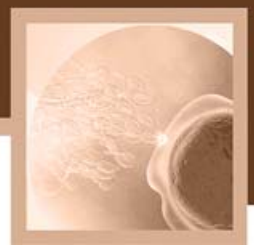
SQA-Vb

NEW TECHNOLOGY
for the Bull Industry

The SQA Vb: Overview

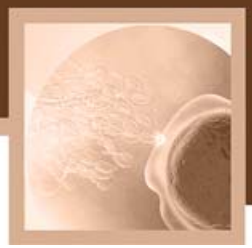


Applications for testing bull semen:

- **Dairy Application for AI dosing and QC - In conjunction with B-Sperm software:**
  - **Fresh samples can be tested and dosing calculations performed based on total, motile or progressive motile cell concentration**
  - **Frozen semen samples can be evaluated for quality after straw preparation and prior to insemination**
- **BSE – A stand-alone system for performing BREEDING SOUNDNESS EVALUATION in the field**

Medical Electronic Systems

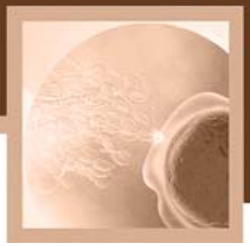
SQA-Vb: System Components



- **SQA-Vb**
- **B-Sperm Management Software**
- **Test Kit with I-button and 50 testing capillaries**
- **Cleaning Kit**
- **QwikCheck™-beads for QC**

Medical Electronic Systems

SQA-Vb Components



Disposable testing capillary (8 uses)

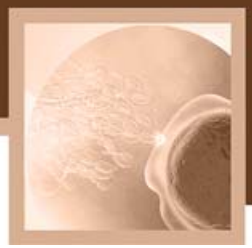
Diluent dispenser and pipette

QC Beads

SQA-V (Vb) Cleaning Kit

Data management software

SQA-Vb Overview



- **The SQA-Vb automatically measures the following parameters in less than 1 minute:**

Semen Parameters	
Concentration M/ml	Velocity microns/sec
Motile Sperm Concentration M/ml	Total # Sperm/Ejaculate
Motility %	Total Motile # Sperm/Ejaculate
Progressive Motility %	Total Progressive Motile # Sperm/Ejaculate
Progressive Motile Sperm Concentration M/ml	

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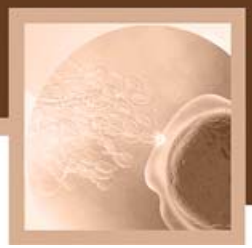

Running FRESH Samples for DOSING and BSE

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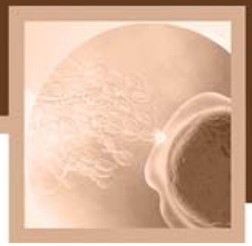
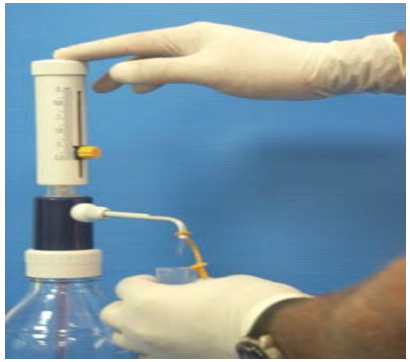
Dairy and BSE – Running FRESH Samples



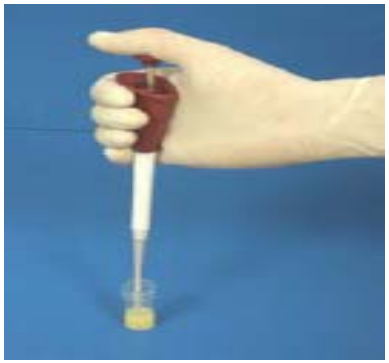
FRESH SAMPLE PREPARATION

STEP #1



Dispense 2ml testing medium

STEP # 2



Aspirate 100µl semen using a pipette

STEP #3

Mix the semen sample and the testing medium

STEP # 4

Aspirate the sample into the testing capillary

SQA-Vb TESTING SCREENS

ENTER SAMPLE DATA: FRESH

TEMP.	26.5 C
HERD #	1
BULL ID:	7254
SEMEN VOLUME:	6.5 ml
SAMPLE #:	12254358

PRESS ENTER TO CONTINUE

FRESH SPECIMEN: SAMPLE PREPERATION

1. SEMEN: 100 microliters
2. DILUENT: 2.0 ml
3. MIX SAMPLE THOROUGHLY
4. FILL AND CLEAN CAPILLARY

INSERT CAPILLARY INTO CHAMBER

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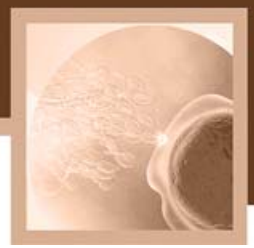
Dairy and BSE : Running FRESH Samples



