

Matrix Cup

Plus Optional Adulterant Strip(s)

**FOR THE QUALITATIVE ASSESSMENT OF DRUGS AND/OR THEIR METABOLITES
IN HUMAN URINE**

and

URINE ALCOHOL (Optional)

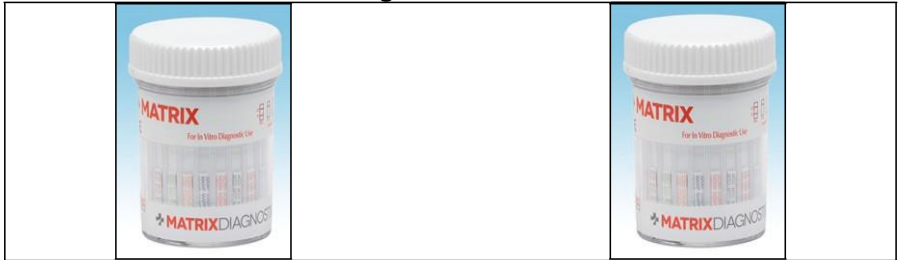
**FOR THE SEMI-QUANTITATIVE ASSESSMENT OF ETHYL ALCOHOL
IN HUMAN URINE**

Plus

URINE CHECK (Optional)

FOR THE VALIDATION OF URINE SPECIMEN EXAMINED

For in vitro Diagnostic and Forensic Use



Optional: Alcohol & Adulteration

REF	Urine Alcohol Strip can be optionally integrated into this Matrix Cup Urine check adulteration strip can also be optionally integrated into Drugs Of Matrix Cup with custom parameters. pH and/or creatinine are the optional standard parameters whereas five other parameters are offered as options for custom made test devices. The currently available Adulteration parameters offered by Matrix Diagnostics Ltd. are Creatinine (C), pH (P), Specific Gravity (G), Nitrite (N), Glutaraldehyde (U), Bleach(B), and Pyridinium Chlorochromate (P).
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INTENDED USE

Matrix Cup, hereinafter referred to as Matrix Cup is an immunochromatography based one step in vitro test. It is designed for qualitative determination of drug substances in human urine specimens. This assay may be used in the point of care setting. Below is a list of cut-off concentrations for each drug.

ACE	Acetaminophen	5000	ng/ml of Acetaminophen
ALP	Alprazolam	100	ng/ml of Alprazolam
AMP	Amphetamine	300	ng/ml of d-amphetamine
AMP	Amphetamine	500	ng/ml of d-amphetamine
AMP	Amphetamine	1000	ng/ml of d-amphetamine
BAR	Barbiturate	300	ng/ml of secobarbital
BZO	Benzodiazepine	300	ng/ml of oxazepam
BJP	Buprenorphine	10	ng/ml of Buprenorphine-3-β-d-glucuronide
CAT	Cathine	100	ng/ml of (+)-Norpseudoephedrine
CAF	Caffeine	8000	ng/ml of Caffeine
CFYL	Carfentanil	500	ng/ml of Carfentanil
CLON	Clonazepam	150	ng/ml of Clonazepam
COC	Cocaine	150	ng/ml of benzoylcegonine
COC	Cocaine	300	ng/ml of benzoylcegonine
COT	Cotinine	200	ng/ml of Cotinine
DIA	Diazepam	100	ng/ml of Diazepam
EDDP	EDDP	100	ng/ml of EDDP
ETG	Ethyl Glucuronide	500	ng/ml of Ethyl Glucuronide
ETG II*	Ethyl Glucuronide	1000	ng/ml of Ethyl Glucuronide
FYL	Fentanyl	10	ng/ml of Fentanyl
GAB	Gabapentin	2000	ng/ml of Gabapentin
HMO	Hydromorphone	250	ng/ml of Hydromorphone
KET	Ketamine	1000	ng/ml of Ketamine
KRA	Kratom	500	ng/ml of Kratom
K2	JHW-018 and JWH-073	50	ng/ml of JHW-018 and JWH-073
K2-AB	AB-PINACA	25	ng/ml of AB-PINACA
K4	UR-144	25	ng/ml of UR-144
LSD	Lysergic acid diethylamide	20	ng/ml of Lysergic acid diethylamide
MCAT	Methcathinone	500	ng/ml of Methcathinone
MDA	Tenamfetamine	500	ng/ml of Tenamfetamine
MDMA	MDMA	500	ng/ml of MDMA
MDPV	3,4-Methylenedioxypropyvalerone	500	ng/ml of 3,4-Methylenedioxypropyvalerone
MDPHP	MDPHP	500	ng/ml of MDPHP
MET	Methamphetamine	500	ng/ml of (+)methamphetamine
MET	Methamphetamine	1000	ng/ml of (+)methamphetamine
MEP	Mephedrone	500	ng/ml of Mephedrone

MES	Mescaline	300	ng/ml of Mescaline
MPD	Methylphenidate	150	ng/ml of Methylphenidate
MQL	Methaqualone	300	ng/ml of Methaqualone
MTD	Methadone	300	ng/ml of methadone
OPI *	Opiate*	300	ng/ml of morphine
OPI II*	Opiate II*	2000	ng/ml of morphine
OXY	Oxycodone	100	ng/ml of oxycodone
PCP	Phencyclidine	25	ng/ml of phencyclidine
PGB	Pregabalin	500	ng/ml of Pregabalin
PGB	Pregabalin	1000	ng/ml of Pregabalin
PPX	Propoxyphene	500	ng/ml of Norpropoxyphene
TAP	Tapentadol	300	ng/ml of Tapentadol
THC	Cannabinoid	50	ng/ml of 11-nor-Δ9-THC-9-COOH
TPM	Tropicamide	350	ng/ml of Tropicamide
TML	Tramadol	100	ng/ml of Tramadol
TML	Tramadol	200	ng/ml of Tramadol
TCA	Tricyclic antidepressant	1000	ng/ml of Nortriptyline
TZD	Trazodone	200	ng/ml of Trazodone
TLD	Tildine	300	ng/ml of Tildine
ZAL	Zaleplon	100	ng/ml of Zaleplon
ZOL	Zolpidem Phenyl-4-carboxylic acid	50	ng/ml of Zolpidem Phenyl-4-carboxylic acid
ZOP	Zopiclone	50	ng/ml of Zopiclone
6-MAM	6-Acetylmorphine	10	ng/ml of 6-Acetyl morphine
7-ACL	7-Aminoclonazepam	300	ng/ml of 7-Aminoclonazepam
APVP	α -Pyrrolidinovalerophenone	500	ng/ml of α -Pyrrolidinovalerophenone
GHB	Gamma-Hydroxybutyric Acid	10	μ g/ml of Gamma-Hydroxybutyric Acid
ALC	Alcohol	40	mg/dl (0.04% BAC) of Alcohol
Oxidants/ Specific Gravity / pH/Nitrite / Glutaraldehyde/Creatinine			

This assay provides only a preliminary analytical test result. A more specific alternative chemical method must be used in order to obtain a confirmed analytical result. Gas chromatography/ mass spectrometry (GC/MS) has been established as the preferred confirmatory method by the Substance Abuse Mental Health Services Administration (SAMHSA). Clinical consideration and professional judgement should be applied to any drug of abuse test result, particularly when preliminary positive results are indicated. The optional built-in Adulteration Test is for validation of urine specimen's integrity and must not be used for In Vitro diagnostic use.

*** SAMHSA recommends a cut-off concentration of 2000 ng/ml for Opiates Test, a cut-off concentration of 1000 ng/ml for Amphetamine Test, a cut-off concentration of 10 ng/ml for Buprenorphine Test, a cut-off concentration of 100 ng/ml for EDDP Test, a cut-off concentration of 1000 ng/ml for Methamphetamine Test.**

SUMMARY AND EXPLANATION

Drugs of Abuse

ACE Acetaminophen (paracetamol) is a popular alternative to aspirin due to its lower potential for undesirable side effects, exhibiting analgesic and antipyretic effect without anti-inflammatory properties. Acetaminophen is available in pure form as numerous tradename preparations for oral use, in amounts of 350-500 mg in normal-release or 650 mg in sustained release formulations. Its is also found combined in over 200 preparations with other drugs such as codeine, hydrocodone and propoxyphene. In therapeutic usage the drug is excreted largely in the urine as various conjugates: 45-55% as a glucuronide conjugate, 20-30% as a sulfate, and 15-55% as cysteine and mercapturic acid conjugates. Approximately 2% of each doses is excreted unchanged in the urine. Following overdosage, saturation of conjugation pathways occurs and glutathione stores become depleted, resulting in the formation of a highly reactive acetaminophen metabolite. The amount of unchanged acetaminophen excreted in urine after overdosage may increase to as much as 10-14% of each dose.

