

The ABL800 FLEX Setting the standard



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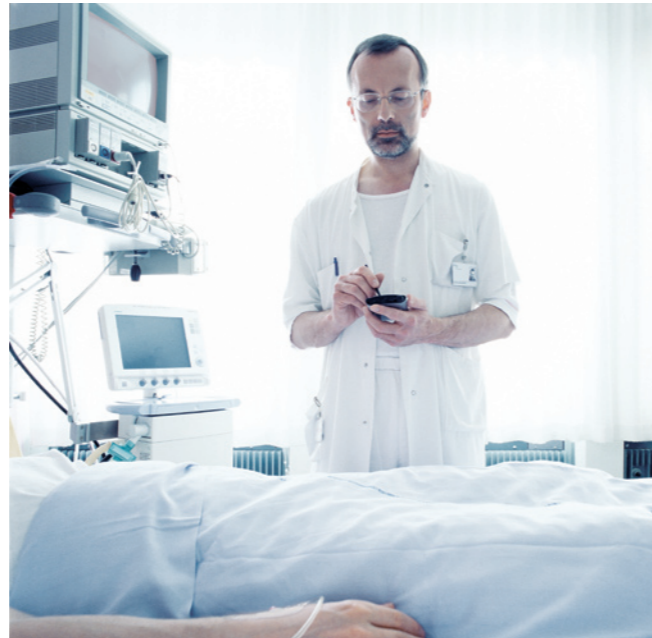
**RADIOMETER
COPENHAGEN** 

Setting the standard for fast and reliable measurements

Since the introduction, Radiometer's ABL Series has set the standard for fast and reliable measurements of blood gas and related parameters. The ABL800 FLEX is a prime example of this proud tradition. Today, the ABL800 FLEX is found wherever fast, accurate STAT measurements are needed; e.g. central labs, ICUs, NICUs, blood gas labs, operating and emergency rooms.

A superior sensor technology has contributed to the success of the ABL800 FLEX – and in this brochure, you will find out more about what makes our sensors so unique. The first step in achieving an accurate result starts with the quality of the sample. The ABL800 FLEX has set the bar for fast and reliable testing by ensuring safe sampling, technology that accurately matches the right patient information with the right sample, and automatic mixing of samples to avoid preanalytical errors.

This is, however, just the first step in ensuring that you get the best possible result in order to provide fast diagnosis and treatment. The second step is accurate measurements offered by unique sensor technology as explained in the following pages.



A look behind Radiometer's superior sensor technology

When measuring oximetry and metabolites such as glucose, lactate, bilirubin and creatinine, the effect of interfering substances has proven to be a source of difficulty for many STAT analyzers. Not so for the ABL800 FLEX.

Thanks to its superior and proven sensor technology, the ABL800 FLEX handles these parameters with dependable precision, providing you with a complete and accurate picture of patient status.

In this brochure, we go behind the ABL800 FLEX sensor technology and explain how it works and how it can change your everyday work.



Safe sampling



Accurate data capture



Mixing of samples



High stability for true STAT readiness

Glucose and lactate

Radiometer's ABL800 FLEX offers glucose and lactate measurements with no interference from commonly seen substances. Unique stability and long lifetime of the sensors ensure maximum uptime and low operational costs.

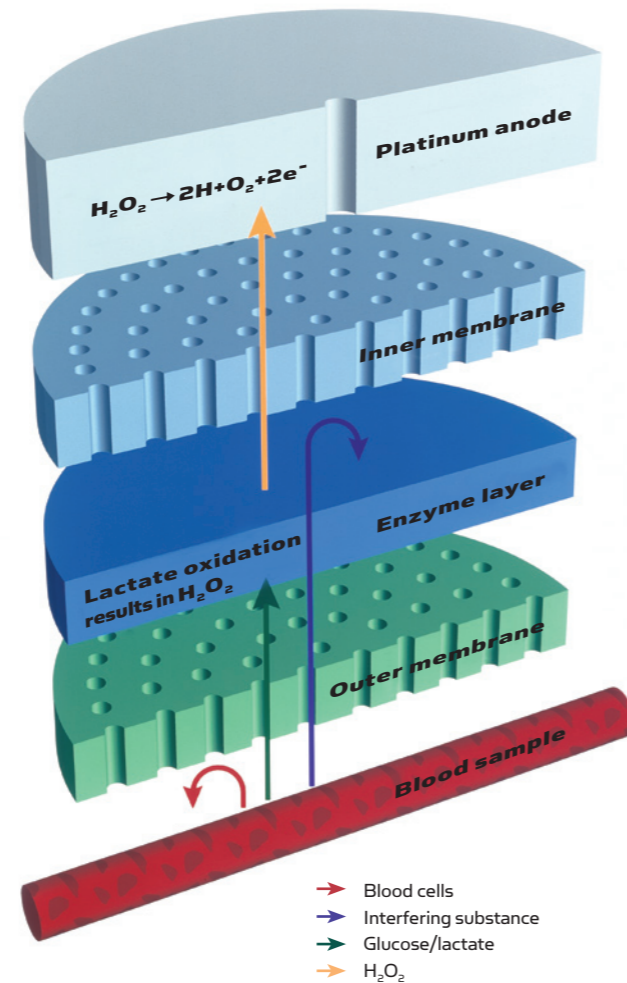
Interference suppression ensures reliable results

