SIEMENS

Syva®

Emit® II Plus 6-Acetylmorphine Assay

See shaded sections:
Updated information from 2015-04 version.

10871746_F

6-Acetylmorphine Assay

1 Intended Use

The Emit® II Plus 6-Acetylmorphine Assay is a homogeneous enzyme immunoassay with a 10 ng/mL cutoff.[1] The assay is intended for use in laboratories for the qualitative and/or semiquantitative analyses of 6-acetylmorphine (6-AM), a heroin metabolite, in human urine. Emit® II Plus assays are designed for use with a number of chemistry analyzers.

Semiquantitative test results may be used to assess assay performance as part of a quality control program and to estimate a dilution of the specimen for confirmation by GC/MS.

The Emit® II Plus 6-Acetylmorphine Assay provides only a preliminary analytical test result. A more specific alternative chemical method must be used to obtain a confirmed analytical result. Gas chromatography/mass spectrometry (GC/MS) is the preferred confirmatory method.[2] Other chemical confirmation methods are available. Clinical consideration and professional judgment should be applied to any drug-of-abuse test result, particularly when preliminary positive results are used.

2 Summary and Explanation of the Test

Heroin (3, 6- diacetylmorphine) is a naturally occurring alkaloid found in the seedpod resin of the opium poppy *Papaver somniferum.* It can also be synthesized by acetylation of morphine.[3] Heroin is a Schedule I drug, i.e., it has no acceptable medical use in the United States. It is a drug of abuse that may be snorted, smoked or dissolved and injected subcutaneously or intravenously.

In vivo heroin has a half life of 2 to 8 minutes in serum and is rapidly deacetylated to 6-AM.[4] The hydrolysis reaction of heroin to 6-AM is catalyzed by cholinesterase and arylesterase. These reactions take place both in the blood stream and liver. 6-AM has a half life of 10 to 40 minutes and is detectable 2 to 24 hours after intake.[5] 6-AM is further hydrolyzed to morphine and morphine conjugates. The presence of 6-AM in urine is an indicator of heroin use.

The Emit® II Plus 6-Acetylmorphine Assay tests for 6-AM in human urine and gives a positive result if this opiate is present at concentrations equal to or greater than the cutoff. Positive results for specimens containing structurally related opiate compounds have not been observed.

While confirmation techniques other than GC/MS may be adequate for some drugs of abuse, GC/MS is generally accepted as a vigorous confirmation technique for all drugs, since it provides the best level of confidence in the result.[2]

3 Principle

The Emit® II Plus 6-Acetylmorphine Assay is a homogeneous enzyme immunoassay technique used for the analysis of a specific compound in human urine. The assay is based on competition between drug in the specimen and drug labeled with the recombinant glucose-6-phosphate dehydrogenase (rG6PDH) for antibody binding sites. Enzyme activity decreases upon binding to the antibody, so the drug concentration in the specimen can be measured in terms of enzyme activity. Active enzyme converts nicotinamide adenine dinucleotide (NAD) to NADH in the presence of glucose-6-phosphate (G6P), resulting in an absorbance change that is measured spectrophotometrically. Endogenous serum G6PDH does not interfere because the coenzyme NAD functions only with the bacterial *(Leuconostoc mesenteroides)* enzyme employed in the assay.

4 Reagents

REF	Product Description	Volume
9R039UL	**Emit® II Plus 6-Acetylmorphine Assay**	
9R029UL	**Antibody/Substrate Reagent 1**	28 mL
9R129UL	Mouse monoclonal antibodies* to 6-AM (5.2 µg/mL), G6P (22 mM), NAD (18 mM), bovine serum albumin, preservatives and stabilizers	115 mL 1000 mL
	Enzyme Reagent 2	14 mL
	6-AM labeled with bacterial rG6PDH* (0.80 U/mL), HEPES buffer, bovine serum albumin, preservatives, and stabilizers	50 mL 500 mL

****The antibody titer and enzyme conjugate activity may vary from lot to lot.***

Note: Reagents 1 and 2 are provided as a matched set. They should not be interchanged with components of kits with different lot numbers.

