

Blood gas analyzers: retooled designs, more choices

Brendan Dabkowski

“New designs work wonders,” says Mary Catherine Coyle, of Roche Diagnostics. And judging by the number of companies in CAP TODAY’s in vitro blood gas analyzers guide that are offering new or upgraded products, others agree.

Appearing for the first time in the guide is Roche’s Cobas b 123 point-of-care system, which was launched last month at the American Association for Clinical Chemistry’s annual meeting. The analyzer’s fluid pack features fully integrated maintenance, says Coyle, director of point-of-care product marketing. The system also has four levels of clot protection. “The design of the sample port helps ensure clots do not enter the system,” Coyle says. “We use specific design elements at the sensor and CO-oximeter path to prevent clots from impacting the flow of the sample. When flow sensors detect a clot, they will reverse the flow of the fluid and, effectively, expel the clot to the waste through the sample port.”

New from Nova Biomedical is the Stat Profile pHox Ultra blood gas/critical care analyzer, which was cleared by the FDA late last year. The analyzer provides test results in 45 seconds and includes snap-in reagent cartridges, autocalibration, automated quality control, and long-life sensors, says marketing specialist Rick Rollins. The Ultra performs 20 measured tests, including pH, pO₂, pCO₂, SO₂%, ionized magnesium, and blood urea nitrogen/creatinine. It comes with built-in networking that allows users to connect multiple pHox Ultra analyzers into a single, common database, a feature that Rollins says allows operators to access all patient and QC results as well as reports from all analyzers.

While the i-Stat wireless system from Abbott Point of Care is not new, the product now includes five “advanced quality features” to help organizations improve compliance, oversight, and control of their point-of-care programs, says Joe B. Freels, marketing manager of acute care and clinical support. The features, introduced in May, are liquid quality control pass/fail determination, which allows users to download electronic value-assignment information; liquid quality control scheduling and lock-out, which ensures that QC is completed successfully and on schedule by halting further testing unless the QC check occurs on time; customizable reportable ranges, which allow the lab to set upper and lower measurement limits for better control of test reporting; operator competency notification, which informs operators when their recertification is due;

and positive patient identification, which allows the system to display the patient’s name, date of birth, and gender.

The company last year released the i-Stat learning system, which, Freels says, combines online delivery of educational content with “the best features of classroom interaction and live instruction to personalize learning, allow thoughtful reflection, and differentiate instruction from student to student.”

Also released in May was Siemens

Healthcare Diagnostics’ lactate assay for the company’s RapidPoint 500 blood gas system. Among the planned enhancements for the RapidPoint 500 are wireless connectivity, support for ventilator settings, and 100-test measurement cartridges for customers with lower test volumes, says Peter Koerte, PhD, vice president of Siemens’ point-of-care business unit. Last October, the company added neonatal total bilirubin to its RapidPoint 405 blood gas system. And for its RapidLab 1200 blood gas

system, Siemens has released software that allows for the simultaneous transmission of information from the serial and Ethernet port to multiple data/patient management systems. The software also includes a read/write application for the USB port and e-mail customization, Dr. Koerte says.

Siemens now has two free mobile blood gas resources for download: “RAPID Analysis—Blood Gases and More,” an e-book reference manual

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Blood gas analyzers

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that covers such topics as blood gas testing, pre-exam considerations, and electrolytes; as well as ABG Guide, an interactive iPhone/iPad app to educate users about parameters commonly measured in critical care testing, including those for acid base balance, electrolytes, and metabolites. "It identifies normal and abnormal result ranges, corresponding clinical significance, and possible underlying causes for the specified result values of 18 different analytes," Dr. Koerte says.

Another company implementing mobile applications is Radiometer America, which, last month, released a preanalytical error prevention app for iPhone users. The app will be available for Android and Windows phones in September, says representative Jan Weaver. Also last month, the company released a 200-test sensor cassette, with an on-analyzer life of two months, for the ABL80 Flex (OSM version). In June, Radiometer released a 100-test sensor cassette for its ABL90 Flex point-of-care blood gas analyzer for sites that run fewer than 100 tests per month. The company released pleural fluid pH on the ABL800 Flex analyzer late last year.

Instrumentation Laboratory in June added Plus Technology to its Gem Premier 4000 system. The technology includes integrated wireless and remote service and faster touchscreen response, says director of marketing William Manchester. An expanded test menu is being developed for the Gem Premier 4000; it will include blood urea nitrogen, creatinine, and measured tCO₂. IL continues to offer its Gem Premier family of critical care analyzers—including the Gem Premier 3000, 3500, and 4000—all of which measure blood gases, pH, CO-oximetry, electrolytes, metabolites, and more, from one whole-blood sample. All Gem Premier systems feature Intelligent Quality Management, which "automatically and continuously detects, corrects, and documents errors in real time," Manchester says.

Roche's Coyle predicts that in coming years customers will demand such services as remote functionality that not only performs instrument maintenance and tracks reagent levels but also automatically refills supply inventories before they become depleted. In her words: "Now that you know what I've sent you, can you dial into my instrument and know what I've used? And then can you auto-resupply me?" Clinicians will have to be able to remotely access and monitor instrument status and patient results simply, quickly, and securely via wireless connectivity throughout the hospital and other networked locations, says Siemens' Dr. Koerte. "It's becoming a requirement, and hospitals look to device manufacturers for this type of IT integration support."

CAP TODAY's guide to in vitro blood gas analyzers includes products from the aforementioned companies and from Alere, ITC, and Opti Medical. Readers interested in a particular system should confirm it has the stated features and capabilities.

Brendan Dabkowski is CAP TODAY associate editor.

Part 1 of 8	Abbott Point of Care Joe Freels joe.freels@apoc.abbott.com 400 College Road East Princeton, NJ 08540 800-827-7828 www.abbottpointofcare.com	Alere, Inc. Martin Berner martin.berner@alere.com 30 South Keller Road, Suite 100 Orlando, FL 32810 888-893-6225 www.alere.com
See captodayonline.com/productguides for an interactive version of guide		
Name of device/First year sold/Number of analyzers sold in 2011 Number of devices sold in U.S./Outside U.S./List price Dimensions (H x W x D)/Weight	i-STAT System/1992/— 30,000+/20,000+/\$8,761 9.25 x 3.0 x 2.85 inches/22.4 ounces	epoc Blood Analysis System/2008/— —/—/\$7,500 3 x 3.4 x 8.5 inches/~1.5 pounds
Analytes measured on device	pH, pCO ₂ , pO ₂ , Hct, Na, K, Cl, iCa, lactate, glucose, creatinine, BUN, TC0 ₂ , cTnl, CK-MB, BNP, ACT, PT/INR	pH, pCO ₂ , pO ₂ , Hct, Na, K, iCa, lactate, glucose
Parameters calculated on device	Hb, Hct, O ₂ SAT, BE, TC0 ₂ , HCO ₃	Hb, O ₂ SAT, BE, TC0 ₂ , HCO ₃
Barometric pressure	measured	recorded
Analytical method(s) or technologies employed	electrochemical for all analytes	pH, iCa, pCO ₂ , Na, K: potentiometry; pO ₂ , lactate, glucose: amperometry; Hct: conductometric; Hb: calculated
Device is part of a series of related models	no	no
Device warranty/Loaner devices provided	1-year replacement/yes	initial 1-year warranty; extended warranty available
Average life expectancy of device	8 years	—
Open or closed system/External gas tanks required	closed/no	closed/no
Categorized for point-of-care testing or laboratory	point-of-care testing	point-of-care testing
Point of care:		
Disposable prepackaged system used for analysis	reagent, electrode (single use)	reagent, electrode (single use)
No. of disposable reagent system units in standard package	25	50
No. of samples analyzed per one disposable reagent, electrode system	1	1
Reagent unit storage requirements	refrigerate, two-month shelf life for blood gas cartridges, two-week shelf life for all others	room temperature
Shelf life of disposable units	up to 6 months	up to 6 months
Laboratory:		
No. of different disposable reagents required to maintain device	—	—
Max. No. of analyte reagents that can reside in device at once	—	—
Shelf life of components	—	—
Cost per test/Reagent cost per test	—	—
Calibrations required	1 point (automatic)	1 point (automatic)
Calibration frequency	every test	every test
Internal QC program recommended	electronic QC, automated internal wet QC	—
QC features/Capabilities of QC features	comparable plot/monthly cumulative reports (available with external system)	—
Remote control of device from laboratory	yes	yes
System can use LOINC to transmit results to LIS	no	yes
Specimen types suitable for device	whole blood, capillary, mixed venous, arterial, venous	whole blood, capillary, mixed venous, arterial, venous
Acceptable anticoagulants/Sampling technique	heparin/injection, capillary transfer, and fill	heparin/injection, capillary transfer and fill
Sample size for complete panel of analyte results	blood gas, 96 µL; electrolytes, 65 µL	~92 mL
Sample size differs with number of analytes selected	no	no
Time from sample introduction to result availability	~2 minutes	~35 seconds
Maximum No. of patient samples per hour/Maximum No. measured results per hour	20 per unit/160	—
Optimal throughput when analyzer calibrated, awaiting specimens	—	—
Calibration can be interrupted to perform stat sample	—	no
Known interferences	—	—
Sampler has self-wiping probe	—	no
Time required for maintenance by lab personnel	—	—
Service center performs diagnostics through modem	yes	no
Method of analyst ID in system	keypad entry/bar-code scanner (customizable)	—
Instrument response for:		
• hardware failure/software failure	code number error message	error code, rejection of card
• QC failure	code number error message	failure noted on final report
• calibration failure	code number error message	card rejected
For what bar-code scanning is provided	operator and patient IDs, reagent lot number	operator and patient IDs, reagent lot number, all open fields
Built-in printer/Data port	no/—	no/—
Information listed on hard copy report	device-unique identifier, operator and patient IDs, results, QC results, QC identifier	all
Analyzer connections	LIS/HIS, via data-management system	LIS/HIS, via data-management system
Interface standards supported	ASTM 1394 and 1238, HL7	HL7
How analyzer connects to external system to upload patient and QC results	hospital Ethernet or wireless network	real-time wireless (RF)
Information included in transmission from analyzer to external system	device-unique identifier, operator and patient IDs, results, QC identifier, others	device-unique identifier, operator and patient IDs, results, QC identifier, others
Hardware and software for data-management system	PrecisionWeb, Central Data Station	software only
No. of different management reports system produces	35+	customizable
Contents downloaded from data-management system to analyzer	valid operator IDs, device behavior customizations	valid operator IDs, others
System connected (live installations) to which LISs, HISs	major LIS vendors	most
Use a third-party interfacing tool, engine for LIS, HIS interfaces	yes, Sybase Interface Manager	yes, Mirth
Distinguishing features (supplied by company)	handheld, portable, single-use test cartridge menu; broad test menu; laboratory-accurate results at the bedside; integrated 802.11b or g bidirectional data transmission to data manager	room-temperature card storage (up to 6 months); bar-coded test cards for quality and inventory management; fully wireless data transfer to data manager, real time (no need to dock for download)

