510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
ASSAY ONLY

I Background Information:

A 510(k) Number

K232276

B Applicant

Oxoid Limited (Part of Thermo Fisher Scientific)

C Proprietary and Established Names

Thermo Scientific Oxoid Sulbactam/Durlobactam Disc (10/10 µg) SUD20

D Regulatory Information

Product Code(s)	Classification	Regulation Section	Panel
JTN	Class II	21 CFR 866.1620 - Antimicrobial Susceptibility Test Disc	MI - Microbiology

II Submission/Device Overview:

A Purpose for Submission:

To obtain a substantial equivalence determination for sulbactam/durlobactam antimicrobial susceptibility test disk

B Measurand:

Sulbactam/durlobactam 10/10 µg

C Type of Test:

Antimicrobial susceptibility test disks

III Intended Use/Indications for Use:

A Intended Use(s):

See Indications for Use below.

B Indication(s) for Use:

Thermo Scientific Oxoid Antimicrobial Susceptibility Test Discs are used in the semi-quantitative agar diffusion test method for *in vitro* susceptibility testing. Used in a diagnostic workflow to aid clinicians in determining potential treatment options for patients suspected of having a microbial infection, these discs are intended to determine susceptibility against microorganisms for which specific drugs have been shown to be active both clinically and *in vitro*.

The Thermo Scientific Oxoid Sulbactam/Durlobactam Disc (10/10 µg) SUD20 can be used to determine susceptibility to sulbactam/durlobactam against the following bacteria for which Sulbactam/Durlobactam has been shown to be active both clinically and *in vitro*:

Acinetobacter-baumannii calcoaceticus complex

C Special Conditions for Use Statement(s):

Rx - For Prescription Use Only

D Special Instrument Requirements:

Not applicable.

IV Device/System Characteristics:

A Device Description:

Thermo Scientific Oxoid Sulbactam/Durlobactam Disc (10/10 µg) which is designated with the code SUD 20 is a high quality 6 mm diameter white filter paper disk that is impregnated with 10/10 µg sulbactam/durlobactam. The disks are clearly marked on both sides with SUD20, designating the agent and the drug content. The disks are supplied in plastic cartridges containing 50 disks each. Thermo Scientific Oxoid Sulbactam/Durlobactam Disc (10/10 µg) is intended to be used for *in vitro* agar diffusion susceptibility testing.

B Principle of Operation:

A suitable therapeutic agent for *in vivo* use can be determined using filter paper disks impregnated with specified concentrations of antimicrobial agents placed on the surface of a suitable test medium. Pure cultures of clinical isolates are inoculated onto the test medium and the AST disk placed on the surface. The antibiotic within the disk diffuses into the agar. After incubation, the zones of inhibition around the discs are measured and compared against

recognized zone diameter ranges for the specific antimicrobial agent/organism combinations under test.

V Substantial Equivalence Information:

A Predicate Device Name(s):

Thermo Scientific Oxoid Omadacycline Disc (30 ug) OMC30

B Predicate 510(k) Number(s):

K203336

C Comparison with Predicate(s):

Device & Predicate Device(s):	**Device: K232276**	**Predicate: K203336**
Device Trade Name	Thermo Scientific Oxoid Sulbactam/Durlobactam Disc (10/10 µg) SUD20	Thermo Scientific Oxoid Omadacycline Disc (30 µg) OMC30
General Device Characteristic Similarities		
Intended Use/Indications For Use	Antimicrobial susceptibility test disks are used for *in vitro* susceptibility testing by standardized agar diffusion test procedures.	Same
Test Method	Antimicrobial susceptibility testing using paper disks impregnated with an antimicrobial agent	Same
Methodology	Disk diffusion susceptibility test protocol requires the user to determine categorical interpretations (S/I/R) using the measured zone diameters.	Same
Inoculum	Prepared from pure isolated colonies to match the turbidity equivalent of a 0.5	Same

Device & Predicate Device(s):	Device: K232276	Predicate: K203336
	McFarland.	
Inoculum Method	Dip a sterile swab into the prepared inoculums and streak an appropriate agar plate's surface three times. Add the disks impregnated with the antimicrobial agent to the surface of the plate. The temperature, atmospheric conditions and duration of incubation are dependent on the organism tested.	Same
Reading Method	The user will interpret the zone diameters according to established interpretive criteria for the drug.	Same
General Device Characteristic Differences		
Antibiotic	Sulbactam/Durlobactam	Omadacycline
Concentration	10/10 µg	30 µg

VI Standards/Guidance Documents Referenced:

- CLSI M02 13th ed. *Performance Standards for Antimicrobial Disk Susceptibility Tests* (January 2018).
- CLSI M100 31st ed. *Performance Standards for Antimicrobial Susceptibility Testing* (March 2021).

