December 11, 2024

Microgenics Corporation
Nikhita Tandon
Manager, Regulatory Affairs
46500 Kato Road
Fremont, California 94538

Re: K243498
Trade/Device Name: Alinity c Benzodiazepines Reagent Kit
Regulation Number: 21 CFR 862.3170
Regulation Name: Benzodiazepine Test System
Regulatory Class: Class II
Product Code: JXM
Dated: November 11, 2024
Received: November 12, 2024

Dear Nikhita Tandon:

We have reviewed your section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (the Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. Although this letter refers to your product as a device, please be aware that some cleared products may instead be combination products. The 510(k) Premarket Notification Database available at https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpmn/pmn.cfm identifies combination product submissions. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

Additional information about changes that may require a new premarket notification are provided in the FDA guidance documents entitled "Deciding When to Submit a 510(k) for a Change to an Existing Device" (https://www.fda.gov/media/99812/download) and "Deciding When to Submit a 510(k) for a Software Change to an Existing Device" (https://www.fda.gov/media/99785/download).

Your device is also subject to, among other requirements, the Quality System (QS) regulation (21 CFR Part 820), which includes, but is not limited to, 21 CFR 820.30, Design controls; 21 CFR 820.90, Nonconforming product; and 21 CFR 820.100, Corrective and preventive action. Please note that regardless of whether a change requires premarket review, the QS regulation requires device manufacturers to review and approve changes to device design and production (21 CFR 820.30 and 21 CFR 820.70) and document changes and approvals in the device master record (21 CFR 820.181).

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Part 801 and Part 809); medical device reporting (reporting of medical device-related adverse events) (21 CFR Part 803) for devices or postmarketing safety reporting (21 CFR Part 4, Subpart B) for combination products (see https://www.fda.gov/combination-products/guidance-regulatory-information/postmarketing-safety-reporting-combination-products); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820) for devices or current good manufacturing practices (21 CFR Part 4, Subpart A) for combination products; and, if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR Parts 1000-1050.

All medical devices, including Class I and unclassified devices and combination product device constituent parts are required to be in compliance with the final Unique Device Identification System rule ("UDI Rule"). The UDI Rule requires, among other things, that a device bear a unique device identifier (UDI) on its label and package (21 CFR 801.20(a)) unless an exception or alternative applies (21 CFR 801.20(b)) and that the dates on the device label be formatted in accordance with 21 CFR 801.18. The UDI Rule (21 CFR 830.300(a) and 830.320(b)) also requires that certain information be submitted to the Global Unique Device Identification Database (GUDID) (21 CFR Part 830 Subpart E). For additional information on these requirements, please see the UDI System webpage at https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/unique-device-identification-system-udi-system.

Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to https://www.fda.gov/medical-devices/medical-device-safety/medical-device-reporting-mdr-how-report-medical-device-problems.

For comprehensive regulatory information about medical devices and radiation-emitting products, including information about labeling regulations, please see Device Advice (https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance) and CDRH Learn (https://www.fda.gov/training-and-continuing-education/cdrh-learn). Additionally, you may contact the Division of Industry and Consumer Education (DICE) to ask a question about a specific regulatory topic. See the DICE website (https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-

assistance/contact-us-division-industry-and-consumer-education-dice) for more information or contact DICE by email (DICE@fda.hhs.gov) or phone (1-800-638-2041 or 301-796-7100).

Sincerely,

Joseph A. Kotarek -S

Digitally signed by Joseph A. Kotarek -S
Date: 2024.12.11 14:38:36 -05'00'

Joseph Kotarek, Ph.D.
Branch Chief
Division of Chemistry
and Toxicology Devices
OHT7: Office of In Vitro Diagnostics
Office of Product Evaluation and Quality
Center for Devices and Radiological Health

Enclosure

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Food and Drug Administration

Indications for Use

Form Approved: OMB No. 0910-0120
Expiration Date: 06/30/2023
See PRA Statement below.