Note: a dash in lieu of an answer means company did not answer question or question is not applicable

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<p>Part 2 of 8</p> <p><i>See captodayonline.com/productguides for an interactive version of guide</i></p>	<p>Instrumentation Laboratory Customer Service customerservice@ilwww.com 180 Hartwell Road, Bedford, MA 01730 800-955-9525 www.ilus.com</p>	<p>Instrumentation Laboratory Customer Service customerservice@ilwww.com 180 Hartwell Road, Bedford, MA 01730 800-955-9525 www.ilus.com</p>	<p>Instrumentation Laboratory Customer Service customerservice@ilwww.com 180 Hartwell Road, Bedford, MA 01730 800-955-9525 www.ilus.com</p>
<p>Name of device/First year sold/Number of analyzers sold in 2011 Number of devices sold in U.S./Outside U.S./List price Dimensions (H x W x D)/Weight</p>	<p>GEM Premier 3000/2000/1,700 >3,000/>9,000/\$39,995 17 x 12 x 12 inches/29.5 pounds</p>	<p>GEM Premier 3500/2009/— >1,100 worldwide/\$45,000 17.5 x 13 x 11.8 inches/31.2 pounds</p>	<p>GEM Premier 4000/2006/— >4,300 worldwide/\$50,000 18 x 12 x 15 inches/44 pounds</p>
<p>Analytes measured on device</p>	<p>pH, pO2, pCO2, Hct, Na+, K+, Ca++, glucose, lactate</p>	<p>pH, pO2, pCO2, Hct, Na+, K+, Ca++, glucose, lactate</p>	<p>pH, pCO2, pO2, Hct, Na, K, Cl, iCa, lactate, glucose, tHb, O2Hb, COHb, Methb, HHb, tBili</p>
<p>Parameters calculated on device</p>	<p>A-aDo2, Hb, pAO2, paO2/pA02, RI, O2cap*, O2Ct*, CtO2*, CaO2*, CvO2*, CcO2*, a-vDO2*, Qsp/Qt, P50, HCO3-, BEb, BEcecf, SO2c</p>	<p>A-aDo2, Hb, pAO2, paO2/pA02, RI, O2cap*, O2Ct*, CtO2*, CaO2*, CvO2*, CcO2*, a-Qsp/Qt, P50, HCO3-, tCO2-, BEB, BEcecf, SO2c</p>	<p>Hct, TC02, BEecf (in vivo), BE(B) (in vivo), tHb(c), Ca++ (7.4), anion gap, P/F ratio, pAO2, CaO2, CvO2, P50, O2cap, sO2, sO2(c), HCO3-std, HCO3-(c), others</p>
<p>Barometric pressure Analytical method(s) or technologies employed</p>	<p>— pH, pCO2: potentiometry; pO2, glucose, lactate: Na, iCa, K: amperometry; Hct: conductivity; potentiometric ion selective electrode</p>	<p>— pH, pCO2: potentiometry; pO2, glucose, lactate, Na, iCa, K: amperometry; Hct: conductivity; potentiometric ion-selective electrode</p>	<p>— pH, pCO2: potentiometry; pO2, glucose, lactate: amperometry; Hct: conductivity; Hb, tBili: spectrophotometric; Na, Cl, iCa, K: potentiometric ion-selective electrode</p>
<p>Device is part of a series of related models Device warranty/Loaner devices provided Average life expectancy of device Open or closed system/External gas tanks required Categorized for point-of-care testing or laboratory</p>	<p>yes 5 years/yes 7–10 years closed/no point-of-care testing and laboratory</p>	<p>yes 5 years/yes 7–10 years closed/no point-of-care testing and laboratory</p>	<p>yes 5 years/yes 7–10 years closed/no point-of-care testing and laboratory</p>
<p>Point of care: Disposable prepackaged system used for analysis No. of disposable reagent system units in standard package No. of samples analyzed per one disposable reagent, electrode system Reagent unit storage requirements Shelf life of disposable units</p>	<p>multi-use cartridge 1 35-, 75-, 150-, 300-, 450-, and 600-test cartridge room temperature 6 months</p>	<p>multi-use cartridge 1 75-, 150-, 300-, 450-, and 600-test cartridge room temperature 6 months</p>	<p>multi-use cartridge 1 cartridges available: 75, 150, 300, 450, 600 room temperature 6 months</p>
<p>Laboratory: No. of different disposable reagents required to maintain device Max. No. of analyte reagents that can reside in device at once Shelf life of components Cost per test/Reagent cost per test</p>	<p>1 1 multi-use cartridge 6 months varies with size and menu</p>	<p>1 1 multi-use cartridge 6 months varies with size and menu</p>	<p>1 1 multi-use cartridge 6 months (cartridge) varies with cartridge size and menu</p>
<p>Calibrations required Calibration frequency Internal QC program recommended QC features/Capabilities of QC features Remote control of device from laboratory System can use LOINC to transmit results to LIS</p>	<p>automated continuous with Intelligent Quality Management (iQM) automated continuous with iQM internal, automated, continuous quality management included onboard iQM/monthly report includes number of measurements, mean, maximum, and minimum delta values yes no</p>	<p>automated continuous with Intelligent Quality Management (iQM) automated continuous with iQM internal, automated, continuous quality management included onboard iQM/monthly report includes number of measurements, mean, maximum, and minimum delta values yes no</p>	<p>automated continuous with Intelligent Quality Management (iQM) automated continuous with iQM internal, automated, continuous quality management included onboard iQM/monthly report includes number of measurements, mean, maximum, and minimum delta values yes no</p>
<p>Specimen types suitable for device Acceptable anticoagulants/Sampling technique Sample size for complete panel of analyte results Sample size differs with number of analytes selected Time from sample introduction to result availability Maximum No. of patient samples per hour/Maximum No. measured results per hour Optimal throughput when analyzer calibrated, awaiting specimens Calibration can be interrupted to perform stat sample Known interferences Sampler has self-wiping probe</p>	<p>whole blood, arterial, venous, or capillary heparin/aspiration 135–150 µL no 85 seconds 20/180 20 samples per hour yes — yes</p>	<p>whole blood, arterial, venous, or capillary heparin/aspiration 135–150 µL no 85 seconds 20/180 20 samples per hour yes — yes</p>	<p>whole blood, capillary, mixed venous, arterial, venous heparin/aspiration 150 µL, 95 µL (electrochemical only), 65 µL micro mode (electrochemical only) yes 70 seconds for electrochemical; 25 additional seconds for CO-ox 20/300 20 samples per hour yes interfering substance detected, operator notified yes</p>
<p>Time required for maintenance by lab personnel Service center performs diagnostics through modem Method of analyst ID in system Instrument response for: • hardware failure/software failure • QC failure • calibration failure For what bar-code scanning is provided Built-in printer/Data port Information listed on hard copy report</p>	<p>none (disposable cartridge) no (but can through VPN) manual or bar-code entry of ID and password (customizable) operator warning, sampling lockout channel flagged no results for channel operator and patient IDs, QC values yes/3 RS-232, 1 parallel, bar-code reader port, Ethernet port patient demographics, hospital name and address, results</p>	<p>none (disposable cartridge) no (but can through VPN) manual or bar-code entry of ID and password (customizable) operator warning, sampling lockout channel flagged no results for channel operator and patient IDs, QC values yes/4 USB, 3 RS-232, 1 parallel, bar-code reader port, Ethernet patient demographics, hospital name and address, results</p>	<p>none no (but can through VPN) wireless bar-code gun or manual virtual keyboard entry operator warning, sampling lockout iQM disables analyte channel; no result reported system automatically performs checks before samples can be analyzed operator and patient IDs, cartridge lot number and expiration date yes/4 RS-232, 1 parallel port, 1 Ethernet port, 4 USB ports patient demographics, hospital information, results, result flags and legend, reference and critical ranges (optional), comments, notification information</p>
<p>Analyzer connections Interface standards supported How analyzer connects to external system to upload patient and QC results Information included in transmission from analyzer to external system Hardware and software for data-management system No. of different management reports system produces Contents downloaded from data-management system to analyzer System connected (live installations) to which LISs, HISs Use a third-party interfacing tool, engine for LIS, HIS interfaces</p>	<p>GEMweb, GEMweb Plus, Impact for Critical Care ASTM protocol direct serial, Ethernet, modem dial-in device identifier, operator and patient IDs, results, QC ID and results Impact for Critical Care customizable patient ID, demographics major HIS/LIS vendors MAS RALS, Telcor</p>	<p>GEMweb, GEMweb Plus, Impact for Critical Care ASTM and HL7 protocols direct serial, Ethernet, modem dial-in device identifier, operator and patient IDs, results, QC ID and results GEMweb, GEMweb Plus, Impact for Critical Care customizable patient ID, demographics major HIS/LIS vendors MAS RALS, Telcor</p>	<p>LIS/HIS via direct interface or GEMweb Plus Custom Connectivity; vendor-neutral or Web-based systems ASTM 1394, HL7 direct serial, hospital network, real-time wireless device identifier, operator and patient IDs, results, QC ID GEMweb Plus 4 most configuration information, including valid operator IDs, QC lots, and ranges major HIS/LIS vendors MAS RALS, Telcor</p>
<p>Distinguishing features (supplied by company)</p>	<p>iQM detects, corrects, and documents instrument errors, reducing error detection time to minutes; maintenance-free, multi-use cartridge available in customized configurations for use in any hospital location; wireless communication to LIS or HIS</p>	<p>iQM detects, corrects, and documents instrument errors, reducing error detection time to minutes; maintenance-free, multi-use cartridge available in customizable configurations for use in any hospital location; wireless communication to LIS or HIS</p>	<p>iQM detects, corrects, documents instrument errors, reducing error detection time to minutes; single component, multi-use cartridge includes all testing components, is changed every 30 days, requires no refrigeration or maintenance; GEMweb Plus software allows access and control from any networked PC or GEM Premier 4000 analyzer; Plus Technology offers faster touchscreen response, wireless communication to HIS/LIS, and remote service capabilities</p>
<p><i>Note: a dash in lieu of an answer means company did not answer question or question is not applicable</i></p>	<p><i>*when interfaced with GEM OPL CO-Oximeter</i></p>	<p><i>*when interfaced with GEM OPL CO-Oximeter</i></p>	