ALP 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 the urine is 3-7 days. Alprazolam may be quantified in blood or plasma to confirm a diagnosis of poisoning in hospitalized patients, provide evidence in an impaired driving arrest, or to assist in a medicolegal death investigation. Blood or plasma alprazolam concentrations are usually in a range of 10–100 µg/L in persons receiving the drug therapeutically, 100–300 µg/L in those arrested for impaired driving, and 300–2000 µg/L in victims of acute overdosage

AMP are a class of potent sympathomimetic agents with therapeutic applications. The most common amphetamines are d-amphetamine and dl-amphetamine. Amphetamines are central nervous stimulants that cause the neurotransmitters epinephrine, norepinephrine and dopamine to be released into the brain and body giving users feelings of euphoria, alertness, and increased energy. Chronic abuse of amphetamine leads to tolerance and drug reinforcement effect. Cardiovascular responses to amphetamine include i ncreased blood pressure and cardiac arrhythmias. More acute responses produce anxiety, paranoia, hallucinations and psychotic behavior. Amphetamine is metabolized by a number of pathways. In general, acid urine promotes excretion whereas alkaline urine retards it. In 24 hours, approximately 79% of the amphetamine dose is excreted in acid urine and about 45% in alkaline urine. Typically, about 20% is excreted as unchanged amphetamine. Unchanged amphetamine can be detected up to 1–2 days after use

BAR are a group of prescription drugs that are frequently abused. They can depress the central nervous system. Acute higher dose induces exhilaration, sedation and respiratory depression. More acute responses produce respiratory collapse and coma. The effects of short-acting barbiturates, such as secobarbital last 3 to 6 hours. The effects of long-acting barbiturates such as phenobarbital last 10 to 20 hours. Short-acting barbiturates normally remain detectable in urine for 4 to 6 days, while long-acting barbiturates can be detected for up to 30 days. Barbiturates are excreted in the urine in unchanged forms, hydroxylated derivatives, carboxylated derivatives and glucuronide conjugates

BZO are a class of widely prescribed central nervous system depressants which have anxiolytic, hypnotic, anticonvulsant and muscle relaxant effects. Chronic abuse can result in addiction and tardive dyskinesia. Acute higher doses lead to drowsiness, dizziness, muscle relaxation, lethargy, coma and possible death. The effects of benzodiazepines use last 4 – 8 hours. Many of the benzodiazepines share a commonmetabolic route, and are excreted as oxazepam and its glucuronide in urine. Oxazepam is detectable in the urine for up to 7 days after drug use.

BUP A derivative of thebaine, is an opioid that has been marketed in the United States as the Schedule V parenteral analgesic Buprenex. In 2003, based on a reevaluation of available evidence regarding the potential for abuse, addiction, and side effect, DEA reclassified buprenorphine from a Schedule V to a Schedule III narcotic. Buprenorphine resembles morphine structurally but has a longer duration of action than morphine and can be administered sublingually as an analgesic. In October 2002, FDA approved the use of a buprenorphine monotherapy product, Subutex, and a buprenorphine/naloxone combination product, Suboxone, for the treatment of opioid addiction. Subutex and Suboxone are the first narcotic drugs available under the US Drug Act (DATA) of 2003 for the treatment of opiate dependence that can be prescribed in the US in a physician's work place. It has also been shown that buprenorphine has abuse potential and may itself cause dependency. In addition, a number of deaths have been recorded as a result of overdose with intravenously injected buprenorphine in conjunction with other psychotropic drugs such as benzodiazepines. Buprenorphine is metabolized primarily by n-dealkylation to form glucuronide-buprenorphine and glucuronide-norbuprenorphine.

CAT Cathine, also known as d-norpseudoephedrine and (+)-norpseudoephedrine, is a psychoactive drug of the phenethylamine and amphetamine chemical classes which acts as a stimulant. Along with cathinone, it is found naturally in Catha edulis (khat), and contributes to its overall effect. It has approximately 10–14% the potency of amphetamine. The World Anti-Doping Agency's list of prohibited substances (used for the Olympic Games among other athletic events) bars cathine in concentrations of over 5 micrograms per milliliter in urine.Cathine is a Schedule III drug under the Convention on Psychotropic Substances.

CAF Caffeine is a central nervous system (CNS) stimulant of the methylxanthine class. It is the world's most widely consumed psychoactive drug. It is found in the seeds, roots, or leaves of a number of plants native to South America and East Asia and confers on them several survival

and reproductive benefits. Caffeine can produce a mild form of drug dependence-associated with withdrawal symptoms such as sleepiness, headache, and irritability – when an individual stops using caffeine after repeated daily intake. After intravenous administration of caffeine the urine level of the drug is approximately the same in each of the first 4 hourly specimens. Blood samples taken 10 and 70 minutes after injection of the drug were analyzed and showed 0.29 and 0.28mg. per 100 cc. respectively. There are to be contrasted with the 1st hour urine which contained 0.73mg.per 100 cc., essentially 3 times that in the blood. After oral administration of caffeine to the horse the concentration of caffeine in the urine rose progressively during the first 3 hours, remained relatively constant through the 8th hours. At 48 hours, a urine specimen contained approximately 0.17mg. per 100 cc. of caffeine. In addition, flu-like symptoms, nausea/vomiting, and muscle pain/stiffness were judged likely to represent valid symptom categories. In experimental studies, the incidence of headache was 50% and the incidence of clinically significant distress or functional impairment was 13%. Typically, onset of symptoms occurred 12–24 h after abstinence, with peak intensity at 20–51 h, and for a duration of 2–9 days. 1% to 3% of caffeine is excreted unchanged in the urine. The rate of caffeine metabolism is variable, with a half-life of 4 to 6h.

CFYL Carfentanyl is an analog of the synthetic opioid analgesic fentanyl. It is 10,000 times more potent than morphine, making it among the most potent commercially used opioids. Carfentanil was first synthesized in 1974. It is marketed under the trade name Wildnil as a general anaesthetic agent for large animals. Side effects of carfentanil are similar to those of fentanyl, which include itching, nausea and respiratory depression, which can be life-threatening. Carfentanil is classified as Schedule II under the Controlled Substances Act in the United States with a DEAACSCN of 9743.

CLON is a chlorinated derivative of nitrazepam having anticonvulsant, muscle relaxant and very potent anxiolytic properties. It is marketed as the prescription drug under the names of Klonopin, Ravotril, Tivotril or Rivatril. Clonazepam has an unusually long half-life of 18-50 hours in human body, making it generally considered to be among long-acting benzodiazepines. Clonazepam has a fast onset of action and high effectiveness rate and low toxicity in overdose, but have drawbacks due to adverse reactions including paradoxical effects, drowsiness, and cognitive impairment. Cognitive impairment can persist for at least 6 months after withdrawal of clonazepam. Clonazepam is largely bound to plasma proteins. Clonazepam is rapidly and completely absorbed after oral administration. Maximum plasma concentration of clonazepam are reached within 1 to 4 hours after oral administration. Clonazepam is highly metabolized with less than 2% unchanged in urine. The metabolites include 7-aminoclonazepam, 7-acetaminoclonazepam and 3-hydroxy clonazepam.

COC Derived from the leaves of cocoa plant, cocaine is a potent central nervous system stimulant as well as a local anesthetic. Some of the psychological effects induced by cocaine are: euphoria, confidence and a sense of increased energy, accompanied by increased heart rate, dilation of the pupils, fever, tremors and sweating. Continued ingestion of cocaine could induce tolerances and physiological dependency which leads to its abuse. Cocaine is used by smoking, intravenous, intranasal or oral administration and excreted in the urine primarily as benzoylcegonine in a short period. Benzoylcegonine has a biological half-life of 5 – 8 hours, which is much longer than that of cocaine (0.5 – 1.5 hours), and can be generally detected for 12 – 72 hours after cocaine use or exposure.

COT is an alkaloid found in tobacco and is also a major metabolite of nicotine. Cotinine is used as a biomarker for exposure to tobacco smoke and has also been sold as an anti-depressant under the brand name of Scotine. Cotinine has an in vivo half-life of approximately 20 hours, and is typically detectable for several days after the use of tobacco. The level of cotinine is proportionate to the amount of exposure to tobacco smoke. In urine, values between 11 ng/ml and 30 ng/ml may be associated with light smoking or passive exposure. The cotinine levels in active smokers typically reach 500 ng/ml or more.

DIA 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.

EDDP 2-Ethylidene-1,5-dimethyl-3,3-diphenylpyrrolidine, is the primary metabolite of methadone. Methadone is a controlled substance and is used for detoxification and maintenance of opiate dependant patients. Patients on methadone maintenance may exhibit methadone (parent) levels that account for 5-50% of the dosage and 3-25% of EDDP in urinary excretion during the first 24 hours. The detection of EDDP is more beneficial than traditional methadone screening, in that EDDP exists only in urine from individuals who have ingested methadone. The tampering of specimens by spiking the urine with methadone can be prevented. Secondly, renal clearance of EDDP not affected by urinary pH, therefore the EDDP test provides a more accurate result of methadone ingestion than the methadone parent screen.

ETG Ethyl glucuronide (EtG) is a minor non-oxidative metabolite of ethyl alcohol formed by the in vivo conjugation of ethanol with glucuronic acid with UDP glucuronosyl transferase.ETG is a product of metabolic process about of Ingested alcohol (ethanol) rapidly metabolized in the body, which is excreted in the blood, hair and urine. By using The ETG Rapid Test Device (Urine), can detect ETG in urine, confirming the consumption of alcohol. The ETG metabolite remains in the body longer and therefore has a more useful window of detection of 8 to 80 hours. ETG testing is an excellent option for zero-tolerance alcohol consumption or rehabilitation programs.

