



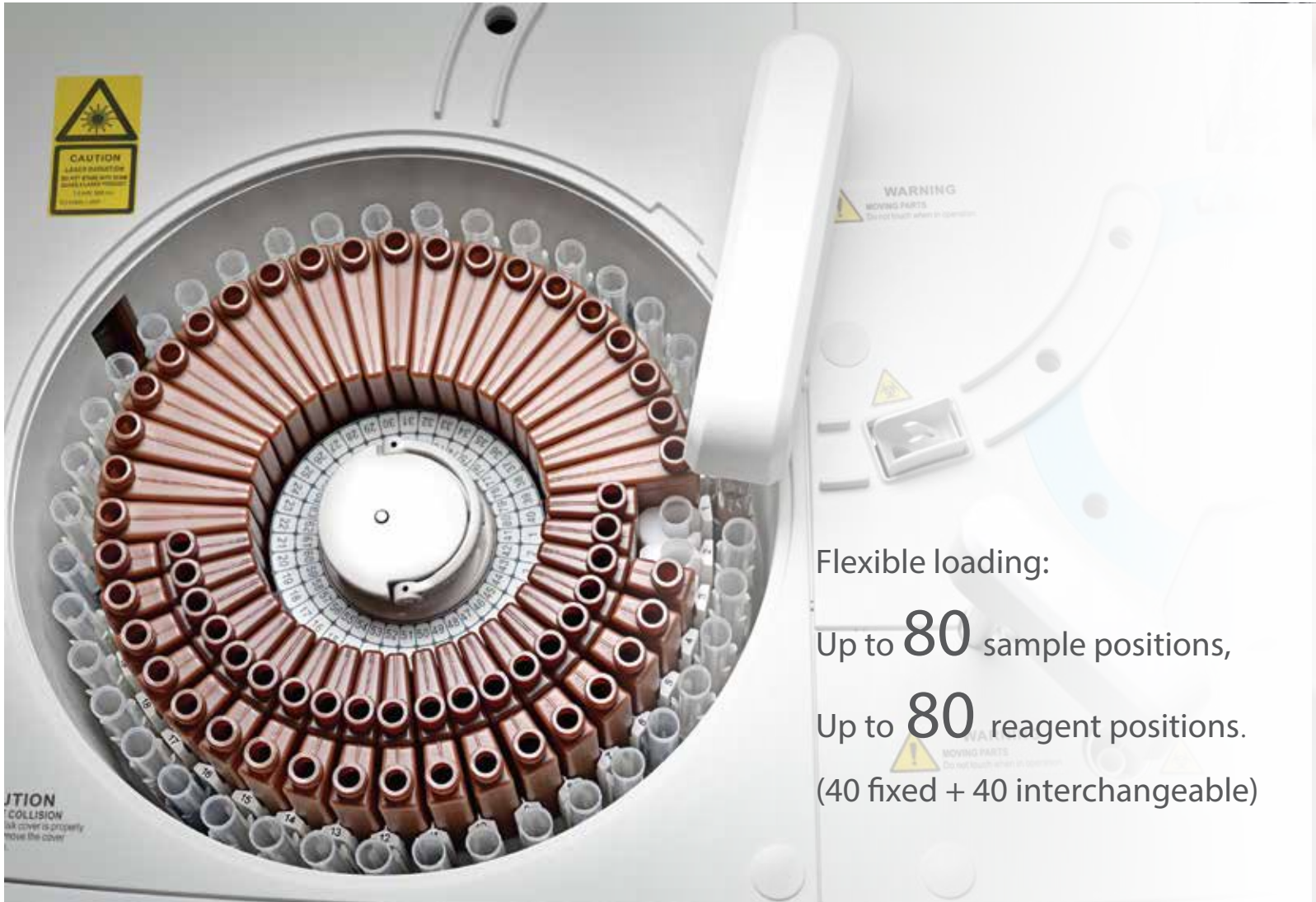
## BS-230

Clinical Chemistry Analyzer



**MEDVAL**  
healthcare

**mindray**  
healthcare within reach



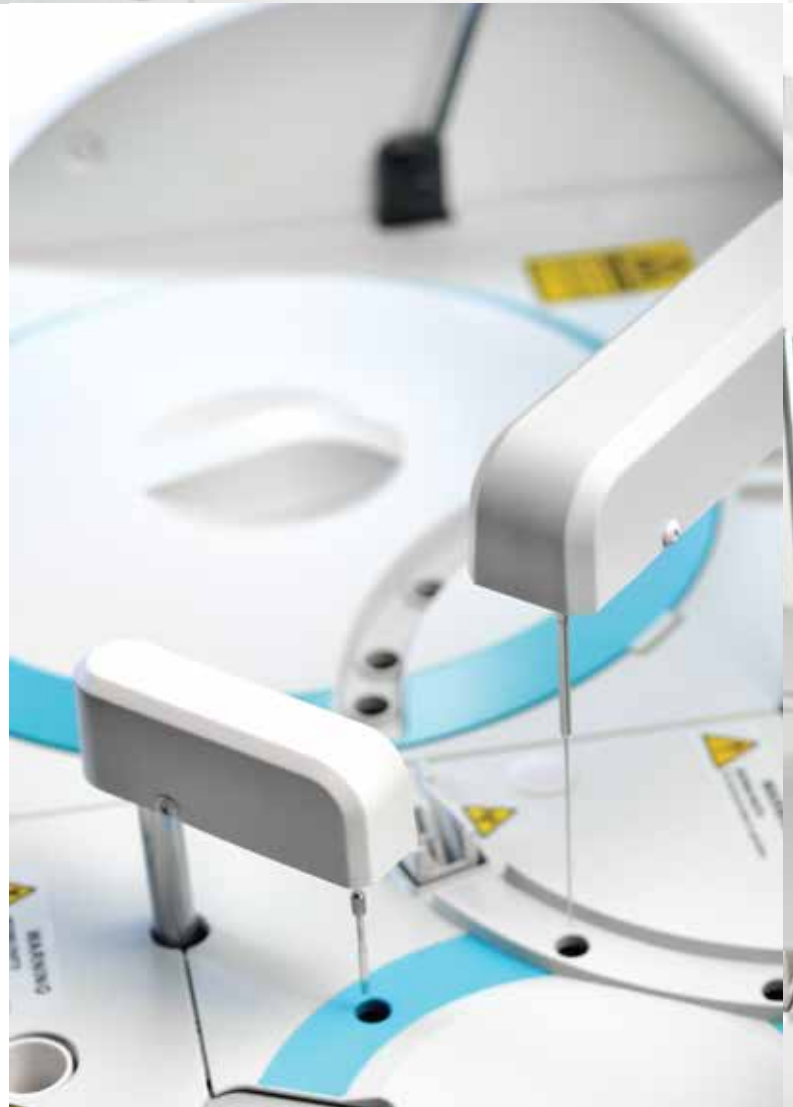
Flexible loading:

Up to **80** sample positions,

Up to **80** reagent positions.

(40 fixed + 40 interchangeable)

**100 $\mu$ l**  
minimum reaction volume



# Disposable Cuvettes

to avoid contamination



Probe carryover less than  