SQA-Vb TESTING SCREENS

TEST RESULTS: FRESH SAMPLE

CONC.	332.6 M/ml	MSC	259.1M/ml
MOTILITY	77.9 %	PMSC	183.9 M/ml
PR. MOT.	55.3 %	VELOC.	32 mic/sec

TOTALS PER EJACULATE

SPERM #	0.67 Bil
MOT. SPERM	0.52 Bil
PR. SPERM	0.37 Bil

FOR DOSING CALCULATION
PRESS: "IMPORT ON-LINE" BUTTON
IN B-SPERM

Semen Parameters: AI Dosing and BSE	
Concentration M/ml	Velocity microns/sec
Motile Sperm Concentration M/ml	Total # Sperm/Ejaculate
Motility %	Total Motile # Sperm/Ejaculate
Progressive Motility %	Total Progressive Motile # Sperm/Ejaculate
Progressive Motile Sperm Concentration M/ml	

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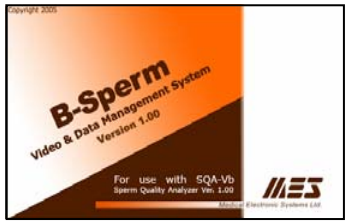
Dairy: Dosing in B-Sperm



Dosing Set-up

Bull ID	7254	Bull Name	Lemon Tree
Herd #	1	Date	25/09/2005 07:56:00

Semen Volume [ml]	6.5	MSC [M/ml]	1085
Sperm Conc. [M/ml]	1817.4	PMSC [M/ml]	446.2

Dosing Method	Total Sperm #
Dose Volume [ml]	0.5
Target # Sperm [M/dose]	21.5

Calculate

Extender Volume	Total Volume [ml]	Number of Doses [#]
263.6	270	540

Save and Close

Report

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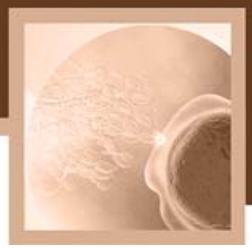
B-Sperm Dosing Report



SQA-Vb

Dosing Test Report

Report Date: 10/08/2006 17:16:01

< >	Sample Data							Test Parameters									Dosing Results	
	Date	Time	Herd #	Bull ID	Bull Name	Sample #	Semen Volume [ml]	Sperm Conc. [M/ml]	Motility [%]	Prog. Motiliy [%]	MSC [M/ml]	PMSC [M/ml]	Velocity [mic/sec]	Totals per Ejaculate			Number of Doses [#]	Extender Volume [ml]
														Sperm # [bil]	Motile Sperm [bil]	Prog. Motile Sperm # [bil]		
	22/09/2005	07:23	111	3954	1234567890	0	7	1139.4	80.5	30.7	917.2	349.6	44	7.98	6.42	2.45	N/A	N/A
	22/09/2005	07:15	111	7226	Fernando	0	7	1718.8	63.5	28.7	1091.4	493.9	41	12.03	7.64	3.46	N/A	N/A
< >	25/09/2005	12:44	111	7328	Frankenstein	1	9	1229.3	56	12.4	688.4	152.6	18	11.06	6.2	1.37	N/A	N/A
< >	25/09/2005	12:41	111	7328	Frankenstein	1	9	1229.3	57.6	12	708.1	148.1	17	11.06	6.37	1.33	N/A	N/A
	25/09/2005	12:18	111	7164	Lemon	1	6	1824.6	48.4	13	883.1	237.1	18	10.95	5.3	1.42	N/A	N/A
	25/09/2005	12:12	111	7164	Lemon	1	6	1781.5	51.5	15.6	917.5	278.4	22	10.69	5.51	1.67	N/A	N/A
< >	25/09/2005	11:49	111	7177	Alberto	1	5	1323	16.6	2.2	219.6	28.9	3	6.62	1.1	0.14	N/A	N/A
< >	25/09/2005	11:45	111	7177	Alberto	1	5	1296.3	20.6	3.2	267	41.7	5	6.48	1.34	0.21	N/A	N/A
< >	25/09/2005	11:29	111	7287	Joshua	1	2.5	411.7	57.3	7.4	235.9	30.4	10	1.03	0.59	0.08	N/A	N/A
< >	25/09/2005	11:25	111	7287	Joshua	1	2.5	428.9	45.8	5.3	196.4	22.8	8	1.07	0.49	0.06	N/A	N/A
< >	25/09/2005	11:11	111	7326	Alejandro	1	6	1369.4	56	14	766.9	191.5	20	8.22	4.6	1.15	N/A	N/A
	25/09/2005	11:05	111	7326	Alejandro	1	6	1406	56.6	14.3	795.8	201.1	20	8.44	4.77	1.21	N/A	N/A
	25/09/2005	10:16	111	7324	Fernando	1	6.5	1293.6	64.3	20.8	831.8	268.9	29	8.41	5.41	1.75	N/A	N/A
	25/09/2005	10:12	111	7324	Fernando	1	6.5	1278	71.2	26	909.9	332.8	37	8.31	5.91	2.16	N/A	N/A

