SQA-Ve

NEW TECHNOLOGY
in the Equine Industry

Medical Electronic Systems

- Established in 1993 in Israel.
- 2005: Offices established in Vienna and Los Angeles
- 2007: Offices opened in Belgium and Hong Kong
- Technology Focus: Medical Electronics
  - Electro-optical engineering
  - Computer algorithms
  - Video microscopy
- Commercialized automated semen analysis technology for both human and animal applications (SQA – Sperm Quality Analyzer)
- Installed base ~ 2,500 systems worldwide

HUMAN SPERM QUALITY ANALYZERS

SQA-V

SQA II CP

Medical Electronic Systems

ANIMAL SPERM QUALITY ANALYZERS

SQA-Vt
TURKEY

SQA-Vp
PIG

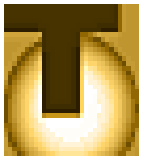
SQA-Ve
EQUINE

SQA-Vb
BULL

Medical Electronic Systems

SOFTWARE PRODUCTS

V-Sperm™ Video and Data Management Software (both English and Russian)



T-Sperm™ Turkey Video, Data and Flock Management Software

B-Sperm™ Bull Video, Herd and Data Management and Dosing Software

P-Sperm™ Pig Video, Herd and Data Management and Dosing Software

Qwik-Link™ LIS interface for information transfer to a centralized database

Qwik-Check™ Kits

QwikCheck™ BEADS

- ✓ Quality control latex beads for testing sperm concentration
- ✓ 3 Levels: High, Low, Negative
- ✓ Labeled for use on the SQA-V
- ✓ Can be used on sperm counting chambers
- ✓ Item #0200

QwikCheck™ LIQUEFACTION

- ✓ Quickly liquefies viscous semen samples
- ✓ 20 – single dose vials
- ✓ Easy to use
- ✓ Item #0900

QwikCheck™ TEST STRIPS

- ✓ Reagent test strips for semen analysis
- ✓ Measures Leukocytes and pH in semen
- ✓ 100 strips per bottle
- ✓ Item #0700

QwikCheck™ DILUTION

- ✓ Dilution media for semen
- ✓ 50 ml sterile solution
- ✓ Item #0800

Medical Electronic Systems

Why Automate Semen Analysis?

Manual Semen Analysis is:

- Time consuming – 70 minutes if done correctly following WHO standards
- Highly variable – Errors counting highly motile cells. Some parameters such as morphology are highly subjective.
- Labor intensive and requires special training – Preparation of stained slides, counting> 200 moving cells, etc.
- Not standardized – high variability between labs and technicians

MES Medical Electronic Systems

SQA-Ve Advantages

- Results in less than one minute
- Fully automated
- Dosing instructions provided automatically
- Accurate, repeatable results
- User friendly interactive screens
- Counts thousands of cells automatically compared to hundreds of cells manually

MES Medical Electronic Systems

CASA Limitations

- Expensive and requires a variety of modules
- Requires considerable lab space (compared to the SQA-V)
- Settings must be set prior to each analysis
- Parameter setting are subjective
- Requires extensive training and re-validation of technician competency

MES Medical Electronic Systems

The SQA Ve: Applications for Testing Equine Semen

- **Fresh semen:**
- Routine semen analysis
- For dosing calculations performed based on Total/ Motile / Prog. Motile cells per AI dose
- **Extended semen :** samples can be evaluated for QC
- **Frozen semen :** samples can be evaluated for QC

SQA-Ve: System Components

- SQA-Ve
- E-Sperm data export table
- SQA-Ve Start-up Kit
- Test Kit with I-button and 50 testing capillaries (500 tests)
- Cleaning Kit

Medical Electronic Systems

SQA-Ve Components

Disposable testing capillary (10 uses)

Heater for samples & capillaries

SQA-V Cleaning Kit

Export data to the PC

SQA-Ve Overview

The SQA-Ve automatically measures the following parameters :