**0.05%**

# BS-230

## Clinical Chemistry Analyzer



Independent mixing bar



Built-in barcode reader



Intelligent software with user-friendly interface



Step-by-step maintenance guide



# Compact Size with Robust Functions

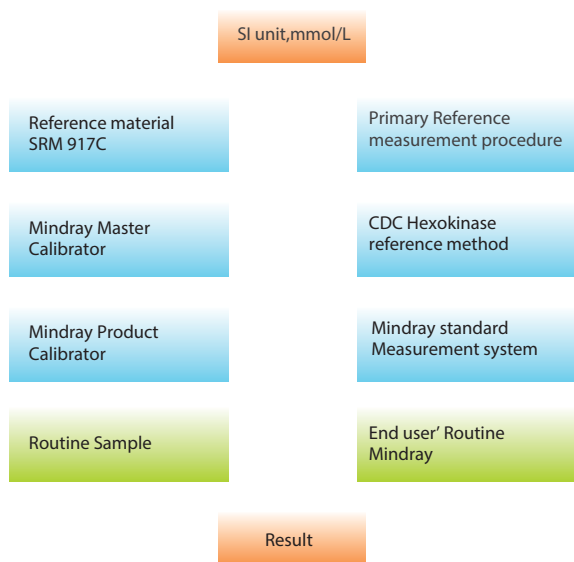


## Complete traceability process

Complete calibration hierarchy and traceability chain are based on ISO standard (EN/ISO17511) from reference system to routine measurement system.

