

# One Step Multi-Drug Screen Test Card

## with the Integrated *i*Cup<sup>A.D.</sup>™

### with Adulteration Strip for Oxidants, pH and Specific Gravity

#### Instruction Sheet for testing of any combination of the following drugs: AMP/BAR/BZO/COC/THC/MDT/mAMP/MDMA/MOP/OPI/PCP/TCA

*A rapid, one step screening test for the simultaneous, qualitative detection of multiple drugs and drug metabolites in human urine.*

*For healthcare professionals including professionals at point of care sites.*

*For in vitro diagnostic use only.*

#### INTENDED USE

The One Step Multi-Drug Screen Test Card with the integrated *i*Cup<sup>™</sup> is a lateral flow chromatographic immunoassay for the qualitative detection of multiple drugs and drug metabolites in urine at the following cut-off concentrations:

Test	Calibrator	Cut-off
<b>Amphetamine (AMP)</b>	<b>D-Amphetamine</b>	<b>1,000 ng/mL</b>
<b>Barbiturates (BAR)</b>	<b>Secobarbital</b>	<b>300 ng/mL</b>
<b>Benzodiazepines (BZO)</b>	<b>Oxazepam</b>	<b>300 ng/mL</b>
<b>Cocaine (COC)</b>	<b>Benzoyllecgonine</b>	<b>300 ng/mL</b>
<b>Marijuana (THC)</b>	<b>11-nor-<math>\Delta^9</math>-THC-9 COOH</b>	<b>50 ng/mL</b>
<b>Methadone (MTD)</b>	<b>Methadone</b>	<b>300 ng/mL</b>
<b>Methamphetamine (mAMP)</b>	<b>D-Methamphetamine</b>	<b>1,000 ng/mL</b>
<b>Methylenedioxyamphetamine (MDMA)</b>	<b>D,L Methylenedioxyamphetamine</b>	<b>500 ng/mL</b>
<b>Morphine (MOP 300)</b>	<b>Morphine</b>	<b>300 ng/mL</b>
<b>Opiates (OPI 2000)</b>	<b>Morphine</b>	<b>2,000 ng/mL</b>
<b>Phencyclidine (PCP)</b>	<b>Phencyclidine</b>	<b>25 ng/mL</b>
<b>Tricyclic Antidepressants (TCA)</b>	<b>Nortriptyline</b>	<b>1,000 ng/mL</b>

**Configurations of the One Step Multi-Drug Screen Test Card with the Integrated *i*Cup<sup>™</sup> can consist of any combination of the above listed drug analytes. This assay provides only a 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) is the preferred confirmatory method. Clinical consideration and professional judgment should be applied to any drug of abuse test result, particularly when preliminary positive results are indicated.**

#### SUMMARY

The One Step Drug Screen Test Card with the integrated *i*Cup<sup>™</sup> 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 specific drugs in urine. The One Step Multi-Drug Screen Test Card with Integrated Cup also includes an adulteration strip that tests for Oxidants, pH and Specific gravity. The colors of the test strips are compared with the color chart to determine if the sample has been adulterated.

#### AMPHETAMINE (AMP)

Amphetamine is a Schedule II controlled substance available by prescription (Dexedrine®) and is also available on the illicit market. Amphetamines are a class of potent sympathomimetic agents with therapeutic applications. They are chemically related to the human body's natural catecholamines: epinephrine and norepinephrine. Acute higher doses lead to enhanced stimulation of the central nervous system and induce euphoria, alertness, reduced appetite, and a sense of increased energy and power. Cardiovascular responses to Amphetamines include increased blood pressure and cardiac arrhythmias. More acute responses produce anxiety, paranoia, hallucinations, and psychotic behavior. The effects of Amphetamines generally last 2-4 hours following use, and the drug has a half-life of 4-24 hours in the body. About 30% of Amphetamines are excreted in the urine in unchanged form, with the remainder as hydroxylated and deaminated derivatives.

The One Step Drug Screen Test Card with the integrated *i*Cup<sup>™</sup> yields a positive result when Amphetamines in urine exceed 1,000 ng/mL. This is the suggested screening cut-off for positive specimens set by the Substance Abuse and Mental Health Services Administration (SAMHSA, USA).<sup>4</sup>

#### BARBITURATES (BAR)

Barbiturates are central nervous system depressants. They are used therapeutically as sedatives, hypnotics, and anticonvulsants. Barbiturates are almost always taken orally as capsules or tablets. The effects resemble those of intoxication with alcohol. Chronic use of barbiturates leads to tolerance and physical dependence.

Short acting Barbiturates taken at 400 mg/day for 2-3 months can produce a clinically significant degree

of physical dependence. Withdrawal symptoms experienced during periods of drug abstinence can be severe enough to cause death.

Only a small amount (less than 5%) of most Barbiturates are excreted unaltered in the urine.