510(k) Number *(if known)*
K243498

Device Name
Alinity c Benzodiazepines Reagent Kit

Indications for Use *(Describe)*

The Alinity c Benzodiazepines Reagent Kit is a homogeneous enzyme immunoassay intended for the qualitative and/or semiquantitative determination of the presence of benzodiazepines and their metabolites in human urine at a cutoff concentration of 200 ng/mL (0.700 µmol/L) on the Alinity c analyzer.
The assay is intended to be used in laboratories and provides a rapid analytical screening procedure to detect benzodiazepines in human urine. This assay is calibrated against oxazepam. This product is intended to be used by trained professionals only.
The semiquantitative mode is for the purpose of enabling laboratories to determine an appropriate dilution of the specimen for confirmation by a confirmatory method such as Liquid Chromatography/Tandem Mass Spectrometry (LC- MS/MS) or permitting laboratories to establish quality control procedures.
The 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) or Liquid Chromatography/Tandem Mass Spectrometry (LC-MS/MS) is the preferred confirmatory method.
Clinical and professional judgment should be applied to any drug of abuse test result, particularly when preliminary results are used. For In Vitro Diagnostic Use Only.

Type of Use *(Select one or both, as applicable)*

☒ Prescription Use (Part 21 CFR 801 Subpart D) ☐ Over-The-Counter Use (21 CFR 801 Subpart C)

CONTINUE ON A SEPARATE PAGE IF NEEDED.

This section applies only to requirements of the Paperwork Reduction Act of 1995.

DO NOT SEND YOUR COMPLETED FORM TO THE PRA STAFF EMAIL ADDRESS BELOW.

The burden time for this collection of information is estimated to average 79 hours per response, including the time to review instructions, search existing data sources, gather and maintain the data needed and complete and review the collection of information. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden, to:

Department of Health and Human Services
Food and Drug Administration
Office of Chief Information Officer
Paperwork Reduction Act (PRA) Staff
PRAStaff@fda.hhs.gov

"An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB number."

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510(k) Summary
K243498

I. Device Information

Contact Details	
Sponsor:	Microgenics Corporation Thermo Fisher Scientific 46500 Kato Road Fremont, CA 94538, USA Phone: 925-208-7045
Correspondent Contact Information:	Nikhita Tandon Manager, Regulatory Affairs Email: Nikhita.tandon@thermofisher.com Phone:925-208-7045
Device Name	
Device Trade Name:	Alinity c Benzodiazepines Reagent Kit
Common Name:	Benzodiazepine Test System
Classification Name:	Enzyme Immunoassay, Benzodiazepine
Regulation Number:	21 CFR 862.3170
Product Code:	JXM
Legally Marketed Predicate Device	
Predicate Premarket Notification Number:	K173963
Predicate Trade Name:	DRI Benzodiazepine Assay
Predicate Common Name:	Benzodiazepine Test System
Predicate Classification Name:	Enzyme Immunoassay, Benzodiazepine
Predicate Regulation Number:	21 CFR 862.3170
Predicate Product Code:	JXM

II. Date Summary Prepared

November 11, 2024

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III. Description of Device

The Alinity c Benzodiazepines Reagent Kit is a homogeneous enzyme immunoassay with liquid ready to-use reagents. The assay uses a specific antibody that can detect most benzodiazepines and their metabolites in urine. The assay is based on competition between a drug labeled with glucose-6- phosphate dehydrogenase (G6PDH), and free drug from the urine sample, for a fixed amount of specific antibody binding sites. In the absence of free drug from the sample, the specific antibody binds the drug labeled with G6PDH and causes a decrease in enzyme activity. In the presence of free drug, the free drug occupies the antibody binding sites, allowing the drug bound G6PDH to interact with the substrate, resulting in enzyme activity. This phenomenon creates a direct relationship between the drug concentration in urine and enzyme activity. The enzyme activity is determined spectrophotometrically at 340 nm by measuring the conversion of nicotinamide adenine dinucleotide (NAD) to NADH.

Benzodiazepines are sedative-hypnotic drugs, which are subject to abuse. Benzodiazepines are structurally similar and include a wide variety of drugs such as alprazolam, chlordiazepoxide, diazepam, lorazepam, oxazepam, and triazolam. They are absorbed and metabolized at different rates, resulting in various psychoactive effects. Baselt describes the metabolism and toxicology of numerous benzodiazepines, including alprazolam, bromazepam, chlordiazepoxide, clobazam, clonazepam, clorazepate, diazepam, estazolam, flunitrazepam, flurazepam, halazepam, lorazepam, medazepam, midazolam, nitrazepam, oxazepam, prazepam, quazepam, temazepam, and triazolam.

The Alinity c Benzodiazepines Reagent Kit is a first-line device, which may be used by medical personnel, along with clinical observations, as an aid for indicating Benzodiazepine abuse through detection of benzodiazepines or their metabolites in urine

IV. Intended Use

A. Indications for Use:

See indications for use below.