In vitro blood gas analyzers

Part 3 of 8 <i>See captodayonline.com/productguides for an interactive version of guide</i>	ITC 8 Olsen Avenue Edison, NJ 08820 800-631-5945 www.itcmed.com	Nova Biomedical Sales info@novabiomedical.com 200 Prospect Street, Waltham, MA 02454-9141 800-458-5813	Nova Biomedical Sales info@novabiomedical.com 200 Prospect Street, Waltham, MA 02454-9141 800-458-5813
Name of device/First year sold/Number of analyzers sold in 2011 Number of devices sold in U.S./Outside U.S./List price Dimensions (H x W x D)/Weight	IRMA TRUpoint Blood Analysis System/1994/— >6,000 worldwide/— 11.5 x 9.5 x 5 inches/5 pounds, 4 ounces	Stat Profile pHox Ultra/2011/— — 17.2 x 22.3 x 18.7 inches/61 pounds	Stat Profile pHox/1998/— — 15 x 12 x 15 inches/18 pounds
Analytes measured on device	pH, pCO ₂ , pO ₂ , Hct, Na, K, Cl, iCa, glucose, BUN, creatinine, lactate	pH, PCO ₂ , PO ₂ , Hct, Hb, Na, K, Cl, iCa, iMg, lactate, glucose, creatinine, BUN, SO ₂ %, bilirubin, CO-oximetry	pH, PCO ₂ , PO ₂ , Hct, Hb, SO ₂ %
Parameters calculated on device	Hb, O ₂ SAT, BEb, BE _{ef} , TC0 ₂ , HCO ₃ ⁻ , iCa(n), creatinine MDRD-GFR	BE, TC0 ₂ , HCO ₃ ⁻	BE, TC0 ₂ , HCO ₃ ⁻
Barometric pressure	measured	tracked	tracked
Analytical method(s) or technologies employed	pH, pCO ₂ , Na, Cl, iCa, K, BUN, creatinine, lactate (enzymatic): potentiometric; pO ₂ , glucose (enzymatic): amperometric; Hct: conductometric	pH, iCa, iMg, Na, Cl, and K: direct ISE; PCO ₂ : Severinghaus; PO ₂ : amperometry; Hct: conductivity; Hb, SO ₂ %, optical-reflectance; lactate, glucose, and creatinine: enzyme/amperometric	pH: direct ISE; PCO ₂ : Severinghaus; PO ₂ : amperometry; Hct: conductivity; Hb and SO ₂ %, optical-reflectance
Device is part of a series of related models	yes	yes (pHox analyzer series, pHox Ultra without CO-ox)	yes
Device warranty/Loaner devices provided	1 year/yes	1 year/yes	1 year, travel and labor, repair, or replacement/yes
Average life expectancy of device	7 years	5-7 years	5-7 years
Open or closed system/External gas tanks required	closed/no	closed/no	closed/no
Categorized for point-of-care testing or laboratory	point-of-care testing	point-of-care testing and laboratory	point-of-care testing and laboratory
Point of care: Disposable prepackaged system used for analysis	reagent, electrode (single use)	reagent	reagent
No. of disposable reagent system units in standard package	25	200-500	200-500
No. of samples analyzed per one disposable reagent, electrode system	1	—	—
Reagent unit storage requirements	room temperature; creatinine 2°-8°C	no special requirements	room temperature
Shelf life of disposable units	up to 6 months	reagents: 18 months at room temperature, electrodes: up to 18 months	reagents: 18 months at room temperature, electrodes: up to 18 months
Laboratory: No. of different disposable reagents required to maintain device	—	1	1
Max. No. of analyte reagents that can reside in device at once	—	20	1
Shelf life of components	—	reagents and electrodes: 18 months, membrane kits: 12-24 months	reagents and electrodes: 18 months, membrane kits: 12-24 months
Cost per test/Reagent cost per test	—	depends on volume/—	<\$0.11 at 35 analyses per day/<\$0.08 at 35 analyses per day
Calibrations required	2 point (automatic)	1 and 2 point (automatic)	1 and 2 point (automatic)
Calibration frequency	automatic with each sample	1 point: 30 or 45 minutes or with every sample (user selectable); 2 point: 2, 3, 4, 5, or 6 hours (user defined)	1 point: 30 or 45 minutes or with every sample (user selectable); 2 point: 2, 4, or 6 hours (user defined)
Internal QC program recommended	automatic electronic QC per 8 hours	minimum CLIA recommendations	minimum CLIA recommendations
QC features/Capabilities of QC features	L-J plots/statistical calculations, monthly cumulative reports (IDMS)	L-J plots/statistical calculations, monthly cumulative reports, true liquid quality control	L-J plots/statistical calculations, monthly cumulative report (onboard, more extensive reporting available with Nova Point-of-Care Manager)
Remote control of device from laboratory	yes	yes	no
System can use LOINC to transmit results to LIS	no	yes	no
Specimen types suitable for device	whole blood, capillary, mixed venous, arterial, venous	whole blood, capillary, mixed venous, arterial, venous	whole blood, capillary, mixed venous, arterial
Acceptable anticoagulants/Sampling technique	heparin, EDTA (glucose strip only)/injection	heparin/aspiration and capillary	heparin/aspiration and capillary
Sample size for complete panel of analyte results	125 µL capillary, 200 µL syringe	210 µL	70 µL
Sample size differs with number of analytes selected	no	yes, variety of micro-panel options offered and can be customized	yes, standard 3-test blood gas micro-panel sample required is 45 µL
Time from sample introduction to result availability	60-90 seconds, on average	up to 134 seconds	45 seconds
Max. No. of patient samples per hour/Max. No. measured results per hour	25/175	26/520	300/300 tests
Optimal throughput when analyzer calibrated, awaiting specimens	20 samples per hour	520 tests per hour	300 tests per hour
Calibration can be interrupted to perform stat sample	—	yes	yes
Known interferences	—	none	—
Sampler has self-wiping probe	no, not needed	yes	yes
Time required for maintenance by lab personnel	none	weekly: <5 minutes; monthly: <10 minutes	weekly: <5 minutes; monthly: <10 minutes
Service center performs diagnostics through modem	no	yes	yes
Method of analyst ID in system	LCD touchscreen, numeric (customizable)	multilevel password with unique user ID number (customizable)	password with unique user ID number (optional)
Instrument response for: • hardware failure/software failure	EQC failure or screen prompt; software: screen prompt	self-diagnosis software informs and notifies operator of HW and SW failure; hotline and field support	self-diagnosis software informs and notifies operator of HW and SW failure; hotline and field support
• QC failure	if QC required, no access to patient testing mode	options range from flagging to not reporting test to lock-out for QC failure or exceeding scheduled QC interval	options range from flagging to not reporting test to lock-out for QC failure or exceeding scheduled QC interval
• calibration failure	test ends—no injection of sample allowed	any test that does not calibrate will not report results and instrument notifies operator of reason for failure	any test that does not calibrate will not report results and instrument notifies operator of reason for failure
For what bar-code scanning is provided	operator and patient IDs, cartridge information, lot number, quality control ranges	operator and patient identifiers	patient ID
Built-in printer/Data port	yes/RS-232, modem, Ethernet, LAN	yes/RS-232, Ethernet, others	yes/multiple RS-232
Information listed on hard copy report	analyzer serial number, date, calibration successful, calibration code, lot number, patient ID and temperature, results, barometric pressure, SW version optional: user ID, reference ranges, O ₂ therapy, sample information	patient ID with accession numbers, entered settings, measures and calculates results	patient ID with accession number, entered settings, measures and calculates results
Analyzer connections	data management systems connect to LIS/HIS; directly to LIS/HIS (both options)	data-management system or directly to LIS/HIS, or both	data-management system or directly to LIS/HIS, or both
Interface standards supported	IRMA (ASTM protocol), ITC Ensemble (script, HL7, or EDI)	ASTM 1394 and 1238, HL7, POCT-1A	ASTM E1381-91 and ASTM 1394-91 (HL7 available with external device)
How analyzer connects to external system to upload patient and QC results	hospital network, direct serial, LAN	hospital network	direct serial/>500 hospitals institutions; hospital network/>100 institutions
Information included in transmission from analyzer to external system	device-unique identifier, operator and patient IDs, results, QC identifier, patient O ₂ therapy information	device-unique identifier, operator and patient IDs, results, QC identifier	device-unique identifier, operator and patient IDs, results, QC identifier, accession number
Hardware and software for data-management system	connects to Alere (MAS RALS+ and LDS Aegis POC) and Telcor data management systems	full-featured onboard DMS capability, external DMS also available	Pentium with Microsoft Windows 2000/Nova Point-of-Care Manager
No. of different management reports system produces	19	>30	>60
Contents downloaded from data-management system to analyzer	all analyzer settings, software upgrades	yes, valid control values and operator IDs, patient demographics	yes, patient name, passwords
System connected (live installations) to which LISs, HISs	major HIS/LIS vendors	—	—
Use a third-party interfacing tool, engine for LIS, HIS interfaces	yes	yes	yes
Distinguishing features (supplied by company)	self-contained and easy to use; contains onboard printer, interactive touchscreen, bar-code scanning, automatic electronic QC, and site-specific custom correlation reference ranges; complete data management from patient information to lot traceability; self-calibrating cartridges with Luer lockport, which forms a closed system and reduces biohazards	20-test whole blood critical care menu and proven platform of hybrid component cartridge-based biosensor technology; BUN, iMg available exclusively; analyzer networking at no extra cost; Multiple pHox Ultra analyzers can be networked together into a single, common database. A supervisor or authorized operator can access all patient results, QC results, and reports from all analyzers	onboard auto-cartridge QC; all-liquid calibration cartridge eliminates gas tanks; single reagent cartridge has all supplies for calibration and waste collection

