

**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY**

A. 510(k) Number:

K152961

B. Purpose for Submission:

Clearance of a new device

C. Measurand:

D-Dimer

D. Type of Test:

Quantitative

E. Applicant:

Maine Standards Company LLC

F. Proprietary and Established Names:

VALIDATE[®] D-Dimer Calibration Verification/Linearity Test Kit

G. Regulatory Information:

1. Regulation section:

21 CFR 864.5425, Multipurpose system for in vitro coagulation studies

2. Classification:

Class II

3. Product code:

GGN, Plasma, coagulation control

4. Panel:

81 (Hematology)

H. Intended Use:

1. Intended use(s):

VALIDATE[®] D-Dimer Calibration Verification/Linearity Test Kit solutions are an assayed quality control materials intended for in vitro diagnostic use in the quantitative determination of linearity, calibration verification and verification of reportable range for the following analyte: D-Dimer in a clinical laboratory setting by laboratory personnel. The product is intended for use with quantitative assays on the indicated analyzers specified in the labeling.

2. Indication(s) for use:

Same as intended use

3. Special conditions for use statement(s):

For prescription use only

4. Special instrument requirements:

Instrumentation Laboratory (IL) ACL TOP Family and HemosIL[®] D-Dimer HS assay

I. Device Description:

The VALIDATE D-Dimer Calibration Verification/Linearity Test Kit is a liquid quality control material designed to confirm the proper calibration of the measuring range of HemosIL D-Dimer HS assay on IL ACL TOP Family. The kit includes five levels of D-Dimer analyte in a human plasma base matrix.

J. Substantial Equivalence Information:

1. Predicate device name(s):

Aalto Scientific Ltd., Audit Micro CV D-Dimer Linearity Set

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

K100716

3. Comparison with predicate:

Similarities		
Item	Device	Predicate
	VALIDATE D-Dimer Calibration Verification/Linearity Test Kit	Audit MicroCV D-Dimer Linearity Set
Intended Use	VALIDATE [®] D-Dimer Calibration Verification/Linearity Test Kit solutions are an assayed quality control materials intended for <i>in vitro</i> diagnostic use in the quantitative determination of linearity, calibration verification and verification of reportable range for the following analyte: D-dimer in a clinical laboratory settings by laboratory personnel. The product is intended for use with quantitative assays on the indicated analyzers specified in the labeling.	The Audit [™] MicroCV [™] D-Dimer Linearity Set is a quantitative, assayed quality control material consisting of five levels of D-dimer analyte. The five D-dimer levels demonstrate a linear analyte. The Audit [™] MicroCV [™] D-Dimer Linearity Set is intended to use with the Biomerieux miniVIDAS [®] analyzer and VIDAS D-dimer assay to verify the calibration of the measuring range. For <i>In Vitro</i> Diagnostic Use Only.
Analyte	D-dimer	Same
Matrix	Human based plasma	Same
Number of Levels per kit	5	Same

Differences		
Item	Device	Predicate
Matrix State	Liquid	Lyophilized
Closed Vial Stability	-10 to 25 °C for 9 months	2 – 8 °C for 24 months
Freeze & Thaw Cycle	Four (4) freeze-thaw cycles when stored at -10 to 25 °C	Not available
Open Vial Stability	Not available	One (1) day when stored at 2-8°C

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

CLSI EP05-A2; Evaluation of Precision Performance of Quantitative Measurement Methods; Approved Guideline, 2nd Edition

CLSI EP6-A; Evaluation of the Linearity of Quantitative Measurement Procedures: A Statistical Approach; Approved Guideline

L. Test Principle:

The VALIDATE[®] D-Dimer Calibration Verification/Linearity Test Kit is used to verify the calibration of the D-dimer measuring range of the HemosIL[®] D-Dimer HS assay with IL ACL TOP Family. The kit includes five levels of D-dimer. These five levels of D-Dimer are provided to establish the relationship between theoretical and actual performance of the D-Dimer analyte quantitatively. The Level 1 D-Dimer is configured to contain the lowest level (lower limit) and Level 5 D-Dimer to contain the highest level (upper limit) of concentration of D-Dimer of the measuring range. The intermediate levels (Level 2, Level 3, and Level 4) are subsequently prepared from Level 1 and Level 5 by equal part dilutions following the CLSI EP6-A guideline to measure intermediate levels of the measuring range. The typical recovery target values for the five levels are:

Assay/Analyzer	Analyte	Levels (ng/mL DDU)				
		1	2	3	4	5
HemosIL D-Dimer HS/IL ACL TOP 500	D-Dimer	191	966	1741	2515	3290

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. Precision/Reproducibility:

The reproducibility study was conducted following the CLSI EP05-A2 guideline. The study was performed utilizing three instruments and three operators testing one lot of VALIDATE D-Dimer across three sites in five replicates per level with one run over 5 days. The study produced a combined total of 75 data points for each level with one lot of HemosIL D-Dimer HS assay on three IL ACL TOP 500 analyzers. The reproducibility study met the pre-specified acceptance criteria. Results from the study are provided in the table below:

Instrument: IL ACL TOP 500								
Sample	N	Mean (ng/mL DDU)	Repeatability		Within-Laboratory		Reproducibility	
			SD	%CV	SD	%CV	SD	%CV
Level 1	75	214	13.6	6.4	13.7	6.4	15.3	7.2
Level 2	75	978	21.8	2.2	33.6	3.4	40.4	4.1
Level 3	75	1722	50.8	2.9	97.0	5.6	97.0	5.6
Level 4	75	2649	53.9	2.0	99.2	3.7	99.2	3.7
Level 5	75	3396	76.6	2.3	124.6	3.7	141.9	4.2

b. Precision/Repeatability:

The repeatability study was conducted testing three lots of VALIDATE D-Dimer at one site on IL ACL TOP 500 with one lot of HemosIL D-Dimer HS assay over 20 days, two runs per day, two replicates per run for Level 1 through Level 5 with a minimum of two operators obtaining a total of 240 replicates for each level. The repeatability study met the pre-determined acceptance criteria. Results from the study are provided in the table below:

Instrument: IL ACL TOP 500												
Sample	N	Mean (ng/mL DDU)	Within-Run		Between-Run		Between-day		Between-Lot		Total	
			SD	%CV	SD	%CV	SD	%CV	SD	%CV	SD	%CV
Level 1	240	204.8	12.4	6.0	4.9	2.4	6.4	3.1	0.7	0.3	14.8	7.2
Level 2	240	969.4	53.4	5.5	0	0.0	9.1	0.9	0	0.0	54.2	5.6
Level 3	240	1752.3	55.7	3.2	25.2	1.5	41.8	2.4	74.1	4.3	74.1	4.3
Level 4	239	2603.2	101.9	3.9	64.1	2.5	32.6	1.3	0	0.0	124.7	4.8
Level 5	240	3336.2	105.6	3.2	58.7	1.8	28.5	0.9	0	0.0	124.1	3.7

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c. Linearity/assay reportable range:

Linearity was determined using one lot of the VALIDATE D-Dimer Calibration Verification/Linearity Test kit on the IL ACL TOP 500. The D-dimer concentrations of each measured value of the five levels were plotted vs. five assigned levels of concentration. The results are determined to be linear.

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

Stability Study:

Freeze-Thaw Stability Study: The freeze and thaw vial stability study was carried out by mimicking end user's usage of the product on three lots of VALIDATE D-Dimer Calibration Verification/Linearity Test kits. The study demonstrated that each level of VALIDATE D-Dimer is stable up to four cycles of freeze and thaw when stored at -10°C to -25°C . The study met the pre-determined acceptance criteria.

Closed Vial Stability Study: The closed vial stability study was conducted on three lots of VALIDATE D-Dimer Calibration/Verification Linearity Test Kits at the storage temperature of -10°C to -25°C . The study demonstrated that the VALIDATE

D-Dimer Calibration Verification/Linearity Test Kit is stable up to 9 months when stored at -10°C to -25°C . The study met the pre-determined acceptance criteria.

Value Assignment/Recovery Data: The value assignment for the VALIDATE D-Dimer Calibration Verification/Linearity Test Kit is obtained by testing Level 1 (lowest concentration) and Level 5 (highest concentration) of VALIDATE D-Dimer in six replicates over 5 days to generate 30 replicates on one IL ACL TOP 500. The value assignments for the intermediate levels (Level 2, Level 3 and Level 4) are calculated based on an equal distance (delta) between levels. The value assignment study met the pre-determined acceptance criteria.

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:

Not applicable

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:

The actual expected values will be included in the kit lot Certificate of Analysis sheet for Level 1 and Level 5. The values for mid-levels are calculated based on an equal distance (delta) between levels.

N. Proposed Labeling:

The labeling is sufficient and it 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.