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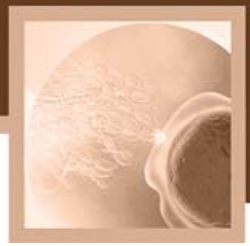

Running FROZEN Samples for Quality Control

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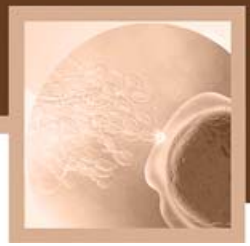
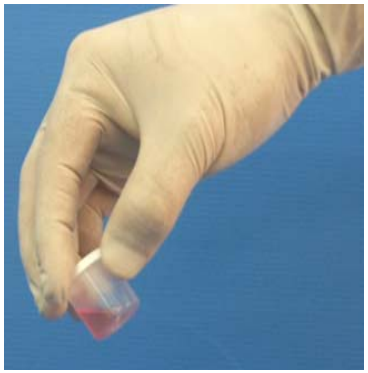
QC Sample Preparation & Semen Analysis



QC can be performed before and after freezing AI samples

FROZEN SAMPLE PREPARATION

Express the semen sample from the straw into a plastic container or dissolve a frozen sperm tablet in a pre-heated media. Use 20µl for testing.



Semen Parameters: QC
Motile Sperm Concentration M/ml
Progressive Motile Sperm Concentration M/ml
Velocity microns/second
Motile # Sperm/Ejaculate
Progressive Motile # Sperm/Ejaculate

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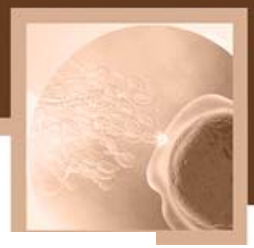
B-Sperm QC FROZEN Screen



Capture Image | Export | Report | ← BACK

QC - Frozen

Number of Records 176

Sort | Hide | Freeze Columns | View All

		< >			Date	Time	Temp.	Herd #	Bull ID	Bull Name	Straw Date	Sample #
					21/09/2005	15:26	85.5	111	7324	Fernando	21/09/2005	1
					21/09/2005	15:25	81.1	111	7261	Simson	21/09/2005	1
					21/09/2005	15:23	82.4	111	7287	Joshua	21/09/2005	1
					21/09/2005	15:13	87.4	111	7142	Michelangelo	21/09/2005	280905
					21/09/2005	15:09	87.4	111	7095	Boris	21/09/2005	280905
					21/09/2005	14:11	86.4	111	7164	Lemon	21/09/2005	280905
					21/09/2005	13:53	81.7	111	7226	Fernando	21/09/2005	250905
					21/09/2005	13:48	81.7	111	7223	Franklin	21/09/2005	250905
		< >			21/09/2005	13:02	80.6	111	7217	Roberto	21/09/2005	280905
					21/09/2005	12:57	80.6	111	7207	Leonardo	21/09/2005	280905
					21/09/2005	11:37	82.6	111	7206	Franklin	21/09/2005	250905
		< >			21/09/2005	11:32	82.6	111	7199	Storm	21/09/2005	250905