Semen Parameters	
Concentration M/ ml (TSC)	Morphology (% Normal) (FRESH SAMPLE ONLY)
Motility %	Motile Sperm Concentration (MSC)
Progressive Motility %	Progressive Motile Sperm Concentration (PMSC)
Velocity (mic/ sec)	Total # Sperm Total # Motile Sperm Total # Prog. Motile Sperm (Per ejaculate)

MES Medical Electronic Systems

Sample Testing

Medical Electronic Systems

Preparing Fresh/Extended Samples

- Place new testing capillaries and 10-ml containers in the heating device
- Distribute 2 ml of fresh semen into a 10-ml container provided in the test kit.
- Close the plastic container and pre-heat the semen to 37°C (98.6°F) for:
  - 4 minutes (room temperature sample)
  - 5 minutes (extended, cooled semen)
- Gently and thoroughly mix the sample for 10 seconds
- The sample is now ready for testing

MES Medical Electronic Systems

Testing and Dosing FRESH Samples

Fresh samples can be tested and dosing calculations performed based on total, motile or progressively motile sperm per AI dose

ENTER SAMPLE DATA: FRESH

DATE: 01/04/05	TIME: 08 :15
STALLION ID:	28
SAMPLE #:	1
SEMEN VOLUME:	100.0 ml
PERFORM DOSING?	YES/NO
DOSING TYPE:	EXTENDED/FROZEN

DOSING SETTINGS: EXTENDED

DOSING BY:	TOTAL/MOTILE/PROG. MOTILE
MINIMUM # SPERM CELLS PER DOSE:	500 M
CONCENTRATION TARGET:	50 M/ml
MAXIMUM DOSE VOLUME:	30.0 ml

DOSIMETRY SETTINGS: FROZEN

DOSING BY:	TOTAL/MOTILE/**PROG. MOTILE**
# SPERM CELLS IN A DOSE:	500.0 M
DOSE VOLUME:	0.5 ml

MES Medical Electronic Systems

Testing and Dosing FRESH Samples

TEST RESULTS: FRESH SAMPLE

CONC.	332.6 M/ml	MSC	259.1 M/ml
MOTILITY	77.9 %	PMSC	183.9 M/ml
PR. MOT.	55.3 %	VELOCITY	32 mic/sec
MORPHOLOGY	73.3%		

TOTALS		SPERM #	33.3 Bil
PER		MOT. SPERM	26.0 Bil
EJACULATE		PR. SPERM	18 Bil

DOSE PREPARATION: EXTENDED

DOSING BY:	PROG. MOTILE
SEMEN VOLUME:	100.0 ml
EXTENDER VOLUME:	235 ml
TOTAL VOLUME:	335 ml
# DOSES:	17
# SPERM CELLS / DOSE:	503 M
DOSE VOLUME:	20.0 ml

DOSE PREPARATION: FROZEN

DOSING BY: TOTAL/MOTILE / **PROG. MOTILE**

ADD EXTENDER TO PELLET UP TO:	22 ml
DOSES:	44
# SPERM CELLS / DOSE:	500 M

MES Medical Electronic Systems

Testing Extended Semen Samples

ENTER SAMPLE DATA: EXTENDED

DATE: 01/04/05	TIME: 08 :15 : 59
STALLION ID:	28
SAMPLE #:	2
SEMEN VOLUME:	60 ml

TEST RESULTS: EXTENDED SAMPLE

CONC.	42.6 M/ml	MSC	25.9.1M/ml
MOTILITY	77.9 %	PMSC	183.9 M/ml
PR. MOT.	55.3 %	VELOC.	62 mic/sec

TOTALS PER SEMEN VOLUME

SPERM #	2.56 Bil
MOT. SPERM	1.99 Bil
PR. SPERM	1.43Bil

Medical Electronic Systems

Testing FROZEN Semen Samples

SEMEN ANALYSIS REPORT: FROZEN SAMPLE

DATE: 01/04/05	TIME: 08 :15 : 59
STALLION ID:	28
STRAW DATE:	01/04/05
SAMPLE #:	4
SEMEN VOLUME:	0.5 ml

TEST RESULTS: FROZEN SAMPLE

CONC.	420.6 M/ml	MSC	254.4M/ml
MOTILITY	60.5 %	PMSC	177.9 M/ml
PR. MOT.	42..3 %	VELOC.	32 mic/sec