Note: a dash in lieu of an answer means company did not answer question or question is not applicable

In vitro blood gas analyzers

Part 4 of 8 <i>See captodayonline.com/productguides for an interactive version of guide</i>	Nova Biomedical Sales info@novabiomedical.com 200 Prospect Street Waltham, MA 02454-9141 800-458-5813	Nova Biomedical Sales info@novabiomedical.com 200 Prospect Street Waltham, MA 02454-9141 800-458-5813	Nova Biomedical Sales info@novabiomedical.com 200 Prospect Street Waltham, MA 02454-9141 800-458-5813
Name of device/First year sold/Number of analyzers sold in 2011 Number of devices sold in U.S./Outside U.S./List price Dimensions (H x W x D)/Weight	Stat Profile pH0x Respiratory/2006/— — 15 x 12 x 15 inches/18 pounds	Stat Profile pH0x Plus/2000/— — 15 x 12 x 15 inches/18 pounds	Stat Profile pH0x Plus L/2001/— — 15 x 12 x 15 inches/18 pounds
Analytes measured on device Parameters calculated on device Barometric pressure Analytical method(s) or technologies employed Device is part of a series of related models Device warranty/Loaner devices provided Average life expectancy of device Open or closed system/External gas tanks required Categorized for point-of-care testing or laboratory	pH, PCO ₂ , PO ₂ , Hct, Hb, SO ₂ %, lactate BE, TC0 ₂ , HC0 ₃ -tracked pH: direct ISE; PCO ₂ : Severinghaus; PO ₂ : amperometry; Hct: conductivity; Hb and SO ₂ %: optical-reflectance; lactate: enzyme/amperometric yes 1 year, travel and labor, repair, or replacement/yes 5-7 years closed/no point-of-care testing and laboratory	pH, PCO ₂ , PO ₂ , Hct, Hb, SO ₂ %, Na, K, Cl or iCa, glucose glucose BE, TC0 ₂ , HC0 ₃ -tracked pH: direct ISE; PCO ₂ : Severinghaus; PO ₂ : amperometry; Hct: conductivity; Hb and SO ₂ %: optical-reflectance; Na, K, Cl, iCa: direct ISE; glucose: enzyme/amperometric yes 1 year, travel and labor, repair or replacement/yes 5-7 years closed/no point-of-care testing and laboratory	pH, PCO ₂ , PO ₂ , Hct, Hb, SO ₂ %, Na, K, Cl or iCa, glucose, lactate glucose, lactate BE, TC0 ₂ , HC0 ₃ -tracked pH: direct ISE; PCO ₂ : Severinghaus; PO ₂ : amperometry; Hct: conductivity; Hb and SO ₂ %: optical-reflectance; Na, K, Cl, iCa: direct ISE; glucose, lactate: enzyme/amperometric yes 1 year, travel and labor, repair or replacement 5-7 years closed/no point-of-care testing and laboratory
Point of care: Disposable prepackaged system used for analysis No. of disposable reagent system units in standard package No. of samples analyzed per one disposable reagent, electrode system Reagent unit storage requirements Shelf life of disposable units	reagent 200-500 — room temperature reagents: 18 months at room temperature, electrodes: up to 18 months	reagent 200 to 500 — room temperature reagents: 18 months at room temperature, electrodes: up to 18 months	reagent 200 to 500 — room temperature reagents: 18 months at room temperature, electrodes: up to 18 months
Laboratory: No. of different disposable reagents required to maintain device Max. No. of analyte reagents that can reside in device at once Shelf life of components Cost per test/Reagent cost per test	1 1 reagents and electrodes: 18 months, membrane kits: 12-24 months <\$0.11 at 35 analyses per day/<\$0.08 at 35 analyses per day	1 1 reagents and electrodes: 18 months, membrane kits: 12 to 24 months <\$0.11 at 35 analyses per day/<\$0.08 at 35 analyses per day	1 1 reagents and electrodes: 18 months, membrane kits: 12 to 24 months <\$0.11 at 35 analyses per day/<\$0.08 at 35 analyses per day
Calibrations required Calibration frequency Internal QC program recommended QC features/Capabilities of QC features Remote control of device from laboratory System can use LOINC to transmit results to LIS	1 and 2 point (automatic) 1 point: 30 or 45 minutes or with every sample (user selectable); 2 point: 2, 4, or 6 hours (user defined) minimum CLIA recommendations L-J plots/statistical calculations, monthly cumulative report (onboard, more extensive reporting available with Nova Point-of-Care Manager) no no	1 and 2 point (automatic) 1 point: 30 or 45 minutes or with every sample (user selectable); 2 point: 2, 4, or 6 hours (user defined) minimum CLIA recommendations L-J plots/statistical calculations, monthly cumulative report (onboard, more extensive reporting available with Nova Point-of-Care Manager) no no	1 and 2 point (automatic) 1 point: 30 or 45 minutes or with every sample (user selectable); 2 point: 2, 4, or 6 hours (user defined) minimum CLIA recommendations L-J plots/statistical calculations, monthly cumulative report (onboard, more extensive reporting available with Nova Point-of-Care Manager) no no
Specimen types suitable for device Acceptable anticoagulants/Sampling technique Sample size for complete panel of analyte results Sample size differs with number of analytes selected Time from sample introduction to result availability Maximum No. of patient samples per hour/Maximum No. measured results per hour Optimal throughput when analyzer calibrated, awaiting specimens Calibration can be interrupted to perform stat sample Known interferences Sampler has self-wiping probe	whole blood, capillary, mixed venous, arterial heparin/aspiration and capillary 125 µL yes, standard 3-test micro-panel required is 60 µL 52 seconds 50/500 300 tests per hour yes — yes	whole blood, capillary, mixed venous, arterial heparin/aspiration and capillary 115 µL yes, micro-panel; standard 3-test micro-panel required is 55 µL 50 seconds 50/500 300 tests per hour yes — yes	whole blood, capillary, mixed venous, arterial, serum plasma heparin/aspiration and capillary 125 µL yes, standard 3-test micro-panel required is 60 µL 52 seconds 50/500 300 tests per hour yes none yes
Time required for maintenance by lab personnel Service center performs diagnostics through modem Method of analyst ID in system Instrument response for: • hardware failure/software failure • QC failure • calibration failure For what bar-code scanning is provided Built-in printer/Data port Information listed on hard copy report	weekly: <5 minutes; monthly: <10 minutes yes password with unique user ID number (optional) self-diagnosis software informs and notifies operator of HW and SW failure; hotline and field support options range from flagging to not reporting test to lock-out for QC failure or exceeding scheduled QC interval any test that does not calibrate will not report results and instrument notifies operator of reason for failure patient ID yes/multiple RS-232 patient ID with accession number, entered settings, measures and calculates results	weekly: <5 minutes; monthly: <10 minutes yes password with unique user ID number (optional) self-diagnosis software informs and notifies operator of HW and SW failure; hotline and field support options range from flagging to not reporting test to lock-out for QC failure or exceeding scheduled QC interval any test that does not calibrate will not report results and instrument notifies operator of reason for failure patient ID yes/multiple RS-232 patient ID with accession number entered settings, measures and calculates results	weekly: <5 minutes; monthly: <10 minutes yes password with unique user ID number (optional) self-diagnosis software informs and notifies operator of HW and SW failure; hotline and field support options range from flagging to not reporting test to lock-out for QC failure or exceeding scheduled QC interval any test that does not calibrate will not report results and instrument notifies operator of reason for failure patient ID yes/multiple RS-232 patient ID with accession number entered settings, measures and calculates results
Analyzer connections Interface standards supported How analyzer connects to external system to upload patient and QC results Information included in transmission from analyzer to external system Hardware and software for data-management system No. of different management reports system produces Contents downloaded from data-management system to analyzer System connected (live installations) to which LISs, HISs Use a third-party interfacing tool, engine for LIS, HIS interfaces	data-management system or directly to LIS/HIS, or both ASTM E1381-91 and ASTM 1394-91 (HL7 available with external device) direct serial/>500 hospitals institutions; hospital network/>100 institutions device-unique identifier, operator and patient IDs, results, QC identifier, accession number Pentium with Microsoft Windows 2000/Nova Point-of-Care Manager >60 yes, patient name, passwords — yes	data-management system or directly to LIS/HIS, or both ASTM E1381-91 and ASTM 1394-91 (HL7 available with external device) direct serial/>500 hospitals institutions; hospital network/>100 institutions device-unique identifier, operator and patient IDs, results, QC identifier, accession number Pentium with Microsoft Windows 2000/Nova Point-of-Care Manager >60 yes, patient name, passwords — yes	data-management system or directly to LIS/HIS, or both ASTM E1381-91 and ASTM 1394-91 (HL7 available with external device) direct serial/>500 hospitals institutions; hospital network/>100 institutions device-unique identifier, operator and patient IDs, results, QC identifier, accession number Pentium with Microsoft Windows 2000/Nova Point-of-Care Manager >60 yes, patient name, passwords — yes
Distinguishing features (supplied by company)	onboard auto-cartridge QC; all-liquid calibration cartridge eliminates gas tanks; single reagent cartridge has all supplies for calibration and waste collection	onboard auto-cartridge QC; all-liquid calibration cartridge eliminates gas tanks; single reagent cartridge has all supplies for calibration and waste collection	onboard auto-cartridge QC; all-liquid calibration cartridge eliminates gas tanks; single reagent cartridge has all supplies for calibration and waste collection

Note: a dash in lieu of an answer means company did not answer question or question is not applicable