Fentanyl is a synthetic opioid. It has the brand names of Sublimaze, Actiq, Durogesic, Fentora and others. Fentanyl is approximately 100 times more potent than morphine, with 100 micrograms of fentanyl approximately equivalent to 10 mg of morphine or 75 mg of meperidine in analgesic activity. Fentanyl is a potent narcotic analgesic with rapid onset and short duration of action. Historically, it has been used to treat chronic breakthrough pain and is commonly used pre-procedures. Illicit use of pharmaceutical fentanyl's first appeared in the mid-1970s. Because the effects of fentanyl last for only a very short time, it is even more addictive than heroin. The regular uses may become addicted very quickly. Fentanyl is much more potent than heroin, and tends to produce significantly worse respiratory depression, making it somewhat more dangerous than heroin to users. The overdose of fentanyl has caused death. In the United States, fentanyl is classified as a Schedule II controlled substance.

GAB Gabapentin (GAB) marketed under the brand name Neurontin among others, is a medication used to treat epilepsy,neuropathic pain, hot flashes, and restless leg syndrome. In epilepsy it may be used for those with partial seizures. It is recommended as one of a number of first line medications for the treatment of neuropathic pain idiopathic neuropathy, post-herpetic neuralgia, and central neuropathic pain. The mechanism of the anticonvulsant action of gabapentin has not been fully described. Several possible mechanisms for pain improvement have been discussed. Though similar in structure to the endogenous neurotransmitter GABA, gabapentin has not been shown to bind to GABA receptors at concentrations at or below 1 mM. Gabapentin modulates the action of glutamate decarboxylase (GAD) and branched chain aminotransferase (BCAT), two enzymes involved in GABA biosynthesis. In human and rat studies, gabapentin was found to increase GABA biosynthesis, and to increase non-synaptic GABA neurotransmission in vitro.Common side effects include sleepiness and dizziness. Serious side effects may include an increased risk of suicide, aggressive behaviour, and drug reaction with eosinophilia and systemic symptoms. It is unclear if it is safe duringpregnancy or breastfeeding. Lower doses should be used in people with kidney problems. Gabapentin affects the inhibitory neurotransmitter γ-aminobutyric acid (GABA).

HMO The hydromorphone (HMO) is a derivative of morphine. It can be said that hydromorphone is to morphine as hydrocodone is to codeine and, therefore, a semi-synthetic drug. Hydromorphone is commonly used in the hospital setting, mostly intravenously (IV) because its bioavailability orally, rectally, and intranasally is very low. But a positive test result does not automatically mean that an abuse of drugs has been taken place since also some fully legally taken medicaments do contain opiates (e.g. codeine)

KET is a derivative of phencyclidine. It is used medically as a veterinary and human anaesthetic. Certain doses of ketamine can cause dream-like states and hallucinations. In high doses, ketamine can cause delirium, amnesia, impaired motor function, high blood pressure, depression, and potentially fatal respiratory problems. Ketamine is metabolized in the liver and excreted through the kidney. The half-life of ketamine in the body is around three hours.

KRAMITragyna speciosa is a tropical evergreen tree in thecoffee family native to Southeast Asia. M. speciosa isindigenous to Thailand, Indon esia, Malaysia, Myanmar, Vietnam, Laos, Cambodia, and Laos, where it has been used in traditional medicine since at least the nineteenth century. Krato m has opioid properties and some stimulant-like effects.Mitragyna is classified as a mixed-opioid receptor agonist and is roughly 13 times more potent than morphine. Mitragynine is thought to be responsible for the opioid-like action of Kratom, due to its opioid-like action, has been used for treatment of pain and opioid withdrawal. Animal studies suggest that the primary mitragyninepharmacologic action occurs at the mu and delta-opioid receptors, as well as serotonergic and noradrenergic pathways in the spinal cord. Stimulation at post-synaptic alpha-2 adrenergic receptors, and receptor blocking at 5-hydroxytryptamine 2A may also occur. The 7-hydroxymitragynine may have a higher affinity for the opioid receptors. Partial agonist activity may be involved.

K2 is a psychoactive herbal and chemical product that, when consumed, mimics the effects of cannabis. It is best known by the brand name K2 and Spice, both of which have largely become genericized trademarks used for refer to any synthetic cannabis product. The studies suggest that synthetic cannabinoid intoxication is associated with acute psychosis, worsening of previously stable psychotic disorders, and also may have the ability to trigger a chronic (long-term) psychotic disorder among vulnerable individuals such as those with a family history of mental illness. A large and complex variety of synthetic cannabinoids, most often cannabicyclohexans, JWH-018, JWH-073, or HU-210 are used. As of March 1, 2011, five cannabinoids, JWH-018, JWH-073, CP-47, JWH-200 and cannabicyclohexanol are illegal in US because these substances have the potential to be extremely harmful and, therefore, pose an imminent hazard to the public safety.

K2-AB AB-PINACA is a synthetic cannabinoid usually sold as a herbal smoking mixture designed to mimic THC, the active chemical of cannabis. Synthetic cannabinoids are classed as 'New Psychoactive Substances' (NPS) which are unregulated substances that have become newly available on the market as an alternative to illegal drugs. As a reaction to prohibition, synthetic cannabinoid producers change the compounds found in designer drugs and create new generations of synthetic drugs, such as AB-PINACA. As a result, accidental overdose and severe psychiatric complications may be more likely to occur because the type and amount of active compound may vary considerably from batch to batch. Other effects may include agitation, rapid heart rate, confusion, dizziness and nausea.

K4 Synthetic Cannabinoids are chemical compounds that mimic the effects of THC, the main active ingredient of cannabis. They bind to the cannabinoid receptors in the brain and were developed to treat pain. The two most common synthetic cannabinoids were JWH-018 and JWH-073. New versions of these include AM1248, AKBA, UR144 and XLR11. UR144 is the new generation of synthetic cannabinoids and is chemically different to the first generation. New generations of synthetic cannabinoids are continuously emerging to replace the synthetic cannabinoids that have been made illegal. The naphthene ring in JWH-018 is substituted with a tetramethylcyclopropyl group to form UR144.

LSD Lysergic acid diethylamide, abbreviated LSD or LSD-25, also known as lysergide and colloquially as acid, is a semisynthetic psychedelic drug of the ergoline family, well known for its psychological effects which can include altered thinking processes, closed and open eye visuals, synaesthesia, an altered sense of time and spiritual experiences, as well as for its key role in 1960s counterculture. It is used mainly as an entheogen, recreational drug, and as an agent in psychedelic therapy. LSD is non-addictive, is not known to cause brain damage,

and has extremely low toxicity relative to dose, although in rare cases adverse psychiatric reactions such as anxiety or delusions are possible. **MCAT** Methcathinone, is a monomane alkaloid and psychoactive stimulant, a substituted cathinone. Methcathinone is a highly addictive drug, primarily psychologically addicting and most of the signs of addiction to the drug are emotional or psychological. It has been popularized and continues to be sold under misleading names such as "bath salts", "plant fertilizers" or "research chemicals", but it is actually a powerful psycho-stimulant used as a recreational drug. Effects of this drug typically last from 4 to 6 hours. It is used as a recreational drug due to its potent stimulant and euphoric effects and is considered to be addictive, with both physical and psychological withdrawal occurring if its use is discontinued after prolonged or high-dosage administration . It is usually snorted, but can be smoked, injected, or taken orally. Methcathinone is listed as a Schedule I controlled substance by the Convention on Psychotropic Substances and the United States' Controlled Substances Act, and as such it is not considered to be safe or effective in the treatment, diagnosis, prevention, or cure of any disease, and has no approved medical use. Methcathinone has very strong affinities for the dopamine transporter and the norepinephrine (noradrenaline) transporter. Its affinity for the serotonin transporter is less than that of methamphetamine.

MDA MDA (3,4-methylenedioxyamphetamine),also known as tenamphetamine (INN), is a psychedelic and entactogenic drug of the phenethylamine and amphetamine chemical classes. It is mainly used as a recreational drug, an entheogen, and atool in use to supplement various types of practices for transcendence, including in meditation, psychonautics, and as an agent in psychedelic psychotherapy. It was first synthesized by G. Mannish and W. Jacobson in 1910. There are about 20 different synthetic routes described in the literature for its preparation.

MDMA Methylenedioxyamphetamine (Ecstasy) is a designer drug first synthesized in 1914 by a German drug company for the treatment of obesity. 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. The most pervasive effect of MDMA, occurring in almost all people who have taken a reasonable dose of the drug, is to produce a clenching of the jaws. The MDMA Ecstasy Test Strip yields a positive result when Methylenedioxyamphetamine in urine exceeds 500ng/ml.

MDPV Methylenedioxypropylvalerone (MDPV) is a psychoactive drug with stimulant properties which acts as a norepinephrine-dopamine reuptake inhibitor. The primary psychological effects have a duration of roughly 3 to 4 hours, with after effects such as tachycardia, hypertension, and mild stimulation lasting from 6 to 8 hours.