B. Intended Use:

The Alinity c Benzodiazepines Reagent Kit is a homogeneous enzyme immunoassay intended for the qualitative and/or semiquantitative determination of the presence of benzodiazepines and their metabolites in human urine at a cutoff concentration of 200 ng/mL (0.700 µmol/L) on the Alinity c analyzer.
The assay is intended to be used in laboratories and provides a rapid analytical screening procedure to detect benzodiazepines in human urine. This assay is calibrated against oxazepam. This product is intended to be used by trained professionals only. The semiquantitative mode is for the purpose of enabling laboratories to determine an appropriate dilution of the specimen for confirmation by a confirmatory method such as Liquid Chromatography/Tandem Mass Spectrometry (LC- MS/MS) or permitting laboratories to establish quality control

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procedures.
The 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) or Liquid Chromatography/Tandem Mass Spectrometry (LC-MS/MS) is the preferred confirmatory method.[1, 2]
Clinical and professional judgment should be applied to any drug of abuse test result, particularly when preliminary results are used. For *In Vitro* Diagnostic Use Only.

V. Comparison to Predicate Device

Characteristics	**Predicate Device** DRI Benzodiazepine Assay (K173963)	**Candidate Device** Alinity c Benzodiazepines Reagent Kit	**Comparison**
Indications for Use	See intended use below for indications use	See intended use below for indications use	Identical
Intended Use	The DRI® Benzodiazepine Assay is a homogeneous enzyme immunoassay intended for the qualitative and/or semi-quantitative determination of the presence of benzodiazepines and their metabolites in human urine at a cutoff concentration of 200 ng/mL. The assay is intended to be used in laboratories and provides a rapid analytical screening procedure to detect benzodiazepines in human urine. The assay is designed for use with a number of clinical chemistry analyzers. This assay is calibrated against Oxazepam. This product is intended to be used by trained professionals only. The semi-quantitative mode is for the purpose of enabling laboratories to determine an appropriate dilution of the specimen for confirmation by a confirmatory method such as Liquid Chromatography/tandem mass	The Alinity c Benzodiazepines Reagent Kit is a homogeneous enzyme immunoassay intended for the qualitative and/or semiquantitative determination of the presence of benzodiazepines and their metabolites in human urine at a cutoff concentration of 200 ng/mL (0.700 µmol/L) on the Alinity c analyzer. The assay is intended to be used in laboratories and provides a rapid analytical screening procedure to detect benzodiazepines in human urine. This assay is calibrated against oxazepam. This product is intended to be used by trained professionals only. The semiquantitative mode is for the purpose of enabling laboratories to determine an appropriate dilution of the specimen for confirmation by a confirmatory method such as Liquid Chromatography/Tandem Mass	Identical with exception to the brand name of the device and naming of the clinical chemistry analyzer. This does not impact the intended use of device.

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Characteristics	**Predicate Device** DRI Benzodiazepine Assay (K173963)	**Candidate Device** Alinity c Benzodiazepines Reagent Kit	Comparison
	spectrometry (LC-MS/MS) or permitting laboratories to establish quality control procedures. The 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) or Liquid chromatography/tandem mass spectrometry (LC-MS/MS) is the preferred confirmatory method. Clinical and professional judgment should be applied to any drug of abuse test result, particularly when preliminary results are used. For In Vitro Diagnostic Use Only.	Spectrometry (LC-MS/MS) or permitting laboratories to establish quality control procedures. The 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) or Liquid Chromatography/Tandem Mass Spectrometry (LC-MS/MS) is the preferred confirmatory method. Clinical and professional judgment should be applied to any drug of abuse test result, particularly when preliminary results are used. For In Vitro Diagnostic Use Only.	
FDA Product Code	JXM	JXM	Identical
Device Classification and Name	21 CFR 862.3170, ENZYME IMMUNOASSAY, BENZODIAZEPINE Benzodiazepine test system, 91 – Toxicology	21 CFR 862.3170, ENZYME IMMUNOASSAY, BENZODIAZEPINE Benzodiazepine test system, 91 – Toxicology	Identical
Operating Principle (Technology)	Homogeneous Enzyme Immunoassay	Homogeneous Enzyme Immunoassay	Identical

