**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION**
**DECISION SUMMARY**
**ASSAY ONLY TEMPLATE**

## A. 510(k) Number:

k070146

## B. Purpose for Submission:

Notification of intent to add measurement in urine to their previously cleared Urea assay.

## C. Measurand:

Urea

## D. Type of Test:

Quantitative Colorimetric

## E. Applicant:

Horiba ABX

## F. Proprietary and Established Names:

| | |
|---|---|
| Trade/Proprietary Name: | **ABX PENTRA Urea CP** |
| Common or Usual Name: | Urea (Urine) |
| Trade/Proprietary Name: | **ABX PENTRA L Control** |
| Common or Usual Name: | Urine Low Control |
| Trade/Proprietary Name: | **ABX PENTRA H Control** |
| Common or Usual Name: | Urine High Control |

## G. Regulatory Information:

1. Regulation section:

   21 CFR 862.1770: Urea Nitrogen Test System
   21 CFR 862.1660: Quality control material (assayed and unassayed)

2. Classification:

Class II - **ABX PENTRA Urea CP**
Class I, reserved - **ABX PENTRA L Control , ABX PENTRA H Control**

3. Product code:

   **ABX PENTRA Urea CP** - CDQ
   **ABX PENTRA L Control** - JJY
   **ABX PENTRA H Control** - JJY

4. Panel:

   75, Chemistry

## H. Intended Use:

1. Intended use(s):

   See Indications for use below

2. Indication(s) for use:

   ABX PENTRA Urea CP reagent with associated calibrators and controls are intended for use on ABX PENTRA 400 Clinical Chemistry Analyzer for quantitative in vitro diagnostic determination of urea / urea nitrogen (an end-product of nitrogen metabolism) in human serum, plasma and urine based on an enzymatic UV test using urease and glutamate dehydrogenase. Measurements obtained by this device are used in the diagnosis and treatment of certain renal and metabolic diseases.

   The ABX PENTRA Urine Control L/H is for use in quality control by monitoring accuracy and precision.

3. Special conditions for use statement(s):

   For prescription use only

4. Special instrument requirements:

   For use on the Horiba ABX Pentra 400

## I. Device Description:

All the reagents, controls and calibrators included in this submission are for use on the **ABX PENTRA 400**, which is a discrete photometric benchtop clinical chemistry analyzer.

The **ABX PENTRA Urea CP** is an in vitro diagnostic assay for the quantitative determination of urea / urea nitrogen (an end-product of nitrogen metabolism) in human serum, plasma and urine (serum and plasma were previously cleared under k060205) based on an enzymatic UV test using urease and glutamate dehydrogenase. It is composed of a bi-reagent cassette, with 60 ml and 15 ml compartments.

The **ABX PENTRA Urine Control L/H** is a two-level (Low and High) quality control consisting of liquid solutions prepared from human urine with chemical additives and materials of biological origin added as required to obtain given component levels. Each control level is provided in one vial of 10 ml.

## J. Substantial Equivalence Information:

1. Predicate device name(s):

   Infinity Urea reagent, Horiba Pentra Urine Control L/H Urine Chemistry Controls

2. Predicate 510(k) number(s):

   k971477 Urea, k070249 Controls

3. Comparison with predicate:

| | **Predicate device (K971477):** | **Device :** |
|---|---|---|
| **Device Name** | **Infinity Urea Liquid Stable Reagent Set** | **ABX Pentra Urea CP** |
| **Manufactured by** | Thermo Electron Corporation, USA | HORIBA ABX, France |
| **Instrument** | Clinical chemistry analyzer | ABX PENTRA 400 |
| **Analytes** | Urea / BUN | Urea / BUN |
| **Method :** | Enzymatic determination using urease and glutamate dehydrogenase | Enzymatic determination using urease and glutamate dehydrogenase |
| **Specimen :** | Serum, plasma and urine | Serum, Plasma and Urine |
| **Component reagent matrices** | Single-reagent bottle, ready to use:<br>REAGENT: alpha-ketoglutarate, NADH, Urease, GLDH, Tris buffer, fillers and stabilizers | Bi-reagent cassette, ready to use:<br>REAGENT 1: TRIS, 2-oxoglutarate, ADP, Urease, GLDH, Sodium azide<br>REAGENT 2: NADH, Sodium azide |
| **Format** | Liquid | Liquid |
| **Packaging** | Single-reagent bottle<br>REAGENT : 2 x 125 ml | Bi-reagent cassette :<br>REAGENT 1: 60 ml<br>REAGENT 2: 15 ml |

## K. Standard/Guidance Document Referenced (if applicable):

The following standards & FDA guidance documents have been used to support this submission:

Guidance for Industry and FDA Staff: "Format for Traditional & Abbreviated 510(k)s" : August 12, 2005

"In vitro diagnostics devices : Guidance for the preparation of 510(k) submissions Jan 1997"

"Guidance for Industry- In vitro diagnostics Urea Nitrogen Test System July 1998"

"Guidance for Industry and FDA Staff Bundling Multiple Devices or Multiple Indications in a Single Submission, November 2003"

CLSI (NCCLS) :

EP05-A2 – Evaluation of Precision Performance of Quantitative Measurement Methods; Approved Guideline-Second Edition

EP06-A - Evaluation of the Linearity of Quantitative Measurement Procedures: A Statistical Approach; Approved Guideline

EP09-A2 – Method Comparison and Bias Estimation Using Patient Samples; Approved Guideline -Second Edition

EP21-A - Estimation of Total Analytical Error for Clinical Laboratory Methods; Approved Guideline

## L. Test Principle:

ABX PENTRA Urea CP reagent performs quantitative in vitro diagnostic determination of urea / urea nitrogen (an end-product of nitrogen metabolism) in human serum, plasma and urine based on an enzymatic UV test using urease and glutamate dehydrogenase.