The approximate detection time limits for Barbiturates are:

Short acting (e.g. Secobarbital)	100 mg PO (oral)	4.5 days
Long acting (e.g. Phenobarbital)	400 mg PO (oral)	7 days <sup>1</sup>

The One Step Drug Screen Test Card with the integrated *i*Cup<sup>™</sup> yields a positive result when the Barbiturates in urine exceed 300 ng/mL.

#### BENZODIAZEPINES (BZO)

Benzodiazepines are medications that are frequently prescribed for the symptomatic treatment of anxiety and sleep disorders. They produce their effects via specific receptors involving a neurochemical called gamma aminobutyric acid (GABA). Because they are safer and more effective, Benzodiazepines have replaced barbiturates in the treatment of both anxiety and insomnia. Benzodiazepines are also used as sedatives before some surgical and medical procedures, and for the treatment of seizure disorders and alcohol withdrawal. Risk of physical dependence increases if Benzodiazepines are taken regularly (e.g., daily) for more than a few months, especially at higher than normal doses. Stopping abruptly can bring on such symptoms as trouble sleeping, gastrointestinal upset, feeling unwell, loss of appetite, sweating, trembling, weakness, anxiety and changes in perception.

Only trace amounts (less than 1%) of most Benzodiazepines are excreted unaltered in the urine; most of the concentration in urine is conjugated drug. The detection period for the Benzodiazepines in the urine is 3-7 days.

The One Step Drug Screen Test Card with the integrated *i*Cup<sup>™</sup> yields a positive result when the Benzodiazepines in urine exceed 300 ng/mL.

#### COCAINE (COC)

Cocaine is a potent central nervous system (CNS) stimulant and a local anesthetic. Initially, it brings about extreme energy and restlessness while gradually resulting in tremors, over-sensitivity and spasms. In large amounts, cocaine causes fever, unresponsiveness, difficulty in breathing and unconsciousness. Cocaine is often self-administered by nasal inhalation, intravenous injection and free-base smoking. It is excreted in the urine in a short time primarily as Benzoyllecgonine.<sup>2,3</sup> Benzoyllecgonine, a major metabolite of cocaine, has a longer biological half-life (5-8 hours) than cocaine (0.5-1.5 hours), and can generally be detected for 24-48 hours after cocaine exposure.<sup>3</sup>

The One Step Drug Screen Test Card with the integrated *i*Cup<sup>™</sup> yields a positive result when the cocaine metabolite in urine exceeds 300 ng/mL. This is the suggested screening cut-off for positive specimens set by the Substance Abuse and Mental Health Services Administration (SAMHSA, USA).<sup>4</sup>

#### MARIJUANA (THC)

THC ( $\Delta^9$ -tetrahydrocannabinol) is the primary active ingredient in cannabis (marijuana). When smoked or orally administered, THC produces euphoric effects. Users have impaired short term memory and slowed learning. They may also experience transient episodes of confusion and anxiety. Long term relatively heavy use may be associated with behavioral disorders. The peak effect of marijuana administered by smoking occurs in 20-30 minutes and the duration is 90-120 minutes after one cigarette. Elevated levels of urinary metabolites are found within hours of exposure and remain detectable for 3-10 days after smoking. The main metabolite excreted in the urine is 11-nor- $\Delta^9$ -tetrahydrocannabinol-9-carboxylic acid ( $\Delta^9$ -THC-COOH).

The One Step Drug Screen Test Card with the integrated *i*Cup<sup>™</sup> yields a positive result when the concentration of THC-COOH in urine exceeds 50 ng/mL. This is the suggested screening cut-off for positive specimens set by the Substance Abuse and Mental Health Services Administration (SAMHSA, USA).<sup>4</sup>

#### METHADONE (MTD)

Methadone is a narcotic analgesic prescribed for the management of moderate to severe pain and for the treatment of opiate dependence (heroin, Vicodin, Percocet, Morphine). The pharmacology of Oral Methadone is very different from IV Methadone. Oral Methadone is partially stored in the liver for later use. IV Methadone acts more like heroin. In most states you must go to a pain clinic or a Methadone maintenance clinic to be prescribed Methadone.

Methadone is a long acting pain reliever producing effects that last from twelve to forty-eight hours. Ideally, Methadone frees the client from the pressures of obtaining illegal heroin, from the dangers of injection, and from the emotional roller coaster that most opiates produce. Methadone, if taken for long periods and at large doses, can lead to a very long withdrawal period. The withdrawals from Methadone are more prolonged and troublesome than those provoked by heroin cessation, yet the substitution and phased removal of methadone is an acceptable method of detoxification for patients and therapists.<sup>1</sup>

The MTD One Step Methadone Test Card with the integrated *i*Cup<sup>™</sup> yields a positive result when the Methadone in urine exceeds 300 ng/mL.