Characteristics	**Predicate Device** DRI Benzodiazepine Enzyme Immunoassay (K173963)	**Candidate Device** Alinity c Benzodiazepines Reagent Kit	Comparison
Analyte	Benzodiazepines	Benzodiazepines	Identical
Measured Analyte	Benzodiazepines and their metabolites	Benzodiazepines and their metabolites	Identical
Test Matrix	Human Urine	Human Urine	Identical
Cut-off Levels	200 ng/mL	200 ng/mL	Identical
Methodology	Homogeneous Enzyme Immunoassay	Homogeneous Enzyme Immunoassay	Identical
Materials	Antibody/Substrate Reagent contains active ingredients: sheep polyclonal anti-benzodiazepine antibodies, glucose-6-phosphate (G6P) and nicotinamide adenine dinucleotide (NAD) and Inactive ingredients: TRIS buffer, bovine serum albumin (BSA). Preservative: sodium azide Enzyme Conjugate Reagent contains active ingredients: benzodiazepine derivative labeled with glucose-6-phosphate dehydrogenase (G6PDH) and Inactive ingredients: TRIS buffer, BSA. Preservative: sodium azide	Antibody/Substrate Reagent contains active ingredients: Anti-benzodiazepine sheep polyclonal antibodies, glucose-6-phosphate (G6P) and nicotinamide adenine dinucleotide (NAD) and Inactive ingredients: TRIS buffer, bovine serum albumin (BSA). Preservative: sodium azide Enzyme Conjugate Reagent contains active ingredients: benzodiazepine derivative labeled with glucose-6-phosphate dehydrogenase (G6PDH) and Inactive ingredients: TRIS buffer, BSA. Preservative: sodium azide	Identical
Reagent Form	Liquid ready-to-use Reagents are sold in three sizes, 18 mL, 100 mL and 500 mL kits.	Liquid ready-to-use Reagents are sold as 2 cartridges per kit with 250 tests per cartridge and 500 tests per kit Volume of R1 per cartridge: 32.2 mL Volume of R2 per cartridge: 31.8 mL	Identical Formulation. Kit available in different sizes
Antibody	Sheep Polyclonal Anti-benzodiazepine antibodies	Sheep Polyclonal Anti-benzodiazepine antibodies	Identical

Storage	2–8°C until expiration date	2–8°C until expiration date	Identical
Principal Operator	Trained professionals	Trained professionals	Identical
Instrument	Beckman Coulter AU680 Clinical Chemistry Analyzer	Alinity c Analyzer System	Different analyzers, but both meet the following requirements: Automated clinical analyzers capable of maintaining a constant temperature, pipetting, mixing reagents, measuring enzymatic rates at 340 nm and timing the reaction accurately.

Characteristics	**Predicate Device** DRI Benzodiazepine Enzyme Immunoassay (K173963)	**Candidate Device** Alinity c Benzodiazepines Reagent Kit	**Comparison**
Package Insert	Header and footer	Header and footer	Different, candidate device's header and footer has been modernized to reflect present labeling regulation and practices and branding

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<table>
<tr><th>Characteristics</th><th><u>Predicate Device</u>
DRI Benzodiazepine Enzyme Immunoassay (K173963)</th><th><u>Candidate Device</u>
Alinity c Benzodiazepines Reagent Kit</th><th>Comparison</th></tr>
<tr><td></td><td><u>Additional Material</u>
<table><tr><th>Ref</th><th>Kit Description</th></tr><tr><td>1664</td><td>DRI Negative Calibrator, 10 mL</td></tr><tr><td>1388</td><td>DRI Negative Calibrator, 25 mL</td></tr><tr><td>1588</td><td>DRI Multi-Drug Urine Calibrator 1, 10 mL</td></tr><tr><td>1589</td><td>DRI Multi-Drug Urine Calibrator 1, 25 mL</td></tr><tr><td>1591</td><td>DRI Multi-Drug Urine Calibrator 2, 10 mL</td></tr><tr><td>1592</td><td>DRI Multi-Drug Urine Calibrator 2, 25 mL</td></tr><tr><td>1594</td><td>DRI Multi-Drug Urine Calibrator 3, 10 mL</td></tr><tr><td>1595</td><td>DRI Multi-Drug Urine Calibrator 3, 25 mL</td></tr><tr><td>1597</td><td>DRI Multi-Drug Urine Calibrator 4, 10 mL</td></tr><tr><td>1598</td><td>DRI Multi-Drug Urine Calibrator 4, 25 mL</td></tr><tr><td>DOAT-4</td><td>MAS® DOA Total-Level 4</td></tr><tr><td>DOAT-5</td><td>MAS® DOA Total-Level 5</td></tr></table></td><td><u>Additional Material</u>
<table><tr><th>Ref</th><th>Kit Description</th></tr><tr><td>08P6306</td><td>Alinity c DOA MC Negative Calibrator Kit</td></tr><tr><td>09P5201</td><td>Alinity c Benzodiazepines Qual Calibrator Kit</td></tr><tr><td>09P5202</td><td>Alinity c Benzodiazepines Semiquant Calibrator Kit</td></tr><tr><td>08P6318</td><td>Alinity c DOA MC I Controls</td></tr></table></td><td>Calibrators and Controls are Identical in formulation but assigned different Ref. numbers.

