

**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION  
DECISION SUMMARY  
ASSAY AND INSTRUMENT COMBINATION TEMPLATE**

**A. 510(k) Number:**

k093883

**B. Purpose for Submission:**

New Device: Analyzer, Assay, Control material and Calibrator material

**C. Measurand:**

Aspartate Aminotransferase (AST), Quality control and Calibrator material

**D. Type of Test:**

Quantitative enzymatic

**E. Applicant:**

Seppim S.A.S.

**F. Proprietary and Established Names:**

ELITech Clinical Systems AST/GOT 4+1 SL

ELITech Clinical Systems Elical 2

ELITech Clinical Systems Elitrol I and II

Vital Scientific Selectra Junior Analyzer and Vital Scientific Flexor Junior Analyzer

**G. Regulatory Information:**

1. Regulation section:

21 CFR 862.1100: Aspartate aminotransferase (AST/SGOT) Test System

21 CFR 862.1150: Calibrator

21 CFR 862.1660: Quality Control material (assayed and unassayed)

21 CFR 862.2160: Discrete Photometric Chemistry Analyzer for Clinical Use

2. Classification:

Class II, Class II, Class I, reserved and Class I, respectively

3. Product code:

CIT, JJX, JIT, and JJE, respectively

4. Panel:

75 Clinical Chemistry

**H. Intended Use:**

1. Intended use(s):

See indications for use below

2. Indication(s) for use:

The Vital Scientific Selectra Junior Analyzer (also trademarked as the Vital Scientific Flexor Junior Analyzer) is a discrete photometric chemistry analyzer for *in vitro* diagnostic use.

ELITech Clinical Systems AST/GOT 4+1 SL reagent is for the quantitative *in vitro* diagnostic determination of the activity of the enzyme Aspartate aminotransferase in human serum and plasma on the Vital Scientific Selectra/Flexor Analyzers. Aspartate Amino Transferase (AST) measurements are used in the diagnosis and treatment of certain types of liver and heart disease.

ELITech Clinical Systems Elical 2 is a single parameter calibrator for *in vitro* diagnostic use in the calibration of quantitative ELITech Clinical Systems methods on the Vital Scientific Selectra Junior Analyzer and the Vital Scientific Flexor Junior Analyzer.

ELITech Clinical Systems ELITROL I is a single parameter control serum for *in vitro* diagnostic use in accuracy control of quantitative ELITech Clinical Systems methods on the Vital Scientific Selectra Junior Analyzer and the Vital Scientific Flexor Junior Analyzer.

ELITech Clinical Systems ELITROL II is a single parameter control serum for *in vitro* diagnostic use in accuracy control of quantitative ELITech Clinical Systems methods on the Vital Scientific Selectra Junior Analyzer and the Vital Scientific Flexor Junior Analyzers.

3. Special conditions for use statement(s):

For prescription use only

4. Special instrument requirements:

Performance was provided for Vital Scientific Selectra Junior Analyzer which is also trademarked as the Vital Scientific Flexor Junior Analyzer.

**I. Device Description:**

**ELITech Clinical Systems AST/GOT 4+1 SL** reagent is available as a kit only. It consists of 2 reagents: Reagent 1 contains Tris buffer, L-Aspartate; Lactate dehydrogenase (LDH) (microorganisms), Malate dehydrogenase (MDH) (bacterial) and sodium azide. Reagent 2 contains  $\alpha$ -Ketoglutarate, NADH and sodium azide.

**ELITech Clinical Systems Elical 2** is a Lypholized calibrator based on human serum containing constituents to ensure optimal calibration.

**ELITech Clinical Systems Elitrol I and II** is a two level quality control product consisting of lypholized human serum containing constituents at desired levels.

All human source materials were tested with FDA-approved methods and found to be negative for HbsAG and to antibodies to HCV and HIV 1/2.

The Vital Scientific Selectra Junior Analyzer (also trademarked as the Vital Scientific Flexor Junior Analyzer) is a discrete photometric chemistry analyzer for *in vitro* diagnostic use.