Errors due to varying hematocrit and oxidizable compounds such as acetaminophen are a common problem with many glucose and lactate analyzers. In the ABL800 FLEX these common substances have been demonstrated not to interfere, even in up to several times the toxic concentration recommended by the National Committee for Clinical Laboratory Standards (NCCLS) [1]. For example, acetylsalicylic acid has been tested in a concentration of 3 mmol/L (54.0 mg/dL), which is approximately three times the toxic level.

Interference testing for glucose and lactate

Substance	Test concentration	
	mmol/L	mg/dL
Acetylsalicylic acid	3	54.0
Dopamine	1	15.3
Salicylic acid	4	55.2
Acetaminophen (Tylenol, paracetamol)	2	30.2
Bilirubin, unconjugated	0.34	20.0
Bilirubin, conjugated	0.46	40.0
Ascorbic acid	2	35.2

Some of the substances that have been shown to have an interference of less than 0.1 mmol/L (1.80 mg/dL) on glucose measurements and 0.1 mmol/L (0.90 mg/dL) on lactate measurements.



The inner and outer membrane layers of the glucose/lactate sensors prevent blood cells and various interfering compounds from reaching the electrode.

Creatinine

The concentration of creatinine provides information on kidney function and muscle mass. There is a poor track record for creatinine in other measurement systems [2], and a fluctuation in results due to interference is one of the main problems for creatinine measurements.

Interference suppression ensures reliable results

Radiometer's experience with interference suppression has been transferred to the creatinine measuring system. Through its choice of sensor technology, Radiometer have been able to suppress interference from a significant number of substances that cause problems on other measuring systems.

Substance	Test concentration	Interference (µmol/L)
Acetoacetate	10 mmol/L	< 8
Acetaminophen (paracetamol)	1.7 mmol/L	< 8
Creatine	200 µmol/L	< 8
Cyclosporin	12 µmol/L	< 8
Dopamine	5.9 µmol/L	< 8
Hydroxyurea	100 µmol/L	< 8

Source: Reference Manual

In total, 62 different endogenous and exogenous substances were identified and subjected to an interference test protocol on creatinine. None of them showed detectable signs of interference.

Glomerular Filtration Rate (GFR)

GFR is recognised to have great importance in the early detection and management of chronic kidney disease. The GFR indicates how effectively the kidneys clear out the substrates from the body. Besides creatinine, the GFR algorithm is based on age, gender and race.



The ABL800 FLEX reports GFR according to the method laid down in the Modification of Diet in Renal Disease (MDRD) Study recommended by the National Kidney Disease Education Program (NKDEP).

GFR reporting feature on the ABL800 FLEX is pending.

Standardization of creatinine measurement

An accurate result is a prerequisite of precise and comparable GFR measurements.

Radiometer creatinine measurements follow the standardization recommended by NKDEP. The purpose of NKDEP is to reduce the morbidity and mortality caused by kidney disease and its complications. It has defined boundaries for combinations of systematic bias and imprecision in serum creatinine measurements.

¹ NCCLS: Interference testing in clinical chemistry; Proposed guideline. NCCLS publication EP/-P. Villanova Pa.

² Myers GL, Miller WG, Coresh J et al. Recommendations for improving serum creatinine measurement: a report from the National Kidney Disease Education Program. Clin Chem 2006; 52: 5-18.

Oximetry - unique technology eliminates maintenance and ensures accuracy

The oximeter used in ABL800 FLEX instruments is widely regarded as the gold standard for STAT analyzers. The oximeter's 128-wavelength spectrophotometer automatically corrects interferences that can impair the accuracy of oximetry parameters. The result is clearly indicated by measurement precision, sample after sample.

