5 - 8.2</td>
<td>7.32 - 7.44</td>
</tr>
<tr>
<td>pH</td>
<td>mmHg</td>
<td>5 - 130</td>
<td>26 - 45</td>
</tr>
<tr>
<td>Partial Pressure of Carbon Dioxide (PCO₂)</td>
<td>mEq/L</td>
<td>1.0 - 85.0</td>
<td>16 - 26</td>
</tr>
<tr>
<td>Bicarbonate (HCO₃⁻)*</td>
<td>mmHg</td>
<td>5 - 50</td>
<td>16 - 26</td>
</tr>
<tr>
<td>Total Carbon Dioxide (TCO₂)</td>
<td>mEq/L</td>
<td>5 - 50</td>
<td>16 - 26</td>
</tr>
<tr>
<td>Anion Gap (AnGap)*</td>
<td>mEq/L</td>
<td>(-10) - (+99)</td>
<td>8 - 21</td>
</tr>
<tr>
<td>Base Excess (BE)*</td>
<td>mEq/L</td>
<td>(-30) - (+30)</td>
<td>(-9) - (+1)</td>
</tr>
<tr>
<td>Blood Gas (arterial)**</td>
<td>mmHg</td>
<td>5 - 800</td>
<td>85 - 100</td>
</tr>
<tr>
<td>Partial Pressure of Oxygen (PO₂)</td>
<td>%</td>
<td>0 - 100</td>
<td>95 - 100</td>
</tr>
<tr>
<td>Oxygen Saturation (sO₂)*</td>
<td>mmHg</td>
<td>5 - 800</td>
<td>25 - 70</td>
</tr>
<tr>
<td>Blood Gas (venous)**</td>
<td>%</td>
<td>0 - 100</td>
<td>49 - 100</td>
</tr>
<tr>
<td>Lactate (Lac)</td>
<td>mmol/L</td>
<td>0.30 - 20.00</td>
<td>0.4 - 2.8</td>
</tr>
</tbody>
</table>

*Calculated Value
**Arterial blood gas ranges are built into software. Venous blood gas ranges are not available in the software at this time.
***Reference interval are for venous samples unless specified

Highlighted cells reflect interval for arterial samples. Equine arterial ranges developed for i-STAT Alinity v. Canine and feline arterial interval developed for i-STAT 1.

Reference intervals are provided only as a guideline. The most definitive reference intervals are those established for your patient population and using individualized patient trends. Test results should be interpreted in conjunction with the patient’s clinical signs.
Arterial blood gas ranges are built into software. Venous blood gas ranges are not available in the software at this time.

6 Data on File, Study report DH65R-US-19-084, Zoetis Inc., 2021. Arterial ranges for canine and feline reflect historical data and were not updated in this study.

For Cartridge & Test Information sheets, please visit: www.pointofcare.abbott

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