#### METHAMPHETAMINE (mAMP)

Methamphetamine is an addictive stimulant drug that strongly activates certain systems in the brain. Methamphetamine is closely related chemically to amphetamine, but the central nervous system effects of Methamphetamine are greater. Methamphetamine is made in illegal laboratories and has a high potential for abuse and dependence. The drug can be taken orally, injected, or inhaled. Acute higher doses lead to enhanced stimulation of the central nervous system and induce euphoria, alertness, reduced appetite, and a sense of increased energy and power. Cardiovascular responses to Methamphetamine include increased blood pressure and cardiac arrhythmias. More acute responses produce anxiety, paranoia, hallucinations, psychotic behavior, and eventually, depression and exhaustion. The effects of Methamphetamine generally last 2-4 hours and the drug has a half-life of 9-24 hours in the body. Methamphetamine is excreted in the urine as amphetamine and oxidized and deaminated

derivatives. However, 10-20% of Methamphetamine is excreted unchanged. Thus, the presence of the parent compound in the urine indicates Methamphetamine use. Methamphetamine is generally detectable in the urine for 3-5 days, depending on urine pH level.

The One Step Drug Screen Test Card with the integrated *i*Cup<sup>™</sup> yields a positive result when the Methamphetamine in urine exceeds 1,000 ng/mL.

#### METHYLENEDIOXYMETHAMPHETAMINE (MDMA)

Methylenedioxyamphetamine (ecstasy) is a designer drug first synthesized in 1914 by a German drug company for the treatment of obesity.<sup>8</sup> Those who take the drug frequently report adverse effects, such as increased muscle tension and sweating. MDMA is not clearly a stimulant, although it has, in common with amphetamine drugs, a capacity to increase blood pressure and heart rate. MDMA does produce some perceptual changes in the form of increased sensitivity to light, difficulty in focusing, and blurred vision in some users. Its mechanism of action is thought to be via release of the neurotransmitter serotonin. MDMA may also release dopamine, although the general opinion is that this is a secondary effect of the drug (Nichols and Oberlander, 1990). The most pervasive effect of MDMA, occurring in virtually all people who took a reasonable dose of the drug, was to produce a clenching of the jaws. The One Step Drug Screen Test Card with the integrated *i*Cup<sup>™</sup> yields a positive result when the Methylenedioxyamphetamine in urine exceeds 500 ng/mL.

#### OPIATE (MOP 300)

Opiate refers to any drug that is derived from the opium poppy, including the natural products, morphine and codeine, and the semi-synthetic drugs such as heroin. Opioid is more general, referring to any drug that acts on the opioid receptor.

Opioid analgesics comprise a large group of substances which control pain by depressing the central nervous system. Large doses of morphine can produce higher tolerance levels, physiological dependency in users, and may lead to substance abuse. Morphine is excreted unmetabolized, and is also the major metabolic product of codeine and heroin. Morphine is detectable in the urine for several days after an opiate dose.<sup>1</sup>

The One Step Drug Screen Test Card with the integrated *i*Cup<sup>™</sup> yields a positive result when the morphine in urine exceeds the 300 ng/mL cut-off level.<sup>4</sup>

#### OPIATE (2000)

The One Step Drug Screen Test Card with the integrated *i*Cup<sup>™</sup> yields a positive result when the morphine in urine exceeds 2,000 ng/mL. This is the suggested screening cut-off for positive specimens set by the Substance Abuse and Mental Health Services Administration (SAMHSA, USA).<sup>4</sup> See Opiate (MOP 300) for a summary.

#### PHENCYCLIDINE (PCP)

Phencyclidine, also known as PCP or Angel Dust, is a hallucinogen that was first marketed as a surgical anesthetic in the 1950's. It was removed from the market because patients receiving it became delirious and experienced hallucinations.

Phencyclidine is used in powder, capsule, and tablet form. The powder is either snorted or smoked after mixing it with marijuana or vegetable matter. Phencyclidine is most commonly administered by inhalation but can be used intravenously, intra-nasally, and orally. After low doses, the user thinks and acts swiftly and experiences mood swings from euphoria to depression. Self-injurious behavior is one of the devastating effects of Phencyclidine.

PCP can be found in urine within 4 to 6 hours after use and will remain in urine for 7 to 14 days, depending on factors such as metabolic rate, user's age, weight, activity, and diet.<sup>5</sup> Phencyclidine is excreted in the urine as an unchanged drug (4% to 19%) and conjugated metabolites (25% to 30%).<sup>5</sup>

The One Step Drug Screen Test Card with the integrated *i*Cup<sup>™</sup> yields a positive result when the phencyclidine level in urine exceeds 25 ng/mL. This is the suggested screening cut-off for positive specimens set by the Substance Abuse and Mental Health Services Administration (SAMHSA, USA).<sup>4</sup>

#### TRICYCLIC ANTIDEPRESSANTS (TCA)

TCA (Tricyclic Antidepressants) are commonly used for the treatment of depressive disorders. TCA overdoses can result in profound central nervous system depression, cardiotoxicity and anticholinergic effects. TCA overdose is the most common cause of death from prescription drugs. TCAs are taken orally or sometimes by injection. TCAs are metabolized in the liver. Both TCAs and their metabolites are excreted in urine mostly in the form of metabolites for up to ten days.