TOTALS PER SEMEN VOLUME

SPERM #	166.3 M
MOT. SPERM	129.6 M
PR. SPERM	92.0 M

TEST RESULTS: LOW QUALITY SAMPLE

CONC.	NA	MSC	59.1M/ml
MOTILITY	NA	PMSC	15.2 M/ml
PR. MOT.	< 35.0 %	VELOC.	22 mic/sec

TOTALS PER SEMEN VOLUME

SPERM #	NA
MOT. SPERM	29.6 M
PR. SPERM	7.6 M

Medical Electronic Systems

Export Test Results to E-Sperm Table

Test results and stallion information can be exported in .csv or Excel format:

SQA-Ve Equine Test Results: FRESH SAMPLES

SQA-Ve (EQUINE) SAMPLE DATA								TEST RESULTS									
Date	Time	Stallion ID	Sample			Perform Dosing?	Dosing Type	Conc., M/ml	Motility, %	Prog. Mot., %	Morph., %	MSC, M/ml	PMSC, M/ml	Velocity, mic/sec	# Sperm, Bil	Mot. Sperm, Bil	Prog. Sperm, Bil
			Type	ID #	Volume, ml												
10/1/2008	18:03	123	Fresh	1	90	Yes	Extended	152.6	52.4	46.0	62.0	79.9	70.2	93	13.7	7.2	6.3
14/1/2008	10:10	15	Fresh	3	110	Yes	Extended	63.2	72.1	44.1	73.1	45.5	27.9	91	7.0	5.0	3.1
14/1/2008	10:15	159	Fresh	4	55	Yes	Extended	214.4	85.2	83.7	80.6	182.6	179.4	125	11.8	10.0	9.9
14/1/2008	10:26	456	Fresh	5	40	Yes	Extended	109.1	67.1	50.6	70.3	73.2	55.2	99	4.4	2.9	2.2
14/1/2008	10:29	147	Fresh	6	60	Yes	Extended	87.6	83.5	82.0	79.6	73.2	71.9	125	5.3	4.4	4.3
14/1/2008	10:34	143	Fresh	7	100	Yes	Frozen	84.3	46.2	44.9	58.5	38.9	37.8	92	8.4	3.9	3.8
14/1/2008	10:38	158	Fresh	8	85	Yes	Frozen	62.3	9.9	9.4	N/A	6.2	5.9	16	5.3	0.5	0.5
14/1/2008	10:45	120	Fresh	9	75	Yes	Frozen	138.9	75.0	52.7	74.8	104.2	73.2	102	10.4	7.8	5.5
14/1/2008	11:07	118	Fresh	10	65	Yes	Extended	71.0	67.5	40.3	70.6	47.9	28.6	85	4.6	3.1	1.9