MDPHP MDPHP is a psychoactive drug with stimulant properties which acts as a norepinephrine-dopamine reuptake inhibitor. The primary psychological effects have a duration of roughly 3 to 4 hours, with after effects such as tachycardia, hypertension, and mild stimulation lasting from 6 to 8 hours. The second largest group of new drugs monitored by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) for synthetic cathinones. Substances that are controlled by the law are immediately replaced by new uncontrolled derivatives that cause constant and dynamic changes on the drug market. The MDPHP is a recent synthetic cathinones that have appeared on the "legal highs" market

MET is the most popular synthetic derivative of the amphetamines. It is a potent sympathomimetic agent with therapeutic applications. Acute large doses lead to enhanced stimulation of the central nervous system and induce euphoria, alertness, reduced appetite, and a sense of increased energy and power. More acute response produces anxiety, paranoia, psychotic behavior, and cardiac dysrhythmias. Methamphetamine is excreted in the urine as amphetamine and oxidized and deaminated derivatives. However, 10-40% of methamphetamine is excreted unchanged. Methamphetamine is generally detectable in the urine for 3 to 5 days after use.

MEP Mephedrone, also known as 4-methylmethcathinone (4-MMC) or 4-methylphedrone is a synthetic stimulant drug of the amphetamine and cathinone classes. Slang names include drone, M-CAT, White Magic and meow meow. It is chemically similar to the cathinone compounds found in the khat plant of eastern Africa. Mephedrone comes in the form of tablets or a powder, which users can swallow, snort or inject, producing similar effects to MDMA, amphetamines and cocaine. In addition to its stimulant effects, Mephedrone produces side effects, of which teeth grinding are the most common. A number of metabolites are possible, however the n-demethyl metabolite of Mephedrone will be 4-Methylcathinone. This metabolite appears to be nearly inactive as a Monoamine Oxidase Inhibitor .On further metabolism of this metabolite one of the possible metabolites is 4-Methylnorephedrine, caused by the reduction of the Keto.A dose of 150mg-250mg is the average, giving a duration of around 2 hours.the duration will lengthen in larger 250mg+ dosages .

MES Mescaline or 3,4,5-trimethoxyphenethylamine is a naturally occurring psychedelic alkaloid of the phenethylamineclass, known for its hallucinogenic effects similar to those of LSD and psilocybin. It shares strong structural similarities with the catecholamine dopamine.It occurs naturally in the peyote cactus (Lophophora williamsii), the San Pedro cactus (Echinopsis pachanoi) and in the Peruvian torch (Echinopsis peruviana), and as well in a number of other members of the Cactaceae plant family. It is also found in small amounts in certain members of the Fabaceae (bean) family, including Acacia berlandieri. Tolerance builds with repeated usage, lasting for a few days. Mescaline causes cross-tolerance with other serotonergic psychedelics such as LSD andpsilocybin. About half the initial dosage is excreted after 6 hours, but some studies suggest that it is not metabolized at all before excretion. Mescaline appears to not be subject to metabolism by CYP2D6and between 20% and 50% of mescaline is excreted in the urine unchanged, and the rest being excreted as the carboxylic acid form of mescaline, a likely result of MAO degradation.

MPD is most commonly known by the Novartis trademark name Ritalin, which is an instant-release racemic mixture. There are also a variety of formulations and generic brand names exist. Methylphenidate is a psychostimulant drug for the treatment of attention-deficit hyperactivity disorder, Postural Orthostatic Tachycardia Syndrome, and narcolepsy. It may also be prescribed for off-label use in treatment-resistant cases of lethargy, depression, neutral insult, obesity, and rarely other psychiatric disorders such as Obsessive-Compulsive Disorder. Methylphenidate like other stimulants increases dopamine levels. The abuse potential is increased when methylphenidate is crushed and snored or when it is injected producing effects almost identical to cocaine. Cocaine-like effects can also occur with very large doses taken orally. Methylphenidate has a high potential for drug dependence and additive abuse due to its similar pharmacologically to cocaine and amphetamines. Internationally, methylphenidate is a Schedule II drug under the Convention on Psychotropic Substances. In the United States, methylphenidate is classified as a Schedule II controlled substance, the designation used for substances that have a recognized medical value but present a high likelihood for abuse because of their addictive potential.

MQL Methaqualone is classified as a sedative/hypnotic. It was originally synthesized in India to combat malaria but found to be ineffective. Methaqualone did prove effective as a sedative and was developed in the hopes of avoiding some of the adverse effects of the barbiturates, particularly their high capacity for addiction. Unfortunately, methaqualone was found to be just as addictive. Physiologically, methaqualone is cumulative, and tolerance occurs rapidly in some individuals. In addition, it is extensively metabolized,at least 12 hydroxylated metabolites having been identified in the urine. The major metabolites are methaqualone-N-oxide, conjugate 4'-hydroxy-methaqualone,conjugated 2-hydroxymethaqualone.About 0.2% of methaqualone is excreted unchanged within 24 hours;40-50% of the methaqualone is excreted as metabolites within 72 hours,mostly as the glucuronide conjugates. The half-life for methaqualone averages 33 to 36 hours.It can be detected up to four days after administration.Side effects from chronic use of methaqualone are loss of motor coordination,walking into walls,ataxia,slurred speech,drowsiness and nystagmus.Severe acute overdose tends to produce muscle spasms, abnormally rapid reflexes,extreme muscle tension and restlessness.

MTD is a synthetic opioid, clinically available. It is used clinically for the treatment of severe pain and in maintenance programs for morphine and heroine addicts. Methadone acts on the central nervous and cardiovascular systems to produce respiratory and circulatory depression. Methadone also produces miosis and increases the tone of smooth muscle in the lower gastrointestinal tract while decreasing the amplitude of peristalt

therapy for partial seizures with or without partial generalization in adults. It is also considered useful for generalized anxiety disorder.Pregabalin is a lipophilic structural analogue of γ-Aminobutyric acid (GABA) and classified as a depressant by the Drug Enforcement Agency. It is a neurotransmitter modulator that has analgesic, anticonvulsant, anxiolytic, and sleep-modulating properties.Pregabalin is a potent gabapentinoid and a close structural analogue of GABOB (β-hydroxy-GABA), baclofen (β-(4-chlorophenyl)-GABA), and phenibut (β-phenyl-GABA). Common side effects include: sleepiness, confusion, trouble with memory, poor coordination, dry mouth, problem with vision, and weight gain. Potentially serious side effects include angioedema, drug misuse, and an increasedsuicide risk.

PPX Propoxyphene is a prescription drug for the relief of pain. Although slightly less selective than morphine, Propoxyphene binds primarily to opioid receptors and produces analgesia and other CNS effects that are similar to those seen with morphine-like opioids. It is likely that at equianalgesic doses the incidence of side effects such as nausea, anorexia, constipation, abdominal pain, and drowsiness are similar to those of codeine. After oral administration, concentrations of Propoxyphene in plasma rise to their maximum values at 1 to 2 hours. There is great variability between subjects in the rate of clearance and the plasma concentrations that are achieved. The percentage of excreted unchanged Propoxyphene in urine is less than 1%. In humans, the major route of metabolism is N-demethylation to yield norpropoxyphene. Norpropoxyphene has a longer half-life (30 to 36 hours) than parent Propoxyphene (6 to 12 hours), and its accumulation with repeated doses may be responsible for some of the observed toxicity

TAPTapentadol is a centrally acting opioid analgesic of the benzenoid class with a dual mode of action as anagonist of the μ-opioid receptor a nd as a norepinephrine reuptake inhibitor. Analgesia occurs within 32 minutes of oral administration, and lasts for 4-6 hours. It is similar to tra madol in its dual mechanism ofaction; namely, its ability to activate the mu opioid receptor and inhibit the reuptake of norepinephrine.

THC The agents of Marijuana that cause various biological effects in humans are called cannabinoid. Cannabinoid is a central nervous stimulant that alters mood and sensory perceptions, produces loss of coordination, impairs short term memory, and produces symptoms of anxiety, paranoia, depression, confusion, hallucination, and increased heart rate. Large doses of cannabinoid could cause the development of tolerances and physiological dependency and lead to abuse. A tolerance to the cardiac and psychotropic effects can occur and withdrawal syndrome produces restlessness, insomnia, anorexia and nausea. Δ⁹-THC is the primary active ingredient in cannabinoids. The main metabolite excreted in the urine is 11-nor-Δ⁹-THC-9-COOH, which are found within hours of exposure and remain detectable in the urine for 3-10 days after smoking.

TPM Tropicamide is a synthetic muscarinic antagonist with actions similar to atropine and with an anticholinergic property. Upon ocular administration, tropicamide binds to and blocks the muscarinic receptors in the sphincter and ciliary muscle in the eye. This inhibits the responses from cholinergic stimulation, producing dilation of the pupil and paralysis of the ciliary muscle. Tropicamide is a diagnostic agent and is used to produce short-duration mydriasis and cycloplegia.

Tramadol is a quasi-narcotic analgesic used in the treatment of moderate to severe pain. It is a synthetic analog of codeine, but has a low binding affinity to the mu-opioid receptors. Large doses of tramadol can develop tolerance and physiological dependency and lead to its abuse. Tramadol is extensively metabolized after oral administration. Approximately 30% of the dose is excreted in the urine as unchanged drug, whereas 60% is excreted as metabolites. The major pathways appear to be N- and O- demethylation, glucuronidation or sulfation in the liver.

TCA Tricyclic antidepressants, commonly known as TCA, are a group of antidepressant drugs. TCA are mostly administered by oral or intramuscularly. The progressive symptomatology of TCA includes agitation, confusion, hallucinations, hypertonicity, seizures and EKG changes. Nortriptyline, Desipramine (Pertofran) and Imipramine (Tofranil) are the most often used TCA. TCA's half life varies from a few hours to a few days. TCA are excreted with less than 1% of the unchanged drug.