Risk and Safety

H317, H412
P280, P272, P302 + P352, P333 + P313, P273, P501
Warning!
May cause an allergic skin reaction. Harmful to aquatic life with long lasting effects.

Wear protective gloves/protective clothing/eye protection/face protection. Contaminated work clothing should not be allowed out of the workplace. IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Avoid release to the environment. Dispose of contents and container in accordance with all local, regional, and national regulations.

Contains: 5-chloro-2-methyl-3(2h)-isothiazolone mixture with 2-methyl-3(2h)-isothiazolone.

Safety data sheets (MSDS/SDS) available on siemens.com/healthcare

For *in vitro* diagnostic use

Reagents

The Emit® II Plus 6-Acetylmorphine Assay Reagent 1 is provided liquid, ready to use and may be used directly from the refrigerator. Reagent 2 is shipped in powder form.

Preparation and Storage of Assay Components

Reagent 2

To prepare Reagent 2:

- Record the reconstitution date.
- Remove and mark the cap to identify it with the original bottle.
- Add the amount of distilled or deionized water listed in Table 1.
- Replace the cap and gently invert the bottle until the contents are completely dissolved. Let stand at room temperature for 2 hours. Gently invert the bottle several times before placing on the instrument.
- Allow the reagent to equilibrate for one hour on the instrument.

Reagent 2 may be reconstituted the day before use as described above and refrigerated overnight at 2–8°C. Gently invert the bottle several times before use.

Table 1 – Preparation, Storage and Stability of Reagent 2

Component	Storage Temperature	Reconstitution Volume	Unopened Stability	Reagent Stability After Reconstitution
Reagent 2 9R039UL	2–8°C	13 mL	Exp. date	12 weeks*
Reagent 2 9R029UL	2–8°C	45 mL	Exp. date	30 days
Reagent 2 9R129UL	2–8°C	450 mL	Exp. date	30 days

*V-Twin®, Viva-E®, and Viva-Jr® Analyzers

Close the reagent bottles when not in use.

Note: Caps must always be replaced on the original containers.

Storage

When not in use, reagents must be stored at 2–8°C (36–46°F), upright and with screw caps tightly closed. If stored as directed, reagents are stable until the expiration date printed on the label. Refer to the application sheet for on instrument stability information. Do not freeze reagents. Avoid prolonged exposure to temperatures above 32°C. Improper storage of reagents can affect assay performance.

The purpose of specimen handling and storage information is to provide guidance to users; however, users may validate their own procedures for handling and storing patient samples.

5 Specimen Collection and Preparation

- Urine specimens may be collected in plastic (i.e., polypropylene, polycarbonate, polyethylene) or glass containers. Some plastics can adsorb certain drugs.
- If not analyzed immediately, specimens may be stored refrigerated for up to 7 days following collection. Stability of 6-acetylmorphine may vary across individual specimens. After 7 days specimens should be stored frozen.[6]
- Frozen specimens must be thawed and mixed thoroughly prior to analysis.
- Specimens with high turbidity should be centrifuged before analysis.
- Urine specimens should be within the pH range of 4.0 to 10.0.
- Adulteration of the urine specimen may cause erroneous results. If adulteration is suspected, obtain another specimen.
- Human urine specimens should be handled and treated as if they are potentially infectious.

6 Procedure

Materials Provided

Emit® II Plus 6-Acetylmorphine Assay
- Reagent 1
- Reagent 2

Materials Required But Not Provided

Emit® Calibrator/Control
- 9A509UL Level Ø (0 ng/mL)

Emit® II Plus 6-AM/Ecstasy Calibrators/Controls
- 9R529UL Level 1 (5 ng/mL)
- 9R549UL Level 2 (10 ng/mL)
- 9R569UL Level 3 (15 ng/mL)
- 9R589UL Level 4 (20 ng/mL)

Materials Required But Not Supplied

Commercially available controls (see Quality Control, Semiquantitative Analysis)

Instruments

Siemens Healthcare Diagnostics provides instructions for using this assay on a number of chemistry analyzers. Contact the Technical Solutions Center in the USA or your local Siemens representative for application sheets.