Clear All | Select All | Delete

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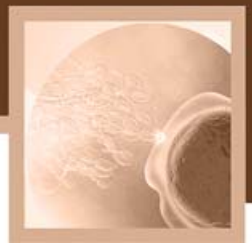
B-Sperm Software



- **B-Sperm software is provided with each SQA-Vb in order to:**
  - **Manage and save herd and bull data to the PC**
  - **Provide on-line dosing calculations**
  - **View specimens on the PC screen**
- **In the BSE mode the user can:**
  - **View test results and analyze herd data**
  - **Sort bulls based on the quality of their sperm**
  - **Import data from the SQA to the PC at the end of the day**
- **In the Dosing mode the user can:**
  - **Calculate sample dilution parameters based on test results (Total, Motile or Progressive Motile Sperm Concentration)**
  - **Divide fresh semen samples into AI doses based on on-line dosing calculations**

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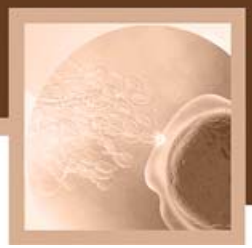

SQA-Vb Technology and Performance Data

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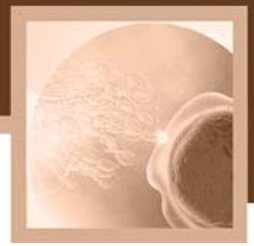
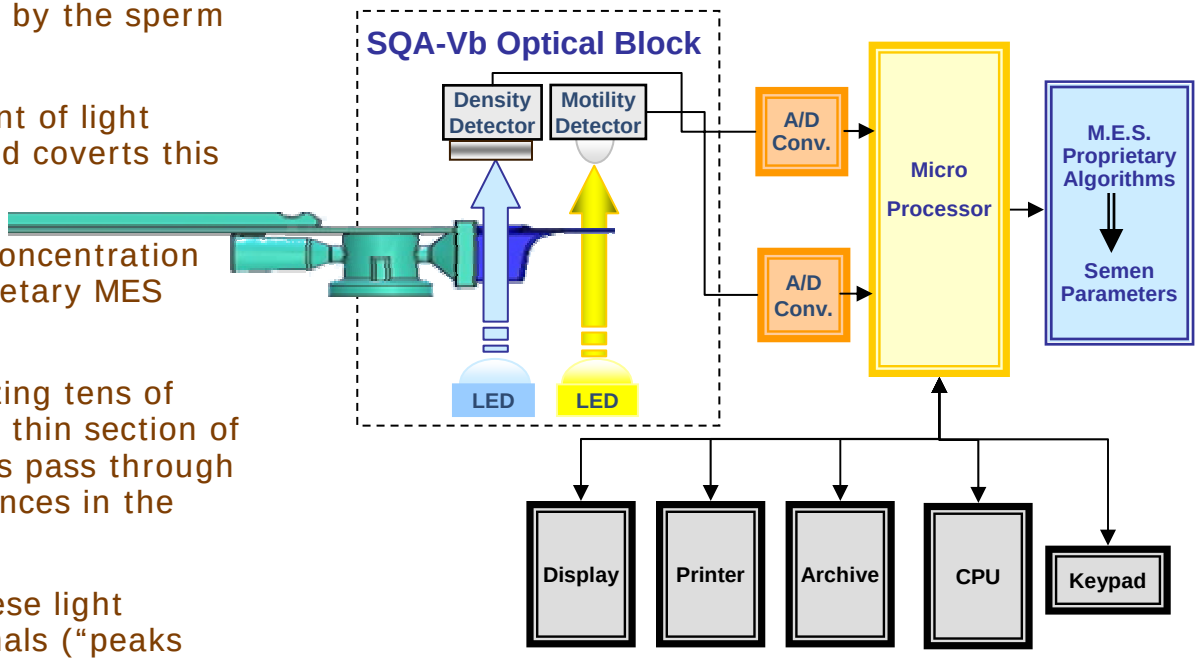
SQA-Vb Technology