**J. Substantial Equivalence Information:**

1. Predicate device name(s):

ABX PENTRA CP AST Reagent

Roche Diagnostics Calibrator for Automated Systems (C.f.a.s)

Roche Diagnostics Precinorm U and Precipath U

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

k060318, k033501, k041227

3. Comparison with predicate:

<b>Similarities and Differences</b>		
<b>Item</b>	<b>Device</b> <b>ELITech Clinical Systems AST/GOT 4+SL</b>	<b>Predicate</b> <b>ABX Pentra</b> <b>AST CP</b> <b>Reagent</b> <b>k060318</b>
Intended Use/Indications for Use	The quantitative in vitro diagnostic determination of the activity of the enzyme Aspartate amino transferase in human serum and plasma. Aspartate Aminotransferase (AST) measurements are used in the diagnosis and treatment of certain types of liver and heart disease.	Same
Appearance of Reagents	Liquid Form; ready to use	Same
Test Method	Modified IFCC without pyridoxal-phosphatase	Optimized UV test according to IFCC modified method without pyridoxal phosphatase
Sample type	Serum, Plasma in lithium heparin	Same
Reagent Storage	Store at 2-8°C and protected from light. The reagents are stable until the expiration date stated on the label.	Reagents in unopened cassette, are stable up to expiry date on the label if stored at 2-8°C, and contamination is avoided
Instrument	The Vital Scientific Selectra Junior Analyzer (also trademarked as the Vital Scientific Flexor Junior Analyzer)	ABX Pentra 400 Analyzer
Calibration Frequency	28 days	8 days

<b>Similarities and Differences</b>		
<b>Item</b>	<b>Device</b> <b>ELITech Clinical Systems Elical 2</b>	<b>Predicate</b> <b>Roche Calibrator (C.f.a.s)</b> <b>k033501</b>
Intended Use/Indications for Use	For <i>in vitro</i> diagnostic use in the calibration of quantitative method	<u>Same</u>
Format	Lyophilized calibrator based on human serum with constituents added as required to obtain desired components levels.	Same
Level	Single level	Same
Stability	Lyophilized: store at 2-8°C and protect from light until the expiry date  After reconstitution*:-8 hours between 15-25°C, 2 days between 2-8°C, 4 weeks between -25 and -15 °C (when frozen once)	Same
Instrument	The Vital Scientific Selectra Junior Analyzer (also trademarked as the Vital Scientific Flexor Junior Analyzer)	Roche Analyzers

<b>Similarities and Differences</b>		
<b>Item</b>	<b>Device</b> <b>ELITech Clinical Systems Elitrol I/Elitrol II</b>	<b>Predicate</b> <b>Roche Precinorm U/ Precipath U</b> <b>k041227</b>
Intended Use/Indications for Use	For <i>in vitro</i> diagnostic use in accuracy control of quantitative method	Same
Format	Lyophilized human sera with constituents added as required to obtain defined components levels	Same
Levels	Two levels Level I (33-60 U/L), Level II ( 85-340 U/L)	Same
Stability	Lyophilized: Store at 2-8°C and protected from light until the expiry date. After Reconstitution*: 12 hours between 15-25°C, 5 days between 2-8°C ,4 weeks between -25 and -15°C (when frozen once)	Same

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

EP07-A2-Interference Testing in Clinical Chemistry-Second Edition

EP09-A2-Method comparison and bias estimate using patient samples-Second Edition

EP06-A-Evaluation of the linearity of the measurement of quantitative procedures: a statistical approach-First Edition

EP05-A2-Evaluation of precision performance of quantitative measurement methods; Approved guideline Second-Edition

**L. Test Principle:**

AST catalyzes the transfer of amino group from aspartate to oxoglutarate during the formation of glutamate and oxaloacetate. Oxaloacetate is reduced to malate by malate dehydrogenase (MHD). During this conversion, an equivalent amount of NADH is oxidized to NAD. The resulting decrease in absorbance at 340 nm is directly proportional to the activity of AST in serum.