TZD Trazodone is an antidepressant medicine. It affects chemicals in the brain that may become unbalanced and cause depression. TZD is used to treat major depressive disorder. TZD is a non-tricyclic antidepressant drug with specific antagonistic activities at 5-HT(2) and alpha-1 adrenoceptors. Trazodone is well absorbed after oral administration, with mean peak blood levels obtained at about one hour after ingestion. The mean blood elimination half-life is biphasic: the first phase's half-life is 3–6 hour, and the following phase's half-life is 5–9 hour. Around 70–75% of trazodone was found to be excreted in the urine within 72 hours. Trazodone is highly protein-bound.

TLD Tilidine is a syntheticoioid painkiller, used mainly in Germany, Switzerland, South Africa and Belgium for treatment of moderate to severe pain, both acute and chronic. Its onset of pain relief after oral administration is about 10–15 minutes and peak relief from pain occurs about 25–50 minutes after oral administration. Tilidine itself is only a weak opioid, but is rapidly metabolised in the liver and gut to its active metabolite nortilidine and then to bisonortilidine. It is the (1S,2R)-isomer (dextilidine) that is responsible for its analgesic activity.Its most common adverse effects are transient nausea and vomiting, dizziness, drowsiness, fatigue, headache and nervousness; less commonly, nausea and vomiting (after repeated dosing), hallucinations, confusion, euphoria, tremor, hyperreflexia, clonus and increased sweating. Uncommonly, somnolence; rarely, diarrhoea and abdominal pain.

ZAL Zaleplon is a sedative-hypnotic, almost entirely used for the management/treatment of insomnia. It is a nonbenzodiazepine hypnotic from the pyrazolopyrimidine class.The side effects of zaleplon are similar to the side effects of benzodiazepines, although with less next-day sedation, and in two studies zaleplon use was found to not cause an increase in traffic accidents, as compared to otherhypnotics currently on the market.Zaleplon is primarily metabolised by aldehyde oxidase, and its half-life can be affected by substances which inhibit or induce aldehyde oxidase. Taken orally, zaleplon reaches full concentration in about one hour. It is extensively metabolised into 5-oxozaleplon and 5-oxodesethylzaleplon (the latter via desethylzaleplon), with less than 1% of it excreted intact in urine.

ZOL Zolpidem is a prescription medication used for the treatment of insomnia and some brain disorders. It is a short-acting nonbenzodiazepine hypnotic of the imidazopyridine class that potentiates GABA, an inhibitory neurotransmitter, by binding to GABA_A receptors at the same location as benzodiazepines. It works quickly, usually within 15 minutes, and has a short half-life of two to three hours. Zolpidem has not adequately demonstrated effectiveness in maintaining sleep, unless delivered in a controlled-release (CR) form. However, it is effective in initiating sleep. Its hypnotic effects are similar to those of the benzodiazepine class of drugs, but it is molecularly distinct from the classical benzodiazepine molecule and is classified as an imidazopyridine. Flumazenil, a benzodiazepine receptor antagonist, which is used for benzodiazepine overdose, can also reverse zolpidem's sedative/hypnotic and memory-impairing effects.

ZOP Zopiclone is a nonbenzodiazepine hypnotic agent used in the treatment of insomnia. It is a cyclopyrrolone, which increases the normal transmission of the neurotransmitter gamma-Aminobutyric acid in the central nervous system, as benzodiazepines do, but in a different way. Zopiclone is extensively metabolised by the human liver into two major metabolites: N-oxidezopiclone, which retains a low pharmacological inactivity; and N-desmethylzopiclone, which is pharmacologically inactive.

6-MAM 6-Monoacetylmorphine (6-MAM) or 6-acetylmorphine is one of three active metabolites of heroin (diacetylmorphine), the others being morphine and the much less active 3-monoacetylmorphine (3-MAM).6-MAM is rapidly created from heroin in the body, and then is either metabolized into morphine or excreted in the urine. Since 6-MAM is a unique metabolite to heroin, its presence in the urine confirms that heroin was the opioid used. This is significant because on a urine immunoassay drug screen, the test typically tests for morphine, which is a metabolite of a number of legal and illegal opiates/opioids such as codeine, morphine sulfate, and heroin. 6-MAM remains in the urine for no more than 24 hours so a urine specimen must be collected soon after the last heroin use, but the presence of 6-MAM guarantees that heroin was in fact used as recently as within the last day. 6-MAM is naturally found in the brain, but in such small quantities that detection of this compound in urine virtually guarantees that heroin has recently been consumed.

7-ACL 7-aminoclonazepam is the major metabolite of clonazepam. Clonazepam sold under the brandname Klonopin among others, is a medication used to prevent and treat seizures, panic disorder, and for the movement disorder known as akathisia. It is a type of benzodiazepine. As a major metabolite, 7-aminoclonazepam may be used to monitor use of the parent drug, clonazepam. Clonazepam, marketed as Klonopin and Rivotril, is a long-acting benzodiazepine with anxiolytic, anticonvulsant, muscle relaxant, and hypnotic properties.

APVP α-PVP is the active ingredient in drugs commonly sold as "bath salts", "flakka" or "gravel" which have gained popularity since the mid-2000s due to their potency and low cost. α-PVP is a derivative of MDPV- the only difference being the removal of the 3,4-methylenedioxy group from the MDPV molecule. Bath salt blends such as α-PVP are marketed as alternatives to internationally controlled drugs that are often adulterated with other synthetic cathinones, methamphetamine or clonazepam. Reported effects of α-PVP include euphoria, increased alertness, tachycardia, hypertension, hyperthermia, diaphoresis, seizures and even cardiac arrest.

Alcohol Acute alcohol intoxication can lead to loss of alertness, coma, and even death. Long term effects include internal organ damage and birth defects. The blood alcohol concentration (BAC) at which a person becomes impaired is variable. The United States Department of Transportation (DOT) has established a BAC of 0.02% (0.02g/dL) as the cut-off level at which an individual is considered positive for the presence of alcohol. Since urine alcohol concentration is normally higher than that in saliva and blood, the cutoff concentration for alcohol in urine is set at 0.04%

UrineCheck: Adulteration Test(s)

UrineCheck adulteration tests are built-in firm plastic strips to which options of one (1) up to six (6) different reagent areas can be affixed. UrineCheck test(s) is/are read-to-use and disposable. No equipment is required for its use. Only fresh and uncentrifuged urine samples without preservatives are to be used.

UrineCheck provides tests for Creatinine (C), Nitrite (N), pH (P), Specific Gravity (G), Glutaraldehyde (U), Bleach (B), and Pyridinium Chlorochromate (P) in urine. Test results may be useful for assessing the integrity of the urine sample while running Drugs-of-Abuse & Alcohol testing, for example, whether the sample is possibly diluted with water or other liquids as indicated by the Creatinine and specific gravity tests. UrineCheck detects whether the sample contains commercially available adulterants including nitrite, Glutaraldehyde, and other oxidizing agents. UrineCheck can also assess whether the sample is possibly contaminated by acidic (vinegar) or basic (ammonia solution) adulterants as indicated by the pH test.

PRINCIPLE
Drugs Of Abuse
Each component strip of the Matrix Cup is based on the principle of specific immunochemical reaction between antibodies and antigen to analyze particular compound in human urine specimen. The assay relies on the competition for binding antibody. When drug is present in the urine specimen, it competes with drug conjugate for the limited amount of antibody-dye conjugate. When the amount of drug is equal or more than the cut-off, it will prevent the binding of drug conjugate to the antibody. Therefore, a positive urine specimen will not show a colored band on the test line zone, indicating a positive result, while the presence of a colored band indicates a negative result.

A control line is present in the test window to work as procedural control. This colored band should always appear on the control line zone if the

test device is stored in good condition and the test is performed appropriately.

Alcohol







Alcohol Test is based on the high specificity of alcohol oxidase (ALOX) for ethyl alcohol in the presence of peroxidase and enzyme substrate such as tetramethylbenzidine (TMB) as shown in the following:

EtOH + TMB → CH₃CHO + Colored TMB

The distinct color on reactive pad could be observed in less than 20 seconds after the urine samples migrates over the reaction pad with the ethyl alcohol concentration greater than 0.04%. It should be pointed out that other alcohols such as methyl, propanyl and allyl alcohol would develop the similar color on the reactive pad. However, these alcohols are not normally present in urine.

UrineCheck: Adulteration Test(s)

In general, all UrineCheck Tests are based on the chemical reactions of the indicator reagents on the pads with components in the urine sample effecting color changes. Results are obtained by comparing the color on each of the test pads with the corresponding pad on the color chart provided.

1 Bring all materials and specimens to room temperature.		
2 Remove the Matrix Cup from sealed foil pouch		
3 Label the device with patient ID.		
4 Remove the lid		5 Collect the sample and ensure that the sample is above the minimumfill line
		
6		7
Replace the lid and screw the lid tightly and place the urine test cup on a flat surface.		Use the temperature Validator to verify the freshly collected urine. Green indicator shows the temperature detected.
		