Analyzers must be capable of maintaining a constant reaction temperature, pipetting specimens/reagents and measuring enzyme rates precisely, timing the reaction accurately, and mixing reagents thoroughly.

Daily Maintenance

Refer to the instrument operator's manual for maintenance instructions.

Assay Sequence

To run the assay, see the instrument operator's manual and application sheets available from Siemens.

Calibration

Calilbrate the assay using the calibrators listed in Table 2.

Note: These reagents are qualified for use with these calibrators only.

Table 2 – Emit® II Plus 6-AM/Ecstasy Calibrators/Controls for use in Qualitative or Semiquantitative Analysis

Required Calibrator for Qualitative Analysis (ng/mL)	Required Calibrators for Semiquantitative Analysis (ng/mL)
Level 2 (10)	Level Ø (0) Level 1 (5) Level 2 (10) Level 3 (15) Level 4 (20)

Qualitative Analysis

Calibrate by running the Emit® II Plus 6-AM/Ecstasy Calibrator/Control Level 2 in duplicate. Validate the calibration by running controls (see Quality Control). Refer to the Emit® II Plus 6-AM/Ecstasy Calibrators/Controls Instructions For Use and the application sheet for additional information and instrument settings. Recalibrate as indicated by control results.

Semiquantitative Analysis

Prepare a calibration curve by running the appropriate Emit® II Plus 6-AM/Ecstasy Calibrators/Controls listed in Table 2 in duplicate. Validate the calibration by running controls (see Quality Control). Refer to the Emit® II Plus 6-AM/Ecstasy Calibrators/Controls instructions for use and the application sheet for additional information and instrument settings. Recalibrate as indicated by control results.

Quality Control

Follow government regulations or accreditation requirements for quality control frequency.

Qualitative Analysis

Validate the calibration by assaying controls. The Emit® Calibrator/Control Level 0 may be used as the negative control and the Emit® II Plus 6-AM/Ecstasy Calibrator/Control Level 4 may be used as the positive control. Ensure that the result relates appropriately to the cutoff calibrator. That is,

- If Emit® Calibrator/Control Level Ø (0 ng/mL) was run, ensure that the result is negative relative to the cutoff calibrator level.
- If Emit® II Plus 6-AM/Ecstasy Calibrator/Control Level 4 (20 ng/mL) was run, ensure that the result is positive relative to the cutoff calibrator level.

Alternatively, other commercially available quality control materials may be used.

Once the calibration is validated, run urine specimens.

Semiquantitative Analysis

Validate the calibration curve by assaying commercial controls. Ensure that control results fall within acceptable limits as defined by your laboratory.

Once the calibration curve is validated, run urine specimens.

7 Results

Qualitative Analysis

Refer to Table 2 for the Emit® II Plus 6-AM/Ecstasy Calibrator/Control cutoff level. The table lists the concentration of 6-AM present in the Emit® II Plus 6-AM/Ecstasy Calibrator/Control cutoff level for distinguishing "positive" from "negative" specimens.

Positive Results A specimen that gives a change in rate value greater than or equal to the Emit® II Plus 6-AM/Ecstasy Calibrator/Control cutoff rate value is interpreted as positive.

Negative Results A specimen that gives a change in rate value less than the Emit® II Plus 6-AM/Ecstasy Calibrator/Control cutoff rate value is interpreted as negative; either the specimen does not contain 6-AM or 6-AM is present in concentrations below the cutoff level for this assay.

Semiquantitative Analysis

The semiquantitation of positive results enables the laboratory to determine an appropriate dilution of the specimen for confirmation by GC/MS. Semiquantitation also permits the laboratory to establish quality control procedures and assess control performance. Refer to the Analytical Recovery section for the semiquantitative range.

