

# SureStep™ BUP

## One Step Buprenorphine Test Device (Urine) Package Insert

English

A rapid, one step test for the qualitative detection of Buprenorphine in human urine. For medical and other professional in vitro diagnostic use only.

### INTENDED USE

The BUP One Step Buprenorphine Test Device (Urine) is a lateral flow chromatographic immunoassay for the detection of Buprenorphine in human urine at a cut-off concentration of 10 ng/mL.

This assay provides only a qualitative, preliminary analytical test result. A more specific alternate chemical method must be used in order to obtain a confirmed analytical result. Gas chromatography/mass spectrometry (GC/MS) or Liquid Chromatography/mass spectrometry (LC/MS) are the preferred confirmatory methods. Clinical consideration and professional judgment should be applied to any drug of abuse test result, particularly when preliminary positive results are used.

### SUMMARY

Buprenorphine is a potent analgesic often used in the treatment of opioid addiction. The drug is sold under the trade names Subutex™, Buprenex™, Temgesic™ and Suboxone™, which contain Buprenorphine HCl alone or in combination with Naloxone HCl. Therapeutically, Buprenorphine is used as a substitution treatment for opioid addicts. Substitution treatment is a form of medical care offered to opiate addicts (primarily heroin addicts) based on a similar or identical substance to the drug normally used. In substitution therapy, Buprenorphine is as effective as Methadone but demonstrates a lower level of physical dependence. Concentrations of free Buprenorphine and Norbuprenorphine in urine may be less than 1 ng/mL after therapeutic administration, but can range up to 20 ng/mL in abuse situations. The plasma half-life of Buprenorphine is 2-4 hours.<sup>1</sup> While complete elimination of a single-dose of the drug can take as long as 6 days, the detection window for the parent drug in urine is thought to be approximately 3 days.

The BUP One Step Buprenorphine Test Device (Urine) is a rapid urine screening test that can be performed without the use of an instrument. The test utilizes a monoclonal antibody to selectively detect elevated levels of Buprenorphine in urine. The BUP One Step Buprenorphine Test Device (Urine) yields a positive result when the Buprenorphine in urine exceed 10 ng/mL.

### PRINCIPLE

The BUP One Step Buprenorphine Test Device (Urine) is an immunoassay based on the principle of competitive binding. Drugs which may be present in the urine specimen compete against the drug conjugate for binding sites on the antibody.

During testing, a urine specimen migrates upward by capillary action. Buprenorphine, if present in the urine specimen below 10 ng/mL, will not saturate the binding sites of antibody-coated particles in the test. The antibody-coated particles will then be captured by immobilized Buprenorphine conjugate and a visible colored line will show up in the test line region. The colored line will not form in the test line region if the Buprenorphine level exceeds 10 ng/mL because it will saturate all the binding sites of anti-Buprenorphine antibodies.

A drug-positive urine specimen will not generate a colored line in the test line region because of drug competition, while a drug-negative urine specimen or a specimen containing a drug concentration lower than the cut-off will generate a line in the test line region.

To serve as a procedural control, a colored line will always appear at the control line region, indicating that proper volume of specimen has been added and membrane wicking has occurred.

### REAGENTS

The test contains mouse monoclonal anti-Buprenorphine antibody-coupled particles and Buprenorphine-protein conjugate. A goat antibody is employed in the control line system.

### PRECAUTIONS

- For medical and other professional in vitro diagnostic use only. Do not use after the expiration date.
- The test should remain in the sealed pouch until use.
- All specimens should be considered potentially hazardous and handled in the same manner as an infectious agent.
- The used test should be discarded according to local regulations.

### STORAGE AND STABILITY

Store as packaged in the sealed pouch either at room temperature or refrigerated (2-30°C). The test is stable through the expiration date printed on the sealed pouch. The test must remain in the sealed pouch until use. **DO NOT FREEZE.** Do not use beyond the expiration date.

### SPECIMEN COLLECTION AND PREPARATION

#### Urine Assay

The urine specimen must be collected in a clean and dry container. Urine collected at any time of the day may be used. Urine specimens exhibiting visible precipitates should be centrifuged, filtered, or allowed settle to obtain a clear specimen for testing.