Full oximetry at 128 wavelengths

Radiometer's 128-wavelength spectrophotometer measures a full range of oximetry parameters, including total bilirubin on whole blood. 128 wavelengths ensure that all the details of the measured spectrum are revealed, providing a highly precise spectral blueprint. The advantage of having this vital information is that the ABL800 FLEX is able to detect and subsequently suppress interferences from commonly seen substances.

Substance	Test concentration
Bilirubin, conjugated	40 mg/dL
Bilirubin, unconjugated	20 mg/dL
Intralipid	0.4-0.8 %
SulfHb	10 %
Evans Blue	5 mg/dL
Cardio Green	5 mg/dL

The above table lists some of the substances that have been shown to cause interference of less than 0.5 g/dL on ctHb and less than 1 % interference on hemoglobin derivatives and sO₂ measurements in the ABL800 FLEX.

Quantitative bilirubin measurements

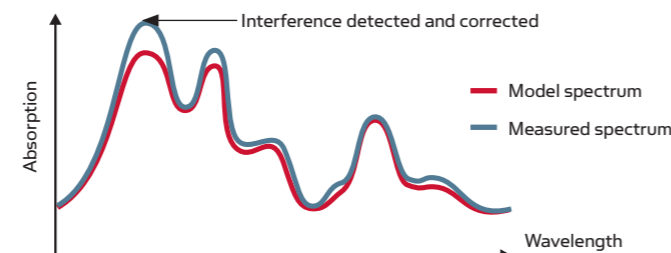
Quantitative bilirubin measurements on whole blood was first introduced by Radiometer. Together with its fetal hemoglobin measurement and small sample size the ABL800 is an ideal choice for neonatal ICUs.

Automatic detection and correction for interfering substances

The spectra of the common interferences are stored in the ABL800 FLEX software. The analyzer compares the model spectrum with the measured spectrum. Any deviations caused by interferences (such as lipids, HbF, SMb, pH, Cardio Green, Evans Blue, betacarotene, Patent Blue V, methylene blue, HiCN) are detected and suppressed, ensuring high accuracy.

No drift ensures high measuring quality

The ABL800 FLEX oximeter is equipped with a neon lamp which generates constant spectral lines. The function of the spectral lines is to serve as references to ensure that there is no drift in the 128 wavelengths used in the spectrophotometer. The neon lamp controls that any deviations are automatically detected and corrected, ensuring a constantly high measuring quality.



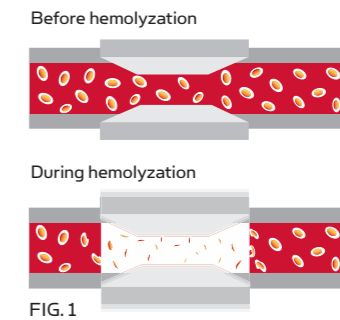
The 128 wavelengths provide a precise spectral blueprint. By comparison of the model spectrum with the measured spectrum, any interference is detected and subsequently suppressed.

High accuracy and precision

The net result of the oximeter's design is measurement accuracy and precision. For example, the ABL800 FLEX is able to measure ctHb with a repeatability of less than 0.15 g/dL on ctHb levels between 7.0 g/dL and 25.0 g/dL.

Eliminated influence of non-hemolyzed blood

The Radiometer oximeter hemolyzes blood samples with ultrasound waves inside the measuring cuvette itself. With the blood being hemolyzed inside the measuring cuvette, the blood sample does not have to be moved after hemolyzation. This eliminates the possibility of the measured sample being mixed with non-hemolyzed blood, and thereby ensures maximal accuracy (Fig. 1).

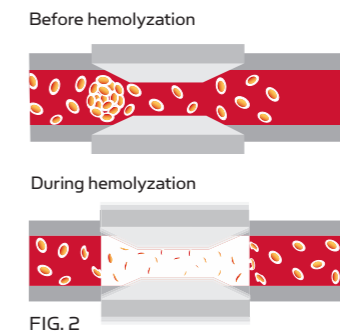


Avoid clots

Oximeter clots are a frequent and serious problem.

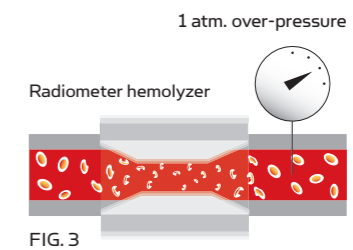
The ABL800 FLEX reduces the risk of clots in two ways:

1. The analyzer's sample aspiration port is only 0.1 mm in diameter, preventing most clots from even entering the measuring path.
2. The oximeter is equipped with intra-cuvette hemolyzation. The measuring cuvette destroys potential clots ultrasonically during the hemolyzation process.