Using the Emit® II Plus 6-Acetylmorphine Assay, it is possible to make semiquantitative determinations of 6-AM. An estimate of relative total drug concentrations may be obtained by running the Emit® Calibrator/Control Level Ø (0 ng/mL) and the appropriate Emit® II Plus 6-AM/Ecstasy Calibrator/Controls: Levels 1 (5 ng/mL), 2 (10 ng/mL), 3 (15 ng/mL), 4 (20 ng/mL). Refer to the application sheet for instructions.

Results of this test should always be interpreted in conjunction with the patient's medical history, clinical presentation and other findings.

Siemens has validated use of these reagents on various analyzers to optimize product performance and meet product specifications. User defined modifications are not supported by Siemens as they may affect performance of the system and assay results. It is the responsibility of the user to validate modifications to these instructions or use of the reagents on analyzers other than those included in Siemens Application Sheets or these instructions for use.

8 Limitations

- The assay is designed for use with human urine only.
- A positive result from the assay indicates the presence of 6-AM but does not indicate or measure intoxication.
- Boric acid is not recommended as a preservative for urine.
- There is a possibility that substances and/or factors not listed (e.g., technical or procedural errors) may interfere with the test and cause false results.
- Interpretation of results must take into account that urine concentrations can vary extensively with fluid intake and other biological variables.
- Immunoassays that produce a single result in the presence of a drug and its metabolites cannot fully quantitate the concentration of individual components.
- To maintain sample stability store processed patient samples frozen at -20°C.

9 Expected Values

When the Emit® II Plus 6-Acetylmorphine Assay is used as a qualitative assay, the amount of drugs and metabolites detected by the assay in any given specimen cannot be estimated. The assay results distinguish between positive and negative specimens—positive indicating specimens that contain 6-AM.

When used semiquantitatively, the assay yields approximate, cumulative concentrations of the metabolites detected by the assay (See Specificity, Section 10).

10 Specific Performance Characteristics

The data appearing in this section were collected on the Viva-E® using the Emit® II Plus 6-Acetylmorphine Assay.

Method Comparison

Qualitative and Semiquantitative Results

One hundred five (105) samples were analyzed by the Emit® II Plus 6-Acetylmorphine Assay and by GC/MS. Both methods used a cutoff of 10 ng/mL. 22 samples were within +/- 50% of the cutoff by GC/MS.

Forty nine (49) samples showed positive results by both methods, while fifty five (55) samples showed negative results by both methods. One specimen showed a negative result by GC/MS and a positive result by the Emit® II Plus 6-Acetylmorphine Assay.

Data are summarized in Table 3.

Table 3 – Qualitative and Semiquantitative Accuracy Summary

		GC/MS				
		LOW NEG Less than 50% below the cutoff (<5 ng/mL)	NEG Within 50% below the cutoff (5.0 ~ 9.9 ng/mL)	POS Within 50% above the cutoff (10.0 ~ 15 ng/mL)	HIGH POS Greater than 50% above the cutoff (>15 ng/mL)	% Agreement
Qualitative Summary						
Emit®	POS	0	1	15	34	98%
	NEG	49	6	0	0	100%
Semiquantitative Summary						
Emit®	POS	0	1	15	34	98%
	NEG	49	6	0	0	100%

Table 4 – Discordant Result Summary

Cutoff Value (10 ng/mL)	Qualitative Result (POS/NEG)		Semiquantitative Result (ng/mL)	
	Emit® Assay	GC/MS	Emit® Assay	GC/MS
Sample # 55	+	-	16.3	7.8

Precision

Precision was determined by assaying urine pools spiked with 6-AM for 20 days, 2 runs per day in duplicate (N = 80). Precision data were calculated according to the Clinical and Laboratory Standards Institute (CLSI) Guideline EP5-A2. Results are summarized in Tables 5 and 6.

