



Food and Drug Administration
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December 10, 2016

Diagnostica Stago
c/o Carlo d'Alessandro
Director, Quality and Regulatory
Donawa Lifescience Consulting
Piazza Albania, 10
00153 Rome, Italy

Re: K162227

Trade/Device Name: STA[®] – Liatest[®] D-Di
Regulation Number: 21 CFR 864.7320
Regulation Name: Fibrinogen/fibrin degradation products assay
Regulatory Class: Class II
Product Code: DAP
Dated: November 7, 2016
Received: November 9, 2016

Dear Mr. d'Alessandro:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21

CFR Part 807); labeling (21 CFR Parts 801 and 809); medical device reporting (reporting of medical device-related adverse events) (21 CFR 803); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820); and if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801), please contact the Division of Industry and Consumer Education at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address

<http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm>. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR Part 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to <http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm> for the CDRH’s Office of Surveillance and Biometrics/Division of Postmarket Surveillance.

You may obtain other general information on your responsibilities under the Act from the Division of Industry and Consumer Education at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address

<http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm>.

Sincerely,

Leonthena R. Carrington -S

Leonthena R. Carrington, MS, MBA, MT(ASCP)
Director
Division of Immunology and Hematology Devices
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Enclosure

Indications for Use

510(k) Number (if known)

Device Name

STA® - Liatest® D-Di

Indications for Use (Describe)

The STA® - Liatest® D-Di kit is an immuno-turbidimetric assay for the 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.

Type of Use (Select one or both, as applicable)

Prescription Use (Part 21 CFR 801 Subpart D)

Over-The-Counter Use (21 CFR 801 Subpart C)

CONTINUE ON A SEPARATE PAGE IF NEEDED.

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510(k) Summary

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Date of Submission: 05 August 2016

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Device Trade Name: STA[®] - Liatest[®] D-Di

Regulatory Information:
Classification Name: Fibrinogen and fibrin split products, antigen, antiserum, control
Regulatory Class: Class II
Panel: Hematology
Product Code: DAP
Regulation Number: 864.7320

Predicate Device: VIDAS[®] D-Dimer Exclusion[™] (K040882)

Device Intended Use:

✓ New Device Intended Use

The STA[®] - Liatest[®] D-Di kit is an immuno-turbidimetric 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.



✓ **Previous Device Intended Use**

The STA[®] - Liatest[®] D-Di kit is an immuno-turbidimetric 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 as an aid in the diagnosis of deep venous thrombosis (DVT) in outpatients suspected of PE or DVT.

Device description:

STA[®] - Liatest[®] D-Di kit contains: 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.

The test principle is based on the change in turbidity of a microparticle suspension that is measured by photometry. 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 an 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.

Statement of technological characteristics of the device compared to predicate device:

The STA[®] - Liatest[®] D-Di kit and the Vidas[®] D-Dimer Exclusion[™] (K040882) have different assay method and test principle. However, both kits are equivalent considering their intended use for excluding PE and DVT.

Similarities Chart with VIDAS[®] D-Dimer Exclusion[™] (K040882)

Attributes or characteristics	Device	Predicate Device
	Diagnostica Stago, STA [®] - Liatest [®] D-Di	bioMérieux, VIDAS [®] D-Dimer Exclusion [™] K040882
Indications for Use	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.	Automated quantitative test for use on the VIDAS instruments for the immunoenzymatic determination of fibrin degradation products (FbDP) in human plasma (sodium citrate) using ELFA technique (Enzyme Linked Fluorescent Assay). The assay is indicated for use in conjunction with a clinical pretest probability assessment model to exclude deep vein thrombosis (DVT) and pulmonary embolism (PE) disease in outpatients suspected of PE or DVT.

Attributes or characteristics	Device	Predicate Device
	Diagnostica Stago, STA [®] - Liatest [®] D-Di	bioMérieux, VIDAS [®] D-Dimer Exclusion [™] K040882
Analyte(s) measured	D-dimer	D-dimer
Cut-off	0.5 µg/mL	500 ng/mL (same)
Clinical performances	<p>For exclusion of PE on low and moderate PTP population (n = 1130): Sensitivity = 97.0% (95% CI: 91.6% - 99.4%) NPV = 99.7% (95% CI: 99.2% - 100.0%)</p> <p>For exclusion of DVT on low and moderate PTP population (n = 980): Sensitivity: 100.0 % (95% CI: 95.8% - 100.0 %) NPV: 100.0 % (95% CI: 99.3 % - 100.0 %)</p>	<p>For exclusion of PE on low and moderate PTP population (n = 891): Sensitivity: 100.0 % (95% CI: 97.7% - 100.0 %) NPV: 100.0 % (95% CI: 98.7 % - 100.0 %)</p> <p>For exclusion of DVT on low PTP population (n = 295): Sensitivity: 100.0 % (95% CI: 81.5% - 100.0 %) NPV: 100.0 % (95% CI: 96.7 % - 100.0 %)</p> <p>For exclusion of DVT on moderate PTP population (n=189): Sensitivity: 100.0 % (95% CI: 80.5% - 100.0 %) NPV: 100.0 % (95% CI: 92.3 % - 100.0 %)</p>
Anatomical Sites	Not applicable. No direct patient contact.	Not applicable. No direct patient contact.
Where Used: Hospital, home, ambulance, etc.	Hospital Laboratory or other Health Care Laboratory.	Hospital Laboratory or other Health Care Laboratory.
Sterility	No sterility requirements. No direct patient contact.	No sterility requirements. No direct patient contact.
Biocompatibility	No biocompatibility requirements. No direct patient contact.	No biocompatibility requirements. No direct patient contact.
Chemical Safety	No issues regarding chemical safety due to no direct patient contact.	No issues regarding chemical safety due to no direct patient contact.

