

**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
DEVICE ONLY TEMPLATE**

A. 510(k) Number:

k033522

B. Analyte:

Daptomycin (0.03-64 ug/mL) AST

C. Type of Test:

Quantitative Antimicrobial Susceptibility Test (AST) growth based fluorescence

D. Applicant:

TREK Diagnostic Systems, Inc.

E. Proprietary and Established Names:

Sensititre® 18-24 hours susceptibility MIC Plates

F. Regulatory Information:

1. Regulation section:
866.1640 Antimicrobial Susceptibility Test Powder
2. Classification:
II
3. Product Code:
JWY-manual readings of AST testing of >16 hour incubation
LRG Automated readings of AST of >16 hour incubation.
4. Panel:
83 Microbiology

G. Intended Use:

1. Intended use(s):
The Sensititre® MIC Susceptibility system is an *in vitro* diagnostic product for clinical susceptibility testing of gram negative and gram positive organisms.
2. Indication(s) for use:
This will include daptomycin in the dilution range of 0.03-64 ug/mL to the gram positive Sensititre® MIC Susceptibility panel for testing *Staphylococcus spp.*, *Enterococcus spp.*, and *Streptococcus spp.*
3. Special condition for use statement(s):
The ability of the Sensititre® 18-24 hour susceptibility system to detect resistance with *Staphylococcus spp.*, *Enterococcus spp.*, and *Streptococcus spp.* and daptomycin is unknown because these strains have not yet been detected and should be retested. If the non-susceptible result is confirmed the strain should be sent to a reference laboratory for further testing.

4. Special instrument Requirements:

Automated readings are performed on the Sensititre® AutoReader® or ARIS®.

H. Device Description:

Sensititre® MIC Susceptibility plate MIC panels are multi-well plastic microtitre plates, precision dosed with dried, stabilized antimicrobics. This is a microversion of the classic broth dilution methods and can provide both qualitative and quantitative susceptibility results.

I. Substantial Equivalence Information:

1. Predicate device name(s):
Pasco MIC and MIC/ID Panels
2. Predicate K number(s):
K033119
3. Comparison with predicate:

Similarities		
Item	Device	Predicate
Intended use	an <i>in vitro</i> diagnostic product for clinical susceptibility testing of gram negative and gram positive organisms.	same
Inoculum	Prepared from colonies using the direct inoculation method	Prepared from colonies using the direct inoculation method
Inoculation method	Direct equated to a 0.5 McFarland	Direct equated to a 0.5 McFarland
Item	Device	Predicate
Type panel	Dried antibiotics	100 µl/well frozen
Incubation	18-24 hours	16-24 hours
Technology	Fluorescence detection of growth	Turbidity detection of growth
Reading method	Visual growth and Auto read by instrumentation	Visual growth

J. Standard/Guidance Document Referenced (if applicable):

“Class II Special Controls Guidance Document: Antimicrobial Susceptibility Test (AST) Systems; Guidance for Industry and FDA”; NCCLS M7 (M100-S13)

“Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria That Grow Aerobically; Approved Standard”

K. Test Principle:

The Sensititre® Autoread System utilizes fluorescence technology to read 18-24 hour plates. The technology involves the detection of bacterial growth which is

determined by generating a fluorescent product from a non-fluorescent substrate. The non-fluorescent substrate is prepared by conjugating a fluorescent compound to the specific enzyme substrates with a bond which prevents fluorescence. The substrate is added to the inoculum broth and dispensed into the test plates at the same time as the test organism. The amount of fluorescence detected is directly related to the activity of bacterial growth. The MIC is determined by observing the lowest dilution of antimicrobial agent that inhibits growth of the organism.

L. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. *Precision/Reproducibility:*

Reproducibility testing was performed on 25 gram positive isolates appropriate for testing with daptomycin. These were tested 1 time at each of three sites on each reading method. This demonstrated >95% reproducibility using either the automated read method or the manual method of reading.

b. *Linearity/assay reportable range:*

Not applicable

c. *Traceability (controls, calibrators, or method):*

The recommended QC isolate was tested daily with acceptable results with the reference method. Quality control was also performed at all sites using both the manual read method and the Autoread® method. The Sensititre® results demonstrate that the system can produce QC results in the recommended range for both the manual method of reading and the automated read method.

ORGANISM	Conc ug/mL	Reference	Sensititre® Autoread	Sensititre® manual
<i>S. aureus</i> ATCC 29213 Range 0.25-1 ug/ml	<0.25			
	0.25	58	56	57
	0.5	2	3	2
	1		1	1
	2			
<i>Enterococcus faecalis</i> ATCC 29212 Range 1-8 ug/ml	<1	1		1
	1	58	51	52
	2	1	9	6
	4			
	8			1

Nephelometer was used at each site to standardize the inoculum and it was calibrated each time it was switched on.

d. *Detection limit:*

Not applicable

e. *Analytical specificity:*

Not applicable

f. Assay cut-off:

Not applicable

2. Comparison studies:

a. *Method comparison with predicate device:*

Broth reference panels prepared according to the recommendations of the NCCLS were used to compare to the Sensititre® panel results. The concentration of calcium on the Mueller Hinton Broth was adjusted to 50 ug/mL as recommended by the NCCLS and FDA. Testing was performed at 3 sites and included fresh and stock clinical isolates and a set of challenge organisms. The comparison resulted in the following performance evaluations for the gram positive panel. Category agreement is not determined since there is only a susceptible interpretative category.

The following are the comparative results for the manual read method.

	total	EA	%EA	Total evaluable	EA of evaluable	%EA
Clinical	291	284	97.6	282	275	97.5
Challenge	77	76	98.7	76	75	98.7
Combined	368	360	97.8	358	350	97.8

The following are the comparative results for the Automated Read method.

	total	EA	%EA	Total evaluable	EA of evaluable	%EA
Clinical	287	282	98.3	279	274	98.2
Challenge	77	76	98.7	76	75	98.7
Combined	364	358	98.4	355	349	98.3

EA-Essential Agreement

EA is when there is agreement between the reference method and the Sensititre™ panel within plus or minus one serial two-fold dilution of antibiotic. The %EA is acceptable when compared to the reference method as described in the FDA guidance document, “Class II Special Controls Guidance Document: Antimicrobial Susceptibility Test (AST) Systems; Guidance for Industry and FDA”.

Autoread results were very similar to the manual readings with no observable trending.

The percent no growth in the manual reading method was 0% and the Autoread method was 5%.

- b. Matrix comparison:*
Not applicable
- 3. Clinical studies:
 - a. Clinical sensitivity:*
Not applicable
 - b. Clinical specificity:*
Not applicable
 - c. Other clinical supportive data (when a and b are not applicable):*
Not applicable
- 4. Clinical cut-off:
Not applicable
- 5. Expected values/Reference range:
 - Staphylococcus spp. ≤ 1 (S)*
 - Streptococcus spp. ≤ 1 (S)*
 - Enterococcus spp. ≤ 4 (S)*

The Interpretative criteria, QC isolates and the expected ranges are the same as recommended by the NCCLS and the FDA. All values will be included in the package insert

The current absence of data on resistant strains precludes defining any results other than “Susceptible”. Strains yielding MIC results suggestive of a “non-susceptible” category should be submitted to a reference laboratory for further testing.

M. Conclusion:

Data analysis when analyzed as recommended in the “Class II Special Controls Guidance Document: Antimicrobial Susceptibility Test (AST) Systems; Guidance for Industry and FDA” demonstrates that the Sensititre® System is substantially equivalent to the predicate.