In vitro blood gas analyzers

Part 5 of 8 <i>See captodayonline.com/productguides for an interactive version of guide</i>	Nova Biomedical Sales info@novabiomedical.com 200 Prospect Street Waltham, MA 02454-9141 800-458-5813	Opti Medical Systems Inc. Sales Department 235 Hembree Park Drive Roswell, GA 30076 800-490-6784 www.optimedical.com	Opti Medical Systems Inc. Sales Department 235 Hembree Park Drive Roswell, GA 30076 800-490-6784 www.optimedical.com
Name of device/First year sold/Number of analyzers sold in 2011 Number of devices sold in U.S./Outside U.S./List price Dimensions (H x W x D)/Weight	Stat Profile pH0x Plus C/2003/— — 15 x 12 x 15 inches/18 pounds	OPTI R/2006/— — 4.7 x 14.2 x 14 inches/4.5 kg (10 pounds) without fluid pack	OPTI CCA-TS Blood Gas Analyzer/2003/— — 4.7 x 14.2 x 9 inches/12 pounds (10 pounds without battery)
Analytes measured on device Parameters calculated on device Barometric pressure Analytical method(s) or technologies employed Device is part of a series of related models Device warranty/Loaner devices provided Average life expectancy of device Open or closed system/External gas tanks required Categorized for point-of-care testing or laboratory	pH, PCO ₂ , PO ₂ , Hct, Hb, SO ₂ %, Na, K, Cl, iCa, glucose BE, TC0 ₂ , HCO ₃ - tracked pH: direct ISE; PCO ₂ : Severinghaus; PO ₂ : amperometry; Hct: conductivity; Hb and SO ₂ %; optical-reflectance; Na, K, Cl, iCa: direct ISE; glucose: enzyme/amperometric yes 1 year, travel and labor, repair or replacement 5-7 years closed/no point-of-care testing and laboratory	pH, pCO ₂ , pO ₂ , tHb, Na, K, iCa, SO ₂ Hct, HCO ₃ , BE, BEcf, BEact, BB, tCO ₂ , st. HCO ₃ , st. pH, O ₂ ct, cH+, AaDO ₂ , AG, p50, nCa++ measured optical fluorescence and reflectance yes, Opti series 1 year (service contract available for subsequent years)/yes 7 years closed/no point-of-care testing and laboratory	pH, pCO ₂ , pO ₂ , Na, K, Cl, iCa, tHb, SO ₂ , glucose, BUN, lactate Hct, HCO ₃ , BE, BEcf, BEact, BB, tCO ₂ , st. HCO ₃ , st. pH, O ₂ ct, cH+, AaDO ₂ , AG, p50, nCa++ measured optical fluorescence and reflectance yes, Opti series 1 year (service contract available for subsequent years)/yes >7 years closed/no point-of-care testing and laboratory
Point of care: Disposable prepackaged system used for analysis No. of disposable reagent system units in standard package No. of samples analyzed per one disposable reagent, electrode system Reagent unit storage requirements Shelf life of disposable units	reagent 200 to 500 — room temperature reagents: 18 months at room temperature, electrodes: up to 18 months	reagent/multi-use cartridge 4 50 room temperature cassette: 7 months, fluid pack: 12 months	single-use cassettes 25 1 room temperature cassette: 6-12 months, depends on type
Laboratory: No. of different disposable reagents required to maintain device Max. No. of analyte reagents that can reside in device at once Shelf life of components Cost per test/Reagent cost per test	1 1 reagents and electrodes: 18 months, membrane kits: 12 to 24 months <\$0.11 at 35 analyses per day/<\$0.08 at 35 analyses per day	2 8 cassette: 7 months, fluid pack: 12 months depends on volume	1 8 cassette: 6-8 months, depends on type depends on volume
Calibrations required Calibration frequency Internal QC program recommended QC features/Capabilities of QC features Remote control of device from laboratory System can use LOINC to transmit results to LIS	1 and 2 point (automatic) 1 point: 30 or 45 minutes or with every sample (user selectable); 2 point: 2, 4, or 6 hours (user defined) minimum CLIA recommendations L-J plots/statistical calculations, monthly cumulative report (onboard, more extensive reporting available with Nova Point-of-Care Manager) no no	2 point (automatic) 1 point: after every sample or 30 minutes; 2 point: every 3 hours minimum CLIA recommendations; auto QC can be programmed to meet requirements —/auto QC, statistics reports no yes	1 point (automatic) with each cassette minimum CLIA recommendations; electronic QC can be used for daily QC requirements —/electronic QC, statistics reports no yes
Specimen types suitable for device Acceptable anticoagulants/Sampling technique Sample size for complete panel of analyte results Sample size differs with number of analytes selected Time from sample introduction to result availability Maximum No. of patient samples per hour/Maximum No. measured results per hour Optimal throughput when analyzer calibrated, awaiting specimens Calibration can be interrupted to perform stat sample Known interferences Sampler has self-wiping probe	whole blood, capillary, mixed venous, arterial, serum plasma heparin/aspiration and capillary 125 µL yes, standard 3-test micro-panel required is 60 µL 52 seconds 50/500 300 tests per hour yes none yes	plasma, serum, whole blood heparin/aspiration and capillary 125 µL no ~1 minute 24/192 24 per hour no — no	plasma, serum, whole blood heparin/aspiration and capillary 125 µL — ~1 minute from sample aspiration 24/192 24 per hour no — no, single use
Time required for maintenance by lab personnel Service center performs diagnostics through modem Method of analyst ID in system Instrument response for: • hardware failure/software failure • QC failure • calibration failure For what bar-code scanning is provided Built-in printer/Data port Information listed on hard copy report	weekly: <5 minutes; monthly: <10 minutes yes password with unique user ID number (optional) self-diagnosis software informs and notifies operator of HW and SW failure; hotline and field support options range from flagging to not reporting test to lock-out for QC failure or exceeding scheduled QC interval any test that does not calibrate will not report results and instrument notifies operator of reason for failure patient ID yes/multiple RS-232 patient ID with accession number entered settings, measures and calculates results	weekly: 1 minute; quarterly: 5 minutes no bar code or secure PIN for 300 operators error message QC lockout error message with automatic retry operator and patient IDs, reagent, QC yes/RS-232, Ethernet patient ID, results, patient demographics (customized), critical ranges	weekly: 1 minute; quarterly: 5 minutes no bar code or secure PIN for 300 operators error message QC lockout error message operator and patient IDs, reagent, QC yes/RS-232, Ethernet patient ID, results, patient demographics (customized), critical ranges
Analyzer connections Interface standards supported How analyzer connects to external system to upload patient and QC results Information included in transmission from analyzer to external system Hardware and software for data-management system No. of different management reports system produces Contents downloaded from data-management system to analyzer System connected (live installations) to which LISs, HISs Use a third-party interfacing tool, engine for LIS, HIS interfaces	data-management system or directly to LIS/HIS, or both ASTM E1381-91 and ASTM 1394-91 (HL7 available with external device) direct serial/>500 hospitals institutions; hospital network/>100 institutions device-unique identifier, operator and patient IDs, results, QC identifier, accession number Pentium with Microsoft Windows 2000/Nova Point-of-Care Manager >60 yes, patient name, passwords — yes	directly to LIS/HIS, DMS that in turn connects to LIS/HIS, Prism POC data manager ASTM, ASCII direct serial, Ethernet hospital network device-unique identifier, operator and patient IDs, results, QC identifier, all information pertinent to patient and QC data Prism POC data manager 40 — Meditech, McKesson, Cerner, Siemens, others —	directly to LIS/HIS, DMS that in turn connects to LIS/HIS, Prism POC data manager ASTM, ASCII direct serial, Ethernet hospital network device-unique identifier, operator and patient IDs, results, QC identifier, all information pertinent to patient and QC data Prism POC data manager 40 — Meditech, McKesson, Cerner, Siemens, others —
Distinguishing features (supplied by company) <i>Note: a dash in lieu of an answer means company did not answer question or question is not applicable</i>	onboard auto-cartridge QC; all-liquid calibration cartridge eliminates gas tanks; single reagent cartridge has all supplies for calibration and waste collection	three independent levels of automatic QC, stable optical fluorescence technology, multiple-use cassette, low maintenance, and color touchscreen	stable optical fluorescence technology, easy-to-use touchscreen, measured tHb and SO ₂ , no standby costs (single-use system), low maintenance

