510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
ASSAY ONLY TEMPLATE

A. 510(k) Number:

k093741

B. Purpose for Submission:

To add *S. pneumoniae* to tigecycline on the Sensititre® *Haemophilus*/*Streptococcus pneumoniae* (HP) MIC plates

C. Measurand:

Tigecycline 0.004 – 8 µg/mL

D. Type of Test:

Quantitative Antimicrobial Susceptibility Test (AST) growth based

E. Applicant:

TREK Diagnostic Systems, Inc.

F. Proprietary and Established Names:

Sensititre® *Haemophilus*/*Streptococcus pneumoniae* (HP) MIC plates

G. Regulatory Information:

1. Regulation section:

   866.1640 Antimicrobial Susceptibility Test Powder

2. Classification:

   Class 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

H. Intended Use:

1. Intended use(s):

   Sensititre® *Haemophilus influenzae/Streptococcus pneumoniae* (HP) MIC plates are *in vitro* diagnostic products for clinical susceptibility testing of *H. influenzae*, *Streptococcus pneumoniae* and *Streptococcus* species.

2. Indication(s) for use:

   The Sensititre® HP Susceptibility System is an *in vitro* diagnostic product for clinical susceptibility testing of fastidious organisms.

   Plates can either be read manually or automatically on the Sensititre Autoreader and/or ARIS with *Streptococcus pneumoniae* and *Streptococcus* species and manually with *H. influenzae.* The JustOne® strip can only be read manually.

   This 510(k) is for the addition of Tigecycline in the dilution range of 0.004 - 8 µg/mL for testing *Streptococcus pneumoniae* isolates on the Sensititre® (HP) MIC susceptibility system. The additional approved primary "Indications for Use" and clinical significance of Tigecycline is for:

   Aerobic facultative Gram-positive microorganisms
   *Streptococcus pneumoniae (*Penicillin susceptible stains only)

3. Special conditions for use statement(s):

   Prescription use only

   The current absence of resistant isolates precludes defining any results other than "Susceptible." Isolates yielding MIC results suggestive of "Nonsusceptible" category should be submitted to reference laboratory for further testing.

   The only method of inoculation used for this drug/bug combination is Autoinoculator. Any other method of inoculation should be validated before use.

4. Special instrument requirements:

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

I. Device Description:

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

JustOne® STRIPS:

Refer to the format (in configuration sheet enclosed separately) before using the strips. The JustOne® strip is a single row of 12 wells containing the antimicrobial dilutions along with one positive control well. The positive control wells on each strip contain no antimicrobic and are used to check for satisfactory growth in the broth system used. The JustOne® strip is equal to one row of the Sensititre MIC susceptibility plate and can only be read manually.

J. Substantial Equivalence Information:

1. Predicate device name(s):

   Siemens' Microscan®, Dried Gram-Negative and Gram-Positive MIC/Combo Panels

2. Predicate 510(k) number(s):

   k010159

3. Comparison with predicate:

Similarities		
Item	Device	Predicate
Intended Use	an *in vitro* diagnostic product for clinical susceptibility testing of gram negative and gram positive organisms.	Microscan panels are designed for use in determining antimicrobial agent susceptibility for gram positive isolates, gram negative isolates, and *Streptococcus* spp.
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
Technology	Growth based	Growth based
Results	Report results as minimum inhibitory concentration (MIC) and categorical interpretation (SIR)	Report results as minimum inhibitory concentration (MIC) and categorical interpretation (SIR)

Differences		
Item	Device	Predicate
Components	Tigecycline	Different concentrations depending on the antibiotic

Differences		
Item	Device	Predicate
Test organism	*S. pneumoniae*	Varies according to the antibiotic

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

Class II Special Controls Guidance Document: Antimicrobial Susceptibility Test (AST) Systems; Guidance for Industry and FDA"; CLSI M7 (M100-S19) "Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria That Grow Aerobically; Approved Standard."

L. 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.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. Precision/Reproducibility:

A reproducibility study was performed on 10 *S. pneumoniae* and 15 *Streptococcus* species (spp.) for testing with tigecycline. These were tested once at each of the three sites on the automated and manual read method demonstrating >95% reproducibility for both read methods.

b. Linearity/assay reportable range:

Not Applicable

c. Traceability, Stability, Expected values (controls, calibrators, or methods):

The QC performance was within the expected ranges as shown in the table below. Quality control was also performed at all sites using both manual and autoread methods. The Sensititre® results demonstrated that the system can produce QC results in the recommended range for both manual and automated read methods.

Quality Control Table

ORGANISM	**Conc ug/mL**	**Sensititre® Autoread**	**Sensititre® manual**	**Reference**
S. pneumoniae ATCC 49619 Expected Range : 0.015 – 0.12 ug/ml	0.008			
	0.015	40	39	33
	0.03	30	31	37
	0.06			

A Nephelometer was used at each site to standardize the inoculum and it was calibrated each time it was switched on. A colony count from the QC ATCC source was performed using the direct inoculum method and the mean result was within the minimum and maximum ranges.

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:

The broth dilution reference panel was prepared according to CLSI recommendation. Clinical testing was performed on 227 *Streptococcus* isolates which included fresh and stock clinical isolates and a set of challenge organisms. The broth reference panel for *Streptococcus* pneumoniae was set up on a cation adjusted MH broth with 2% to 5% lysed horse blood and incubated at 35°C; ambient air for 20 – 24 hours as recommended by CLSI. The comparison resulted in the following performance evaluations as reflected below.

Summary Table (**Manual Read Method**)

Organism Group	EA Tot	EA N	EA %	Eval EA Tot	Eval EA N	Eval EA %	CA N	CA %	#NS	min	maj	vmj
Clinical	**151**	**148**	**99.3**	**150**	**147**	**99.3**	**151**	**100**	**N/A**	**0**	**0**	**0**
Challenge	**76**	**76**	**100**	**76**	**76**	**100**	**76**	**100**	**N/A**	**0**	**0**	**0**
Combined	**227**	**224**	**98.7**	**226**	**223**	**98.7**	**227**	**100**	**N/A**	**0**	**0**	**0**

Summary Table (***Automated* Read Method**)

Organism Group	EA Tot	EA N	EA %	Eval EA Tot	Eval EA N	Eval EA %	CA N	CA %	#NS	min	maj	vmj
Clinical	**151**	**147**	**98.7**	**149**	**146**	**99.3**	**151**	**100**	**N/A**	**0**	**0**	**0**
Challenge	**76**	**76**	**100**	**76**	**76**	**100**	**76**	**100**	**N/A**	**0**	**0**	**0**
Combined	**227**	**223**	**98.2**	**223**	**222**	**99.6**	**227**	**100**	**N/A**	**0**	**0**	**0**

EA-Essential Agreement **N/A –** not applicable
CA-Category Agreement **NS –** Not Susceptible Isolates

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. Category agreement (CA) is when the Sensititre® panel result interpretation agrees exactly with the reference panel result interpretation. Evaluable EA is when the MIC result is on scale for both the Sensititre® and the reference and have on-scale EA. 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 growth rate for *Streptococcus pneumoniae* is greater than 90%.

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:

   S. pneumoniae ≤0.06*****

   ***** Limitation statement: The current absence of resistant isolates precludes defining any category other than "Susceptible". Isolates yielding MIC results suggestive of "Nonsusceptible" category should be submitted to a reference laboratory for further testing.

N. Proposed Labeling:

The expected range, interpretive criteria and QC are included in the package insert. The labeling is sufficient and satisfies the requirements of 21 CFR Part 809.10.

O. Conclusion:

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