DOA MC Cals/controls contain Oxazepam and are traceable to the Oxazepam drug purchased from a commercial source which is established at 98% purity.</td></tr>
</table>

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<table>
<tr><th>Characteristics</th><th><u>Predicate Device</u>
DRI Benzodiazepine Enzyme Immunoassay (K173963)</th><th><u>Candidate Device</u>
Alinity c Benzodiazepines Reagent Kit</th><th>Comparison</th></tr>
<tr><td></td><td><u>Precautions and Warnings</u>
The reagents are harmful if swallowed.

DANGER:
1. The reagents contain ≤ 0.2% bovine serum albumin (BSA) and ≤0.5% Drug-specific antibody (Sheep). Avoid contact with skin and mucous membranes. Avoid inhalation.
May cause skin or inhaled allergic reaction.
2. In the case of accidental spill, clean and dispose of material according to your laboratory’s Standard Operating Procedure, local, and state regulations.
3. In the case of damaged packaging on arrival, contact your technical support representative.
4. Reagents used in the assay components contain ≤0.09% sodium azide. Avoid contact with skin and mucous membranes. Refer to Safety Data Sheet for additional precautions, handling instructions, and accidental exposure treatment.
H317 - May cause allergic skin reaction.
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled. Avoid breathing mist or vapor. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves/eye protection/face protection. In case of inadequate</td><td><u>Precautions and Warnings</u>
• [IVD]
• For In Vitro Diagnostic Use
• [Rx Only]
Safety Precautions
CAUTION: This product requires the handling of human specimens. It is recommended that all human-sourced materials and all consumables contaminated with potentially infectious materials be considered potentially infectious and handled in accordance with the OSHA Standard on Bloodborne Pathogens. Biosafety Level 2 or other appropriate regional, national, and institutional biosafety practices should be used for materials that contain, are suspected of containing, or are contaminated with infectious agents.5-8

<table>
<tr><td colspan="2">The following warnings and precautions apply to: [R1]</td></tr>
<tr><td colspan="2">Contains sodium azide.</td></tr>
<tr><td>EUH032</td><td>Contact with acids liberates very toxic gas.</td></tr>
<tr><td>P501</td><td>Dispose of contents / container in accordance with local regulations.</td></tr>
</table>
The following warnings and precautions apply to: [R2]</td><td>Different, candidate device precautions and warnings have been modernized to reflect present safety regulations.</td></tr>
</table>

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Characteristics	Predicate Device DRI Benzodiazepine Enzyme Immunoassay (K173963)	Candidate Device Alinity c Benzodiazepines Reagent Kit		Comparison
	ventilation wear respiratory protection. If on skin: Wash with plenty of soap and water. IF NHALED: If breathing becomes difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If skin irritation or rash occurs: Get medical advice/attention. If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician. Wash contaminated clothing before reuse. Dispose of contents/container to location in accordance with local/regional/national/international regulations.	**WARNING**	Contains tromethamine hydrochloride* and sodium azide.	
		H316*	Causes mild skin irritation.	
		EUH032	Contact with acids liberates very toxic gas.	
		Response		
		P332+P313*	If skin irritation occurs: Get medical advice / attention.	
		Disposal		
		P501	Dispose of contents / container in accordance with local regulations.	
		* Not applicable where regulation EC 1272/2008 (CLP) or OSHA Hazard Communication 29 CFR 1910.1200 (HCS) 2012 have been implemented. Follow local chemical disposal regulations based on your location along with recommendations and content in the Safety Data Sheet to determine the safe disposal of this product. For the most current hazard information, see the product Safety Data Sheet. Safety Data Sheets are available at www.corelaboratory.abbott or contact your local representative		

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<table>
<tr><th>Characteristics</th><th><u>Predicate Device</u>
DRI Benzodiazepine Enzyme Immunoassay (K173963)</th><th><u>Candidate Device</u>
Alinity c Benzodiazepines Reagent Kit</th><th>Comparison</th></tr>
<tr><td></td><td><u>Specimen Collection and Preparation</u>

Collect urine specimens in plastic or glass containers. Care should be taken to preserve the chemical integrity of the urine sample from the time it is collected until the time it is assayed.