The One Step Drug Screen Test Card with the integrated *i*Cup<sup>™</sup> yields a positive result when the concentration of Tricyclic Antidepressants in urine exceeds 1,000 ng/mL.

#### PRINCIPLE

The One Step Multi-Drug Screen Test Card with the integrated *i*Cup<sup>™</sup> is an immunoassay based on the principle of competitive binding. Drugs which may be present in the urine specimen compete against their respective drug conjugate for binding sites on their specific antibody.

During testing, a urine specimen migrates upward by capillary action. A drug, if present in the urine specimen below its cut-off concentration, will not saturate the binding sites of its specific antibody. The antibody will then react with the drug-protein conjugate and a visible colored line will show up in the test line region of the specific drug strip. The presence of drug above the cut-off concentration will saturate all the binding sites of the antibody. Therefore, the colored line will not form in the test line region.

A drug-positive urine specimen will not generate a colored line in the specific test line region of the strip because of drug competition, while a drug-negative urine specimen will generate a line in the test line region because of the absence of drug competition.

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 a membrane strip coated with drug-protein conjugates (purified bovine albumin) on the test line, a goat polyclonal antibody against gold-protein conjugate at the control line, and a dye pad which contains colloidal gold particles coated with mouse monoclonal antibody specific to Amphetamine, Cocaine, Methamphetamine, Methylenedioxyamphetamine, Morphine, THC, Phencyclidine, Benzodiazepine, Methadone, Barbiturate or Tricyclic antidepressants.

## PRECAUTIONS

- For healthcare professionals including professionals at point of care sites.
- For *in vitro* diagnostic use only. Do not use after the expiration date.
- The test panel 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 card should be discarded according to federal, state and local regulations.

## STORAGE AND STABILITY

Store as packaged in the sealed pouch at 2-30°C. The test is stable through the expiration date printed on the sealed pouch. The test devices 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 to 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 testing. For prolonged storage, specimens may be frozen and stored below -20°C. Frozen specimens should be thawed and mixed well before testing.

## MATERIALS

### Materials Provided

- i*Cup™ with multi-drug card
- Security seal label
- Package insert

### Materials Required But Not Provided

- Timer
- External controls

## DIRECTIONS FOR USE

**Allow the test card, urine specimen, and/or controls to equilibrate to room temperature (2-30°C) prior to testing.**

- Bring the pouch to room temperature before opening it. Remove the cup from the sealed pouch and use it as soon as possible.
- Donor provides specimen.
- Technician replaces and secures cap while the cup is on a flat surface.
- Technician dates and initials the security seal and attaches the security seal over the cup cap.
- Technician peels off the label on the multi-drug test card to view results.
- The adulteration strip should be read between 2-5 minutes. Compare the colors on the adulteration strip to the color chart. If the results indicate adulteration, do not read the drug test results.
- If results do not indicate adulteration, read the drug test result at 5 minutes. The drug test results remain stable for up to sixty minutes. See the illustration below. For detailed operation instructions, please refer to the Procedure Card and Color Chart.

## INTERPRETATION OF RESULTS

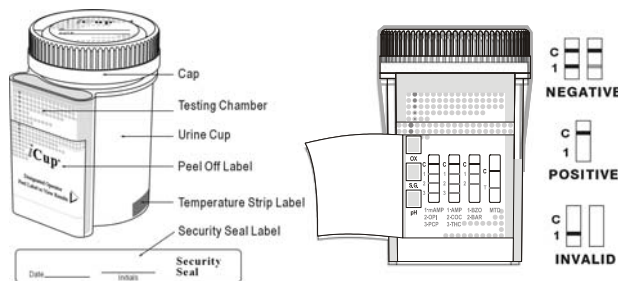
(Please refer to the illustration below)

**NEGATIVE:** \* **Two lines appear.** One red line should be in the control region (C), and another apparent red or pink line adjacent should be in the test region (T). This negative result indicates that the drug concentration is below the detectable level.

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

**POSITIVE:** **One red line appears in the control region (C). No line appears in the test region (T).** This positive result indicates that the drug concentration is above the detectable level.

**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 panel. If the problem persists, discontinue using the lot immediately and contact your manufacturer.



## ADULTERANT INTERPRETATION

(Please refer to the color chart)

**pH:** Tests for the presence of acidic and alkaline adulterants. Normal urine pH ranges from 4.0 to 9.0. Values below pH 4.0 or above pH 9.0 are indicative of adulteration.

**Specific Gravity:** Tests for sample dilution. Normal levels for specific gravity will range from 1.003-1.030. Specific gravity levels of less than 1.003 or higher than 1.030 are an indication of adulteration.

**Oxidants:** Tests for the presence of oxidants, such as bleach and peroxide, in the urine. Oxidants, when present in the urine, will produce a blue or green color.