- **The SQA-Vb testing capillary is inserted into the optical block and testing begins.**
- **Concentration** is measured by analyzing millions of sperm cells in the thick section of the SQA-V testing capillary: A very specific wavelength of light is absorbed by the sperm cells.
- A detector measures the amount of light absorbed by the sperm cells and coverts this value to optical density (OD).
- "OD" is translated into sperm concentration by a microprocessor and proprietary MES algorithms.
- **Motility** is measured by analyzing tens of thousands of sperm cells in the thin section of the SQA-V capillary: Motile cells pass through a light source creating disturbances in the beam of light.
- A motility detector converts these light disturbances into electrical signals ("peaks and valleys") and transmits them to a converter which translates them into digital form.
- These electronic signals are analyzed by the SQA software and proprietary algorithms and translated into sperm motility parameters.



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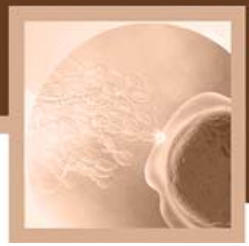
SQA-Vb: Dynamic Range



SQA-Vb Dynamic Range for FRESH and FROZEN Bull Semen

Sample Type	Conc. M/ml	Motility %	MSC M/ml	PMSC M/ml	Velocity mic/sec
Fresh	0-2000	0-95	0-1900	0-1800	0-130
Frozen	-	-	0-100	0-95	0-70

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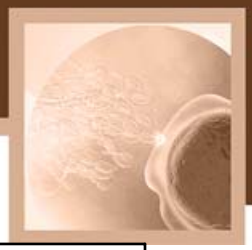
SQA-Vb: Performance Claims



FRESH BULL SEMEN (BSE and DOSING)					
Claims	Conc. M/ml	Motility %	MSC M/ml	PMSC M/ml	Velocity mic/sec
Precision (CV, %)	3%	5%	7%	-	10%
Accuracy (correlation to manual data)	0.9	0.8	0.9	0.8	0.75
Repeatability (QC material)					
Intra-device Variability (CV, %)		≤ 0.01	Inter-device Variability (CV, %)		≤ 2.5

FROZEN BULL SEMEN (QC)			
Claims	MSC M/ml	PMSC M/ml	Velocity mic/sec
Precision (CV, %)	7%	-	4%
Accuracy (correlation to manual data)	0.8	0.7	0.85

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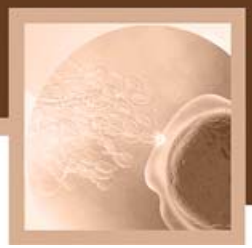

SQA-Vb
Comparison to CASA

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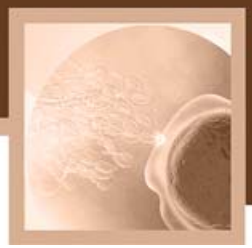
SQA-Vb vs. CASA



Comparison Table: SQA-Vb vs. CASA		
Parameter	**SQA-Vb**	**CASA**
Sample volume for testing	100 µl – Fresh semen 20 µl – Frozen semen	5-10 µl
# Spermatozoa tested	Concentration channel: Millions Motility channel: Thousands	200-400 cells (setting dependent)
Dilution rate	Constant	Variable depending on sample quality
Automation	Full	Partial (a lot of settings and adjustments)
Accuracy (correlation to manual method)	Concentration: 0.9 Motility: 0.8	Inconsistent
Precision (CV, %)	Concentration: 3% Motility: 5%	
Repeatability using QC material (CV, %)	Intra-device ≤ 0.01 Inter-device ≤ 2.5	

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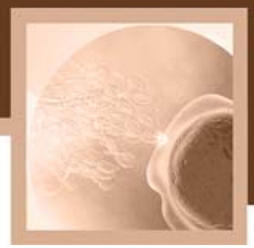
The SQA Vb: Summary



SQA-Vb: Automated test results in less than one minute!

- **BSE – A stand-alone system for performing BREEDING SOUNDNESS EVALUATION in the field**
- **Dosing QC/AI- In conjunction with B-Sperm software:**
  - **Fresh samples can be tested and dosing calculations performed based on total, motile or progressive motile sperm concentration**
  - **Frozen semen samples can be evaluated for quality prior to insemination**

Medical Electronic Systems

SQA-Vb

NEW TECHNOLOGY

in the Cattle Industry