## M. Performance Characteristics (if/when applicable):

1. Analytical performance:

   *a. Precision/Reproducibility:*

Within Run Precision:

Precision was based upon CLSI EP05-A2 using 2 controls and 3 patient samples covering the measuring range of the assay were tested in duplicate for 20 days, two runs per day. Data is presented in mg/dL:

| Sample | N | Mean | SD | CV% |
|---|---|---|---|---|
| Control N | 80 | 363 | 1.6 | 1,24 |
| Control P | 80 | 628 | 1.66 | 0.74 |
| Sample 1 | 80 | 257 | 1.61 | 1.76 |
| Sample 2 | 80 | 488 | 2.51 | 1.44 |
| Sample 3 | 80 | 1465 | 3.75 | 0.72 |

Between run and Total Precision

Based upon the CLSI EP-5A, two controls and 4 patient samples were tested in duplicate for 20 days, two series per day. Data is presented in mg/dL:

| Sample | N | Mean | SD | CV% |
|---|---|---|---|---|
| Control N | 80 | 361 | 4.89 | 3.80 |
| Control P | 80 | 607 | 8.92 | 4.13 |
| Sample 1 | 80 | 556 | 6.78 | 3.42 |
| Sample 2 | 80 | 1538 | 16.85 | 3.08 |
| Sample 3 | 80 | 63 | 1.67 | 7.5 |
| Sample 4 | 80 | 1852 | 20.30 | 3.08 |

*b. Linearity/assay reportable range:*

Linearity determination was based upon CLSI EP6-A. Urea concentrations were prepared by diluting a high concentration sample with urine containing a low concentration of urea. Samples were serially measured from 55 to 2154 mg/dL (19.7 to 766.9 mmol/L). Linear regression statistics were $y=0.9878x+0.1583$; $r^2=0.9998$. The linear range tested was 55 to 2154 mg/dL (19.7 to 766.9 mmol/L). The sponsor claims a measuring range for ABX Urea CP of 35 – 2106 mg/dL (12.6 to 750 mmol/L).

A post dilution study was performed to test samples above the linear range. This study was performed by testing 2 samples above the linear limit of the assay (2200 mg/dL or 800 mmol/L). These tests showed that the automatic dilution gave a bias of less than 8% up to 10530 mg/dL.

A complementary study was performed to provide additional samples (n=6) to more thoroughly cover the post-dilution assay range. Spiked samples were

used for this study at concentrations of 2274, 3156, 5060, 6910, 8876, and 9772 mg/dL. Assays were performed on split samples using both manual dilution and auto-post dilution. A bias of ≤10% was considered observed.

c. *Traceability, Stability, Expected values (controls, calibrators, or methods):*

The ABX PENTRA Controls are traceable to a Master Lot of Horiba calibrator that was cleared under k060205.

Real time stability of the control was determined when stored after lyophilization at 4°C. Results have determined a real time stability of24 months. Pentra Control closed stability was determined to be 18 months

Stability after reconstitution was determined on three different lots of controls. Recovery of each parameter has been analyzed at different storage conditions. Open stability of the parameters:

| | |
|---|---|
| 12 hours at | 15°C to 25°C |
| 5 days at | 2°C to 8°C |
| 1 month at | -25°C to –15°C |

d. *Detection limit:*

The Limit of Blank was calculated from the mean of 30 measurements of saline + 4.65SD. The Limit of Blank (LoB) was determined to be 35.0 mg/dL or 12.6 mmol/L.

e. *Analytical specificity:*

Interfering substances in solution were added to the base urine at two different urea concentrations (normal and high). Each sample was then serially diluted with the same neat base urine to adjust urea concentration.

Conclusions:

- Hemoglobin 500mg/dL – 5g/L does not interfere with urea determination by the Horiba ABX Pentra Urea CP.
- Conjugated Bilirubin up to 38mg/dL does not interfere with urea determination by the Horiba ABX Pentra Urea CP.
- Ascorbic Acid up to 350 umol/L does not interfere with urea determination by the Horiba ABX Pentra Urea CP
- Specific Gravity within the range of 1.005 – 1.035 does not interfere with urea determination by the Horiba ABX Pentra Urea CP
- pH within normal urine pH (5 – 8) does not interfere with urea determination by the Horiba ABX Pentra Urea CP

f. *Assay cut-off:*

Not applicable

2. Comparison studies:

   a. *Method comparison with predicate device:*

      Method comparisons were performed based upon CLSI EP-9A2. Samples of urine were collected and tested across the measuring range of the assay.

      Y=1.1336x-1.0282
      $r^2$=0.9933
      n=147
      range=39-1736 mg/dL

   b. *Matrix comparison:*

      Matrix comparison for serum and plasma matrices were previously cleared under k060205.

3. Clinical studies:

   a. *Clinical Sensitivity:*

      Not applicable

   b. *Clinical specificity:*

      Not applicable

   c. Other clinical supportive data (when a. and b. are not applicable):

      Not applicable

4. Clinical cut-off:

      Not applicable

5. Expected values/Reference range:

   Urine:

   - Urea : 430-710 mmol/24h
   - BUN : 1207-1993 mg/24h (conversion factor : urea in mmo/l/.3561= BUN mg/dL)

   Reference:
   Roberts W.L., McMillin G.A., Burtis C.A., Bruns, D.E., Reference Information for the Clinical Laboratory, TIETZ Textbook of Clinical Chemistry and Molecular Diagnostics. 4ème Ed., Burtis C.A., Ashwood

E.R., Bruns, D.E., (Elsevier Saunders eds., St Louis, USA), (2006), 2301.

**N. Proposed Labeling:**

The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10.

**O. Conclusion:**

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.