#### Specimen Storage

Urine specimens may be stored at 2-8°C for up to 48 hours prior to assay. For prolonged storage, specimens may be frozen and stored below -20°C. Frozen specimens should be thawed and mixed before testing.

### MATERIALS

#### Materials Provided

- Test devices
- Package insert

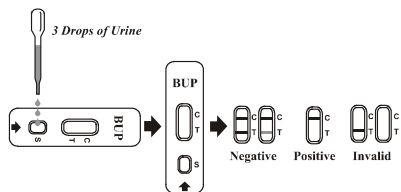
#### Materials Required But Not Provided

- Specimen collection container
- Timer

### DIRECTIONS FOR USE

Allow the test, urine specimen, and/or controls to reach room temperature (15-30°C) prior to testing.

- Bring the pouch to room temperature before opening it. Remove the test device from the sealed pouch and use it as soon as possible.
- Place the test device on a clean and level surface. Hold the dropper vertically and transfer **3 full drops of urine** (approx. 100 µL) to the specimen well (S) of the test device, and then start the timer. Avoid trapping air bubbles in the specimen well (S). See the illustration below.
- Wait for the colored line(s) to appear. **Read results at 5 minutes.** Do not interpret the result after 10 minutes.



### INTERPRETATION OF RESULTS

(Please refer to the illustration above)

**NEGATIVE:** \* Two distinct colored lines appear. One colored line should be in the control line region (C), and another apparent colored line should be in the test line region (T). This negative result indicates that the Buprenorphine concentration is below the detectable level (10 ng/mL).

\*NOTE: The shade of color in the test line region (T) will vary, but it should be considered negative whenever there is even a faint colored line.

**POSITIVE:** One colored line appears in the control region (C). No line appears in the test line region (T). This positive result indicates that the Buprenorphine concentration exceeds the detectable level (10 ng/mL).

**INVALID:** Control line fails to appear. Insufficient specimen volume or incorrect procedural techniques are the most likely reasons for control line failure. Review the procedure and repeat the test using a new test. If the problem persists, discontinue using the lot immediately and contact your local distributor.

### QUALITY CONTROL

A procedural control is included in the test. A colored line appearing in the control region (C) is considered an internal procedural control. It confirms sufficient specimen volume, adequate membrane wicking and correct procedural technique.

Control standards are not supplied with this kit; however it is recommended that positive and negative controls be tested as good laboratory practice to confirm the test procedure and to verify proper test performance.

### LIMITATIONS

- The BUP One Step Buprenorphine Test Device (Urine) provides only a qualitative, preliminary analytical result. A secondary analytical method must be used to obtain a confirmed result. Liquid chromatography/mass spectrometry (LC/MS) is the preferred confirmatory method.<sup>1,2</sup>
- It is possible that technical or procedural errors, as well as other interfering substances in the urine specimen may cause erroneous results.
- Adulterants, such as bleach and/or alum, in urine specimens may produce erroneous results regardless of the analytical method used. If adulteration is suspected, the test should be repeated with another urine specimen.
- A positive result indicates presence of the drug or its metabolites but does not indicate level or intoxication, administration route or concentration in urine.
- A negative result may not necessarily indicate drug-free urine. Negative results can be obtained when drug is present but below the cutoff level and test.
- Test does not distinguish between drugs of abuse and certain medications.

### PERFORMANCE CHARACTERISTICS

#### Accuracy

A correlation study was conducted on fifty-eight (58) clinical specimens from patients reporting Buprenorphine use and one-hundred fifty (150) urine specimens collected from presumed non-drug users. Using the BUP One Step Buprenorphine Test Device (Urine), the specimens were tested and compared to the self-reported use of Buprenorphine. All specimens, including the ones showing negative results, were then confirmed by LC/MS. The following results were tabulated:

Method	Patient Self-Report		Total Results
	Positive	Negative	
BUP One Step Test Device	Positive	51	51
	Negative	7	157
	<b>Total Results</b>	<b>58</b>	<b>208</b>
<b>% Agreement</b>	<b>88%</b>	<b>&gt;99%</b>	<b>97%</b>

When compared at 10 ng/mL with LC/MS, the following results were tabulated:

Method	LC/MS		Total Results
	Positive	Negative	
BUP One Step Test Device	Positive	55	57
	Negative	1	169
	<b>Total Results</b>	<b>56</b>	<b>170</b>
<b>% Agreement</b>	<b>98%</b>	<b>99%</b>	<b>99%</b>