8 Read the results at 5 minutes.		9 Remove the result window cover and read the results.
		

Creatinine: Testing for sample dilution. In this assay, Creatinine reacts with a Creatinine indicator in an alkaline condition to form a purplish-brown color complex. The concentration of Creatinine is directly proportional to the color intensity of the test pad.

Specific Gravity: Testing for sample dilution. This test is based on the apparent pKa change of certain pretreated polyelectrolytes in relation to ionic concentration. In the presence of an indicator, the colors range from dark blue or blue-green in urine of low ionic concentration to green and yellow in urine of higher ionic concentration.

pH: Testing for the presence of acidic or alkaline adulterant. This test is based on the well-known double pH indicator method that gives distinguishable colors over wide pH range. The colors range from orange (low pH) to yellow and green to blue (high pH).

Nitrite: Testing for the presence of exogenous nitrite. Nitrite reacts with an aromatic amine to form a diazonium compound in an acid medium. The diazonium compound in turn couples with an indicator to produce a pink-red/purple color.

Oxidants: Testing for presence of oxidizing reagents. In this reaction, a color indicator reacts with oxidants such as hydrogen peroxide, ferrioyanide, persulfate, or pyridinium chlorochromate to form a blue color complex. Other colors may indicate the presence of other oxidants.

Glutaraldehyde: Testing for the presence of exogenous aldehyde. In this assay, the aldehyde group on the Glutaraldehyde reacts with an indicator to form a pink/purple color complex.

Bleach: Testing for the presence of bleach in urine. In this test, the presence of bleach forms a blue-green, brown, or orange color complex.

Pyridinium Chlorochromate: Testing for the presence of Pyridinium Chlorochromate in urine. In this test, the presence of chromate forms a blue-green color complex.

MATERIALS PROVIDED

1. Instructions for use

2. One Matrix Cup, including Temperature Strip (with optional Alcohol and /or Adulteration Test)

Drugs Of Abuse

The amount of each coated antigen and/or antibody on the strip is less than 1.0 mg for antigen conjugate and is less than 1.0 mg for goat anti-rabbit IgG antibody.

Test zone: contains drug bovine protein antigen conjugates

Control zone: contains Goat anti-rabbit IgG antibody

Conjugate pad: contains mice monoclonal anti-drug antibody.

Temperature Strip

Use the temperature validator to verify the freshly collected urine. A visible green indicator shows the temperature detected and indicates the specimen is in a normal temperature range. Conversely, if no green indicator appears within the temperature strip, the temperature is either lower or higher the the normal temperature ragne (90°F-100°F / 32°C-38°C).

Alcohol (optional)

Each Alcohol test contains these materials:

Tetramethylbenzidine (TMB)	0.12 mg
Alcohol oxidase (EC)	0.5IU
Peroxidase(EC)	35 IU
Proteins	0.15mg

Adulteration Test (optional)

3. Alcohol /Adulteration Test Color Chart (When order Alcohol and/or Adulteration Tests)

MATERIAL REQUIRED BUT NOT PROVIDED

Timer or clock.

STORAGE AND STABILITY

The Matrix Cup should be stored at 4 to 30°C and will be effective until the expiration date stated on the package. The product is humidity-sensitive and should be used immediately after being open. Any improperly sealed product should be discarded.

PRECAUTIONS

- For in vitro diagnostic and forensic use only.
- Do not use the product beyond the expiration date.
- Handle all specimens as potentially infectious.
- Humidity sensitive product. Do not open foil pouch until it is ready to be tested.
- Use a new urine specimen cup for each sample to avoid cross contamination.

SPECIMEN COLLECTION AND PREPARATION

Fresh urine does not require any special handling or pretreatment. Specimen should be collected in a clean, dry, plastic or glass container. If the assay is not performed immediately, urine specimen may be refrigerated at 2-8 °C or frozen up to 7 days. Specimens should be brought to room temperature before testing. Urine specimens exhibiting a large amount of precipitate or turbidity should be centrifuged or allowed to settle before testing. Avoid contact with skin by wearing gloves and proper laboratory attire.

QUALITY CONTROL

Good Laboratory practice recommends the daily use of control materials to validate the reliability of device. Control materials should be assayed as clinical specimen and challenging to the assay cutoff concentration, e.g., 50% above and below cutoff concentration. If control values do not fall within establish range, assay results are invalid. Control materials which are not provided with this test kit are commercially available.

Drugs of Abuse

The Matrix Cup provides a built-in process control with a different antigen/antibody reaction at the control region (C). This control line should always appear regardless the presence of drug or metabolite. If the control line does not ppear, the test device should be discarded and the obtained result is invalid. The presence of this control band in the control region serve as 1) verification that sufficient volume is added, 2) that proper flow is obtained.

Alcohol

Alcohol test may be qualitatively verified by using a test solution prepared by adding 0.75 ml of ethanol alcohol into 240 ml of distilled water or negative urine control.

UrineCheck: Adulteration Test(s)

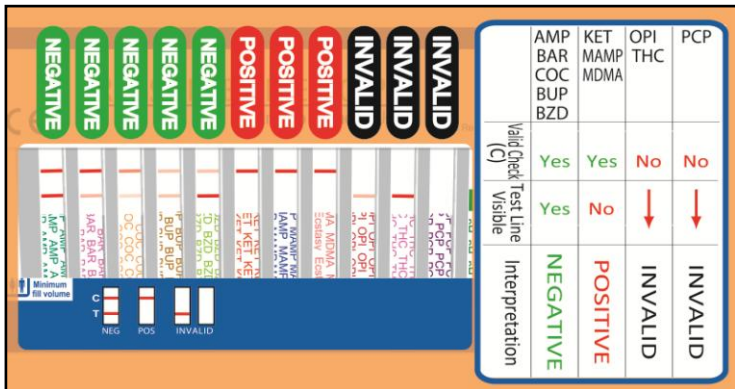
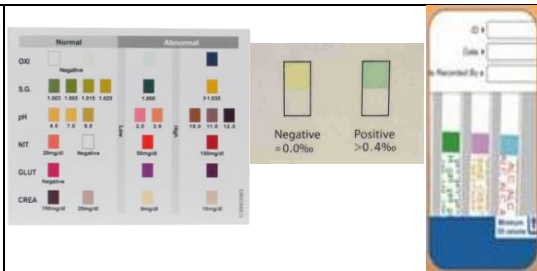
For best results, performance of UrineCheck test should be confirmed by testing known negative and positive specimens

PROCEDURE

Caution: Results after 10 minutes may not be accurate.

INTERPRETATION OF RESULTS

Names of drugs on the test could be different depending on the various combination of drugs selecte

	INTERPRETATION OF RESULTS	
DRUGS OF ABUSE		
	NEGATIVE	Colored bands show on both test line zone and control line zone (top line). This is an indication of negative result for that (those) particular test(s). The negative result does not indicate the absence of drug(s) in the specimen; it only indicates the level of tested drug in the specimen is less than cut-off level.
	POSITIVE	One colored band forms in control line zone (top lines) and no colored band forms in test line zone (bottom lines). This is an indication the level of tested drug(s) in the specimen is above the cut-off level.
	INVALID	If there is no colored band in control line zone (top lines), the test result is invalid. Retest the sample with a new device.
ALCOHOL & ADULTERATION		
	1.Read Reaction Pads against the Alcohol /Adulteration Test Color Chart provided. 2.Refer to supplied color chart for the level of each index to be tested and check if it is in the normal range.	

Note: A borderline(+/-) in test line zone should be considered negative result.

LIMITATION OF PROCEDURE

The assay is designed for use with human urine only. A positive result with any of the tests indicates only the presence of a drug/metabolite and does not indicate or measure intoxication. There is a possibility that technical or procedural error as well other substances in certain foods and medicines may interfere with the test and cause false results. Please refer "SPECIFICITY" section for lists of substances that will produce either positive results, or that do not interfere with test performance. If a drug/metabolite is found present in the urine specimen, the assay does not indicate frequency of drug use or distinguish between drug of abuse and certain foods and medicines.

EXPECTED RESULTS

The Matrix Cup is a qualitative assay. It identifies the drug(s) in human urine at its cut-off concentration or higher. The concentration of the drug(s) can not be determined by this assay. The test is intended to distinguish negative result from presumptive positive result. All positive results must be confirmed using an alternate method, preferably GC/MS.

PERFORMANCE CHARACTERISTICS

A. Accuracy:

The accuracy of Matrix Cup was established by running urine samples against GC/MS.

