510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY

A. 510(k) Number:

K162227

B. Purpose for Submission:

To expand the intended use of the previously cleared STA® - Liatest® D-Di to include the exclusion of deep vein thrombosis (DVT)

C. Measurand:

D-dimer (µg/mL FEU)

D. Type of Test:

Quantitative

E. Applicant:

Diagnostica Stago

F. Proprietary and Established Names:

STA® - Liatest® D-Di

G. Regulatory Information:

1. Regulation section:

   21 CFR 864.7320, Fibrinogen/fibrin degradation products assay

2. Classification:

   Class II

3. Product code:

   DAP, Fibrinogen and fibrin split products, antigen, antiserum, control

4. Panel:

Hematology (81)

H. Intended Use:

1. Intended use:

   Same as indication(s) for use below.

2. Indication(s) for use:

   The STA® - Liatest® D-Di kit is an immuno-turbidimetric assay for quantitative determination of D-dimer in venous plasma (3.2% sodium citrate) for use on STA-R®, STA Compact® and STA Satellite® analyzers by professional laboratory personnel. The STA® - Liatest® D-Di is intended for use in conjunction with a clinical pretest probability (PTP) assessment model to exclude pulmonary embolism (PE) and deep venous thrombosis (DVT) in outpatients suspected of PE or DVT.

3. Special conditions for use statement(s):

   For prescription use only

4. Special instrument requirements:

   STA-R® (K983460)
   STA Compact® (K093167)
   STA Satellite® (K082248)

I. Device Description:

The STA® - Liatest® D-Di kit consists of two liquid reagents: 6 x 5 mL vials of ready-for-use Tris buffer and 6 x 6 mL vials of a suspension of microlatex particles coated with two different mouse monoclonal anti-human D-dimer antibodies (8D2 and 2.1.16) stabilized with bovine albumin.

J. Substantial Equivalence Information:

1. Predicate device names:

   VIDAS® D-Dimer Exclusion™ Assay

2. Predicate 510(k) numbers:

   K040882

3. Comparison with predicate:

Similarities		
Item	Device STA® - Liatest® D-Di	Predicate VIDAS® D-Dimer Exclusion
Intended Use	The STA® - Liatest® D-Di is an immuno-turbidometric assay for the quantitative determination of D-dimer in venous plasma (in 3.2% sodium citrate) for use on STA-R®, STA Compact® and STA Satellite® analyzers by professional laboratory personnel. The STA® – Liatest® D-Di is intended for use in conjunction with a clinical pretest probability (PTP) assessment model to exclude pulmonary embolism (PE) and deep venous thrombosis (DVT) in outpatients suspected of PE or DVT.	VIDAS® D-dimer Exclusion™ assay is an automated quantitative test for use on the VIDAS analyzers for the immunoenzymatic determination of fibrin degradation products (FbDP) in citrated human plasma using the ELFA techniques (Enzyme Linked Fluorescent Assay). VIDAS® D-Dimer Exclusion assay is indicated for use in conjunction with a clinical pretest probability assessment model to exclude deep venous thrombosis (DVT) and pulmonary embolism (PE) disease in outpatients suspected of DVT or PE.
Clinical cut-off for exclusion of DVT	0.5 µg/mL (FEU)	500 ng/mL (FEU)

Differences		
Item	Device STA® –Liatest® D-Di	Predicate VIDAS® D-dimer Exclusion
Assay methodology	Immuno-turbidimetric	Enzyme Linked Fluorescent Assay (ELFA)
Test Principle	Immuno-turbidimetric method based on the measurement of light absorbance (at 540 nm) produced by a suspension of microlatex particles coated with specific mouse anti-human D-dimer monoclonal antibodies.	Two-step enzyme immunoassay sandwich method with a final fluorescent detection step (ELFA).
Analytical measurement range	0.27–10 µg/mL (FEU)	45–10,000 ng/mL (FEU)

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

CLSI document H59-A, Quantitative D-dimer for the Exclusion of Venous Thromboembolic Disease; Approved Guideline

L. Test Principle:

A suspension of latex microparticles, coated by covalent bonding with monoclonal antibodies specific for D-dimer is mixed with the test plasma for which the D-dimer level is to be

assayed. An antigen-antibody reaction takes place, leading to agglutination of the latex microparticles which causes an increase in turbidity of the reaction medium. This increase in turbidity is reflected by an increase in absorbance, the latter being measured photometrically. The increase in absorbance is a function of the D-dimer level present in the test sample expressed in fibrinogen equivalent units (FEU).