#### Analytical Sensitivity

A drug-free urine pool was spiked with Buprenorphine at the following concentrations: 0 ng/mL, 5 ng/mL, 7.5 ng/mL, 10 ng/mL, 12.5 ng/mL and 15 ng/mL. The result demonstrates >99% accuracy at 50% above and 50% below the cut-off concentration. The data are summarized below:

Buprenorphine Concentration (ng/mL)	Percent of Cut-off	n	Visual Result	
			Negative	Positive
0	0%	90	90	0
5	-50%	90	90	0
7.5	-25%	90	78	12
10	Cut-off	90	48	42
12.5	+25%	90	24	66
15	+50%	90	0	90

#### Analytical Specificity

The following table lists compounds that are positively detected in urine by the BUP One Step Buprenorphine Test Device (Urine) at 5 minutes.

Compound	Concentration (ng/mL)	Compound	Concentration (ng/mL)
Buprenorphine	10	Buprenorphine 3-D-Glucuronide	15
Norbuprenorphine	20	Norbuprenorphine 3-D-Glucuronide	200

#### Precision

A study was conducted at 3 physician's offices by untrained operators using 3 different lots of product to demonstrate the within run, between run and between operator precision. An identical panel of coded specimens containing no Buprenorphine, 25% Buprenorphine above and below the cutoff and 50% Buprenorphine above and below the 10 ng/mL cutoff were provided to each site. The following results were tabulated:

Buprenorphine Concentration (ng/mL)	n per Site	Site A			Site B			Site C		
		-	+	-	+	-	+	-	+	
0	15	15	0	15	0	15	0	15	0	
5	15	15	0	15	0	15	0	15	0	
7.5	15	8	7	10	5	9	6	6	6	
12.5	15	0	15	1	14	0	15	0	15	
15	15	0	15	0	15	0	15	0	15	

#### Effect of Urinary Specific Gravity

Fifteen urine samples with specific gravities ranging from 1.004 to 1.034 were spiked with Buprenorphine to the concentrations of 5 ng/mL, and 15 ng/mL. The BUP One Step Buprenorphine Test Device (Urine) was tested in duplicate using the fifteen neat and spiked urine specimens. The results demonstrate that varying ranges of urinary specific gravity do not affect the test results.

#### Effect of the Urinary pH

The pH of an aliquoted negative urine pool was adjusted to a pH range of 5 to 9 in 1 pH unit increments and spiked with Buprenorphine to 5 ng/mL and 15 ng/mL. The spiked, pH-adjusted urine was tested with the BUP One Step Buprenorphine Test Device (Urine) in duplicate. The results demonstrate that varying ranges of pH do not interfere with the performance of the test.

#### Cross-Reactivity

A study was conducted to determine the cross-reactivity of the test with compounds in either drug-free urine or Buprenorphine positive urine. The following compounds show no cross-reactivity when tested with the BUP One Step Buprenorphine Test Device (Urine) at a concentration of 100 µg/mL.