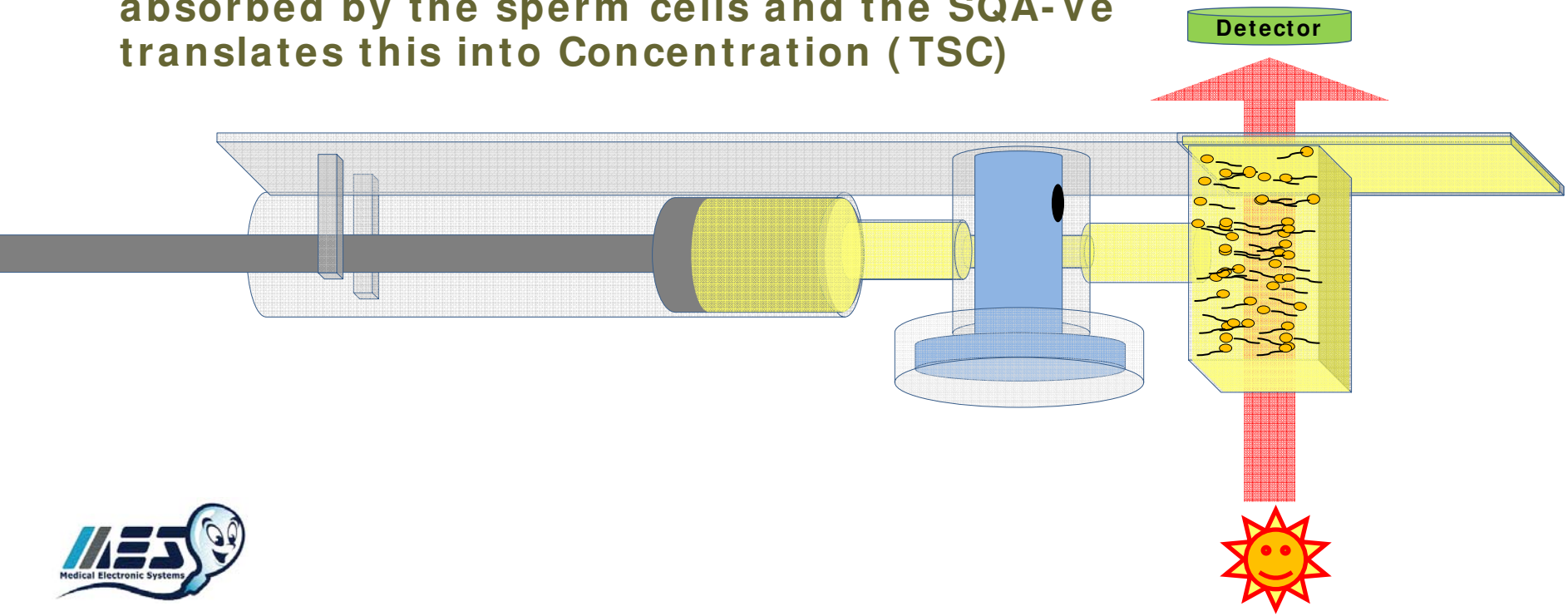
MES Medical Electronic Systems

SQA-Ve Technology and Performance Data

Medical Electronic Systems

Technology: Measuring Concentration

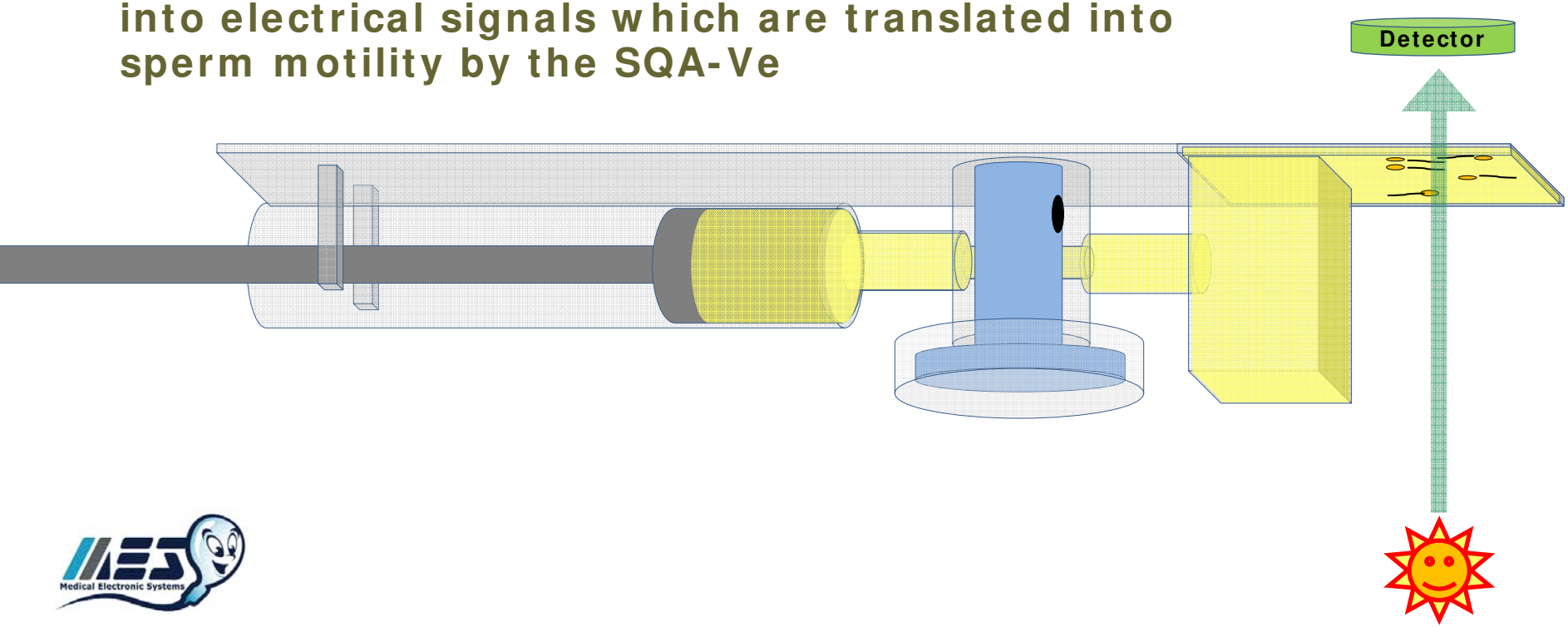
- Concentration is measured by analyzing millions of sperm cells in the cuvette section of the SQA-Ve testing capillary
- An LED light passing through the cuvette section is absorbed by the sperm cells
- A detector measures the amount of light absorbed by the sperm cells and the SQA-Ve translates this into Concentration (TSC)