Differences Chart with VIDAS[®] D-Dimer Exclusion[™] (K040882)

Attributes or characteristics	Device	Predicate Device
	Diagnostica Stago, STA [®] - Liatest [®] D-Di	bioMérieux, VIDAS [®] D-Dimer Exclusion [™] K040882
Contents of the Kit	Two reagents. 6 x 5-ml Vials of Reagent 1 (Buffer)	- DD2 Reagent Strips- ready to use - 2x30 DD2 Solid Phase Receptors



Attributes or characteristics	Device	Predicate Device
	Diagnostica Stago, STA [®] - Liatest [®] D-Di	bioMérieux, VIDAS [®] D-Dimer Exclusion [™] K040882
	6 x 6-ml Vials of Reagent 2 (Latex)	(SPR) - 1 x 25-ml DD2 diluent Vial (liquid) - 3 x 2-ml Vials of C1 and C2 control (lyophilized) - 2 x 2-ml Vials of S1 and S2 calibrator (lyophilized)
Assay Method	Immuno-turbidimetric method	ELFA technique (Enzyme Linked Fluorescent Assay)
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.	The assay combines a two-step enzyme immunoassay sandwich method with a final fluorescent detection step (ELFA).
Analyzers	IVD analyzers of the STA [®] line.	VIDAS instruments

Clinical Performance Data:

A clinical multi-center study (16 sites over the United States, Europe and Canada), conducted according to CLSI H59-A, was performed to demonstrate the ability of STA[®] - Liatest[®] D-Di to safely rule-out DVT by using samples of prospective, consecutive, ambulatory outpatients (presenting at the emergency unit or outpatient clinic) suspected of having venous thromboembolism (VTE).

The study population was recruited from prospective, consecutive, ambulatory outpatients suspected of having DVT. After consenting, these patients were evaluated using the Wells score as pretest probability (PTP) model:

- Patients with low or moderate PTP were considered for D-dimer testing:
 - those with positive D-dimer result were considered for an imaging procedure
 - those with negative D-dimer result were considered as not having DVT and assigned to a three month follow up.
- Patients with high PTP were considered for an imaging procedure and not included in the study's primary analyses.

D-dimer assays were carried out using STA[®] - Liatest[®] D-Di on fresh plasma samples or on frozen plasma samples tested within 30 days of blood collection.

For primary efficacy analysis the population of interest was limited to patients with a PTP result low or moderate. In this group, only patients with a negative D-dimer result had a follow up call or visit at 3 months.



The study product was used in accordance with routine clinical practice and sites used imaging procedures according to standard of care.

Results:

980 samples of patients with a low or moderate PTP were included in the primary efficacy analyses (79 suspects of DVT and PE and 901 suspects of DVT only).

Of the 980 samples, 85 were from DVT positive and 895 from DVT negative patients.

The overall prevalence of DVT (low and moderate PTP patients with positive imaging) in the prospective study population was 8.4 % with 6.0 % in the US population and 9.8% in the European/Canadian ("out of US") population.

Primary efficacy analyses of the study included calculation of two co-primary parameters: Negative Predicted Value (NPV) and Sensitivity which were tested versus four (4) performance goals—two using 95 % two-sided confidence intervals (CI) and two versus point estimates.

All the efficacy parameters with upper and lower limit of 95 % confidence intervals (CI) were calculated in the overall study population, and separately for the US population and the "out of US" population with the STA[®] - Liatest[®] D-Di clinical cut-off of 0.50 µg/ml (FEU) in the (low + moderate) PTP group of patients.

Results obtained for each study population are detailed below:

Table 1 Results obtained on the overall prospective study population

Overall		Reference (imaging or 3-month follow-up)		
		Positive	Negative	Total
D-dimer	Positive	85	401	486
	Negative	0	494	494
	Total	85	895	980

Sensitivity (95 % CI) = 100% (95.8% - 100%)
 Specificity (95 % CI) = 55.2% (51.9% - 58.5%)
 NPV (95 % CI) = 100% (99.3% - 100%)
 PPV (95 % CI) = 17.5% (14.2% - 21.2%)

Table 2 Results obtained on the US prospective study population

US		Reference (imaging or 3-month follow-up)		
		Positive	Negative	Total
D-dimer	Positive	22	145	167
	Negative	0	202	202
	Total	22	347	369

Sensitivity (95 % CI) = 100% (84.6% - 100%)
 Specificity (95 % CI) = 58.2% (52.8% - 63.5%)
 NPV (95 % CI) = 100% (98.2% - 100%)
 PPV (95 % CI) = 13.2% (8.4% - 19.3%)



Table 3 Results obtained on the "out of US" prospective study population

Out of US		Reference (imaging or 3-month follow-up)		
		Positive	Negative	Total
D-dimer	Positive	63	256	319
	Negative	0	292	292
	Total	63	548	611

Sensitivity (95 % CI) = 100% (94.3%-100%)
Specificity (95 % CI) = 53.3% (49.0%-57.5%)
NPV (95 % CI) = 100% (98.7%-100%)
PPV (95 % CI) = 19.7% (15.5%-24.5%)

This study demonstrates that the STA[®] - Liatest[®] D-Di is effective in excluding deep venous thrombosis (DVT) in patient with a low or moderate PTP and a D-dimer level < 0.50 µg/ml (FEU) with a NPV of 100.0 % (confidence interval 95 %: 99.3% to 100%) according to CLSI H59-A requirements and with a Sensitivity of 100% (confidence interval 95 %: 95.8% to 100%). These results meet both confirmatory hypotheses relating to NPV and Sensitivity.