## QUALITY CONTROL

A procedural control is included in the test. A red 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 One Step Multi Drug Screen Test Card with the *i*Cup™ provides only a qualitative, preliminary analytical result. A secondary analytical method must be used to obtain a confirmed result. Gas chromatography/mass spectrometry (GC/MS) is the preferred confirmatory method.<sup>3,4,7</sup>
- There is a possibility 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 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 cut-off level of the test.
- Test does not distinguish between drugs of abuse and certain medications.
- A positive test result may be obtained from certain foods or food supplements.
- The adulteration assays are for screening purposes only; all abnormal results should be confirmed by an alternative methodology.

## ADULTERATION LIMITATIONS

- The adulteration tests included with this product are meant to aid in the determination of abnormal specimens. While comprehensive, these tests are not meant to be an "all-inclusive" representation of possible adulterants.
- Oxidants – The presence of high levels of antioxidants in the specimen, such as ascorbic acid, may result in false negative results for the oxidant pad.
- Specific Gravity – Elevated levels of protein in urine may cause specific gravity values to be higher.

## PERFORMANCE CHARACTERISTICS

### Accuracy

A side-by-side comparison was conducted using the One Step Single Drug Test Strip and commercially available drug rapid tests. Testing was performed on approximately 300 specimens per drug type previously collected from subjects presenting for Drug Screen Testing. Presumptive positive results were confirmed by GC/MS. The following compounds were quantified by GC/MS and contributed to the total amount of drugs found in presumptive positive urine samples tested.

Test	Compounds Contributed to the Totals of GC/MS
AMP	Amphetamine
BAR	Secobarbital, Butalbital, Phenobarbital, Pentobarbital
BZO	Oxazepam, Nordiazepam, a-OH-Alprazolam, Desalkylflurazepam
COC	Benzoyllecgonine
THC	11-nor- $\Delta^8$ -tetrahydrocannabinol-9-carboxylic acid
MTD	Methadone
mAMP	Methamphetamine

MDMA	D,L Methylenedioxyamphetamine, Methylenedioxyamphetamine
OPI	Morphine, Codeine
PCP	Phencyclidine
TCA	Nortriptyline

The following results were tabulated:

Method	GC/MS						
	Neg.*	Neg. (< -25% cutoff)	Near cutoff neg. (-25% cutoff to cutoff)	Near cutoff pos. (cutoff to +25% cutoff)	Pos. (> +25% cutoff)	% agreement with GC/MS	
AMP	Positive	0	0	1	14	114	94%
	Negative	150	2	12	8	0	99%
BAR	Positive	0	0	2	4	118	92
	Negative	150	2	6	1	10	99

Method	GC/MS						
	Neg.*	Neg. (< -25% cutoff)	Near cutoff neg. (-25% cutoff to cutoff)	Near cutoff pos. (cutoff to +25% cutoff)	Pos. (> +25% cutoff)	% agreement with GC/MS	
BZO	Positive	0	2	0	6	122	98
	Negative	150	9	2	2	1	98
COC	Positive	0	0	1	13	99	95%
	Negative	150	8	22	4	2	99%
THC	Positive	0	5	3	12	114	95%
	Negative	150	14	6	2	4	95%
MTD	Positive	0	0	0	2	118	93
	Negative	150	17	10	8	1	>99
mAMP	Positive	0	0	0	4	116	90%
	Negative	150	0	12	6	8	>99%
MDMA	Positive	0	0	3	6	79	98
	Negative	150	0	2	0	2	98
MOP	Positive	0	1	4	4	115	98
	Negative	150	2	3	2	1	97
OPI	Positive	0	0	2	19	111	98%
	Negative	150	0	14	1	1	99%
PCP	Positive	0	0	2	6	64	90%
	Negative	150	0	2	3	5	99%
TCA**	Positive	0	9	2	14	20	>99
	Negative	150	24	7	0	0	94

\*Negative urine samples were screened by predicate tests.

\*\*Note: TCA concentration was based on HPLC data.

### %Agreement with Commercial Kit

	AMP	BAR	BZO	COC	THC	MTD
Positive Agreement	97%	>99%	90%	95%	98%	99%
Negative Agreement	100%	>99%	97%	>99%	100%	>99%
Total Results	98%	99%	94%	98%	99%	>99%

	mAMP	MDMA	MOP	OPI	PCP	TCA*
Positive Agreement	98%	100%	100%	>99%	98%	95%
Negative Agreement	100%	99%	100%	>99%	100%	>99%
Total Results	99%	99%	100%	>99%	99%	99%

### %Agreement with GC/MS

	AMP	BAR	BZO	COC	THC	MTD
Positive Agreement	97%	>99%	96%	96%	97%	99%
Negative Agreement	95%	>99%	96%	>90%	88%	>94%
Total Results	96%	99%	96%	93%	91%	>96%

	mAMP	MDMA	MOP	OPI	PCP	TCA*
Positive Agreement	99%	96%	100%	>99%	100%	>99%
Negative Agreement	94%	98%	94%	>90%	97%	89%
Total Results	96%	97%	97%	>95%	98%	91%

Forty (40) clinical samples for each drug were run using each of The One Step Single Drug Test Strips by an untrained operator at a Professional Point of Care site. Based on GC/MS data, the operator obtained statistically similar Positive Agreement, Negative Agreement and Overall Agreement rates as trained laboratory personnel.

