



Comparison of the SQA-Vp Sperm Quality Analyzer for Boar Semen and NucleoCounter

Item	SQA-Vp	NucleoCounter
General view		
Technology	Signal processing: Electronic signals are detected in two independent channels, digitized and analyzed by an internal processor and proprietary algorithms.	Sperm cell (nuclei) counting principle: The NucleoCounter is an integrated fluorescence microscope that detects signals from a fluorescent dye which binds to all types of cell nuclei.
Parameters	Sperm Concentration Motility Motility Grading Motile Sperm Concentration Morphology	Sperm Concentration Non-viable Sperm Concentration
Automation	Full	Full
Sample type	Fresh and extended	Fresh and extended
Loading sample volume, μl	500 μl	50 μl
Measurement volume	125 μl	2 μl
Statistical representation	Representative due to large sample volume	Not representative due to small sample volume
Number of cells analyzed	Tens of thousands in motility channel and millions in concentration channel	Up to thousands depending on the dilution rate

Sample preparation	<p>Fresh samples: Dilute according to on-screen instructions. Final dilution rate is 10 times.</p> <p>Extended samples: No dilution required</p>	<p>Variable dilution depending on sample quality. The user must decide how to prepare the sample. Over-dilution and under-dilution are not acceptable. Dilution rate is hundreds of times.</p>
Sample loading	<p>Simple filling of a multi-use capillary equipped with a syringe.</p>	<p>Load a disposable one-time-use NucleoCassette with lysate solution by immersing the tip of the cassette into the solution and pressing the piston.</p>
Navigation through the screens	<p>User friendly man-machine interface displayed on operational screens leads the user through the entire testing, dilution, dosing and complete test reporting process.</p> <p>Uniquely designed for boar semen testing, dosing and reporting with data base management system.</p>	<p>Small display shows the number of cells detected (The final sperm concentration needs to be calculated by the user).</p> <p>No man-machine interface for boar semen analysis: The device is designed as a general mammalian cell counter.</p>
Starting test	<p>Insert a capillary into the measurement slot, testing will be started automatically.</p>	<p>Place the NucleoCassette in the instrument and press the "Run" button.</p>
Testing time	<p>~ 40 seconds</p>	<p>~ 30 seconds</p>
Results	<p>Fully automated, objective and standardized boar semen analysis test results for FIVE semen parameters:</p> <p>Sperm Concentration Motility Motility Grading Motile Sperm Concentration Morphology</p>	<p>Automated results for cell concentration</p>
Calibration	<p>Not required: Device is pre-calibrated by the manufacturer</p>	<p>Not required: Device is pre-calibrated by the manufacturer</p>
Dosing	<p>Complete dosing instructions</p>	<p>No dosing feature</p>
Accuracy	<p>High clinical correlation to both the microscope and IVOS (CASA) system specific to boar semen analysis</p>	<p>Poor agreement between Nucleocounter and the other systems:</p> <p>Overestimation of concentration when compared to the IVOS (CASA) system due to the fact that the nuclei of cells OTHER than spermatozoa are also counted.</p>
Precision	<p>High precision:</p> <p>Sperm Concentration: CV = 2.0 % Motility: CV = 4.0 % Morphology: CV = 3.6 %</p>	<p>Sperm Concentration: CV = 4.6 %</p>

Consumables	SQA-Vp multi-use capillaries	Disposable NucleoCassette Reagent A Reagent B
Summary of Limitations	Disposable re-use requires washing	<ul style="list-style-type: none"> • Only sperm concentration is assessed • Overestimation of concentration • No dosing feature • No boar semen analysis man-machine interface • Designed as a general cell counter for mammals • Statistical counting errors • Dilution errors caused by the requirement for high dilutions • Low measurement volume is not statistically representative • Cost: No re-use of the disposable NucleoCassette • The analysis is not standardized for pig semen

References:

1. SQA-Vp User Guide, 2007.
2. SQA-Vp Product Performance Data, 2007.
3. Clinical Trial at IMV, Nov 2007.
4. Description of the NucleoCounter from ChemoMetec A/S, Denmark (web site).
5. C. Hansen, T. Vermeiden, J.P.W. Vermeiden, C. Simmet, B.C. Day and H. Feitsma. Comparison of FACSCount AF system, Improved Neubauer hemocytometer, Corning 254 photometer, SpermVision, UltiMate and NucleoCounter SP-100 for determination of sperm concentration of boar semen. Theriogenology, Vol 66, Issue 9, Dec 2006, 2188-94.
6. Danish Pig Production – Reproduction. Report no. 639 By Claus Hansen, Anne Marie Hedeboe, 29.01.2004. Examination of the NucleoCounter SP-100 during production of semen doses: www.danishpigproduction.dk.