



## Comparison of the Equine Sperm Quality Analyzer SQA-Ve to CASA

Item	SQA-Ve	CASA
General view		
Technology	<p>Signal processing: Analog electronic signals detected in two independent channels are digitized and analyzed by the internal processor and proprietary algorithms are applied.</p>	<p>Image analysis. Video images of sperm cells are captured and analyzed by the software.</p>
Automation	<p>Full</p>	<p>Partial:</p> <ul style="list-style-type: none"> <li>• Morphology assessment is semi-automated in most of the systems</li> <li>• A lot of settings and adjustments</li> </ul>
Sample type	<p>Fresh, extended and frozen</p>	<p>Fresh, extended and frozen</p>
Sample size	<p>Hundreds of <math>\mu</math>l</p>	<p>Tens of <math>\mu</math>l</p>
Sample preparation	<p>No dilution</p>	<p>The user must decide how to prepare/dilute the sample based on the sample quality. Overly diluted or insufficiently diluted samples are rejected by the system and have to be re-run.</p>

<b>Sample loading</b>	Simple process of filling of a multi-use capillary equipped with a syringe.	The sample is loaded into a counting chamber.
<b>Navigation through the screens</b>	Friendly and easy man-machine interface	Navigation can be cumbersome
<b>Number of cells analyzed</b>	Thousands in motility channel and millions in concentration channel.	200 or more. Measurements of single spermatozoa tracks.
<b>Statistical representation</b>	Representative due to the large sample size	Poor due to the small sample size
<b>Starting test</b>	Insert a testing capillary into the measurement slot – testing begins automatically.	Place the sample chamber on the stage, focus the image, select the fields, and begin analysis.
<b>Testing time</b>	~ 40 seconds	Not specified, varying. The time required to track spermatozoa to achieve accurate results is controversial. Settings and adjustments take extra time. Testing time for 1 sample along with a semi-automated morphology assessment is ~20 minutes.
<b>Parameters</b>	Sperm Concentration Motility Progressive Motility Morphology Motile Sperm Concentration Prog. Motile Sperm Concentration Velocity Totals per semen volume	Total Motile Progressive Morphology (semi-automated) Velocity
<b>Results</b>	Fully objective standardized automated test results generated by a device pre-calibrated by the manufacturer.	Automated cell image counts varying due to different user settings.
<b>Dosing</b>	Complete dosing instructions based on the number of total, motile or progressively motile sperm cells per dose.	Calculation of doses by number of total or progressively motile sperm cells per dose.
<b>Accuracy (correlation to manual results)</b>	Concentration: 0.9 Motility: 0.9 Prog. Motility: 0.8 Morphology: 0.7	Not specified
<b>Precision</b>	Concentration: CV = 3 % Motility: CV = 3 % Prog. Motility: CV = 7 % Morphology: CV = 3 %	Not specified

Consumables	SQA-Ve multi-use capillaries	Disposable counting chambers (Microcell, Leja, etc.)
Limitations	Disposable re-use requires washing	<ul style="list-style-type: none"> <li>• Instrument settings are subjective.</li> <li>• Different CASA instruments use different mathematical algorithms. The degree of comparability of measurements across all CASA systems is not yet known.</li> <li>• Problems with accuracy reporting high and low sperm concentration.</li> <li>• Statistical counting errors impact the accuracy of system measurements.</li> <li>• CASA requires extensive training and cross validation to ensure technician competency.</li> <li>• The clinical significance of kinematical test results is limited.</li> <li>• The analysis is not standardized due to the different instrument settings and algorithms.</li> </ul>

**References:**

1. SQA-Ve User Guide, 2008.
2. Hamilton Thorn Biosciences web site.
3. Spiropoulos J. Computerized semen analysis (CASA): effect of semen concentration and chamber depth on measurements. Arch Androl 2001; Jan-Feb;46(1):37-42.
4. Katila T. In vitro evaluation of frozen-thawed stallion semen: A review. Acta Vet Scand. 2001; 42(2): 199–217.
5. Quintero-Moreno A. et al. Identification of sperm subpopulations with specific motility characteristics in stallion ejaculates. Theriogenology 2003, May:59(9):1973-90.