Specimens kept at room temperature that do not receive initial test within 7 days[5] of arrival at the laboratory may be placed into a secure refrigeration unit at 2-8ºC for two months.[6] For longer storage prior to analysis or for sample retention after analysis, urine specimens may be stored at -20ºC.[6, 7]

Laboratories following the SAMHSA mandatory guidelines should refer to SAMHSA “Short- Term Refrigerated Storage” and “Long-Term Storage” requirements.[4]

To protect the integrity of the sample, do not induce foaming and avoid repeated freezing and thawing. An effort should be made to keep pipetted samples free of gross debris. It is recommended that grossly turbid specimens be centrifuged before analysis. Frozen samples should be thawed and mixed prior to analysis. Adulteration of the urine sample may cause erroneous results. If adulteration is</td><td><u>Specimen Collection and Preparation</u>

The specimen type used for this assay is human urine only.
The specimen type listed below was verified for use with this assay.
<table><tr><th>Specimen Type</th><th>Collection Vessel</th><th>Special Conditions</th></tr><tr><td>Urine</td><td>Clean plastic or glass container</td><td>Testing of fresh urine specimens is suggested. Samples within a pH range of 3 to 11 are suitable for testing with this assay.</td></tr></table>• The instrument does not provide the capability to verify specimen types. It is the responsibility of the operator to verify that the correct specimen types are used in the assay.
Specimen Conditions
• Analyze fresh specimens if possible.
• To prevent cross contamination, use of disposable pipettes or pipette tips is recommended.
Preparation for Analysis</td><td>Different, candidate device specimen collection and preparation has been modernized to reflect present guidelines and provide clearer handling instructions.</td></tr>
</table>

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Characteristics	Predicate Device DRI Benzodiazepine Enzyme Immunoassay (K173963)	Candidate Device Alinity c Benzodiazepines Reagent Kit	Comparison
	suspected, obtain another sample and forward both specimens to the laboratory for testing. **Handle all urine specimens as if they were potentially infectious.**	Adulteration of the urine specimen may cause erroneous results. If adulteration is suspected, obtain another specimen and forward both specimens to the laboratory for testing. An effort should be made to keep pipetted specimens free of gross debris. It is recommended that highly turbid specimens be centrifuged before analysis. Stored specimens must be inspected for particulates. If present, mix with a low speed vortex or by inversion and centrifuge the specimen to remove particulates prior to testing. Prepare frozen specimens as follows: • Frozen specimens must be completely thawed before mixing. • Mix thawed specimens thoroughly. • Visually inspect the specimens. If layering or stratification is observed, mix until specimens are visibly homogeneous. • If specimens are not mixed thoroughly, inconsistent results may be obtained. Specimen Storage Analyze fresh specimens if possible. **Specimen Type** **Temperature** **Maximum Storage Tim**	

Characteristics	Predicate Device DRI Benzodiazepine Enzyme Immunoassay (K173963)	Candidate Device Alinity c Benzodiazepines Reagent Kit	Comparison
		Urine Room Temperature 24 hours[9] 2 to 8°C 30 days[10] If analysis will not be completed within the maximum storage recommendations, the urine should be frozen at or below -20°C.[11] Repeated freeze/thaw cycles should be avoided to minimize analyte deterioration. It is the responsibility of the individual laboratory to determine specific specimen stability criteria for their laboratory per their laboratory workflow. For additional information on sample handling and processing, refer to CLSI C52-ED3.[11] The storage information provided here is based on references maintained by the manufacturer. Stored specimens must be inspected for particulates. If present, mix with a low-speed vortex or by inversion and centrifuge the specimen to remove particulates prior to testing. **Specimen Shipping** Package and label specimens in compliance with applicable state, federal, and international regulations covering the transport of clinical specimens and infectious substances.	