In vitro blood gas analyzers

<p>Part 6 of 8</p> <p><i>See captodayonline.com/productguides for an interactive version of guide</i></p>	<p>Radiometer America Inc. Telesales Department info@radiometeramerica.com 810 Sharon Drive, Westlake, OH 44145 800-736-0600 www.radiometeramerica.com</p>	<p>Radiometer America Inc. Telesales Department info@radiometeramerica.com 810 Sharon Drive, Westlake, OH 44145 800-736-0600 www.radiometeramerica.com</p>	<p>Radiometer America Inc. Telesales Department info@radiometeramerica.com 810 Sharon Drive, Westlake, OH 44145 800-736-0600 www.radiometeramerica.com</p>
<p>Name of device/First year sold/Number of analyzers sold in 2011 Number of devices sold in U.S./Outside U.S./List price Dimensions (H x W x D)/Weight</p>	<p>ABL90 FLEX/2010 in U.S./— —/—/\$40,000 17.7 × 9.8 × 11.4 inches/24 pounds</p>	<p>ABL 800 Series/2004/— —/—/depends on configuration 22 × 28 × 21 inches/70 pounds</p>	<p>ABL80/2006/— —/—/depends on configuration 16 × 9 × 11 inches/19 pounds</p>
<p>Analytes measured on device</p> <p>Parameters calculated on device</p> <p>Barometric pressure</p> <p>Analytical method(s) or technologies employed</p> <p>Device is part of a series of related models</p> <p>Device warranty/Loaner devices provided</p> <p>Average life expectancy of device</p> <p>Open or closed system/External gas tanks required</p> <p>Categorized for point-of-care testing or laboratory</p>	<p>pH, pCO₂, pO₂, Hb, Na, K, Cl, iCa, lactate, glucose, sO₂, tHb, F02Hb, FCOHb, FMetHb, FHHb, FHbF Hct, BE, TCO₂, HCO₃, and 44 additional parameters</p> <p>measured and recorded</p> <p>pH, iCa, pCO₂, lactate, glucose, Na, Cl, K: thick film sensors, potentiometric analysis; pO₂: optical phosphorescence; Hct: calculation; Hb: multi-wavelength CO-ox spectrophotometric analysis</p> <p>no</p> <p>1 year (parts, labor, and travel) with service plans available after year one/yes</p> <p>10+ years</p> <p>closed/no</p> <p>point-of-care testing and laboratory</p>	<p>pH, pCO₂, pO₂, Hb, Na, K, Cl, iCa, lactate, glucose, bilirubin, fetal Hb, O2Hb, MetHb, RHb, COHb, O2SAT, creatinine Hct, BE, TCO₂, HCO₃-, plus 40 additional parameters</p> <p>measured</p> <p>pH: pH-sensitive glass (ISE); pCO₂, pO₂, Na, Cl, iCa, K, ISE; Hct: calculated from measuring Hb, bilirubin; Hb: optical, multiwavelength analysis, intra-cuvette ultrasonic hemolysis, and more</p> <p>yes, ABL 800 series</p> <p>2 years, parts, labor, and travel/yes</p> <p>20 years, with full support</p> <p>closed/yes (low-pressure, premixed)</p> <p>point-of-care testing and laboratory</p>	<p>pH, pCO₂, pO₂, Hct, Na, K, iCa, Cl-, glu, Hb, O2SAT, O2Hb, COHb, MetHb, HHb Hb, O2SAT, TCO₂, HCO₃-, ctO₂ (a-v), ctO₂, anion gap (K+), cCa2+ (7.40), cBase (B), ABE, SBE, others</p> <p>—</p> <p>pH, pCO₂, pO₂, Na, K, iCa, Cl, glu: thick film; amperometric/potentiometric technology; HCT: conductivity</p> <p>yes</p> <p>1 year, parts, labor, and travel, with service plans available after year 1/yes</p> <p>analyzer: 10+ years</p> <p>closed/no</p> <p>point-of-care testing and laboratory</p>
<p>Point of care:</p> <p>Disposable prepackaged system used for analysis</p> <p>No. of disposable reagent system units in standard package</p> <p>No. of samples analyzed per one disposable reagent, electrode system</p> <p>Reagent unit storage requirements</p> <p>Shelf life of disposable units</p>	<p>electrode sensors (multiuse cartridge)</p> <p>1</p> <p>100, 300, 600, 900</p> <p>small SC only needs refrigeration</p> <p>reagent/electrode system: four months</p>	<p>—</p> <p>—</p> <p>—</p> <p>—</p> <p>—</p>	<p>electrode sensors (multi-use cartridge)</p> <p>1</p> <p>50/100/200/300</p> <p>room temperature</p> <p>90–100 days</p>
<p>Laboratory:</p> <p>No. of different disposable reagents required to maintain device</p> <p>Max. No. of analyte reagents that can reside in device at once</p> <p>Shelf life of components</p> <p>Cost per test/Reagent cost per test</p>	<p>2</p> <p>—</p> <p>reagent and sensor cartridge: four months</p> <p>depends on configuration/depends on configuration</p>	<p>4</p> <p>4</p> <p>reagent, electrode, membrane kit, cartridge: 2+ years</p> <p>depends on sample volume and any extra included items/same</p>	<p>2</p> <p>—</p> <p>reagent: 100 days, cartridge: 90 days</p> <p>depends on configuration/same</p>
<p>Calibrations required</p> <p>Calibration frequency</p> <p>Internal QC program recommended</p> <p>QC features/Capabilities of QC features</p> <p>Remote control of device from laboratory</p> <p>System can use LOINC to transmit results to LIS</p>	<p>1 and 2 point (manual and automatic)</p> <p>1 point with each sample analysis, 2 point: 8 hours (user configurable)</p> <p>standard QC according to CAP, CLIA, JCAHO guidelines; user configurable for increased QC frequency</p> <p>L-J plots/auto QC (statistical calculations, monthly cumulative reports, on board and through DMS)</p> <p>yes</p> <p>yes</p>	<p>1 and 2 point (automatic)</p> <p>1 point: 1/2 hour BG/pH, 4 hours—manufacturer; 2 point: every 8 hours</p> <p>depends on hospital management and inspection agency</p> <p>L-J plots/comparable plot (via DMS), statistical calcs., automatic QC, monthly cumulative reports (onboard and available with external system)</p> <p>yes</p> <p>yes</p>	<p>1 and 2 point (manual and automatic)</p> <p>1 point: with each test, 2 point: 8 hours (user definable)</p> <p>QC material according to CLIA, CAP, JCAHO</p> <p>L-J plots/statistical calculations, monthly cumulative (onboard—current mean, STD, CV%) reports (onboard and available with external system, PC download to Excel)</p> <p>yes</p> <p>yes</p>
<p>Specimen types suitable for device</p> <p>Acceptable anticoagulants/Sampling technique</p> <p>Sample size for complete panel of analyte results</p> <p>Sample size differs with number of analytes selected</p> <p>Time from sample introduction to result availability</p> <p>Maximum No. of patient samples per hour/Maximum No. measured results per hour</p> <p>Optimal throughput when analyzer calibrated, awaiting specimens</p> <p>Calibration can be interrupted to perform stat sample</p> <p>Known interferences</p> <p>Sampler has self-wiping probe</p>	<p>whole blood, capillary, mixed venous, arterial, venous</p> <p>heparin, electrolyte-balanced heparin/aspiration, auto aspiration, capillary, test tube, micro-sample</p> <p>65 µL</p> <p>no</p> <p>35 seconds</p> <p>50/800</p> <p>800 tests (equals 50 patient samples)</p> <p>yes</p> <p>—</p> <p>yes</p>	<p>whole blood, capillary, mixed venous, arterial, venous, expired air</p> <p>heparin, electrolyte-balanced heparin/autoaspiration, syringe and/or capillary tube and/or test tube</p> <p>95 µL for 17 measured parameters</p> <p>yes, with fewer measured parameters, smaller micro-modes available from 35 µL</p> <p>~1 minute (depends on tests ordered)</p> <p>25/425</p> <p>25 per hour</p> <p>yes</p> <p>halothane, thiocyanic and glycolic acids</p> <p>yes</p>	<p>whole blood, capillary, mixed venous, arterial, venous</p> <p>heparinized, electrolyte balanced heparin/aspiration, capillary</p> <p>70 µL</p> <p>no</p> <p>70 seconds</p> <p>30/270</p> <p>30 patient samples per hour</p> <p>yes</p> <p>—</p> <p>no</p>
<p>Time required for maintenance by lab personnel</p> <p>Service center performs diagnostics through modem</p> <p>Method of analyst ID in system</p> <p>Instrument response for:</p> <ul style="list-style-type: none"> hardware failure/software failure QC failure calibration failure <p>For what bar-code scanning is provided</p> <p>Built-in printer/Data port</p> <p>Information listed on hard copy report</p>	<p>monthly: as needed</p> <p>option</p> <p>customizable user log-ons, bar code, onboard keyboard; built-in bar code scanner</p> <p>system message; traffic light; audible, visual signals, parameter bar traffic light; self-correcting, when possible</p> <p>same as hardware/software failure</p> <p>same as hardware/software failure</p> <p>operator and patient IDs; uses smart-chips for reagents, no scanning needed</p> <p>yes/RS-232, parallel, Ethernet, others</p> <p>patient information and demographics, patient therapy settings, measured and calculated results, system messages, reference and critical values, analyzer set-up and configuration, and more</p>	<p>monthly: as needed; annually: dependent on version</p> <p>yes</p> <p>customizable onboard keyboard, bar code</p> <p>system message with customized (“traffic light”) visual and audible signals, parameter status bar</p> <p>—</p> <p>—</p> <p>operator and patient IDs, reagent and QC lot numbers, expiration, software keys</p> <p>yes/RS-232, Ethernet/USB</p> <p>patient information/demographics, patient therapy settings, measures and calculates results, system messages, reference and critical ranges</p>	<p>monthly: as needed</p> <p>option</p> <p>customizable, onboard keyboard, built-in bar-code reader</p> <p>system message with customized (“traffic light”) visual and audible signals, parameter status bar</p> <p>self-correcting, when possible</p> <p>onscreen report: same as hardware/software failure</p> <p>operator and patient IDs, reagent and QC lot numbers, expiration, software keys</p> <p>yes/RS-232, Ethernet/USB</p> <p>patient information/demographics, patient therapy settings, measures and calculates results, system messages, reference and critical ranges</p>
<p>Analyzer connections</p> <p>Interface standards supported</p> <p>How analyzer connects to external system to upload patient and QC results</p> <p>Information included in transmission from analyzer to external system</p> <p>Hardware and software for data-management system</p> <p>No. of different management reports system produces</p> <p>Contents downloaded from data-management system to analyzer</p> <p>System connected (live installations) to which LISs, HISs</p> <p>Use a third-party interfacing tool, engine for LIS, HIS interfaces</p>	<p>directly to LIS/HIS; LIS/HIS, via data-management system</p> <p>ASTM 1394, HL7, serial, POCT1-A, network, TCP/IP</p> <p>direct serial, hospital network</p> <p>device-unique identifier, operator and patient IDs, results, QC identifier, calibration and analyzer status</p> <p>internal system and external: Radiance and all other DMS systems</p> <p>standard and user definable reports</p> <p>valid operator IDs</p> <p>Cerner, McKesson, Meditech, Sunquest, many others</p> <p>no (an interfacing tool/engine could be used)</p>	<p>Radiance stat information management system that connects to LIS/HIS or directly to LIS/HIS</p> <p>ASTM, HL7, serial, POCT1A, network TCP/IP</p> <p>direct serial/thousands of hospitals installed; modem dial-in/hundreds; hospital network/hundreds; real-time wireless-capable</p> <p>device-unique identifier, operator and patient IDs, results, QC identifier, per ASTM/HL7 standards plus calibration and analyzer status information</p> <p>internal system plus optional external system, Radiance</p> <p>user-definable searches/reports</p> <p>—</p> <p>Cerner, Meditech, Misys, others</p> <p>—</p>	<p>Radiance stat analyzer management system that connects to LIS/HIS or directly to LIS/HIS</p> <p>ASTM, HL7, POCT1-A, serial, network, TCP/IP</p> <p>direct to HIS/LIS or Radiance STAT analyzer management system that connects to HIS/LIS</p> <p>device-unique identifier, operator and patient IDs, results, QC identifier</p> <p>Radiance</p> <p>user definable</p> <p>—</p> <p>Cerner, Meditech, Sunquest, others</p> <p>no (use interface templates)</p>
<p>Distinguishing features (supplied by company)</p> <p><i>Note: a dash in lieu of an answer means company did not answer question or question is not applicable</i></p>	<p>fast results (35 seconds on 65-µL sample with 44–55 per hour throughput); easy to use: walk-up ready; one-handed operation with integrated user guides and no user maintenance; automatic quality management supports regulatory compliance requirements, performs continuous checks and corrective actions are performed automatically</p>	<p>IDMS-traceable creatinine; FLEXQ automated inlet part of automatic system; bilirubin and fetal Hb measured on whole blood with no extra sample volume, low maintenance and cost of operation; FDA approved for the measurement of Pleural Fluid pH</p>	<p>portable, true battery operation; fast startup/warmup and analysis time; simple and easy-to-use system</p>