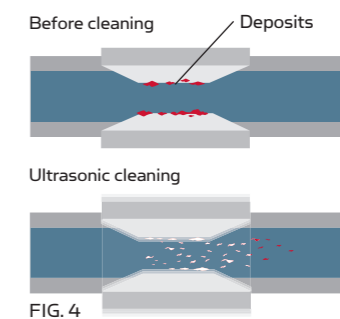
Fewer bubbles

The design of the ABL800 FLEX oximeter prevents the formation of air bubbles by carrying out the intra-cuvette ultrasound hemolyzation under over-pressure. An over-pressure of one atmosphere is maintained not only during the hemolyzing process but until the measurement has been completed. Such maintenance improves the precision of the measurement (Fig. 3).

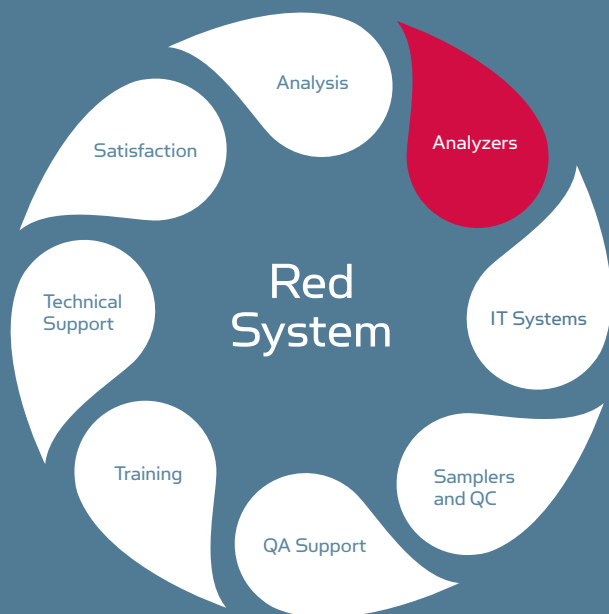


Prevent deposits

After each measurement, the oximeter ultrasonically cleans the cuvette's glass walls, knocking loose deposits before they build up. This eliminates the need to replace the glass – a costly and time-consuming procedure with other analyzers – and keeps the oximeter completely maintenance-free (Fig. 4).



www.bloodgas.org is a knowledge site with practical information on blood gas and critical care testing.



Sales companies:

Country:	Radiometer representative:	Telephone:	E-mail:	Website:
Australia:	Radiometer Pacific Pty. Ltd.	(+61) 3 9259 2222	sales@radiometer.com.au	www.radiometer.com.au
Canada:	Radiometer Canada	(+1) 877 414 0447 (toll free)	info@radiometercanada.com	www.radiometer.ca
China:	Radiometer China	(+86) 21 6354 3387	pol@radiometer.com.cn	www.radiometer.cn
Denmark:	Radiometer Danmark A/S	(+45) 38 27 28 29	rdan@radiometer.dk	www.radiometer.dk
France:	Radiometer S.A.S.	(+33) 1 49 44 35 50	marketing@radiometer.fr	www.radiometer.fr
Germany:	Radiometer GmbH	(+49) 2154 818-0	info@radiometer.de	www.radiometer.de
Ireland:	Radiometer Ireland Ltd.	(+353) 1 888 3611	sales@radiometer.ie	www.radiometer.ie
Japan:	Radiometer K.K.	(+81) 3 5777 3500	salesdep@radiometer.co.jp	www.radiometer.co.jp
The Netherlands:	Radiometer Nederland BV	(+31) 79 361 4593	info@radiometer.nl	www.radiometer.nl
New Zealand:	Radiometer New Zealand	(+64) 9 574 1400	sales@radiometer.co.nz	www.radiometer.co.nz
Poland:	Radiometer Sp.z.o.o.	(+48) 22 518 02 40	info@radiometer.pl	www.radiometer.pl
Portugal:	Radiometer Ibérica, S.A.	(+351) 214 12 39 70	rapor@radiometer.es	www.radiometer.pt
Spain:	Radiometer Ibérica, S.A.	(+34) 91 655 99 50	resp@radiometer.es	www.radiometer.es
Switzerland:	Radiometer GmbH	(+41) 44 723 38 60	info@radiometer.ch	www.radiometer.ch
United Kingdom:	Radiometer Ltd.	(+44) 1293 517 599	sales@radiometer.co.uk	www.radiometer.co.uk
USA:	Radiometer America, Inc.	(+1) 800 736 0600 (toll free)	info@radiometeramerica.com	www.radiometeramerica.com
Other countries:	Radiometer International Sales Division	(+45) 38 27 38 27	rint@rint.dk	www.radiometer.com

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