Characteristics	**Predicate Device** DRI Benzodiazepine Enzyme Immunoassay (K173963)	**Candidate Device** Alinity c Benzodiazepines Reagent Kit	Comparison
		Do not exceed the storage limitations listed above.	

Characteristics	**Predicate Device** DRI Benzodiazepine Enzyme Immunoassay (K173963)	**Candidate Device** Alinity c Benzodiazepines Reagent Kit	**Comparison**
	References 4. Department of Health and Human Services. Notice of Mandatory Guidelines For Federal Workplace Drug Testing Programs: Final guidelines. Federal Register, Substance Abuse and Mental Health Administration (SAMHSA), (1994) 110 (June 9): 11983. 5. Zaitsu K, Miki A, Katagi M, Tsuchihashi H. Long-term stability of various drugs and metabolites in urine, and preventive measures against their decomposition with special attention to filtration sterilization. Forensic Science Intl 174 (2008) 189-196. 6. Gonzales E, Ng G, Pesce A, West C, West R, Mikel C, Llaatyshev, S, Almazan P. Stability of pain-realted medications, metabolites and illicit substances in urine. Clinica Chimca Acta 416: (2013) 30-35. 7. C52-A2, Toxicology and Drug Testing in the Clinical Laboratory; Approved Guideline – Second Edition, Clinical and Laboratory Standards Institute (CLSI) (April 2007).	References 9. Dahlin JL, Palte MJ, LaMacchia J, Petrides AK. A Rapid Dilute-and-Shoot UPLC-MS/MS Assay to Simultaneously Measure 37 Drugs and Related Metabolites in Human Urine for Use in Clinical Pain Management. J Appl Lab Med 2019;3(6):974-992. 10. Dixon RB, Mbeunkui F, Wiegel JV. Stability study of opioids and benzodiazepines in urine samples by liquid chromatography tandem mass spectrometry. J Anal Sci Technol 2015; 6(17). 11. Clinical and Laboratory Standards Institute (CLSI). Toxicology and Drug Testing in the Medical Laboratory; Approved Guideline—Third Edition. CLSI Document C52. Wayne, PA: CLSI; 2017.	Different, candidate device lists citations/references modernized to represent accurate and present guidelines.

Characteristics	**Predicate Device** DRI Benzodiazepine Enzyme Immunoassay (K173963)	**Candidate Device** Alinity c Benzodiazepines Reagent Kit	**Comparison**
Performance Characteristics	**Data on the IFU is representative. Actual values collected on the 2 devices à Predicate Device (Beckman Coulter AU680 Clinical Chemistry Analyzer) and on the Candidate Device (Alinity c Analyzer System), are not expected to be identical as they have been collected on different instruments, with different lots of reagents and samples. As demonstrated below, the results on both devices are proven to be substantially equivalent.		
Characteristics	**Predicate Device** DRI Benzodiazepine Enzyme Immunoassay (K173963)	**Candidate Device** Alinity c Benzodiazepines Reagent Kit	**Comparison**
	Precision (Within-Laboratory Precision)	Precision (Within-Laboratory Precision and Reproducibility)	Predicate Device and Candidate Device performance data are substantially equivalent in demonstrating precision (Within-Laboratory Precision) Additional reproducibility data is added to reflect the present guideline. For Within-Laboratory Precision ≥95% of samples spiked at levels -25%, -50%, -75%, and -100% below the 200 ng/mL cutoff read as negative and ≥95% of samples spiked at levels +25%, +50%, +75%, +100% above the 200 ng/mL cutoff read as positive in both qualitative and semi-quantitative modes. For Reproducibility In both qualitative and semiquantitative applications, 100% of samples at levels less than 200 ng/mL read as negative, and 100% of samples at levels higher than 200 ng/mL read as positive. Alinity c Benzodiazepines Reagent Kit meets the acceptance criteria for precision (reproducibility) performance on multiple Alinity c clinical chemistry analyzer.