Specimen	ACE	ALP	AMP300	AMP500	AMP	BAR	BZO	BUP10	CAT	CAF	CFYL
Positive	96.1%	98.1%	96.1%	95.9%	95.8%	97.8%	95.3%	100%	94.9%	96.5%	97.1%
Negative	100%	97.2%	100%	100%	100%	98.1%	92.9%	100%	99.1%	98.8%	99.1%
Total	98.1%	99.4%	98.1%	98.1%	98.1%	98%	93.9%	100%	99.6%	99.1%	98.6%

Specimen	CLO	COC	COC150	COT	DIA	EDDP100	ETG500	ETG 1000	FYL10	GAB	HMO	KET
Positive	98.4%	98.2%	96%	96.5%	98.3%	95.8%	79.7%	99.8%	94.4%	97.7%	95.9%	98%
Negative	99.2%	98.1%	94%	98%	99.1%	100%	84.7%	97.6%	100%	98.4%	100%	98.6%
Total	99.9%	98.2%	95%	97.2%	98.2%	98.1%	82.2%	99.9%	97.2%	98.1%	98.0%	98.3%

Specimen	KRA 500	K2	K3	K4	LSD	MCAT	MDA	MDMA	MDPV	MDPHP
Positive	99.1 %	98.9%	99.9%	98.3%	100%	97.6%	98.6%	98.5%	100%	99.1%
Negative	98.6%	100%	99.9%	99.2%	100%	99%	98.2%	98.2%	100%	99.2%
Total	99.2 %	99%	99.9%	99.9%	100%	98%	98.8%	98.3%	100%	99.1%

Specimen	MET500	MET	MEP	MES	MPD	MQL	MTD	OPI	OPI1000	OXY	PCP25
Positive	96.9%	96.8%	98.6%	97.2%	97.7%	98.4%	96.1%	97.6%	96.5%	98%	97.8%
Negative	100%	100%	99.2%	98.6%	98.4%	98%	100%	98.4%	96%	97%	100%
Total	98.3%	98.3%	99.8%	98.4%	98.1%	98.2%	98.1%	98.1%	96.3%	97%	98.9%

Specimen	PGB500	PGB1000	PPX	TAP	THC50	TPM	TML	TML100	TCA	TZD	TLD	ZAL
Positive	97.2%	97.2%	97.8%	98.8%	96.8%	98.6%	96.6%	96.8%	92.1%	99.9%	97.2%	99.9%
Negative	98.3%	98.2%	100%	99.2%	98.3%	99.1%	98.2%	98.8%	100%	99.9%	99.8%	99.8%
Total	97.8%	97.8%	99%	98.9%	97.5%	99.3%	97.4%	97.4%	96.8%	99.9%	99.8%	99.9%

Specimen	ZOL25	ZOP	6-MAM	7-ACL	APVP
Positive	98.4%	97.2%	96.8%	98.8%	99.9%
Negative	98.2%	99.0%	100%	97.6%	99.9%
Total	98.3%	99.2%	98.2%	99.9%	99.9%

C. Precision

The precision of the Matrix Cup was determined by conducting the test with spiked controls and interpreted the results by three individuals to verify the random error of visual interpretation. The results of 40 samples each of 50% above and 50% below cut-off specimens are 100% agreed by three observers. The test results were found to have no significant differences between these three observers.

D. Specificity

The specificity for the Matrix Cup was tested by adding various drugs, drug metabolites, and other compounds that are likely to be present in urine. All compounds were prepared in drug-free normal human urine.

1. Interference testing

The performance of the Matrix Cup at cut-off level is not affected when pH and Specific Gravity ranges of urine specimen are at 4.5 to 9.0 and 1.005 to 1.035.

The following substances were tested and confirmed did not interfere with the Matrix Cup at the concentrations listed below.

Glucose	2000mg/ml	Human albumin	2000mg/dl
Human hemoglobin	10mg/dl	Urea	4000mg/dl
Uric acid	10mg/dl		

2. Specificity

The following table lists compounds that are detected by the Matrix Cup which produced positive results when tested at levels equal or greater than the concentrations listed below

Tests	Compounds	Cut-off (ng/ml)
ACE	Acetaminophen	5,000
	Acetophenetidine	7,500
ALP	Alprazolam	100
	Oxazepam	450
	Bromazepam	800
	Chlordiazepoxide	1000
	Clobazam	50
	Clonazepam	5000
	Clorazepate dipotassium	100
	Desalkylflurazepam	1000
	Diazepam	10
	Estazolam	50
	Flunitrazepam	>50,000
	Flurazepam	250
	(±) Lorazepam	10,000
	Midazolam	800
	Nitrazepam	1000
	Nordiazepam	100
Temazepam	25	
AMP 500	D - Amphetamine	500
	L - Amphetamine	10000
	DL - Amphetamine	1200
	Phentermine	15000
	Hydroxyamphetamine	4000
	Methylenedioxymphetamine (MDA)	5000
	d-Methamphetamine	>100000
	1-Methamphetamine	>100000
	Ephedrine	>100000
	Methylenedioxyethylamphetamine (MDE)	>100000
3,4-methylenedioxy-methamphetamine (MDMA)	>100000	
AMP 300	l-Amphetamine	900
	d-Amphetamine	50,000
	Mephentermine hemisulfate salt	>100,000
	3,4-Methylenedioxyamphetamine (MDA)	625
	Phentermine	625
	Paramethoxyamphetamine (PMA)	625

	Paramethoxymethamphetamine (PMMA)	>100,000
	Tyramine	>100,000
AMP	D-Amphetamine	1,000
	l-Amphetamine	>100,000
	d-methamphetamine	>100,000
	l-methamphetamine	>100,000
	3,4-Methylenedioxyamphetamine	1,250
	3,4-Methylenedioxy-methamphetamine	>100,000
	3,4-Methylenedioxyethylamphetamine	>100,000
	Paramethoxyamphetamine	625
	Phentermine	1250
	Tyramine	>100,000
BAR	Secobarbital	300
	Allobarbitol	1250
	Alphenal	625
	Amobarbital	625
	Aprobarbital	188
	Butabarbitol	94
	Butalbital	2500
	Butethal	200
	Cyclopentobarbital	400
	Pentobarbital	1,000
BUP	Phenobarbital	300
	Buprenorphine	10
	Buprenorphine-3-β-D-Glucuronide	10
	Norbuprenorphine	50
	Norbuprenorphine-3-β-D-Glucuronide	100
Benzoxiazepines	Oxazepam	300
	Alprazolam	125
	Bromazepam	625
	Chlordiazepoxide	2500
	Clobazam	63
	Clonazepam	2500
	Clorazepate	3330
	Desalkflurazepam	250
	Diazepam	250
	Estazolam	5000
	Fentanyl	>100,000
	Flunitrazepam	375
	Flurazepam	>100,000
	Lorazepam	1250
	Lormetazepam	1250
	Medazepam	>100,000
	Midazolam	>100,000
	Nitrazepam	25000
	Norchlordiazepoxide	250
	Nordiazepam	500
	Prazepam	>100,000
	Temazepam	63
	Triazolam	5000
CAT	(+)-Norpseudoephedrine HCl (Cathine)	100
	(+)-3,4-Methylenedioxyamphetamine (MDA)	80
	d/l-Amphetamine	80
	p-Hydroxyamphetamine	80
	Tryptamine	10000
	Methoxyphenamine	10000
CAF	Caffeine	8,000
	Theophylline	100,000
CFYL	CarFentanyl	500
	Fentanyl	100
CLON	Clonazepam	150
	Alprazolam	250
	Bromazepam	625
	Chlordiazepoxide	2,500
	Clobazam	63
	Oxazepam	30
	Clorazepate	3,330
	Delorazepam	2,500
	Desalkflurazepam	250
	Diazepam	250
	Estazolam	5,000
	Flunitrazepam	375
	Lorazepam	1,250
	Lormetazepam	1,250
	Midazolam	100,000
	Nitrazepam	25,000
	Norchlordiazepoxide	250
	Nordiazepam	500

	Sulindac	100,000
	Temazepam	125
	Triazolam	5,000
COC	Benzoyllecgonine	300
	Cocaine	1,000
	Ecgonine	100,000
	Ecgonine Methyl Ester	>100,000
	Benzoyllecgonine	150
COC 150	Cocaine HCl	500
	Cocaethylene	7500
	Ecgonine	15000
	Norcocaine	50000
	(-)-Cotinine	200
COT	(-)-Nicotine	6250
	Diazepam	100
DIA	Oxazepam	450
	Bromazepam	1000
	Chlordiazepoxide	1500
	Clobazam	150
	Clonazepam	6000
	Clorazepate dipotassium	300
	Desalkylflurazepam	2000
	Alprazolam	400
	Estazolam	200
	Flunitrazepam	>50,000
EDDP	Flurazepam	750
	(±) Lorazepam	10,000
	Midazolam	1000
	Nitrazepam	1500
	Nordiazepam	300
	Temazepam	75
	EDDP	100
	Meperidine	>100,000
	Methadone	>100,000
	Norfentanyl	>100,000
	Phencyclidine	>100,000
	Promazine	50000
	Promethazine	25000
	Prothipendyl	50,000
	Prozine	12500
ETG	Ethyl Glucuronide	500
	Ethanol	>100,000
	D-Glucuronic Acid	>100,000
	Morphine-3-b-D-glucuronide	>100,000
	Ethyl Glucuronide	1000
ETG II*	Fentanyl and Fentanyl metabolites	10
	Fentanyl	100
FYL	Norfentanyl	>10,000
	Gabapentin	2000
	Pregbalin	>100000
GAB	Hydromorphone	250
	Acetylcodeine	4000
	Buprenorphine	>10,000
HMO	Codeine	3000
	Diacetyl Morphin	3000
	Dihydrocodeine	4000
	Ethylmorphine	4000
	Hydrocodone	300
	Morphine	2500
	6-Monoacetylmorphine	3000
	Morphine-3-glucuronid	2500
	Nalorphine	12500
	Thebaine	>20000
KET	Methadone	>100000
	Oxazepam	>100000
	Oxycodone	100000
	EDDP	>100000
	Ketamine	1,000
	Norketamine	1,000
	Dextromethorphan	500
	7-hydroxymitragynine	500
	Mitragynine	6000
	JWH-018-5-Pentanoic acid	50
KRA	JWH-073-4-Butanoic acid	50
	Phenytoin	40,000
K2	Theophylline	40,000
	Methadone	300
	(-)-alpha-methadol	2,000
K2-AB	Morphine	300
	Acetylcodeine	150