\*Note: TCA was based on HPLC data.

### Precision

A study was conducted at three physician offices by untrained operators using three different lots of product to demonstrate the within run, between run and between operator precision. An identical panel of coded specimens, containing drugs at the concentration of  $\pm 50\%$  and  $\pm 25\%$  cut-off level, was labeled, blinded and tested at each site. The results are given below:

#### AMPHETAMINE (AMP)

Amphetamine conc. (ng/mL)	n per site	Site A		Site B		Site C	
		-	+	-	+	-	+
0	5	5	0	5	0	5	0
500	5	5	0	4	1	5	0
750	5	5	0	1	4	1	4
1,250	5	0	5	0	5	0	5
1,500	5	0	5	0	5	0	5

#### BARBITURATES (BAR)

Secobarbital conc. (ng/mL)	n per site	Site A		Site B		Site C	
		-	+	-	+	-	+
0	5	5	0	5	0	5	0
150	5	4	1	5	0	5	0
225	5	1	4	4	1	5	0
375	5	0	5	0	5	2	3
450	5	0	5	0	5	1	4

#### BENZODIAZEPINES (BZO)

Oxazepam conc. (ng/mL)	n per site	Site A		Site B		Site C	
		-	+	-	+	-	+
0	5	5	0	5	0	5	0
150	5	4	1	3	2	4	1
225	5	2	3	4	1	2	3
375	5	0	5	0	5	3	2
450	5	0	5	0	5	1	4

#### COCAINE (COC)

Benzoylecgonine conc. (ng/mL)	n per site	Site A		Site B		Site C	
		-	+	-	+	-	+
0	5	5	0	5	0	5	0
150	5	5	0	4	1	5	0
225	5	5	0	1	4	5	0
375	5	1	4	0	5	2	3
450	5	0	5	0	5	1	4

#### MARIJUANA (THC)

11-nor-A9-THC-9-COOH conc. (ng/mL)	n per site	Site A		Site B		Site C	
		-	+	-	+	-	+
0	5	5	0	5	0	5	0
25	5	5	0	3	2	5	0
37.5	5	5	0	2	3	5	0
62.5	5	1	4	1	4	1	4
75	5	0	5	0	5	0	5

#### METHADONE (MTD)

Methadone conc. (ng/mL)	n per site	Site A		Site B		Site C	
		-	+	-	+	-	+
0	5	5	0	5	0	5	0
150	5	5	0	5	0	5	0
225	5	2	3	5	0	4	1
375	5	1	4	2	3	2	3
450	5	0	5	0	5	0	5

#### METHAMPHETAMINE (mAMP)

Methamphetamine conc. (ng/mL)	n per site	Site A		Site B		Site C	
		-	+	-	+	-	+
0	5	5	0	5	0	5	0
500	5	5	0	4	1	5	0
750	5	5	0	4	1	1	4
1,250	5	0	5	0	5	3	2
1,500	5	0	5	0	5	0	5

#### METHYLENEDIOXYMETHAMPHETAMINE (MDMA)

Methylenedioxy-methamphetamine conc. (ng/mL)	n per site	Site A		Site B		Site C	
		-	+	-	+	-	+
0	5	5	0	5	0	5	0
250	5	4	1	5	0	5	0
375	5	4	1	3	2	4	1
625	5	0	5	0	5	1	4
750	5	0	5	0	5	0	5

#### OPIATE (OPI 2000)

Morphine conc. (ng/mL)	n per site	Site A		Site B		Site C	
		-	+	-	+	-	+
0	5	5	0	5	0	5	0
1,000	5	5	0	4	1	5	0
1,500	5	5	0	4	1	4	1
2,500	5	0	5	1	4	2	3
3,000	5	0	5	0	5	0	5

#### OPIATES (OPI 300)

Morphine conc. (ng/mL)	n per site	Site A		Site B		Site C	
		-	+	-	+	-	+
0	5	5	0	5	0	5	0
150	5	4	1	5	0	5	0
225	5	2	3	5	0	5	0
375	5	0	5	0	5	3	2
450	5	0	5	0	5	1	4

#### PHENCYCLIDINE (PCP)

Phencyclidine conc. (ng/mL)	n per site	Site A		Site B		Site C	
		-	+	-	+	-	+
0	5	5	0	5	0	5	0
12.5	5	4	1	5	0	5	0
18.75	5	2	3	5	0	3	2
31.25	5	1	4	0	5	1	4
37.5	5	1	4	0	5	0	5

#### TRICYCLIC ANTIDEPRESSANTS (TCA)

Nortriptyline conc. (ng/mL)	n per site	Site A		Site B		Site C	
		-	+	-	+	-	+
0	5	5	0	5	0	5	0
500	5	5	0	4	1	4	1
750	5	5	0	1	4	3	2
1,250	5	0	5	1	4	0	5
1,500	5	0	5	0	5	0	5

### Analytical Sensitivity

A drug-free urine pool was spiked with drugs at concentrations listed. The results are summarized below.