**M. Performance Characteristics (if/when applicable):**

1. Analytical performance:

a. *Precision/Reproducibility:*

**ELITech Clinical Systems AST/GOT 4+1 SL**

Precision was evaluated with one quality control material and two adjusted human serum pool samples. A human serum pool diluted with saline (low), a control serum (medium), and a spiked human serum pool (high) on the Vital Scientific Selectra Junior Analyzer following CLSI EP5-A2 guideline. Samples were analyzed in duplicate, twice a day for 20 days. Results are summarized in the table below:

Material	n	Mean (U/L)	Within-run		Total	
			SD	CV (%)	SD	CV (%)
Diluted Serum Pool (low)	80	21.2	0.48	2.3%	0.80	3.8%
Control Serum (medium)	80	46.4	0.36	0.8%	0.56	1.2%
Spiked Serum Pool (high)	80	203.4	1.04	0.5%	5.52	2.7%

b. *Linearity/assay reportable range:*

**ELITech Clinical Systems AST/GOT 4+1 SL**

Linearity across the assay range was determined by testing two pools of patient serum, one at a low concentration (9.2 U/L) and one at a high concentration (272 U/L). The low sample was prepared by diluting the serum sample pool with saline and the high sample was prepared by spiking the serum sample pool. All samples were assayed in triplicate. Data was analyzed using 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> order least square regressions according to CLSI Protocol EP6-A. The difference in predicted values between the first and second order models are as follows:

1<sup>st</sup> order  $y = 26.27x - 17.37$

2<sup>nd</sup> order  $y = 0.06x^2 + 25.51x - 15.72$

The sponsor chose the 2<sup>nd</sup> order regression because it is significant and the results are shown in the table below:

Dilution	Mean	Predicted 1st order	Predicted 2 <sup>nd</sup> order	Difference 2 <sup>nd</sup> -1st	% Difference
1	9.2	8.9	9.8	1.0	<sup>a</sup>
2	36.4	35.2	35.5	0.4	1.1%
3	60.4	61.4	61.4	-0.1	-0.1%
4	89.2	87.7	87.3	-0.4	-0.4%
5	113.2	114.0	113.4	-0.6	-0.5%
6	139.1	140.2	139.6	-0.6	-0.5%
7	165.9	166.5	165.9	-0.6	-0.3%
8	192.1	192.8	192.4	-0.4	-0.2%
9	218.0	219.0	219.0	-0.1	0.0%
10	246.6	245.3	245.7	0.4	0.2%

Based on the data, the sponsor claimed that the assay's linearity range is 10 to 250 U/L.

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

**Elical 2, Elitrol I and II** are traceable to IFCC formulation (Schulman, 2002).

Elitrol I and II

Elical 2, Elitrol I & II are value assigned using two Vital Scientific Flexor Junior Analyzers. Each sample is tested in triplicate over several days. The target value of Level I and II are the median of the observed values range. After validation of the target value, a confidence range (high and low values) is then calculated.

## Elical 2

The calibrator is tested against predetermined intervals on multiple Vital Scientific Selectra Junior using the AST reagent and 2 levels of quality control material. The mean analyte value is calculated and a target value is assigned.

The ELITech Clinical Systems AST/GOT 4+1 SL is stable until the expiration date printed on the label when stored at 2-8°C. The on-board stability of the reagent is 28 days.

Before reconstitution, the shelf-life of the ELITech Clinical Systems Elitrol 1 and Elitrol II is 30 months at 2-8°C. After reconstitution the stability is 12 hours when stored at 15-25°C, 5 days when stored at 2-8°C and 4 weeks (when frozen once) at -25° and -15° C.

Elical 2 is stable until the expiration date printed on the label when stored at 2-8°C prior to reconstitution. After reconstitution the stability is 8 hours when stored at 15-25°C, 2 days at 2-8°C and 4 weeks (when frozen once) at -25° and -15°C. The labeling stated that the Elical 2 should be stored tightly capped and protected from light when not in use.

### *d. Detection limit:*

#### **AST/GOT 4+1 SL**

A detection limit study was evaluated according to CLSI EP17-A guideline. LoB was determined by running a blank sample 60 times on the Vital Scientific Selectra Junior analyzer. The limit of detection (LoD) was determined by assaying 4 low (3.6 U/L) diluted sample pools 60 times on the Selectra Junior analyzer. Limit of Quantitation (LoQ) was determined by running 4 low (5 U/L) diluted sample pools 60 times on the Vital Scientific Selectra Junior analyzer.

