Health problem addressed

Analyzers used to measure blood gas, pH, electrolytes, and some metabolites in whole blood specimens. They can measure pH, partial pressure of carbon dioxide and oxygen, and concentrations of many ions (sodium, potassium, chloride, bicarbonate) and metabolites (calcium, magnesium, glucose, lactate). They are also used to determine abnormal metabolite and/or electrolyte levels in blood and the patient’s acid-base balance and levels of oxygen/carbon dioxide exchange.

Product description

Handheld device or benchtop device, sometimes placed on a cart, with a display (usually LCD), a keypad to enter information, and a slot to insert a test strip or sample tube. Some models may have alarms, memory functions, touchpens, USB ports to transfer data to a computer, and/or a small storage compartment for reagents.

Principles of operation

Blood gas/pH analyzers use electrodes to determine pH, partial pressure of carbon dioxide, and partial pressure of oxygen in the blood. Chemistry analyzers use a dry reagent pad system in which a filter pad impregnated with all reagents required for a particular reaction is placed on a thin plastic strip. Electrolyte analyzers use ion-selective electrode (ISE) methodology in which measurements of the ion activity in the solution are made potentiometrically using an external reference electrode and an ISE containing an internal reference electrode.

Operating steps

Whole blood samples are placed in tubes, on reaction cuvettes, or on test strips, and loaded into the analyzer. The operator may select the tests being performed on the sample using a keypad or connected computer.

Reported problems

Operators should be aware of the risk of exposure to potentially infectious bloodborne pathogens during testing procedures and should use universal precautions, including wearing gloves, face shields or masks, and gowns.

Use and maintenance

User(s): Medical staff
Maintenance: Laboratory technician; biomedical or clinical engineer
Training: Initial training by manufacturer and manuals

Environment of use

Settings of use: Hospital, patient bedside, physician office, clinical laboratory, home
Requirements: Battery-operated handheld devices do not have special settings requirements; benchtop units require line power

Product specifications

Approx. dimensions (mm): 100 x 300 x 400
Approx. weight (kg): 1-5 for handheld units; 15-25 for benchtop units
Consumables: Reagent cartridges or test strips, batteries
Price range (USD): 150 - 165,000
Typical product life time (years): 4-6
Shelf life (consumables): Reagents: 1-2 years

Types and variations

Handheld, portable, benchtop