VII Performance Characteristics (if/when applicable):

A Analytical Performance:

1. Precision/Reproducibility:
   Reproducibility was conducted at one internal site using 15 organisms, tested in triplicate with two disk lots on three separate days using one lot of media (MHA media). Each test was visually read by three independent readers with results blinded, resulting in 270 data points for evaluation (15 organisms x 2 disk lots x 1 media x 3 days x 3 independent readers = 270 data points). Colony counts were performed on all isolates.

The reproducibility study included *Acinetobacter-baumannii calcoaceticus* complex which consists of the following species: 4 isolates of *A. baumannii*, 5 isolates of *A. calcoaceticus*, 3 isolates of *A. noscomialis*, 3 isolates of *A. pittii*.

Reproducibility was calculated as the percent of results which were within ±3 mm difference in zone diameter comparing test results with the modal zone diameter value. Two results were >3mm above test mode with Thermo Scientific Oxoid Disk Lot A. Results are shown in **Table 1** below.

Table 1: Reproducibility Summary

Between Disk Lots			Across Readers[1]			
Lot A	Lot B	All Lots	Reader#1	Reader#2	Reader#3	All Readers
98.5% (133/135)	100.0% (135/135)	99.3% (268/270)	100.0% (90/90)	100.0% (90/90)	97.8% (88/90)	99.3% (268/270)

[1]Two disk lots were read by each reader.

The reproducibility across disk lots is >95% and meets the acceptance criteria.

2. Linearity:

   Not applicable

3. Analytical Specificity/Interference:

   Not applicable

4. Assay Reportable Range:

   Not applicable

5. Traceability, Stability, Expected Values (Controls, Calibrators, or Methods):

   Quality Control (QC) Testing:
   The CLSI-recommended quality control (QC) isolates, *Escherichia coli* ATCC 25922 and *Acinetobacter baumannii* NCTC 13304 were tested a sufficient number of times (i.e., 20 replicates per lot per reader). Two Oxoid disk lots were used. Each test was visually read by three independent readers, resulting in 120 Oxoid disk data points. The performance is shown in **Table 2** below.

Table 2: Quality Control Performance of Sulbactam/Durlobactam (10/10 µg)

	Zone Diameter in millimeter (mm)		
QC Organism	**Range**	**Oxoid Lot A[1]**	**Oxoid Lot B[1]**
Acinetobacter baumannii NCTC 13304 Expected Range: 24 – 30 mm	23		
	24		
	25	2	
	26	2	5
	27	9	8
	28	18	20

	Zone Diameter in millimeter (mm)		
QC Organism	**Range**	**Oxoid Lot A[1]**	**Oxoid Lot B[1]**
	29	25	20
	30	4	7
	31		
	32		
E. coli ATCC 25922 Expected Range: 26 – 32 mm	25		
	26	3	2
	27	4	12
	28	20	19
	29	20	12
	30	9	12
	31	3	2
	32	1	1
	33		
	34		

NCTC=National Collection of Type Cultures
ATCC=American Type Culture Collection
[1]Two Oxoid disk lots were tested (lot A and lot B)

Broth micro dilution (BMD) for QC isolates was performed as per CLSI M07 on every day of clinical study (**Table 3**).

Table 3: Quality Control Performance of Sulbactam/Durlobactam by BMD Method

QC Organism[1]	MIC (µg/mL)	Results
Acinetobacter baumannii NCTC 13304 Expected MIC Range: 0.5/4-2/4 µg/mL	0.25/4	
	0.5/4	1
	1/4	8
	2/4	3
	4/4	

NCTC=National Collection of Type Cultures
[1]*E. coli* ATCC 25922 is not a QC strain for BMD method.

The Oxoid disk QC performance, both disk diffusion method and BMD method, is > 95% and is acceptable.

Inoculum Density Check:
Colony counts were conducted for all QC and reproducibility isolates, as well as 10% of clinical isolates. All were within the expected range.

Stability:
The stability study was conducted under real time when the device was stored at the recommended storage conditions. Two batches of disks were tested throughout the 12 months shelf life and all microbiological and chemical performance results were within the expected range which is acceptable.

6. Detection Limit:

Not applicable

7. Assay Cut-Off:

Not applicable

B Comparison Studies:

1. Method Comparison with Predicate Device:

The qualitative Oxoid sulbactam/durlobactam 10/10 µg (SUD 20) disk diffusion results were compared to the qualitative reference broth microdilution (BMD) results to assess the categorical agreement (CA). The study was conducted at one internal testing site. Three independent operators participated in reading of test results with isolates evenly distributed to mimic testing at multiple sites. Testing was performed with one lot of disks utilizing Mueller-Hinton agar (MHA) following the CLSI M02 13th edition method. The reference broth microdilution (BMD) method was performed per CLSI M07 guidelines.