	LoB	LoD	LoQ
Limits	0.9 U/L	1.8 U/L	5.0 U/L

The claimed measuring range is 10-250 U/L.

### *e. Analytical specificity:*

#### **AST/GOT 4+1 SL**

Testing for interfering substances was based on CLSI EP-7A. Testing was performed on a minimum of five concentrations for each interfering substances. Samples with increasing amounts of triglycerides (Intralipid®), Bilirubin, Ditaurobilirubin, Sodium Pyruvate, and Ascorbic Acid were tested in triplicate and compared to the same sample without the interferent.

The sponsor defined non-significant interference as the highest level tested that does not cause >10% change between the tested samples and the control sample.

	Highest concentration tested that showing no significant interference (mg/dL) ( $\leq 10\%$ )
Triglyceride	614
Unconjugated Bilirubin	30.0
Conjugated Bilirubin	29.5
Sodium Pyruvate	2.0
Ascorbic Acid	20.0

The labeling states that hemolyzed samples should not be used since significant hemolysis may increase AST concentration because of high levels of AST in erythrocytes.

*f. Assay cut-off:*

Not applicable

2. Comparison studies:

*a. Method comparison with predicate device:*

A method comparison study was performed using the HORIBA ABX AST CP reagent on a PENTRA 400 chemistry analyzer and the ELITech AST/GOT 4+1 SL reagent on the Selectra Junior analyzer according to CLSI protocol EP9-A2. A total of 70 serum samples covering the linearity of the AST/GOT 4+1 SL assay were assayed. Of these 70 samples, 61 were native samples, and 9 were spiked samples (sample range from 15.5-244.8 U/L). The comparison resulted in a slope of 1.016, an intercept of -1.86, correlation coefficient of  $r^2=0.9998$ . The standard error of the estimate is equal to 3.6 U/L

*b. Matrix comparison:*

Thirty paired serum and plasma (lithium heparin) samples, ranging from 16.8 to 216 U/L, were tested on the Selectra Junior analyzer. 27 were native patient samples and 3 were spiked samples. The comparison resulted in a slope of 0.992, an intercept of +0.58, correlation coefficient of  $r^2 = 0.997$ , The standard error of the estimate is equal to 4.2 U/L.

Based on the data, the sponsor claims that lithium heparin is an acceptable anti-coagulant for this assay.

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:

Reference range: <sup>1</sup>Serum, plasma (37°C): < 40 U/L

1: Tietz:N.W.Clinical Guide to Laboratory tests 3<sup>rd</sup> Ed., (WB Saunders eds. Philadelphia USA) , (1995), 76.

In the labeling, the sponsor also recommends that each laboratory should establish and maintain its own reference values.

**N. Instrument Name:**

Vital Scientific Selectra Junior Analyzer also trademarked as the Flexor Junior Analyzer

**O. System Descriptions:**

1. Modes of Operation:

Continuous loading on a sample by sample basis

2. Software:

FDA has reviewed applicant's Hazard Analysis and software development processes for this line of product types:

Yes   X   or No           

3. Specimen Identification:

Barcoding or manual entry

4. Specimen Sampling and Handling:

Samples in sample tubes or sample cups with a tube adaptor are placed into sample tray. Specimens, calibrators and controls are pipetted by a pipettor arm into a cuvette rotor. A cuvette blank must be conducted every 24 hours. The cuvette rotor must be replaced every 10,000 tests or when the cuvette blank exceeds the maximum allowable average.

5. Calibration:

Onboard automatic and on demand calibration

6. Quality Control:

The software contains a quality control program that evaluates control results and determines if they are within specified acceptable limits.

The labeling recommends that control measurements be assayed daily and the frequency depends on the test method, as well as the legislative regulations valid in each country and in the organization that oversees the laboratory.

**P. Other Supportive Instrument Performance Characteristics Data Not Covered In The “Performance Characteristics” Section above:**

**Q. Proposed Labeling:**

The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10.

**R. Conclusion:**

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