#### Non Cross-Reacting Compounds

4-Acetamidophenol	Diphenhydramine	Lidocaine	Trans-2-phenyl cyclopropylamine
Acetone	5,5-Diphenylhydantoin	Lindane	1-Phenylephrine
Acetophenetidin	Disopyramide	(hexachlorocyclohexane)	β-Phenylethylamine
Acetylsalicylic acid	Doxylamine	Lithium carbonate	Phenylpropanolamine
N-Acetylprocainamide	Ecgonine	Loperamide	(D,L-norephedrine)
Albumin	Ergonine methylester	Magnitoline	(±) Phenylpropanolamine
Amipromine	EDDP	Meperidine	Prednisolone
Amiripitryline	Efavirenz (Sustiva)	Mephentermine	Prednisone
Amobarbital	EMDP	Meprobamate	Procaine
Amoxapine	Ephedrine	Methadone	5β-Pregnen-3α,17α,21-triol-20-one
Amoxicillin	(1r,2s)-(-)-Ephedrine	L,2-Methamphetamine	Methaqualone
D,L-Amphetamine	(-)-ψ-Ephedrine	Methamphetamine	Promazine
Ampicillin	(±)-Epinephrine	Methoxyphenamine	Propofol
Aponorphine	Erythromycin	(±) 3,4-Methylenedioxy-amphetamine (MDA)	D,L-Propranolol
Aspartame	β-Estradiol	(+) 3,4-Methylenedioxy-methamphetamine	D-Pseudoephedrine
Atropine	Estrone-3-sulfate	Methylphenidate	Quinacrine
Benzilic acid	Ethanol (Ethyl alcohol)	Methyprylon	Quinine
Benzoic acid	Ethyl-p-aminobenzoate	Morphine sulfate	Ranitidine
Benzoylecgonine	Etodolac	Morphine	Riboflavin
Benzphetamine	Fampridone	Morphine	Salicylic acid
Bilirubin	Fenfluramine	Naloxone	Secobarbital
Brompheniramine	Fenpropion	Naltrexone	Serotonin
Bupropione	Fentanyl	Nimesulide	(5-Hydroxytryptamine)
Caffeine	Fluoxetine	Norcodeine	Sodium chloride
Cannabidiol	Furosemide	Norethindrone	Sulfamethazine
Cannabitol	Genisteic acid	Noscapine	Sulindac
Chloralhydrate	D (+) Glucose	D,L-Octopamine	Temazepam
Chloramphenicol	Guaiaacol Glyceryl Ether	Orphenadrine	Tetracycline
Chlorazepoxide	Guaiaacol Glyceryl Ether carbamate	Oxaliacetic acid	Tetrahydrocortisone
Chloroquine	Hemoglobin	Naphthaleneacetic acid	3-acetate
Chlorothalidate	Hydralazine	Norethindrone	Tetrahydrozoline
(+)-Chlorpheniramine	(±)-Chlorpheniramine	Hydrochlorothiazide	Thebaine
(±)-Chlorpheniramine	Chlorpromazine	Hydrocodone	Theophylline
Chlorpromazine	Chlorpromazine	Hydrocodone	Thiamine
Cholesterol	Chlorprothixene	Hydrocortisone	Thioridazine
Cimetidine	Cholesterol	Hydrocortisone	(chlorpromazine)
Cimetiidine	Cimetidine	Hydrocortisone	L-Thyroxine
Clopidogrel	Clopidogrel	Hydrocortisone	Tolbutamide
Cocaine HCl	Cocaine HCl	Hydrocortisone	Oxymetazoline
Codine	Codine	Hydrocortisone	Oxymetazoline
Cortisone	Cortisone	Hydrocortisone	Cis-Tramadol
(-) Cotinine	(-) Cotinine	Hydrocortisone	Trazodone
Creatinine	Creatinine	Hydrocortisone	Papaverine
Cyclobarbitol	Cyclobarbitol	Hydrocortisone	Proprietary
Cyclobenzaprine	Cyclobenzaprine	Hydrocortisone	Trihydrozoline
Deoxycorticosterone	Deoxycorticosterone	Hydrocortisone	Trihydrozoline
(-) Deoxyephedrine	(-) Deoxyephedrine	Hydrocortisone	Trihydrozoline
R (-) Deprnyl	R (-) Deprnyl	Hydrocortisone	Trihydrozoline
Dextromethorphan	Dextromethorphan	Hydrocortisone	D, L-Tryptophan
Diazepam	Diazepam	Hydrocortisone	Tyramine
Diclofenac	Diclofenac	Hydrocortisone	D, L-Tyrosine
Dicyclomine	Dicyclomine	Hydrocortisone	Uric acid
Diffunisal	Diffunisal	Hydrocortisone	Verapamil
Digoxin	Digoxin	Hydrocortisone	Zomepirac
4-Dimethylaminocantipyrine	4-Dimethylaminocantipyrine	Hydrocortisone	

### BIBLIOGRAPHY

- Basell RC. Disposition of Toxic Drugs and Chemicals in Man. 6th Ed. Biomedical Publ., Davis, CA, 129, 2002.
- Hawks RL, CN Chiang. Urine Testing for Drugs of Abuse. National Institute for Drug Abuse (NIDA), Research Monograph 73, 1986.

### Index of Symbols

	Attention, see instructions for use		Tests per kit		Authorized Representative
	For in vitro diagnostic use only		Use by		Do not reuse
	Store between 2-30°C		Lot Number		Catalog #



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