Table 5 – Precision: Qualitative Analysis

Urine Pool (ng/mL)	% of cutoff	# of Determinations	Result	Mean (mAU/min)	SD	CV (%)
Repeatability						
0	-100%	40	40 Negative	455	1.1	0.2
2.5	-75%	40	40 Negative	489	1.4	0.3
5.0	-50%	40	40 Negative	523	1.6	0.3
7.5	-25%	40	40 Negative	558	1.5	0.3
10.0	cutoff	40	40 Positive	591	1.7	0.3
12.5	+25%	40	40 Positive	622	1.7	0.3
15.0	+50%	40	40 Positive	649	1.4	0.2
17.5	+75%	40	40 Positive	671	1.6	0.2
20.0	100%	40	40 Positive	688	1.9	0.3
Within-Lab						
0	-100%	80	80 Negative	455	7.5	1.7
2.5	-75%	80	80 Negative	489	7.6	1.6
5.0	-50%	80	80 Negative	523	7.3	1.4
7.5	-25%	80	80 Negative	558	7.0	1.3
10.0	cutoff	80	80 Positive	591	6.5	1.1
12.5	+25%	80	80 Positive	622	6.0	1.0
15.0	+50%	80	80 Positive	649	5.9	0.9
17.5	+75%	80	80 Positive	671	6.7	1.0
20.0	100%	80	80 Positive	688	7.1	1.0

Table 6 – Precision: Semiquantitative Analysis

Urine Pool (ng/mL)	% of cutoff	# of Determinations	Result	Mean (ng/mL)	SD	CV (%)
Repeatability						
0	-100%	40	40 Negative	0.9	0.10	N/A
2.5	-75%	40	40 Negative	3.6	0.10	2.9
5.0	-50%	40	40 Negative	6.0	0.12	2.0
7.5	-25%	40	40 Negative	8.7	0.12	1.4
10.0	cutoff	40	40 Positive	11.3	0.14	1.3
12.5	+25%	40	40 Positive	14.2	0.16	1.1
15.0	+50%	40	40 Positive	17.0	0.15	0.9
17.5	+75%	40	40 Positive	19.6	0.20	1.0
20.0	100%	40	40 Positive	21.8	0.25	1.2
Within-Lab						
0	-100%	80	80 Negative	0.9	0.62	N/A
2.5	-75%	80	80 Negative	3.6	0.47	13.3
5.0	-50%	80	80 Negative	6.0	0.43	7.1
7.5	-25%	80	80 Negative	8.7	0.43	5.1
10.0	cutoff	80	80 Positive	11.3	0.48	4.2
12.5	+25%	80	80 Positive	14.2	0.50	3.5
15.0	+50%	80	80 Positive	17.0	0.54	3.2
17.5	+75%	80	80 Positive	19.6	0.73	3.7
20.0	100%	80	80 Positive	21.8	0.89	4.1

Analytical Recovery

Qualitative Results

In qualitative spike analysis, the Emit® II Plus 6-Acetylmorphine Assay correctly identified the mean rate of spiked specimens containing less than the cutoff as negative and the mean rate of spiked specimens containing greater than the cutoff as positive 100% of the time.

Semiquantitative Results

Drug-free human urine was spiked with concentrations of 6-acetylmorphine at levels throughout the semiquantitative range of 2.5 to 20 ng/mL. For each known concentration, drug recovery was calculated using the mean concentration obtained by the Emit® II Plus 6-Acetylmorphine Assay. Semiquantitative results are shown in Table 7.

Table 7 – Analytical Recovery of Semiquantitative Results

Expected 6-AM Concentration (ng/mL)	Mean 6-AM Concentration by Emit® II Plus 6-Acetylmorphine Assay (ng/mL)	Recovery (%)
0	0.3	N/A
2.5	2.8	112.2
5	5.7	114.7
7.5	8.2	109.8
10	10.8	108.4
12.5	13.5	108.2
15	16.1	107.6
17.5	19.0	108.7
20	22.7	113.5

Specificity

The Emit® II Plus 6-Acetylmorphine Assay detects 6-AM a major metabolite of heroin, in human urine.

Table 8 lists the structurally related compounds that produce a negative result at the concentration tested and did not yield a response equivalent to the 10 ng/mL cutoff. If a specimen contains more than one compound detected by the assay, lower concentrations than those listed in Table 8 may combine to produce a rate equal to or greater than that of the cutoff calibrator. Data presented are representative of typical performance of this assay.