Characteristics	**Predicate Device** DRI Benzodiazepine Enzyme Immunoassay (K173963)	**Candidate Device** Alinity c Benzodiazepines Reagent Kit	**Comparison**
	Accuracy and Method comparison	Accuracy and Method Comparison	Predicate Device and Candidate Device are substantially equivalent in demonstrating Accuracy when the immunoassay method (predicate device or candidate device at 200 ng/mL cutoff) is compared to the reference confirmatory method LC-MS/MS in measuring patient samples. Both devices showed ≥90% negative sample, positive sample and overall percent agreement with LC-MS/MS.
	Accuracy by Recovery and Dilution Linearity	Accuracy by Recovery and Dilution Linearity	Predicate Device and Candidate Device are substantially equivalent in demonstrating dilution linearity throughout the calibration range. For both devices. the %Recovery of Mean Observed Concentration in relative to Expected (Target) Concentration for each sample met acceptance criterion (± 20% from the expected concentration).
	Onboard Stability – N/A because the device is designed for use with a number of clinical chemistry analyzers.	Onboard stability- 56 days, because the device is designed for use on specific clinical chemistry analyzer- the Alinity platform	Candidate Device achieved on-board reagent stability of 56 days.

Characteristics	**Predicate Device** DRI Benzodiazepine Enzyme Immunoassay (K173963)	**Candidate Device** Alinity c Benzodiazepines Reagent Kit	**Comparison**
	Specimen storage and stability	Specimen storage and stability	Compared to Predicate Device, Specimen storage and stability has been modernized in the Candidate Device to reflect accurate present guidelines and provide clearer handling instructions for specimen storage and stability claim when compared to the predicate device. Refer to the specimen collection and preparation comparison under "package insert" section above for supporting literature references.
	• Specificity (cross reactivity - structurally related and unrelated) • Interference • Specific Gravity • Shelf-life Stability • Traceability	• Specificity (cross reactivity - structurally related and unrelated) • Interference • Specific Gravity • Shelf-life Stability • Traceability	Identical, as these performance studies are not instrument dependent
Product Labeling	Kit Labeling Component Labeling	Kit Labeling Component Labeling	Different, candidate device kit and component labeling have been modernized to reflect present the current labeling regulation, safety practices and branding.

VI. Summary of Performance Testing

A. Accuracy and Method Comparison: CLSI Guideline: EP09-A3 and CLSI EP12-A2.

The Alinity c Benzodiazepines Reagent Kit demonstrated equivalent performance on the Alinity c analyzer when compared to the reference LC-MS/MS when using the qualitative and semiquantitative applications at a cutoff of 200 ng/mL. For 200 ng/mL cutoff assay, the positive agreement was 100.00%, negative agreement was 96.96%, and overall agreement was 98.41% in both qualitative and semiquantitative applications.

B. Accuracy by Recovery and Dilution Linearity: CLSI Guideline: EP06-A

The Alinity c Benzodiazepines Reagent Kit underwent an Accuracy by Recovery and Dilution Linearity study to assess its dilution linearity and accuracy by recovery. The test mode used was semi- quantitative. A series of samples with expected concentrations ranging from 0.5 ng/mL to 1051.5 ng/mL were analyzed. The % recovery range for these samples was between 92.5% and 108.3%, indicating that the assay's accuracy by recovery was within the acceptable criteria of ± 20% from the expected concentration of each sample.

C. On-Board Reagent Stability: CLSI Guideline: EP25-A

The study was conducted to determine if sample results were susceptible to drift when the reagents were stored for 56 days for qualitative application and stored for a minimum of 7 days for semiquantitative application on board the Alinity c analyzer while the instrument was in continuous running mode. Reagent On-Board stability studies for one lot stored on-board clinical analyzer (Alinity c) supports the claim of 56 days for qualitative and semi-quantitative modes.

D. Precision: CLSI Guideline: EP05-A3

a. Within-Laboratory Precision Study

The Alinity c Benzodiazepines Reagent Kit demonstrated acceptable precision for both qualitative and semi-quantitative applications.

Greater than or equal to 95% of samples spiked at levels -25%, -50%, -75%, and -100% below the cutoffs read as negative and greater than or equal to 95% of samples spiked at levels +25%, +50%, +75%, +100% above the cutoffs read as positive in both Qualitative and Semi-quantitative modes.

b. Reproducibility Study

Alinity c Benzodiazepines Reagent Kit meets the acceptance criteria for precision (reproducibility) performance on multiple Alinity c clinical chemistry analyzers.

In both qualitative and semiquantitative applications, 100% of samples at levels less than 200 ng/mL read as negative, and 100% of samples at levels higher than 200 ng/mL read as positive.

VII. Conclusion

The information supports a determination of substantial equivalence between the candidate device Alinity c Benzodiazepines Reagent Kit and the predicate device DRI Benzodiazepine Assay (K173963).