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

   In premarket notification K964728 the following studies were performed with STA - Liatest® D-Di: precision/reproducibility, limit of detection, linearity, interference, and stability studies. Additionally, instrument-specific analytical performance of STA - Liatest® D-Di in combination with the STA-R® and STA Satellite was evaluated in premarket notifications K983460 and K082248, respectively. The established analytical performance characteristics cleared in K964728, K983460 and K082248 remain unchanged; therefore, additional performance studies were not required to support substantial equivalence in this premarket notification.

2. Comparison studies:

   In premarket notification K964728, the performance of STA - Liatest® D-Di compared to Asserachrom D-Di Kit (K862156) was evaluated. The established performance characteristics cleared in K964728 remain unchanged; therefore, additional comparison studies were not required to support substantial equivalence in this premarket notification.

3. Clinical studies:

   The STA® - Liatest® D-Di assay was evaluated on the STA-R® (K983460), STA-R® Evolution (K093001), STA Compact® (K093167), and STA Compact Max® (K130090) analyzers in a multi-center study to validate exclusion of DVT in outpatients with a low or moderate pre-test probability (PTP) score. In total, 1,219 consented patients presenting to the emergency department or outpatient clinic with suspected venous thromboembolism (VTE) were prospectively recruited. Overall, samples were collected from a total of 16 sites; 9 in the United States and 7 in France, Italy, Spain and Canada. The Wells' score clinical PTP assessment model was used to categorize patients as low, moderate, or high probability for suspected DVT. Patients with a high PTP score were excluded from the study.

   Of the 1,219 patients, 254 were excluded from analysis; of which 158 had a high PTP score and 96 were excluded on the basis of the defined exclusion criteria, for a total of 980 patients included in the data analysis. The sensitivity, specificity, negative predictive value (NPV) and positive predictive value (PPV) with the lower bound of two-sided 95% confidence intervals (LCL) were obtained with the STA - Liatest ® D-Di clinical cut-off of 0.50 µg/mL (FEU). The overall prevalence of DVT in the 980 patients was 8.4% (85 of 980) with 6.0% (22 of 369) in the U.S. population and 10.3% (63 of 611) in the Canadian and European populations.

Combined Sites	Imaging and 3-month follow-up			Predictive Value (Lower confidence limit)	
STA - Liatest® D-Di	Positive	Negative	Total	NPV	100.0% (LCL: 99.3%)
Positive	85	401	486	PPV	17.5% (LCL: 14.2%)
Negative	0	494	494	Sensitivity	100.0% (LCL: 95.8%)
Total	85	895	980	Specificity	55.2% (LCL: 51.9%)

US Sites	Imaging and 3-month follow-up			Predictive Value (Lower confidence limit)	
STA - Liatest® D-Di	Positive	Negative	Total	NPV	100.0% (LCL: 98.2%)
Positive	22	145	145	PPV	13.2% (LCL: 8.4%)
Negative	0	202	202	Sensitivity	100.0% (LCL: 84.6%)
Total	22	347	369	Specificity	58.2% (LCL: 52.8%)

Non-US Sites	Imaging and 3-month follow-up			Predictive Value (Lower confidence limit)	
STA - Liatest® D-Di	Positive	Negative	Total	NPV	100.0% (LCL: 98.7%)
Positive	63	256	319	PPV	19.7% (LCL: 15.5%)
Negative	0	292	292	Sensitivity	100.0% (LCL: 94.3%)
Total	63	548	611	Specificity	53.3% (LCL: 49.0%)

4. Clinical cut-off**:**

   The clinical cut-off was established at 0.50 µg/mL (FEU).

5. Expected values/Reference range:

   In premarket notification K964728, the adult reference range for D-dimer using STA - Liatest ® D-Di was established as < 0.50 µg/mL (FEU).

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.