Table 8 – Concentrations of Structurally Related Compounds That Produce a Negative Result versus the 10 ng/mL 6-AM Cutoff

Compound	Concentrations Tested (ng/mL)	Cross-reactivity (%)
Buprenorphine	1,000,000	0.00
Codeine	500,000	0.00
Dextromethorphan	100,000	0.00
Dihydrocodeine	500,000	0.00
Heroin HCl	80	1.25
Hydrocodone	300,000	0.00
Hydromorphone	100,000	0.00
Imipramine	200,000	0.00
Levorphanol	100,000	0.00
Meperidine	800,000	0.00
Morphine	100,000	0.01
Morphine-3-Glucuronide	600,000	0.00
Morphine-6-Glucuronide	600,000	0.00

Compound	Concentrations Tested (ng/mL)	Cross-reactivity (%)
Nalorphine	100,000	0.01
Naloxone	300,000	0.00
Naltrexone	300,000	0.00
Norcodeine	600,000	0.00
Normorphine	100,000	0.00
Oxycodone	400,000	0.00
Oxymorphone	80,000	0.00

Structurally Unrelated Compounds

The compounds were spiked into two levels of controls at ±25% of the cutoff concentration. The results for both qualitative and semiquantitative mode are presented below.

Qualitative Results

In qualitative analysis, the Emit® II Plus 6-Acetylmorphine Assay correctly identified the mean rate of the control at -25% of the cutoff as negative 100% of the time and the mean rate of the control at +25% of the cutoff as positive 100% of the time.

Semiquantitative Results

In semiquantitative analysis, the two levels of controls at ±25% of the cutoff concentration did not yield a false response relative to the cutoff. Results are shown in Table 9.

Table 9 – Structurally Unrelated Compounds: Semiquantitative Results

Compound	Concentration Tested (µg/mL)	Sample Mean (-25% Control) (ng/mL)	Sample Mean (+25% Control) (ng/mL)
10,11-Dihydrocarbamazepine	85	8.6	12.9
Acetaminophen	1000	7.7	12.5
Acetylsalicylic Acid	1500	7.6	11.8
Amitriptyline	100	8.3	13.2
Amoxicillin	500	8.4	13.4
AZT (Zipovudine)	2000	7.3	11.7
Benzoylecgonine	1000	7.7	12.1
Brompheniramine	75	8.3	13.1
Caffeine	1000	7.9	12.9
Captopril	500	8.3	12.8
Chlordiazepoxide	100	7.3	11.7
Chlorpromazine	10	7.9	12.7
Cimetidine	1000	7.9	12.7
Clomipramine	2.5	7.8	12.5
Clonidine	1000	7.8	11.9
Cyclobenzaprine	125	7.5	11.7
d-Amphetamine	700	7.2	12.3
Desipramine	800	8.1	12.9
Diazepam	100	7.3	11.1
Digoxin	0.01	7.5	12.4
Diphenhydramine	1000	8.0	12.6
d-Methamphetamine	500	7.6	12.5
Doxepine	100	8.2	12.8
EDDP	1000	7.7	12.5
Enalapril	500	8.1	12.7
Fluoxetine	500	7.9	11.4
Glutethimide	500	7.6	12.1
Haloperidol	100	7.9	12.7
Hydroxyzine	500	7.5	12.3
Ibuprophen	1000	8.4	12.8
Ketamine	100	7.3	12.5
Ketorolac Tromethamine	400	7.1	11.5
LAAM (L-α-Acetylmethadol)	25	7.6	12.6
L-Cotinine	100	8.4	13.2
Levofloxacin	100	7.9	12.6
Levothyroxine	50	7.9	12.9
Lidocaine	1000	7.7	12.7
Lormetazepam	1	7.7	12.3
LSD	10	7.7	12.5
MDMA (Ecstasy)	1000	7.6	12.6
Methadone	500	6.4	10.8
Methaqualone	600	9.3	13.2
NAPA (N-Acetylprocainamide)	400	7.9	12.8
Naproxen	1000	8.6	13.1
Nicotinic Acid	500	7.6	12.5
Nifedipine	500	7.9	12.1
Nordiazepam	100	6.5	10.6
Nortryptiline	250	7.2	11.5
Oxazepam	300	6.6	10.9
Perphenazine	150	7.4	11.6
Phencyclidine	1000	6.9	11.1
Phenobarbital	500	6.7	11.1
Phenelzine	100	7.4	12.5
Phenytoin	1000	7.7	11.8
Procainamide	1000	7.2	12.0
Procyclidine	800	7.3	11.9
Promethazine	100	7.4	12.1
Propoxyphene	1000	6.8	11.1
Protriptyline	200	7.4	12.0
Pseudoephedrine	1000	8.1	13.0
Quinacrine	1000	7.1	11.8
Ranitidine	1000	7.1	11.8
Ritalin	1000	7.6	12.6
Salicylic Acid	500	7.9	11.9
Scopolamine	500	7.1	11.7
Secobarbital	1000	8.2	12.9
THC (11-nor-Δ9-THC-9-COOH)	100	7.5	11.8
Thioridazine	100	7.3	12.1
Tramadol	1000	7.8	12.3
Trazodone	5	7.2	12.4
Trimethoprim	1000	8.2	12.7
Triprolidine	50	7.0	11.5
Tyramine	100	7.0	11.9
Verapamil	500	7.1	11.5
Zolpidem	100	8.0	12.6