In vitro blood gas analyzers

Part 7 of 8	Roche Diagnostics Tonya Sullivan tonya.sullivan@roche.com 9115 Hague Road, Indianapolis, IN 46256 317-521-7368 www.mylabonline.com	Roche Diagnostics Tonya Sullivan tonya.sullivan@roche.com 9115 Hague Road, Indianapolis, IN 46256 800-428-5076 www.mylabonline.com	Siemens Healthcare Diagnostics Inc. 1717 Deerfield Road Deerfield, IL 60015-0778 800-255-3232 www.siemens.com/diagnostics
See captodayonline.com/productguides for an interactive version of guide			
Name of device/First year sold/Number of analyzers sold in 2011 Number of devices sold in U.S./Outside U.S./List price Dimensions (H x W x D)/Weight	cobas b 123 POC system/— — 18.5 × 12.6 × 13 inches/54 pounds	cobas b 221 system/2004/— — 23 × 20 × 23.6 inches/99 pounds (without solutions and AutoQC)	RAPIDPoint 500 system/2011/— — 21.5 × 11.5 × 16 inches/36.5 pounds
Analytes measured on device	pH, pCO ₂ , pO ₂ , Hct, Hb, Na, K, iCa, lactate, glucose	pH, pCO ₂ , pO ₂ , Hct, Hb, Na, K, Cl, iCa, lactate, glucose, BUN, bilirubin, pH pleural fluid	pH, pCO ₂ , pO ₂ , Hb, Na, K, Cl, iCa, glucose, lactate, neonatal total bilirubin, CO-oximeter fractions (fO ₂ Hb, fCOHb, fMetHb, fHHb)
Parameters calculated on device Barometric pressure Analytical method(s) or technologies employed	Hb, Hct, O ₂ SAT, BE, TC0 ₂ , HC0 ₃ - — pH, iCa, Na, K: potentiometric Nernst-equation; pCO ₂ : potentiometric severing-house type; pO ₂ : amperometric clark type; lactate, glucose: enzymatic; Hct: conductivity; Hb: spectroscopy	Hb, Hct, O ₂ SAT, BE, TC0 ₂ , HC0 ₃ - recorded or measured pH: electrode ion-selective galvanometric; pCO ₂ , pO ₂ : electrode ion selective membrane; Hct: conductivity; Hb: CO-ox spectrophotometry; Na, Cl, iCa, K: ion selective potentiometry; lactate, glucose, BUN: MSS sensor enzyme yes, three models in series	O ₂ SAT, BE, TC0 ₂ , HC0 ₃ recorded pH, iCa, Na, Cl, K: potentiometry using ISE; pCO ₂ : potentiometry based on severinghaus; pO ₂ : amperometric; glucose: amperometric, glucose oxidase; tHb, CO-oximetry, nBili: spectrophotometric; lactate: amperometric, lactate oxidase no
Device is part of a series of related models Device warranty/Loaner devices provided Average life expectancy of device Open or closed system/External gas tanks required Categorized for point-of-care testing or laboratory	— 1 year/yes 10 years closed/no point-of-care testing and laboratory	— 1 year (parts and services warranty)/no 7 years closed/no point-of-care testing and laboratory	— 1 year/yes 7–10 years closed/no point-of-care testing and laboratory
Point of care: Disposable prepackaged system used for analysis No. of disposable reagent system units in standard package	reagent and electrode 1	reagent and electrode depends on model	multi-use cartridge 1 measurement and 1 wash-waste cartridge, 1 AQC cartridge
No. of samples analyzed per one disposable reagent, electrode system Reagent unit storage requirements	200, 400, 700 sensor	dependent on use room-temperature storage	250, 400, 750 samples measurement and AQC cartridge: refrigeration, wash/waste cartridge: room temperature
Shelf life of disposable units	reagents: 9 months, electrodes: 4 months	reagents: 12 months, electrodes: 18 months	9 months
Laboratory: No. of different disposable reagents required to maintain device Max. No. of analyte reagents that can reside in device at once Shelf life of components Cost per test/Reagent cost per test	— 1 — —	depends on model, contact Roche 3 reagent: 1 year, electrode: 18 months onboard volume dependent/volume dependent	1 measurement and 1 wash-waste cartridge, 1 AQC cartridge 1 measurement and 1 wash-waste cartridge, 1 AQC cartridge cartridge: 9 months —
Calibrations required Calibration frequency Internal QC program recommended	1 and 2 point (manual and automatic) 1 point: after every sample, 2 point: every 8 hours standard QC according to CAP, CLIA, JCAHO guidelines; user configurable for increased QC frequency	1 and 2 point (automatic) 1 point: 30 minutes, two point: 8 hours CAP and JCAHO guidelines	1 and 2 point (manual and automatic) one point: 30 minutes, two point: 2 hours 1 AQC cartridge; fully user programmable
QC features/Capabilities of QC features	L-J plots/acid, base map; patient trending map, statistical calculations	L-J plots/comparable plot, lot-to-lot comparisons, statistical calculations, monthly cumulative reports, onboard, eQAP	L-J plots/external RapidComm data management, statistical calculations, monthly cumulative reports
Remote control of device from laboratory System can use LOINC to transmit results to LIS	yes —	yes yes	yes yes
Specimen types suitable for device Acceptable anticoagulants/Sampling technique	whole blood, capillary, mixed venous, arterial, venous heparin/aspiration, capillary transfer and fill	plasma, serum, whole blood, capillary, arterial, venous EDTA, heparin, citrate/aspiration, injection, capillary transfer and fill, microsamples	whole blood, capillary, mixed venous, arterial, venous heparin/aspiration
Sample size for complete panel of analyte results Sample size differs with number of analytes selected	123 µL yes, BG-ISE, Hct, glucose, lactate: 102 µL; COOX: 44 µL	200 µL for full panel yes, BG: 40 µL; ISE: 40 µL; CO-ox 44 µL, glucose, lactate, BUN: 75 µL	100 µL minimum no
Time from sample introduction to result availability Maximum No. of patient samples per hour/Maximum No. measured results per hour	120 seconds 30/—	~1 minute (test dependent) 30/360	~60 seconds 25/up to 336
Optimal throughput when analyzer calibrated, awaiting specimens Calibration can be interrupted to perform stat sample Known interferences Sampler has self-wiping probe	30 patient samples per hour yes — yes	30 patient samples per hour (full panel) yes — yes	25 samples per hour yes benzalkonium yes
Time required for maintenance by lab personnel Service center performs diagnostics through modem Method of analyst ID in system Instrument response for: • hardware failure/software failure • QC failure • calibration failure For what bar-code scanning is provided Built-in printer/Data port Information listed on hard copy report	— — bar-code scanner or manual entry plain language issue description; operator warning; lockout/plain language issue description plain language issue description; QC warning and lockout plain language issue description; regulatory compliance lockout operator and patient IDs, smart chip on all consumables captures all important data yes/RS-232, parallel, Ethernet, others patient demographics, hospital information, measured and calculated results, system messages, normal and critical ranges, operator inputs, diagnostic reports, analyzer setup, and more	daily: 2 minutes, monthly: 5 minutes, quarterly: 5 minutes yes 32-level password system (customizable) HW: identified onscreen and with diagnostic routine, SW: onscreen with messages onscreen report with high/low flagging, lockout capabilities onscreen reporting with lockout capabilities operator and patient IDs, reagent lot number, RF with transponders, expiration yes/RS-232, parallel, Ethernet options can be customized; direct and measured parameters	monthly: 1-minute cartridge replacement no password (customizable) diagnostic codes/diagnostic codes fully customizable flags diagnostic codes operator and patient IDs yes/RS-232, Ethernet, USB operator and patient IDs, accession number, patient measured and calculated results, temperature, more
Analyzer connections Interface standards supported How analyzer connects to external system to upload patient and QC results Information included in transmission from analyzer to external system	data-management system, which in turn connects to LIS/HIS; directly to LIS/HIS ASTM 1394, HL7 direct serial, modem dial-in, hospital network (Ethernet) device-unique identifier, operator and patient IDs, results, QC identifier	cobas bge link, data-management systems, LIS or HIS ASTM, HL7, USB port Ethernet device-unique identifier, operator and patient IDs, results, QC identifier	directly to LIS/HIS, data-management system, which connects to LIS/HIS LIS3 direct serial, Ethernet device-unique identifier, operator and patient IDs, results, QC identifier
Hardware and software for data-management system	bge link software	cobas bge link	RapidComm data-management system
No. of different management reports system produces	four pre-selected patient reports; unlimited customizable reports	13 base reports, unlimited customized reports	fully customizable
Contents downloaded from data-management system to analyzer	valid control values, valid operator IDs	valid operator IDs	valid control values and operator IDs
System connected (live installations) to which LISs, HISs Use a third-party interfacing tool, engine for LIS, HIS interfaces	compatible with all major LIS/HIS organizations —	Cerner, Meditech, others Data Innovations	yes, with multiple LISs, HISs yes
Distinguishing features (supplied by company)	—	FDA-510(k)-cleared pH pleural fluid results; 42-day onboard reagent packs; Roche AutoQC with up to 40 days of QC covered; screen sharing and remote protected access with cobas bge link and Axeda software	no maintenance, multi-use cartridge; fast time to patient results and sample to sample throughput; 28-day, onboard, automatic quality control cartridge