	UR-144 5-Pentanoic	5,000
	UR-144	>10,000
	UR-144 5-hydroxypentyl	>10,000
	UR-144 4-hydroxypentyl	>10,000
	APINACA	>10,000
	APINACA 5-hydroxypentyl	>10,000
	ADB-PINACA N-(5-hydroxypentyl)	50
	ADB-PINACA Pentanoic Acid	25
	5-fluoro AB-PINACA N-(4-hydroxypentyl)	50
	UR-144 5-Pentanoic acid metabolite	25
	UR-144 4-hydroxypentyl	50
	UR-144 5-hydroxypentyl	50
	UR-144	>10,000
	XLR-11	>10,000
	AB- PINACA	>10,000
K4	AB-PINACA 5-Pentanoic	>10,000
	AB-PINACA 5-hydroxypentyl	>10,000
	AB- FUBINACA	>10,000
	AB-PINACA 4-hydroxypentyl	>10,000
	APINACA	>10,000
	APINACA 5-hydroxypentyl	>10,000
	ADB-PINACA N-(5-hydroxypentyl)	>10,000
	ADB-PINACA Pentanoic Acid	>10,000
	5-fluoro AB-PINACA N-(4-hydroxypentyl)	>10,000
LSD	Lysergic acid diethylamide	20
	Methcathinone	500
MCAT	4-MMC (Mephedrone)	520
	3-MMC (3-methylmethcathinone)	500
	4-MEC (4-methylethcathinone)	550
	Cathinone	>100,000
	MDPV	>10,000
MDA	3,4-Methylenedioxyamphetamine (MDA)	500
	l-Amphetamine	50,000
	d-Amphetamine	500
	Phentermine	1,250
	Paramethoxyamphetamine (PMA)	625
	Tyramine	100,000
MDMA	3,4-Methylenedioxy-methamphetamine	500
	d-Amphetamine	>100,000
	l-Amphetamine	>100,000
	d-methamphetamine	>100,000
	l-methamphetamine	>100,000
	3,4-Methylenedioxyamphetamine	2,500
	3,4-Methylenedioxyethylamphetamine	156
	Paramethoxyamphetamine	50,000
	Paramethoxymethamphetamine	>100,000
	MDPV	500
MDPV	MDPV	500
	MDPV	500
MDPHP	MDPHP	500
	MDPV	500
MET	α-PVP	10000
	d-Methamphetamine	1,000
MET 500	Chloroquine	25,000
	Fenfluramine	12,500
	l-Methamphetamine	1,000
	Mephentermine hemisulfate salt	31250
	3,4-Methylenedioxyethylamphetamine	50000
	3,4-Methylenedioxy-methamphetamine	313
	Paramethoxymethamphetamine	625
	(-)-Ephedrine	4000
	D(+)-Methamphetamine	500
	(+/-)-3,4-Methylenedioxy-n-ethylamphetamine(MDEA)	5000
MEP	D/L-Methamphetamine	500
	p-Hydroxymethamphetamine	5000
MES	Mephedrone	500
	Methcathinone	500
MPD	Mescaline	300
	Methylphenidate	150
MQL	Ritalinic acid	5000
	Methaqualone	300
	Amitriptyline	50,000
	Carbamazepine	20,000
	Nortriptyline	50,000
Methadone	Phenytoin	40,000
	Theophylline	40,000
	Methadone	300
Opiate	(-)-alpha-methadol	2,000
	Morphine	300
	Acetylcodeine	150

	Buprenorphine	>10000
	Codeine	250
	Diacetyl Morphin	250
	Dihydrocodeine	586
	Ethylmorphine	200
	Hydrocodone	12500
	Hydromorphone	12500
	6-Monoacetylmorphine	250
	Morphine-3-glucuronid	2500
	Nalorphine	25000
	Thebaine	25000
Opiate II	Morphine	2,000
	Acetylcodeine	1,563
	Buprenorphine	25,000
	Codeine	2000
	Diacetylmorphine (Heroin)	5,000
	Dihydrocodeine	1,563
	Ethylmorphine	250
	Hydromorphone	25,000
	Hydrocodone	50,000
	Merperidine	>100,000
OXY100	6-Monoacetylmorphine (6-MAM)	4,000
	Morphine-3-β-d-glucuronide	12,500
	Nalorphine Hydrochloride	>100,000
	Oxycodone	>100,000
	Oxymorphone	>100,000
	Rifampicine	>100,000
	Thebaine	50,000
	Oxycodone	100
	Hydrocodone	6250
	Hydromorphone	50000
PCP	Naloxone	50000
	Oxymorphone	250
	Phencyclidine	25
	Hydrocodone	>100,000
	Hydromorphone	>100,000
PGB	4-hydroxyphencyclidine	75
	Pregabalin	500
	Pregabalin	1000
PGB 1000	Gabapentin	>20,000
	D-Propoxyphene	300
	D-Norpropoxyphene	5000
PPX	Tapentadol	500
	N-Desmethyltapentadol	10000
	Tapentadol-O-sulfate	1000
	Tapentadol-β-D-glucuronide	1000
TAP	11-nor-Δ9-THC-9-COOH	50
	11-nor-Δ8-THC-9-COOH	50
	11-hydroxy-Δ9-Tetrahydrocannabinol	50
	Δ 8-Tetrahydrocannabinol	15000
	Δ 9-Tetrahydrocannabinol	15000
	Cannabinol	20000
THC	Cannabidiol	>100,000
	Tropicamide	350
	Cis-Tramadol	200
	N-Desmethyl-cis tramadol	500
	O-Desmethyl-cis tramadol	20,000
TPM	Netrexone	10,000
	Tetrahydrozoline	10,000
	Dihydrocodeine	50,000
	Tramadol	100
	(+/-)Chlorpheniramine	50,000
TML	Dimenhydrinate	50,000
	Diphenhydramine	50,000
	Phencyclidine	50,000
	(+)-Chlorpheniramine	>100,000
	Nortriptyline HCl	1000
TCA	Amitriptyline	150
	Clomipramine	>100000
	Cyclobenzaprine	12500
	Desipramine	188
	Doxepin	2000
	Imipramine	2500
	Maprotiline	750
	Nordoxepin	500
	Opipramol	1563
	Promazine	1000
	Promethazine	6250

	Prothipendyl	25000
	Protryptiline	6250
	Prozine	1250
	Trimipramine	>100,000
	Trazodone	200
TZD	Tilidin	50
TLD	Zaleplon	200
ZAL	Zolpidem Phenyl-4-carboxylic	50
ZOL	Zolpidem	>10,000
ZOP	N-Desmethylzopiclone	50
	Zopiclone-N-oxide	50
	Zopiclone	300
6-MAM	6-Monoacetylmorphine	10
	Acetylcodeine	>10,000
	Buprenorphine	>10,000
	Codeine	>10,000
	Diacetylmorphine	1000
	Dihydrocodeine	>10,000
	Ethylmorphine	>10,000
	Hydrocodone	>10,000
	Hydromorphone	5000
	Morphine	10000
	Morphine-3-glucuronide	>10,000
	Nalorphine	5000
	Thebaine	>20,000
7-ACL	7-amine-clonazepam	300
	Oxazepam	>10,000
	Alprazolam	>10,000
	Bromazepam	>10,000
	Chlordiazepoxide	>10,000
	Clobazam	>10,000
	Clonazepam	10,000
	Clorazepate dipotassium	>10,000
	Desalkylflurazepam	>10,000
	Diazepam	>10,000
	Estazolam	>10,000
	Flunitrazepam	>50,000
	(±) Lorazepam	10,000
	Midazolam	>100,000
	Nitrazepam	>10,000
	Norchlordiazepoxide	>100,000
	Nordiazepam	>100,000
	Temazepam	>10,000
APVP	APVP	500
	MDPV	40
	PVP	>100,000

1. Interference testing
The performance of the DOA/Alcohol Panel Test Device at cut-off level is not affected when pH and Specific Gravity ranges of urine specimen are at 4.5 to 9.0 and 1.005 to 1.035.

The following substances were tested and confirmed did not interfere with the DOA/Alcohol Panel Test Device at the concentrations listed below.
Glucose 2000 mg/dl
Human albumin 2000 mg/dl
Human hemoglobin 10 mg/dl
Urea 4000 mg/dl
Uric acid 10 mg/dl

2. Specificity
The following table lists compounds that are detected by the DOA/Alcohol Panel Test Device which produced positive results when tested at levels equal or greater than the concentrations listed below:

The following compounds show no cross-reactivity at concentrations up to100 ug/mL unless specified in the table above.

- REFERENCES**
- Urine testing for drugs of abuse, NIDA Research Monograph 73 (1986)
 - Steven B. Karch, Drugs of abuse hand book, CRC Press, 1st. Ed. (1998)
 - Ray H. Liu and Bruce A. Goldberger, Handbook of workplace drug testing, AACC Press, Washington DC (1995)





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