Drug concentration	n	AMP		BAR		BZO		COC	
		-	+	-	+	-	+	-	+
0% Cut-off	30	30	0	30	0	30	0	30	0
-50% Cut-off	30	30	0	30	0	30	0	30	0
-25% Cut-off	30	30	0	27	3	26	4	30	0
Cut-off	30	18	12	22	8	12	18	4	26
+25% Cut-off	30	1	29	7	23	3	27	0	30
+50% Cut-off	30	0	30	2	28	0	30	0	30

Drug concentration	n	THC		MTD		mAMP		MDMA	
		-	+	-	+	-	+	-	+
0% Cut-off	30	30	0	30	0	30	0	30	0
-50% Cut-off	30	30	0	29	1	30	0	30	0
-25% Cut-off	30	12	18	24	6	30	0	26	4
Cut-off	30	1	29	21	9	18	12	17	13
+25% Cut-off	30	1	29	2	28	1	29	4	26
+50% Cut-off	30	0	30	0	30	0	30	0	30

Drug concentration	n	OPI		PCP		TCA	
		-	+	-	+	-	+
0% Cut-off	30	30	0	30	0	30	0
-50% Cut-off	30	30	0	30	0	30	0
-25% Cut-off	30	30	0	19	11	22	8
Cut-off	30	13	17	16	14	12	18
+25% Cut-off	30	4	26	6	24	7	23
+50% Cut-off	30	0	30	0	30	0	30

### Analytical Specificity

The following table lists the concentration of compounds (ng/mL) that are detected positive in urine by One Step Drug Screen Test Card at 5 minutes.

AMPHETAMINE	ng/mL
D-Amphetamine	1,000
D,L-Amphetamine sulfate	3,000
L-Amphetamine	50,000
(±)3,4-Methylenedioxyamphetamine	2,000
Phentermine	3,000
BARBITURATES	
Secobarbital	300
Amobarbital	300
Alphenol	150
Aprobarbital	200
Butobarbital	75
Butalbital	2,500
Butethal	100
Cyclopentobarbital	600
Pentobarbital	300
Phenobarbital	100
BENZODIAZEPINES	
Oxazepam	300
Alprazolam	196
a-Hydroxyalprazolam	1,262
Bromazepam	1,562
Chlordiazepoxide	1,562

	ng/mL
Chlordiazepoxide HCl	781
Clobazam	98
Clonazepam	781
Clorazepate dipotassium	195
Delorazepam	1,562
Desalkylflurazepam	390
Diazepam	195
Estazolam	2,500
Flunitrazepam	390
(±) Lorazepam	1,562
RS-Lorazepam glucuronide	156
Midazolam	12,500
Nitrazepam	98
Norchlordiazepoxide	195
Nordiazepam	390
Temazepam	98
Triazolam	2,500

<b>COCAINE</b>	
Benzoyllecgonine	300
Cocaine HCl	780
Cocaeethylene	12,500
Ecgonine HCl	32,000

<b>MARIJUANA (THC)</b>	
11-nor-Δ <sup>9</sup> -THC-9 COOH	50
Cannabinol	20,000
11-nor-Δ <sup>8</sup> -THC-9 COOH	30
Δ <sup>8</sup> -THC	15,000
Δ <sup>9</sup> -THC	15,000

<b>METHADONE</b>	
Methadone	300
Doxylamine	50,000

<b>METHAMPHETAMINE</b>	
D-Methamphetamine	1,000
p-Hydroxymethamphetamine	30,000
L-Methamphetamine	8,000
(±)-3,4-Methylenedioxyamphetamine	2,000
Mephentermine	50,000

<b>METHYLENEDIOXYMETHAMPHETAMINE (MDMA)</b>	
D,L-3,4-Methylenedioxyamphetamine HCl (MDMA)	500
3,4-Methylenedioxyamphetamine HCl (MDA)	3,000
3,4-Methylenedioxyethyl-amphetamine (MDE)	300

<b>OPIATE 300 (MOP)</b>	
Morphine	300
Codeine	300
Ethylmorphine	6,250
Hydrocodone	50,000
Hydromorphone	3,125
Levorphanol	1500
6-Monoacetylmorphine	400
Morphine 3-β-D-glucuronide	1,000
Norcodeine	6,250
Normorphone	100,000
Oxycodone	30,000
Oxymorphone	100,000
Procaine	15,000
Thebaine	6,250

<b>OPIATES (2000)</b>	
Morphine	2,000
Codeine	2,000
Ethylmorphine	5,000
Hydrocodone	12,500
Hydromorphone	5,000
	ng/mL

Levophanol	75,000
6-Monoacetylmorphine	5,000
Morphine 3-β-D-glucuronide	2,000
Norcodeine	12,500
Normorphone	50,000
Oxycodone	25,000
Oxymorphone	25,000
Procaine	150,000
Thebaine	100,000