Non-Interfering Substances

The substances were spiked into two levels of controls at ±25% of the cutoff concentration. The results for both qualitative and semiquantitative mode are presented below.

Qualitative Results

In qualitative analysis, the Emit® II Plus 6-Acetylmorphine Assay correctly identified the mean rate of the control at -25% of the cutoff as negative 100% of the time and the mean rate of the control at +25% of the cutoff as positive 100% of the time.

Semiquantitative Results

In semiquantitative analysis, the two levels of controls at ±25% of the cutoff concentration did not yield a false response relative to the cutoff. Results are shown in Table 10.

Table 10 – Endogenous Substances: Semiquantitative Results

Substance	Level Tested	Sample Mean (-25% Control) (ng/mL)	Sample Mean (+25% Control) (ng/mL)
Acetone	1.0 g/dL	7.3	11.9
Ascorbic Acid	1.5 g/dL	8.2	14.8
Bilirubin, Conjugated	2.0 mg/dL	7.8	12.6
Bilirubin, Unconjugated	2.0 mg/dL	7.5	12.4
Creatinine	0.5 g/dL	7.6	12.5
Ethanol	1.0 g/dL	7.5	11.9
Galactose	10 mg/dL	7.5	12.7
γ-Globulin	500 mg/dL	7.7	12.9
Glucose	2.0 g/dL	7.3	11.9
Hemoglobin	115 mg/dL	7.4	12.3
Human Serum Albumin	0.5 g/dL	7.7	12.8
Oxalic Acid	0.1 g/dL	6.8	11.3
Riboflavin	7.5 mg/dL	8.3	13.8
Sodium Chloride	6.0 g/dL	7.2	12.7
Urea	6.0 g/dL	7.3	12.4

Specific Gravity and pH

Urine samples with specific gravity values ranging from 1.002 to 1.030 and pH values ranging from 4.0 to 10.0 were tested in the presence of 7.5 and 12.5 ng/mL of 6-AM. No interference was observed.