### Traceability chain of Mindray measurement system (Glu)

Traceability Material Calibration / Value Assignment Procedure Implementation Uncertainty  $U_c(y)$

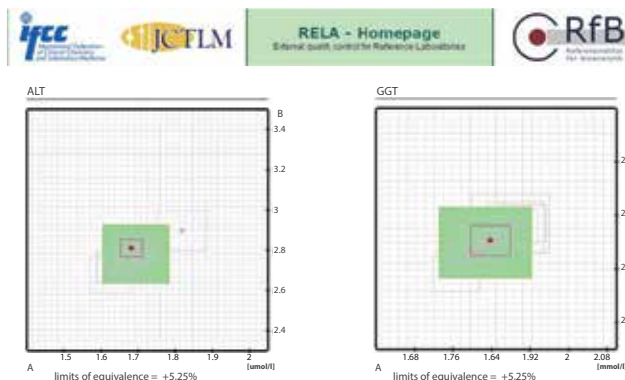


## External quality assurance for reference measurement

Mindray participates in RELA (External quality control for reference laboratory) and CAP (College of American Pathologists external quality control).

## EQA for Mindray Reference laboratory——RELA

Mindray reference laboratory has passed RELA for 6 consecutive years.



More RELA results please refer to: [www.dgkl-rfb.de/81](http://www.dgkl-rfb.de/81)



All the items Mindray participate RELA

ALT AMY ALP CK GGT GLU LDH TB TP UA UREA

## EQA for Mindray Testing System——CAP

Mindray testing system has passed CAP for 6 consecutive years.



CAP Number: 7198395-01 Kit# 1  
 Institution: Shenzhen Mindray Biomed Elec Co Ltd  
 Attention: Lixing Liu MD  
 City / State: Hongkong HK CH 518055

Kit ID: 25733824  
 Kit Mailed: 6/3/2013  
 Original Evaluation: 7/8/2013

EVALUATION ORIGINAL

C-B 2013 Chemistry

CAP

| Regulated Analyte    | Proficiency Event 2012 3 |       |     | Proficiency Event 2013 1 |       |     | Proficiency Event 2013 2 |       |     | Current Event Performance Interpretation | Cumulative CLIA '88 Performance Interpretation |
|----------------------|--------------------------|-------|-----|--------------------------|-------|-----|--------------------------|-------|-----|--|--|
|                      | Test Event               | Score | %   | Test Event               | Score | %   | Test Event               | Score | %   |  |  |
| ALT                  | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Albumin              | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Alkaline Phosphatase | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Amylase              | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| AST                  | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Bilirubin, Total     | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Calcium, Total       | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Chloride             | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Cholesterol, Total   | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Cholesterol, HDL     | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Creatine Kinase      | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Creatinine           | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Glucose              | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Iron, Total          | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| LD                   | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Magnesium            | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Potassium            | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Sodium               | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Protein, Total       | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Triglycerides        | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Urea Nitrogen        | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |
| Uric Acid            | C-C                      | 5/5   | 100 | C-A                      | 5/5   | 100 | C-B                      | 5/5   | 100 | Satisfactory                             | Successful                                     |

## Reagent menu

### Hepatic Panel

Alanine Aminotransferase (ALT)  
Aspartate Aminotransferase (AST)  
Alkaline Phosphatase (ALP)  
 $\gamma$ -GlutamylTransferase ( $\gamma$ -GT)  
Direct Bilirubin (D-Bil) DSA Method  
Direct Bilirubin (D-Bil)VOX Method  
Total Bilirubin (T-Bil) DSA Method  
Total Bilirubin (T-Bil)VOX Method  
Total Protein (TP)  
Albumin (ALB)  
Total Bile Acids (TBA)  
Prealbumin (PA)  
Cholinesterase (CHE)  
 $\alpha$ -L-fucosidase (AFU)  
5'-nucleotidase (5'-NT)

### Renal Panel

Urea (UREA)  
Creatinine (CREA) Modified Jaffé Method  
Creatinine (CREA)Sarcosine Oxidase Method  
Uric Acid (UA)  
Carbon dioxide (CO<sub>2</sub>)  
Microalbumin  
 $\beta$ 2-Microglobulin ( $\beta$ 2-MG)  
Cystatin C (CysC)  
Retinol binding protein( RBP)