<b>PCP</b>	
Phencyclidine	25
4-Hydroxyphencyclidine	12,500

<b>TCA</b>	
Notriptyline	1,000
Nordoxepin	1,000
Trimipramine	3,000
Amitriptyline	1,500
Promazine	1,500
Desipramine	200
Imipramine	400
Clomipramine	12,500
Doxepin	2,000
Maprotiline	2,000
Promethazine	25,000

#### Effect of Urinary Specific Gravity

Fifteen (15) urine samples of normal, high, and low specific gravity ranges (1.000-1.037) were spiked with drugs at 50% below and 50% above cut-off levels respectively. The One Step Drug Screen Test Card was tested in duplicate using fifteen drug-free urine and spiked urine samples. The results demonstrate that varying ranges of urinary specific gravity does 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 drugs at 50% below and 50% above cut-off levels. The spiked, pH-adjusted urine was tested with One Step Drug Screen Test Card. The results demonstrate that varying ranges of pH does 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 drug positive urine containing Cocaine, Barbiturates, Benzodiazepines, Amphetamine, Methamphetamine, Marijuana, Methadone, Methylenedioxyamphetamine, Opiate, Phencyclidine or Tricyclic antidepressants. The following compounds show no cross-reactivity when tested with One Step Drug Screen Test Card at a concentration of 100 µg/mL.

### Non Cross-Reacting Compounds

Acetaminophen	Acetophenetidin
N-Acetylprocainamide	Acetylsalicylic acid
Aminopyrine	Amoxicillin
Ampicillin	L-Ascorbic acid
Apomorphine	Aspartame
Atropine	Benzilic acid
Benzoic acid	Benzphetamine*
Bilirubin	D/L-Brompheniramine
Caffeine	Cannabidol
Chloralhydrate	Chloramphenicol
Chlorothiazide	D/L-Chloropheniramine
Chlorpromazine	Chloroquine
Cholesterol	Clonidine
Cortisone	L-Cotinine
Creatinine	Deoxycorticosterone
Dextromethorphan	Diclofenac
Diffunisal	Digoxin
Diphenhydramine	Ecgonine methyl ester
L -ψ-Ephedrine	β-Estradiol
Estrone-3-sulfate	Ethyl-p-aminobenzoate
[1R,2S] (-) Ephedrine	L(-)-Epinephrine
Erythromycin	Fenoprofen
Furosemide	Gentisic acid
Hemoglobin	Hydralazine
Hydrochlorothiazide	Hydrocortisone
O-Hydroxyhippuric acid	p-Hydroxyamphetamine
p-Hydroxytyramine	Ibuprofen
Iproniazid	D/L-Isoproterenol

Isoxsuprine	Ketamine
Ketoprofen	Labetalol
Loperamide	Meperidine
Meprobamate	Methoxyphenamine
Methylphenidate	Nalidixic acid
Naloxone	Naltrexone
Naproxen	Niacinamide
Nifedipine	Norethindrone
D-Norpropoxyphene	Noscapine
D/L-Octopamine	Oxalic acid
Oxolinic acid	Oxymetazoline
Papaverine	Penicillin-G
Pentazocine hydrochloride	Perphenazine
Phenelzine	Trans-2-phenylcyclo-propylamine hydrochloride
L-Phenylephrine	β-Phenylethylamine
Phenylpropanolamine	Prednisolone
Prednisone	D/L-Propranolol
D-Propoxyphene	D-Pseudoephedrine
Quinacrine	Quinine
Quindine	Ranitidine
Salicylic acid	Serotonin
Sulfamethazine	Sulindac
Tetracycline	Tetrahydrocortisone 3-acetate
Tetrahydrocortisone 3 (β-D-glucuronide)	Tetrahydrozoline
Thiamine	Thioridazine
D/L-Tyrosine	Tolbutamide
Triamterene	Trifluoperazine
Trimethoprim	Tryptamine
D/L-Tryptophan	Tyramine
Uric acid	Verapamil
Zomepirac	

\*Parent compound only; metabolizes into amphetamine and methamphetamine in the body.

#### BIBLIOGRAPHY

- Tietz NW. Textbook of Clinical Chemistry. W.B. Saunders Company. 1986; 1735.
- Stewart DJ, Inaba T, Lucassen M, Kalow W. *Clin. Pharmacol. Ther.* April 1979; 25 ed: 464, 264-8.
- Ambre J. *J. Anal. Toxicol.* 1985; 9:241.
- Hawks RL, CN Chiang. *Urine Testing for Drugs of Abuse*. National Institute for Drug Abuse (NIDA), Research Monograph 73, 1986.
- FDA Guidance Document: Guidance for Premarket Submission for Kits for Screening Drugs of Abuse to be Used by the Consumer, 1997.
- Robert DeCresce. *Drug Testing in the workplace*, 114.
- Baselt RC. Disposition of Toxic Drugs and Chemicals in Man. 2nd Ed. Biomedical Publ., Davis, CA 1982; 487.
- Winger, Gail, A Handbook of Drug and Alcohol Abuse, Third Edition, Oxford Press, 1992, page 146.