

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

A. 510(k) Number:

k082508

B. Purpose for Submission:

New Device

C. Measurand:

Buprenorphine

D. Type of Test:

Qualitative lateral flow immunoassay

E. Applicant:

Branan Medical Corporation

F. Proprietary and Established Names:

Fastect® II BUP Drug Screen Dipstick Test

QuickTox® Drug Screen Dipcard

G. Regulatory Information:

Product Code	Classification	Regulation Section	Panel
DJG	II	862.3650, Test, Opiates,	91 (Tox)

H. Intended Use:

1. Intended use(s):

See indications for use statement below.

2. Indication(s) for use:

The Fastect® II BUP Drug Screen Dipstick and QuickTox® Drug Screen Dipcard devices are rapid immunochromatographic immunoassays for the qualitative detection of Buprenorphine in human urine at a cut-off concentration of 10 ng/ml. The devices are intended for professional use only. They are not intended for over-the-counter sale to non-professionals.

The Fastect® II BUP Drug Screen Dipstick and QuickTox® Drug Screen Dipcard tests are used to obtain visual, qualitative results. A more specific alternate method must be used in order to obtain a confirmed analytical result. GC/MS or LC/MS are the preferred confirmatory methods.

3. Special conditions for use statement(s):

For prescription use.

4. Special instrument requirements:

Not applicable.

I. Device Description:

The Fastect II BUP Drug Screen Dipstick Test contains 50 test devices packaged in a desiccant pouch and package inserts (directions for use). The QuickTox Drug Screen Dipcard contains 25 test devices package with desiccant and sealed in foil pouch and package inserts.

J. Substantial Equivalence Information:

1. Predicate device name(s):

ACON BUP One Step Buprenorphine Test Device

2. Predicate K number(s):

k060466

3. Comparison with predicate:

Similarities		
Item	Device	Predicate
Intended use	Chromatographic immunoassays for the qualitative detection of Buprenorphine in human urine.	Same
Sample	Urine	Same
Test Method	Immunochromatographic	Same
Cutoff	10 ng/mL	Same

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

None were identified.

L. Test Principle:

The Fastect[®] II BUP Drug Screen Dipstick and QuickTox[®] Drug Screen Dipcard are based on the principle of specific immunochemical reactions between antigens and antibodies. Both devices utilize a competitive immunoassay procedure in which an immobilized drug conjugate competes with the drug present in urine for limited antibody binding sites. Each test device contains a membrane strip, onto which the drug conjugate is pre-coated at a specific region known as the test region (T). Colored antibody-colloidal gold conjugate is coated onto a pad and is placed at one end of the

membrane. In the test procedure, when the urine is introduced to the device, the urine migrates across the membrane by capillary action. If any drug is present in the urine, it competes with the immobilized drug conjugate for the limited binding sites on the colored antibody colloidal gold conjugate. When a sufficient amount of drug is present, the drug will saturate the antibodies, and the colored colloidal gold conjugate cannot bind to the drug conjugate immobilized on the membrane. Thus, the absence of a color band at the test region (T) indicates a positive result for the test. If there is no drug or drug metabolite present to compete for the binding sites of the colored colloidal gold conjugate, it binds to the immobilized drug conjugate to form a visible band at the test region (T) of the membrane. The presence of a color band at the test region (T) indicates a negative result for the test. A control band with a different antigen/antibody reaction is added to the immunochromatographic membrane strip at the control region. This control band should always appear regardless of the presence of drug or metabolite.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. *Precision/Reproducibility:*

Assay precision was assessed with three lots (lots A and B were the Fastect II device and lot C was the QuickTox device) tested by three individuals over three consecutive days. Buprenorphine standard was added to drug-free human urine specimens to produce the concentrations shown below. Each sample was divided into 75 aliquots that were further divided into 3 sets of 25 (one set for each lot).

