

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

A. 510(k) Number:

K051597

B. Purpose for Submission:

To seek clearance for a modification to their Stratus® CS D-Dimer (DDMR) Assay

C. Analyte:

D-Dimer

D. Type of Test:

Quantitative solid phase radial partition immunoassay (RIPA)

E. Applicant:

Dade Behring

F. Proprietary and Established Names:

Stratus® CS D-Dimer (DDMR) Assay

G. Regulatory Information:

1. Regulation section:

21 CFR 864.7320

2. Classification:

Class II

3. Product Code:

DAP

4. Panel:

81 Hematology

H. Intended Use:

1. Intended use(s):

The D-dimer (DDMR) method on the Stratus® CS STAT fluorometric analyzer is an *in vitro* diagnostic test for the quantitative measurement of cross-linked fibrin degradation products (D-Dimer) in human citrated or heparinized plasma.

2. Indication(s) for use:

The Stratus® CS D-Dimer (DDMR) Assay is intended for use as an aid in the diagnosis of venous thromboembolism (VTE), deep vein thrombosis (DVT), or pulmonary embolism (PE).

3. Special condition for use statement(s):

4. Special instrument Requirements:

The Advanced D-Dimer is intended for use with the Dade Behring Stratus® CS STAT fluorometric analyzer

I. Device Description:

J. Substantial Equivalence Information:

1. Predicate device name(s):

Dade Behring Stratus® CS D-Dimer (DDMR)

2. Predicate K number(s):
K022976
3. Comparison with predicate:

Similarities		
Item	Device	Predicate
Principle	Solid phase radial partition immunoassay (RIPA)	Same
Antibody	Mouse monoclonal	Same
Measuring Range	6 to 5000 ng/mL	Same
Sample Requirement	Citrate plasma or heparinized plasma	Same
Instrumentation	Stratus® CS STAT fluorometric analyzer	Same
Differences		
Item	Device	Predicate
Intended Use	Quantitative determination of cross-linked fibrin degradation products containing D-Dimer in human plasma and as an aid in the diagnosis of VTE.	Quantitative determination of cross-linked fibrin degradation products containing D-Dimer in human plasma.
Cut-off	450 ng/mL	N/A

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

L. Test Principle: The assay is a two-site sandwich assay based upon solid phase Radial Partition Immunoassay (RIPA) technology. A d-dimer specific monoclonal antibody is added to the center portion of a square piece of glass fiber paper. Sample is then added to the paper, and reacts with the antibody. A conjugate consisting of an enzyme-labeled monoclonal antibody that is directed against a second antigenic site on the d-dimer molecule is added onto the reaction zone of the paper. The enzyme labeled antibody reacts with the bound d-dimer, forming an antibody-antigen-labeled antibody sandwich. The unbound labeled antibody is washed away. Because the wash solution contains substrate for the enzyme, initiation of enzyme activity occurs simultaneously with the wash. The enzymatic rate of the bound fraction increases directly with the concentration of D-dimer in the sample. The reaction rate is measured by an optical system that monitors the reaction rate via front surface fluorescence. All data analysis functions are performed by the microprocessor within the analyzer.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:
 - a. *Precision/Reproducibility:*
3 levels of citrated human plasma pools were tested in duplicate for 20 days. Within run and total coefficients of variation (%CV) were

calculated following guidelines outlined in NCCLS Guideline EP5-A. With-in run reproducibility <4.0%, total reproducibility <6.0%

- b. *Linearity/assay reportable range:*
- c. *Traceability (controls, calibrators, or method):*
- d. *Detection limit:*
- e. *Analytical specificity:*

An extensive list of substances were found to have no significant effect (<10%) on the DDMR method when added to a plasma pool containing ~400 ng/mL of D-dimer. Users should refer to the package insert for this information.

Antibody specificity was demonstrated through cross reactivity testing of fibrinogen and the following fibrinogen degradation fragments D and E. Results demonstrated no significant effect on the assay.

- f. *Assay cut-off:*

Assay cut-off of 450 ng/mL was established through ROC curves. The study was performed by the manufacturer using 152 negative samples, and 26 positives. PE was ruled out or confirmed by ventilation-perfusion (V/Q) lung scan, pulmonary angiography scintigraphy and/or spiral CT. DVT was ruled out or confirmed by compression ultrasonography.

2. Comparison studies:

- a. *Method comparison with predicate device:*
- b. *Matrix comparison:*

3. Clinical studies: Samples were collected from out-patients at three sites, presenting to the emergency department or thromboembolism unit with suspected DVT or PE. Diagnosis was determined by validated diagnostic algorithms utilized by each facility. A total of 832 patients (site 1 = 394 patients, site 2 = 135, site 3 = 303), between the ages of 19 and 99, was tested on the Dade Behring Stratus® CS D-Dimer (DDMR). Sensitivity, Specificity, Negative Predictive Value, and Positive Predictive Value, was determined based on the previously determined cut-off value of 450 ng/mL.

- a. *Clinical sensitivity:*

Site 1	93 %
Site 2	93
Site 3	96
Combined	94

c. Clinical specificity:

Site 1	53%
Site 2	56
Site 3	50
Combined	52

c. Other clinical supportive data (when a and b are not applicable):
NPV

Site 1	94
Site 2	97
Site 3	96
Combined	95

4. Clinical cut-off:
5. Expected values/Reference range:

N. Conclusion:

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