Note: a dash in lieu of an answer means company did not answer question or question is not applicable

In vitro blood gas analyzers

Part 8 of 8 <i>See captodayonline.com/productguides for an interactive version of guide</i>	Siemens Healthcare Diagnostics Inc. 1717 Deerfield Road Deerfield, IL 60015-0778 800-255-3232 www.siemens.com/diagnostics	Siemens Healthcare Diagnostics Inc. 1717 Deerfield Road Deerfield, IL 60015-0778 800-255-3232 www.siemens.com/diagnostics	Siemens Healthcare Diagnostics Inc. 1717 Deerfield Road Deerfield, IL 60015-0778 800-255-3232 www.siemens.com/diagnostics
Name of device/First year sold/Number of analyzers sold in 2011 Number of devices sold in U.S./Outside U.S./List price Dimensions (H x W x D)/Weight	RAPIDPoint 400 Series/2001/— — 21.5 × 11.5 × 16 inches/34 pounds	RAPIDPoint 300 Series/2009/— — 12.5 × 14.5 × 7 inches/16–17 pounds	RAPIDLab 1200 Series/2005/— — 22.75 × 20.5 × 21 inches/65–68 pounds
Analytes measured on device Parameters calculated on device Barometric pressure Analytical method(s) or technologies employed Device is part of a series of related models Device warranty/Loaner devices provided Average life expectancy of device Open or closed system/External gas tanks required Categorized for point-of-care testing or laboratory	pH, pCO ₂ , pO ₂ , Hct, Na ⁺ , K ⁺ , Cl ⁻ , Ca ⁺⁺ , tHb, F02Hb, FCOHb, FMetHb, FHHb, glucose, neonatal total bilirubin HCO ₃ -act, HCO ₃ -std, BE(B), BE(ecf), ctCO ₂ , Ca ⁺⁺ (7.4), RI(T), O ₂ SAT, P02/FIO ₂ , AnGAP, sO ₂ , B02, pO ₂ (A-a)(T), pO ₂ (a/A)(T), p50, Qsp/Qt(T), ctO ₂ (Hb), ctO ₂ (a), ctO ₂ (v), ctO ₂ (V), ctO ₂ (a-v), DO ₂ , VO ₂ , others recorded pH, Na, Cl, iCa, K: potentiometry using ISE; pCO ₂ : potentiometry based on Severinghaus; pO ₂ : amperometric meas. (Clark); glucose: amperometric-glucose oxidase; Hct: conductivity; tHb, CO-oximetry, neonatal total bilirubin: spectrophotometric	pH, pCO ₂ , pO ₂ , Hct, Na ⁺ , K ⁺ , Cl ⁻ , iCa ⁺⁺ Hb, O ₂ SAT, BE, TC0 ₂ , HCO ₃ recorded, measured pH: ISE-potentiometry; iCa: ISE; PCO ₂ : ISE-potentiometry; pO ₂ : ISE-amperometry; Hct: conductivity; Hb: calculated from hematocrit; Na: ISE; Cl: ISE; K: ISE	pH, pCO ₂ , pO ₂ , tHb, Na ⁺ , K ⁺ , Cl ⁻ , iCa ⁺⁺ , lactate, glucose, F02Hb, FCOHb, FMetHb, FHHb, total neonatal bilirubin HCO ₃ -act, HCO ₃ -std, BE(B), BE(ecf), ctCO ₂ , Ca ⁺⁺ (7.4), RI(T), O ₂ SAT, P02/FIO ₂ , AnGAP, sO ₂ , B02, pO ₂ (A-a)(T), pO ₂ (a/A)(T), p50, Qsp/Qt(T), ctO ₂ (Hb), ctO ₂ (a), ctO ₂ (v), ctO ₂ (V), ctO ₂ (a-v), DO ₂ , VO ₂ , others measured, tracked pH: potentiometry; pCO ₂ : Severinghaus electrochemical; pO ₂ : amperometric; Hct: calculated; tHb, CO-oximetry: spectrophotometric; Na, Cl, iCa, K: ISE; lactate: amperometric, lactate oxidase; glucose: amperometric, glucose oxidase; total neonatal bilirubin: spectrophotometric yes, series offers different analyte options
Point of care: Disposable prepackaged system used for analysis No. of disposable reagent system units in standard package No. of samples analyzed per one disposable reagent, electrode system Reagent unit storage requirements Shelf life of disposable units	multi-use cartridge 1 measurement and 1 wash-waste cartridge 250, 400, 750 samples refrigeration 9 months	multi-use cartridge 1 based on daily testing volumes room temperature reagents: 7 to 9 months, electrodes: 12 months	multi-use cartridges, electrode measurement chamber 1 reagent cartridge, 1 wash cartridge reagent cartridge is not sample dependent reagent cartridge/AQC cartridge—refrigeration, wash cartridge—room temperature reagent/wash cartridge: 8 months, AQC cartridge: 9 months, electrodes: varies based on type
Laboratory: No. of different disposable reagents required to maintain device Max. No. of analyte reagents that can reside in device at once Shelf life of components Cost per test/Reagent cost per test	1 measurement cartridge, 1 wash-waste cartridge 1 measurement cartridge, 1 wash-waste cartridge 9 months varies based on configuration	1 1 reagents: 7–9 months, electrodes: 12 months varies based on configuration and test volume/—	1 reagent cartridge, 1 wash cartridge 1 reagent cartridge, 1 wash cartridge, all electrodes electrodes: vary based on type, reagent cartridge: 8 months, wash cartridge: 8 months, AQC cartridge: 9 months varies based on configuration
Calibrations required Calibration frequency Internal QC program recommended QC features/Capabilities of QC features Remote control of device from laboratory System can use LOINC to transmit results to LIS	1 and 2 point (automatic) 1 point: 30 minutes; 2 point: 2 hours AQC cartridge, fully user programmable AQC cartridge, L-J plots/comparable plots, statistical calculations, monthly cumulative reports (available with external system) yes yes	1 and 2 point (manual and automatic) 1 point (with each sample); 2 point (can be set to 2-, 4-, or 8-hour increments) one-level QC every 8 hours of testing (CLIA recommendation): Siemens QC material recommended L-J plots/statistical calculations, monthly cumulative reports, onboard no yes	1 and 2 point (manual and automatic) 1 point: every 30 minutes; 2 point: every 8 hours AQC cartridge, fully user programmable L-J plots/comparable plots, statistical calculations, monthly cumulative reports (available with external system) yes yes
Specimen types suitable for device Acceptable anticoagulants/Sampling technique Sample size for complete panel of analyte results Sample size differs with number of analytes selected Time from sample introduction to result availability Maximum No. of patient samples per hour/Maximum No. measured results per hour Optimal throughput when analyzer calibrated, awaiting specimens Calibration can be interrupted to perform stat sample Known interferences Sampler has self-wiping probe	whole blood, capillary, mixed venous, arterial, venous heparin/aspiration 100 µL no 60 seconds 25/— 25 samples per hour yes benzalkonium yes	whole blood, capillary, mixed venous, arterial, venous heparin/aspiration 75 µL/95 µL capillary (RP340/RP350) 100 µL/120 µL syringe (RP340/RP350) no 125 seconds (RP340), <120 seconds (RP350) 25 samples (RP340), 30 samples (RP350)/75 (RP340), 210 (RP350) 25 samples per hour (RP340), 30 samples per hour (RP350) yes certain anticoagulants yes	whole blood, capillary, mixed venous, arterial, venous heparin/aspiration 95–175 µL yes (microsample mode available) 60 seconds 24/up to 336 tests 24 samples per hour yes — yes
Time required for maintenance by lab personnel Service center performs diagnostics through modem Method of analyst ID in system Instrument response for: • hardware failure/software failure • QC failure • calibration failure For what bar-code scanning is provided Built-in printer/Data port Information listed on hard copy report	none no password (customizable) flag-prompt customizable-flag flag-recalibration	daily: <1 minute no manual or bar-code entry (optional) operator warning, error messages sampling lock-out, flagged high or low QC results automatic calibration repeat, error messages, blank screen display operator identifier, patient identifier, and reagent lot number yes/RS-232 patient information, operator ID, measured and calculated results, date	weekly: 5 minutes, monthly: 5 minutes no password (customizable) diagnostic codes prompt operator diagnostic codes recalibrates, generates diagnostic code if unsuccessful patient ID yes/RS-232, Ethernet, USB operator and patient IDs, accession number, results, temperature, patient demographics, others
Analyzer connections Interface standards supported How analyzer connects to external system to upload patient and QC results Information included in transmission from analyzer to external system Hardware and software for data-management system No. of different management reports system produces Contents downloaded from data-management system to analyzer System connected (live installations) to which LISs, HISs Use a third-party interfacing tool, engine for LIS, HIS interfaces	data-management system, which connects to LIS/HIS; directly to LIS/HIS (both options) LIS 3 direct serial, hospital network device-unique identifier, operator and patient IDs, results, QC identifier RapidComm data-management system customizable valid control values, valid operator IDs yes, with multiple LISs, HISs yes	directly to LIS/HIS ASTM 1394 and E1381 direct serial operator ID, patient ID, results internal data management patient reports, QC statistics, L-J charts — no	data-management system, which connects to LIS/HIS; directly to LIS/HIS (both options) LIS 4 direct serial, hospital network device-unique identifier, operator and patient IDs, results, QC identifier RapidComm data-management system customizable valid control values, valid operator IDs yes, with multiple LISs, HISs yes
Distinguishing features (supplied by company) <i>Note: a dash in lieu of an answer means company did not answer question or question is not applicable</i>	no maintenance, multi-use cartridge; fast time to patient results; onboard audio-video training videos; auto QC	multi-use cartridge-based system eliminates gas tanks; no maintenance, easy-to-replace electrodes; small, portable, and economical; dialysate fluid testing application in select countries	cartridge-based high-throughput analyzer with minimal maintenance; fast time to patient results; onboard troubleshooting tutorials