Clinical:
Clinical testing was performed using a total of 202 clinical isolates including: indicated *Acinetobacter-baumannii calcoaceticus* complex isolates [*A. baumannii* (180 isolates), *A. calcoaceticus* (10 isolates), *A. nosocomialis* (7 isolates), and *A. pittii* (5 isolates)], and non-indicated *A. lwoffii* (25 isolates).

Challenge:
Challenge testing was performed at one U.S site using a total of 50 *A. baumannii* challenge isolates.

Performance results for the total 252 clinical and challenge isolates are shown in **Table 4**.

Table 4: Performance of Thermo Scientific Oxoid Sulbactam/Durlobactam Disk vs. Reference BMD

	Total	CA#	%CA	#S	#I	#R	MIN	MAJ	VJM
***Acinetobacter-baumannii calcoaceticus* complex [Disk Breakpoints (mm): ≥17 (S), 14-16 (I), ≤13 (R)], [MIC Breakpoints (µg/mL): ≤4/4 (S), 8/4(I), ≥16/4 (R)]**									
Clinical	202	199	98.5%	196	3	3	3	0	0
Challenge	50	45	90.0%	33	3	14	5	0	0
Combined	252	244	96.8%	229	6	17	8	0	0

CA – Category Agreement
S – Susceptible isolates
I – Intermediate isolates
R – Resistant isolates
MIN – minor errors
MAJ – major errors
VMJ – very major errors

Category Agreement (CA) is when the Thermo Scientific Oxoid disk result interpretation agrees exactly with the MIC result interpretation.

The performance of the Thermo Scientific Oxoid Sulbactam/Durlobactam disk as compared to the MIC for *Acinetobacter-baumannii calcoaceticus* complex (**Table 4**) is acceptable with 96.8% CA. There were nine minor errors and no major or very major discrepancies.

As required under 511A(b)(2)(C)(ii)(I) of the Federal Food, Drug and Cosmetic Act, the following statement is included as a footnote to the performance table in the device labeling to address testing of non-indicated species:

> *"Per the FDA-Recognized Susceptibility Test Interpretive Criteria website, the safety and efficacy of antimicrobial drugs, for which antimicrobial susceptibility is tested by this AST device, may or may not have been established in adequate and well-controlled clinical trials for treating clinical infections due to microorganisms outside of those found in the indications and usage in the drug label. The clinical significance of susceptibility information in those instances is unknown. The approved labeling for specific antimicrobial drugs provides the uses for which the antimicrobial drug is approved".*

Resistance Isolates:
A total of 252 clinical and challenge isolates were tested and 17 resistant isolates were available for testing for *Acinetobacter-baumannii calcoaceticus* complex which is acceptable.

Resistance Mechanisms in Challenge Isolates:
Fifty challenge isolates of *Acinetobacter baumannii-calcoaceticus* complex harboring various molecular mechanisms of resistance noted in the FDA drug label were evaluated with Thermo Scientific Oxoid Sulbactam/Durlobactam 10/10µg (SUD20). The *Acinetobacter baumannii-calcoaceticus* complex isolates expressing serine beta-lactamases included in Ambler Class A (CTX-M-, TEM-, PER- and SHV-type), Class C (ADC-type), and broad-spectrum activity against Class D (OXA-type) enzymes were evaluated.

2. Matrix Comparison:

   Not applicable

C Clinical Studies:

1. Clinical Sensitivity:

   Not applicable

2. Clinical Specificity:

   Not applicable

3. Other Clinical Supportive Data (When 1. and 2. Are Not Applicable):

Not applicable

D Clinical Cut-Off:

Not applicable

E Expected Values/Reference Range:

Table 5A. FDA-Identified Interpretive Criteria for Sulbactam-Durlobactam (Disk Diffusion)

Organism	Interpretive Criteria for Sulbactam-durlobactam (mm)[a]		
	Susceptible	Intermediate	Resistant
Acinetobacter baumannii-calcoaceticus complex	≥ 17	14-16	≤ 13

[a] FDA STIC Webpage

Table 5B. FDA-Identified Interpretive Criteria for Sulbactam-Durlobactam (MIC)

Organism	Interpretive Criteria for Sulbactam-durlobactam (µg/mL)[a]		
	Susceptible	Intermediate	Resistant
Acinetobacter baumannii-calcoaceticus complex	≤ 4/4	8/4	≥ 16/4

[a] FDA STIC Webpage

VIII Proposed Labeling:

The labeling supports the finding of substantial equivalence for this device.

IX Conclusion:

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.