Bupren.	Conc. (ng/ml)	# of devices tested	Tech 1		Tech 2		Tech 3	
			-	+	-	+	-	+
Lot A (Fastect II Device)	5 (-50%)	25	25	0	25	0	25	0
	7.5 (-25%)	25	25	0	25	0	24	1
	10 (C/O)	25	12	13	15	10	10	15
	12.5 (+25%)	25	0	25	0	25	0	25
	15 (+50%)	25	0	25	0	25	0	25
Lot B (Fastect II Device)	5 (-50%)	25	25	0	25	0	25	0
	7.5 (-25%)	25	25	0	25	0	25	0
	10 (C/O)	25	12	13	13	12	11	14
	12.5 (+25%)	25	1	24	0	25	0	25
	15 (+50%)	25	0	25	0	25	0	25

Bupren.	Conc. (ng/ml)	# of devices tested	Tech 1		Tech 2		Tech 3	
			-	+	-	+	-	+
Lot C (Quicktox Device)	5 (-50%)	25	25	0	25	0	25	0
	7.5 (-25%)	25	25	0	25	0	25	0
	10 (C/O)	25	12	13	11	14	12	13
	12.5 (+25%)	25	0	25	0	25	0	25
	15 (+50%)	25	0	25	0	25	0	25
Total	5 (-50%)	75	75	0	75	0	75	0
	7.5 (-25%)	75	75	0	75	0	74	1
	10 (C/O)	75	36	39	39	36	33	42
	12.5 (+25%)	75	1	74	0	75	0	75
	15 (+50%)	75	0	75	0	75	0	75

The percent agreement at 5 ng/mL (-50% of C/O) was 100% for all three technicians. The percent agreement at 7.5 ng/mL (-25% of C/O) was 98.7% for all three technicians. The percent agreement at the 10 ng/mL cutoff was 84% and 85% agreement on negative and positive respectively. The percent agreement at 12.5 ng/mL (+25% of C/O) was 98.7% for all three technicians. The percent agreement at 15 ng/mL (+50% of C/O) was 100% for all three technicians.

Reading time:

The sponsor conducted a reading time study to validate the optimal reading time for the Fastest II BUP Drug Screen Dipstick and QuickTox Drug Screen Dipcard. Pooled drug-free human urine specimens were spiked with commercially available buprenorphine to achieve five LC/MS/MS confirmed concentration levels (+/-50%, +/-25% and the cutoff). Twenty spiked urine samples were prepared for each concentration level, along with twenty samples prepared from negative pooled urine. The samples were tested at 3, 4, 5 minutes, 15 minutes, 30 minutes, 60 minutes and 90 minutes. The results support the sponsors reading time between 3 to 5 minutes but not more than 15 minutes for both formats.

b. *Linearity/assay reportable range:*

Not applicable.

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

This device has internal process controls. Each strip in the device contains a procedural control that appears in the control line region indicating that the proper volume of urine has been added. The sponsor informs the user not to interpret the test if a colored line failed to appear in the control region.

External controls are not supplied with this device.

d. Detection limit:

Sensitivity of qualitative assays may be characterized by validating performance around the claimed cutoff concentration of the assay, and demonstrating the lowest concentration of drug that is capable of or consistently producing a positive result. Pooled urine was spiked with commercially available buprenorphine to obtain 5 concentrations (-50%, -25%, +25%, +50% and the cutoff). The samples were confirmed by LC/MS/MS and the levels detected with +/-15% of the target concentrations shown below.

Drug Cut-off	Target Concentrations				
	-50% (ng/mL)	-25% (ng/mL)	Cut-off (ng/mL)	+25% (ng/mL)	+50% (ng/mL)
10	5	7.5	10	12.5	15

Twenty-five spiked urine samples were made from each target concentration along with twenty-five sample from the negative pooled urine.

Fastect II BUP Screen Dipstick

BUP Sample Conc.	# of devices tested	Negative (-)	Preliminary Positive (+)
Neg (0 ng/ml)	25	25	0
-50% (5 ng/ml)	25	25	0
-25% (7.5 ng/ml)	25	25	0
Cut-off (10 ng/ml)	25	15	10
+25% (12.5 ng/ml)	25	0	25
+50% (15 ng/ml)	25	0	25

QuickTox Drug Screen Dipcard

BUP Sample Conc.	# of devices tested	Negative (-)	Preliminary Positive (+)
Neg (0 ng/ml)	25	25	0
-50% (5 ng/ml)	25	25	0
-25% (7.5 ng/ml)	25	25	0
Cut-off (10 ng/ml)	25	13	12
+25% (12.5 ng/ml)	25	0	25
+50% (15 ng/ml)	25	0	25

e. Analytical specificity:

The Fastect II BUP Drug Screen Dipstick and the QuickTox Drug Screen

Dipcard devices were evaluated for specificity and cross-reactivity. Related compounds were spiked to a high target concentration of 100,000 ng/mL and tested. The spiked samples were serially diluted and tested to determine the lowest concentration that produced a positive result with the devices. The specificity results are shown in the table below.

