

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

A. 510(k) Number: #K032139

B. Analyte: von Willebrand Factor

C. Type of Test: Quantitative

D. Applicant: Corgenix, Inc.

E. Proprietary and Established Names: REAADS von Willebrand Factor Activity (vWF:Act) Test Kit

F. Regulatory Information:

1. Regulation section: 21 CFR 864.7290 – Factor Deficiency Test
2. Classification: Class II
3. Product Code: GGP
4. Panel: Hematology (81)

G. Intended Use:

1. Intended use(s):
The REAADS von Willebrand Factor Activity Test Kit is an enzyme-linked immunosorbent assay (ELISA) for the quantitative determination of von Willebrand Factor Activity (vWF:Act) in citrated human plasma.
2. Indication(s) for use: (Same as the Intended use); and
The REAADS von Willebrand Activity Test Kit is intended to be used by clinical (hospital and reference) laboratories.
3. Special condition for use statement(s): N/A
4. Special instrument Requirements: Plate reading spectrophotometer with reading absorbance at 450 nm and 650 nm reference.

H. Device Description: The REAADS vWF Activity Test Kit is a sandwich ELISA, performed manually and read on a spectrophotometer. The Test Kit consists of these reagents:

1. Microwells, 8 x 12 strips, coated with a monoclonal antibody (MAB) specific for functional vWF.

2. Sample Diluent, 60 ml.
3. Reference Plasma, 3 x 0.5 ml, lyophilized, for reference curve preparation; and Assay Sheet.
4. Antibody Solution (HRP conjugated anti-human vWF), 12 ml.
5. Substrate (TMB/H₂O₂), 13 ml.
6. Stopping Solution (0.36N sulfuric acid), 15 ml.
7. Wash Concentrate (33 x PBS w/0.01% Tween 20), 30 ml.

I. Substantial Equivalence Information:

1. Predicate device name(s): Shield Diagnostics von Willebrand Factor Activity Kit
2. Predicate K number(s):
#K000398
3. Comparison with predicate:

Similarities		
Item	Device	Predicate
Test Principle	Double sandwich ELISA	Same
Calibrator	Reference Plasma supplied with the Kit	Same
Intended Use	Quantitative determination of vWF activity	Same
Cut-off	5.0%	Same
Type of Test	Quantitative	Same
Sample matrix	Sodium citrated plasma	Same
Differences		
Item	Device	Predicate
Antibodies	Monoclonal and polyclonal HRP	Monoclonal HRP
LLOD	3.1%	1.6%

J. Standard/Guidance Document Referenced (if applicable): NCCLS Approved Guideline: I/LA21-A – Clinical Evaluation of Immunoassays.

K. Test Principle: The Corgenix REAADS vWF:Act assay is a sandwich ELISA. A monoclonal capture antibody (MAB) specific for the portion of vWF which binds platelets, is coated onto 96-microwell polystyrene plates. Diluted patient plasma is incubated in the wells to allow available antigen to bind to the MAB-coated microwell surface. The plates are washed to remove unbound proteins, and bound antigen is quantitated using horseradish peroxidase conjugated anti-human vWF detection antibody. Following incubation, unbound conjugate is removed by washing, and a chromogenic substrate of tetramethylbenzidine and hydrogen peroxide is added to develop a colored reaction. Color intensity is measured in optical density (O.D.) units with a spectrophotometer at 450 nm. Patient vWF:Act, in relative percent (%) concentration is determined against a curve made from the reference plasma provided with kit.

L. Performance Characteristics (if/when applicable):

1. Analytical performance:

- a. *Precision/Reproducibility:* The following precision studies were performed:

Intra-assay, using (3), each, plasmas, plates and lots, (16) replicates/sample/plate. Mean %CV's ranged 2.6 – 6.4%, with an overall %CV = 4.3%. They also ran duplicates of (14) plasmas, with %CV's ranging 3.8 – 6.1%. The overall %CV = 5.2%.

Inter-assay/intra-lot, using the same sample configuration. %CV's ranged 3.3 – 6.1%; 3.8 – 4.5%; and 0.6 – 2.6%. The overall %CV = 3.6%. They also ran (7) controls on (2) lots of (3) plates. The %CV's ranged 1.6 – 3.7%, with the overall %CV = 2.6%.

Inter-assay/inter-lot, using duplicates of (8), each, (2) lots controls and healthy plasmas. Mean %CV's ranged 0.0 – 2.6%, with an overall %CV = 8.3%.

- b. *Linearity/assay reportable range:* The company performed curve fit studies, using duplicate testing of reference plasma dilutions on (3) lots of plates. Theoretical values plotted against the recovered values yielded R2 values > 0.98.
- c. *Traceability (controls, calibrators, or method):* The Reference Plasma was standardized against the ISTH/SSC Plasma 2^o Coagulation Standard, which is calibrated against WHO International Standards. Value assignment was determined by (2) operators, on (3) lots of the Plasma, using (2) dilutions of (10) vials, run in duplicate. The mean value was 105.0%, with %CV = 8.7%.

The Normal and Abnormal control plasmas were cleared under #K941737 and #K941872, respectively.

- d. *Detection limit:* Serial dilutions were performed on (3) lots of Reference Plasma, with a known value. The lowest concentration of 3.1% was 3 SD from the reagent blank.
- e. *Analytical specificity:* The company chose to use literature References, along with a statement in the Limitations, to address possible interferences.
- f. *Assay cut-off:* The cut-off was determined on patients (N=100) to be 50% (the 10/90th percentile). The mean was 98%, with a median of 100%.

2. Comparison studies:

- a. *Method comparison with predicate device:* The company performed an in-house comparison of the REAADS vs the Shields assay, using clinical samples (N = 64), which included normal plasmas (N=26), Type 1 vWD plasmas (N=18) and Type 2 vWD plasmas (N = 20).

In addition, they provided data from a clinical study performed at Emory University. They included normals (N=98), Type 1 vWD (N=70), and Type 2 vWD (N=30), for a sample total of (N=198). The 'r' value was 0.961. They were able to obtain only (1) Type 3 vWD plasma, with a value of 1.4%.

Individual 'r' values ranged from 0.882 – 0.967, over an assay range of 0.9 – 163%. The REAADS was statistically similar to the Shield assay.

- b. *Matrix comparison:* The company performed a study on 3.2% vs 3.8% sodium citrate plasmas (N=20) healthy donors. There was no significant difference between the two concentrations. The 'r' value = 0.951.

	<u>3.2%</u>	<u>3.8%</u>
Mean	77.3%	85.0%
Range	37.7 – 137%	35.3 – 139.8%

3. Clinical studies:

- a. *Clinical sensitivity:* Of the normal samples tested (N=98), none tested deficient with the Shield assay; and (1) sample tested deficient, at 48%, with the REAADS assay.

Of the Type 1 vWF plasmas (N=70), (30) tested deficient with the Shields assay; and (33) , with the REAADS assay.

Of the Type 2 plasmas (N=30), (24) tested deficient with the Shields assay; and (22) with the REAADS assay.

b. Clinical specificity: (See above).

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

4. Clinical cut-off: 50%
5. Expected values/Reference range: The reference range was determined, on healthy donors (N=100), to be 27 - 245%, with a mean of 99.3%.

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