
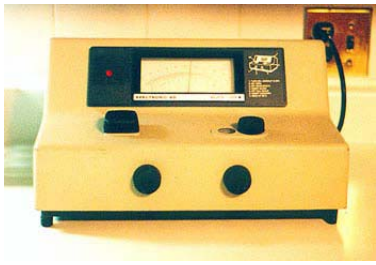


Comparison of the Equine Sperm Quality Analyzer SQA-Ve to Spectrophotometer

Item	SQA-Ve	Spectrophotometer
General View		
Technology	<p>Signal processing: Electronic signals are detected in two independent channels, digitized, and analyzed by an internal processor and proprietary algorithms.</p> <p>Light wavelength: Optimized for sperm cells in order to provide high sensitivity.</p>	<p>Principle of light absorbance: Sperm concentration is proportional to the optical density.</p> <p>Light wavelength: Not optimized for sperm cells.</p>
Automation	Full	<p>Partial: When readings fall outside of the standard absorption curve, sperm has to be added or subtracted in order to bring the absorbance to a specified range.</p>
Sample Type	Fresh, extended and frozen	Fresh
Sample Preparation	No dilution required	<p>Dilution is based on sample quality and user discretion/interpretation. The sample must be in the proper absorption range for reliable test results</p>
Sample Loading	A multi-use capillary equipped with a syringe is used.	A disposable cuvette with diluted semen is used.
Volume of Semen Required for Testing	500 μ l	100 μ l

Statistical Representation	Adequately represented due to the semen volume required for testing	Not adequately represented due to the small semen volume required for testing
Number of Cells Analyzed	Tens of thousands for motility and millions for concentration (2 channel system)	Motility is not measured. Hundreds of thousands for concentration depending on the dilution rate
System Interface and User Navigation	User friendly man-machine interface for Equine testing and dosing. The user is led through the entire testing, dosing and reporting process.	Results are displayed as “Light absorbance or transmittance” and sperm concentration needs to then be calculated by the user. No man-machine interface for stallion semen analysis: The device is designed as a general spectrophotometer.
Testing process	<ol style="list-style-type: none"> 1. Turn on the system and wait for system self test and stabilization (5 minutes). 2. Enter the sample data. 3. Fill the testing capillary with semen. 4. Insert the testing capillary into the measurement compartment of the SQA-Ve and testing will be started automatically 	<ol style="list-style-type: none"> 1. Turn spectrophotometer on 15 minutes before use. 2. Set the wavelength. 3. Turn the shutter knob. 4. Put a cuvette with diluent in a holder. 5. Use the dark current knob to set the meter to read 0% transmittance. 6. Turn the shutter knob to open. Set the transmittance to 100% with the slitwidth knob. 7. Turn the shutter knob to Shtr. 8. Remove the cuvette and add 100 µl semen sample. 9. Cover the cuvette with a cap and mix 10-20 times. 10. Place the cuvette back into the spectrophotometer. 11. Turn the shutter knob to open and read the absorbance as soon as the reading stabilizes. 12. Using prescribed formulas, convert the absorbance to sperm concentration. OR use the calibration curves for recommended dilutions and apply different formulas that account for the dilution factor.
Sample preparation and testing time	< 2 min	Sample dilution, possible re-testing (if results are out of range) takes time.
Parameters	SEVEN semen parameters: <ul style="list-style-type: none"> • Sperm Concentration • Motility • Progressive Motility • Morphology • Motile Sperm Concentration • Prog. Motile Sperm Concentration • Velocity 	ONE parameter: <ul style="list-style-type: none"> • Sperm Concentration

Results	Fully automated, objective and standardized stallion semen analysis and complete AI dosing instructions.	In most of the instruments, the reading is displayed as absorbance or transmittance, but sperm concentration is calculated by the user using a formula or a calibration curve.
Dosing	Complete dosing instructions based on the number of total, motile or progressively motile sperm cells per dose.	No dosing feature
Calibration	Not required: Device is pre-calibrated by the manufacturer.	Required: Device should be calibrated by the user to insure accurate results.
Accuracy (correlation to manual results)	Sperm Concentration: 0.9 Motility: 0.9 Prog. Motility: 0.8 Morphology: 0.7	Not specified
Precision	Sperm Concentration: CV = 3% Motility: CV = 3% Prog. Motility: CV = 7% Morphology: CV = 3%	Not specified
Consumables	SQA-Ve multi-use capillaries	<ul style="list-style-type: none"> • Disposable cuvette • Diluent
Limitations	Disposable re-use requires washing	<ul style="list-style-type: none"> • One parameter: Concentration is assessed • No dosing feature • Is not designed for EQUINE semen analysis. No applicable man-machine interface for stallion testing. • Designed as a general spectrophotometer • The light wavelength is not optimized for sperm cells • Dilution errors can occur due to the requirement for manual sample dilution. • The low volume of semen required for testing is less statistically representative than the SQA-Ve. • Not standardized for equine semen

References:

1. SQA-Ve User Guide, 2008.
2. SQA-Ve Product Performance Data, 2008.
3. Description of the Grey Beckman Spectrophotometer to Determine Sperm Concentration (www.wisc.edu/ansci_repro/lab/procedures/spectrophotometer/gray_beckman_spec_use.html).
4. Jos Mottershead. Setting Up For Semen Collection and Transport, 2003 (www.equine-reproduction.com/articles/setup.htm).