11 Bibliography

1. Mandatory Guidelines for Federal Workplace Drug Testing Programs. Federal Register/Volume 73, No. 228, Effective October 1, 2010. pp 71858-71907.
2. Hawks RL, Chiang CN, eds. Urine Testing for Drugs of Abuse, Rockville, MD: National Institute on Drug Abuse (NIDA), Department of Health and Human Services; 1986. NIDA research monograph 73.
3. Holler, J, et al. Comparison of the Microgenics CEDIA heroin metabolite (6-AM) and the Roche Abuscreen ONLINE opiate immunoassays for the detection of heroin use in forensic urine samples. *J.Anal. Toxicol.* 28:489-493 (2004).
4. von Euler et al. Interpretation of the Presence of 6-Monoacetylmorphine in the Absence of Morphine-3-glucuronide in Urine samples: Evidence of Heroin Abuse. *Ther Drug Monit.* Vol 25, 645-648 No. 5, 2003.
5. Baselt, R.C. Disposition of Toxic Drugs and Chemicals in Man, Biomedical Publications, 8th Ed. 2008 730-35.
6. ARUP Consult Physicians Guide http://www.aruplab.com/guides/ug/tests/0090364.jsp

12 Symbols Key

2	Do not reuse / Nicht zur Wiederverwendung / Ne pas réutiliser / Non riutilizzare / No reutilizar
	Use By / Verwendbar bis / Utiliser jusque / Utilizzare entro / Fecha de caducidad
LOT	Batch Code / Chargenbezeichnung / Code du lot / Codice del lotto / Código de lote
REF	Catalogue Number / Bestellnummer / Référence du catalogue / Numero di catalogo / Número de catálogo
!	Caution, consult accompanying documents / Achtung, Begleitdokumente beachten / Attention voir notice d'instructions / Attenzione, vedere le istruzioni per l'uso / Atención, ver instrucciones de uso
	Manufacturer / Hersteller / Fabricant / Fabbricante / Fabricante
EC REP	Authorized Representative in the European Community / Bevollmächtigter in der Europäischen Gemeinschaft / Mandataire dans la Communauté européenne / Mandatario nella Comunità Europea / Representante autorizado en la Comunidad Europea
Σ	Contains sufficient for <n> tests / Inhalt ausreichend für <n> Tests / Contenu suffisant pour "n" tests / Contenuto sufficiente per "n" saggi / Contenido suficiente para <n> ensayos
IVD	*In Vitro* Diagnostic Medical Device / *In-Vitro*-Diagnostikum / Dispositif médical de diagnostic *in vitro* / Dispositivo medico-diagnostico *in vitro* / Producto sanitario para diagnóstico *in vitro*
	Temperature Limitation / Temperaturbegrenzung / Limites de température / Limiti di temperatura / Límite de temperatura
	Consult Instructions for Use / Gebrauchsanweisung beachten / Consulter les instructions d'utilisation / Consultare le istruzioni per l'uso / Consulte las instrucciones de uso
NON STERILE	Non-sterile / Nicht steril / Non stérile / Non sterile / No estéril
CE	CE Mark / CE Zeichen / Marquage CE / Marchio CE / Marca CE
CONTENTS	Contents / Inhalt / Contenu / Contenuto / Contenido
→	Reconstitution Volume / Rekonstitutionsvolumen / Volume de reconstitution / Volume di ricostituzione / Volumen de reconstitución
LEVEL	Level / Konzentration / Niveau / Livello / Nivel

2015-03_EFIGS

For technical assistance, call Siemens Healthcare Diagnostics:
1-800-227-8994 in the USA
1-800-264-0083 in Canada
Outside the USA and Canada, call your local Siemens representative.

Notice: Adulteration of reagents, use of instruments without appropriate capabilities, or other failure to follow instructions as set forth in this labeling can affect performance characteristics and stated or implied label claims.

Siemens Healthcare Diagnostics Inc.
500 GBC Drive
Newark, DE 19714 USA

Global Siemens Headquarters
Siemens AG
Wittelsbacherplatz 2
80333 Muenchen
Germany

Global Siemens Healthcare Headquarters
Siemens AG
Healthcare Sector
Henkestrasse 127
91052 Erlangen
Germany
Phone: +49 9131 84-0
siemens.com/healthcare

Global Division
Siemens Healthcare Diagnostics Inc.
511 Benedict Avenue
Tarrytown, NY 10591
USA
siemens.com/healthcare

CE
Printed in USA
2019-10
10871746_US_F