### Immune Panel

Immunoglobulin A (IgA)  
Immunoglobulin G (IgG)  
Immunoglobulin M (IgM)  
Complement C3 (C3)  
Complement C4 (C4)

### Diabetes Panel

Glucose (Glu) GOD-POD Method  
Glucose (Glu) HK Method  
Hemoglobin A1c (HbA1c)  
Fructosamine (FUN)  
 $\beta$ -Hydroxybutyrate( $\beta$ -HB)

### Cardiac panel

Creatine Kinase (CK)  
Creatine Kinase-MB (CK-MB)  
Lactate Dehydrogenase (LDH)  
 $\alpha$ -Hydroxybutyrate Dehydrogenase( $\alpha$ -HBDH)  
High sensitive C-reaction protein( HS-CRP)

### Inorganic & Anemia

Iron (Fe)  
Ferritin (FER)  
Transferrin (TRF)  
Calcium (Ca)  
Magnesium (Mg)  
Phosphate Inorganic (P)  
Unsaturated iron binding capacity (UIBC)  
Glucose-6-phosphate dehydrogenase (G6PD)

### Lipid Panel

Total Cholesterol (TC)  
Triglycerides (TG)  
HDL-Cholesterol (HDL-C)  
LDL-Cholesterol (LDL-C)  
Apolipoprotein A1 (ApoA1)  
Apolipoprotein B (ApoB)  
Lipoprotein(a) [Lp(a)]

### Rheumatism Panel

C-reactive protein (CRP)  
Rheumatoid Factor (RF)  
Antibodies Against Streptolysin O (ASO)

### Lung Panel

Adenosine Deaminase (ADA)  
Angiotensin Converting Enzyme(ACE)

### Pancreatitis Panel

$\alpha$ -Amylase ( $\alpha$ -AMY)  
Lipase (LIP)

# BS-230

## Clinical Chemistry Analyzer

### Technical Specifications

#### System function

Automatic, Discrete, Random Access, Bench-top  
STAT sample priority

Throughput: Up to 200 tests/hour, up to 400 tests/hour with ISE  
Measuring principles: Absorbance photometry, Turbidimetry, Ion Selective Electrode technology

Methodology: End-point, Fixed-time, Kinetic, optional ISE,  
Single/Dual/ reagent chemistries,  
monochromatic / bi-chromatic

Original system pack reagent ready to use  
Close system and open system is optional

#### Reagent/Sample Handling

Reagent/Sample tray: 80 positions for reagents and 40 positions  
for samples in 24-hour refrigerated  
compartment (2~12 °C)

Reagent volume: 10~250µl, step by 0.5µl

Sample volume: 2~45µl, step by 0.1µl

Reagent/Sample probe: Liquid level detection, vertical collision  
protection and inventory checking, reagent pre-warming

Probe cleaning: Automatic washing for interior and exterior  
Carry over < 0.05%

Automatic sample dilution: Pre-dilution and post-dilution

#### Internal bar code reader (optional)

Capable to communicate with LIS in bi-directional mode

#### Reaction System:

Cuvette: 40 disposable cuvettes

Reaction volume: 100~360µl

Operating temperature: 37 °C ±0.1 °C

#### ISE Module (optional)

Measuring K<sup>+</sup>, Na<sup>+</sup>, Cl<sup>-</sup>

#### Mixing Unit

Independent mixing bar

#### Optical System

Light Source: Halogen-tungsten lamp

Wavelength: 8 wavelengths, 340nm、405nm、450nm、  
510nm、546nm、578nm、630nm、670nm

Absorption range: 0~4.0 Abs (10mm conversion), resolution  
0.0001Abs

Stray Light 5.6Abs

#### Control and Calibration

Calibration modes: Linear (one point, two points and  
multi-points), Logit-Log 4P, Logit-Log 5P,  
spline, exponential, polynomial, parabola

Control Rules: X-R, L-J, Westgard multi-rule, Cumulative sum  
check, twin plot

#### Operation Unit

Operation system: Windows 8

Interface: RS-232

#### Working Conditions

Power Supply: 200~240V, 50/60Hz, ≤1000VA or 100~130V,  
60Hz, ≤1000VA

Dimension: 690 mm (length) ×580 mm (depth) ×595 mm  
(height)

Weight: 47 kg

Water Consumption: ≤ 2 L/H

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