Buprenorphine Related Compound	Spiked Concentration (ng/ml)	% Cross Reactivity
Buprenorphine Glucuronide	5 ng/ml	200%
Norbuprenorphine	50ng/ml	20%
Norbuprenorphine Glucuronide	50ng/ml	20%

Normal drug-free urine was spiked with many compounds commonly found in urine and with other analytes that the device is capable of detecting to a target concentration of 100,000 ng/mL. Compounds that tested positive at 100,000 ng/mL were serially diluted and tested to determine the lowest concentration that produced a positive result with the devices. There were no interferences detected for the buprenorphine except for structurally similar compounds listed above. These interferences are noted in the insert.

Urine pH was evaluated for interference with the device. Drug-free urine was spiked with commercially available buprenorphine to prepare concentrations at 7.5 ng/mL (near negative -25%), and 12.5 ng/mL (near positive +25%). The sample was adjusted with NaOH or HCl to produce the following pH levels: 4.5, 5.5, 6.5, 7.5 and 8.5. The results were all negative at 7.5 ng/mL and all positive for concentrations of 12.5 ng/mL. These results showed that the range of the pH tested did not interfere with either format of the test.

The effect of urine specific gravity was evaluated for interference with the device. Pooled negative urine (pH confirmed with a refractometer of 1.010) was diluted and/spiked with sodium chloride to obtain specific gravity that ranged from 1.005 to 1.030. The samples were spiked with commercially available buprenorphine to prepare concentrations at 7.5 ng/mL (near negative -25%), and 12.5 ng/mL (near positive +25%). The results were all negative at 7.5 ng/mL and all positive at concentrations of 12.5 ng/mL. These results showed that the range of specific gravity tested did not interfere with either format of the test.

To evaluate the interference with buprenorphine from other drugs (benzoylecgonine, morphine, methamphetamine, THC, amphetamine, MDMA, PCP, oxazepam, secobarbital, methadone, oxycodone and buprenorphine) the sponsor conducted an interference study. Buprenorphine was spiked into urine controls to achieve five concentration levels: -25%, +25%, -50%, +50% and cut-off level. There were no interferences observed.

f. Assay cut-off:

Buprenorphine at 10 ng/mL. See precision/reproducibility section above.

2. Comparison studies:

a. Method comparison with predicate device:

The Fastect II BUP Drug Screen Dipstick and QuickTox Drug Screen Dipcard were both compared to results obtained with a commercially available buprenorphine assay. Of the 90 samples, 40 were drug-free and were LC/MS/MS confirmed to be negative. The 50 remaining samples contained buprenorphine concentrations that ranged from approximately 0.5 to 565 ng/mL. The results are summarized below.

Fastect® II BUP Drug Screen Dipstick Test

	GC/MS Neg. (<50%)	GC/MS Near Negative (50% to C/O)	GC/MS Near Positive (C/O to +50%)	GC/MS High Positive (> +50%)	% Agreement w/ GC/MS
Positive (+)	0	3	6	33	100%
Negative (-)	43	5	0	0	94%

QuickTox® BUP Drug Screen Dipcard Test

	GC/MS Neg. (<50%)	GC/MS Near Negative (50% to C/O)	GC/MS Near Positive (C/O to +50%)	GC/MS High Positive (> +50%)	% Agreement w/ GC/MS
Positive (+)	0	3	6	33	100%
Negative (-)	43	5	0	0	94%

Two discrepant samples that were within the -25% of the cutoff and the cutoff contained buprenorphine glucuronide metabolite of concentrations of 7 and 9 ng/mL respectively. The last remaining discrepant samples that was within the -25% of the cutoff and the cutoff contained norbuprenorphine metabolite concentration of 49.39 ng/mL.

b. Matrix comparison:

Not applicable; this device is for use with urine only.

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:
Not applicable.

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.