Medical Electronic Systems

Technology: Measuring Concentration

- 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 the light disturbances into electrical signals which are translated into sperm motility by the SQA-Ve



Medical Electronic Systems

SQA-Ve Dynamic Range

Sample Type	Concentration M/ml	% Motility	% Progressive Motility	% Normal Morphology
Fresh	0-550	0-100	0-100	0-100
Extended	0-300	0-100	0-100	-
Frozen	0-600	0-100	0-100	-

MES Medical Electronic Systems

Performance Claims FRESH Semen

Precision: SQA-Ve intra- and inter-device Variability

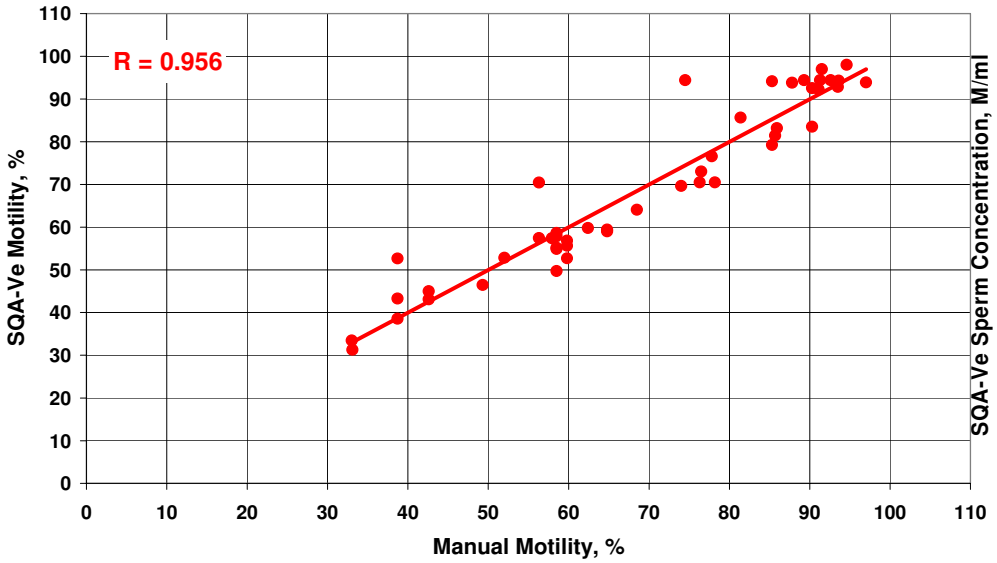
Semen Parameters	Intra-device CV, %	Inter-device CV, %
Sperm Concentration	2.0	7.0
Motility	0.3	7.2
Prog. Motility	5.6	8.6
Morphology	0.3	2.6

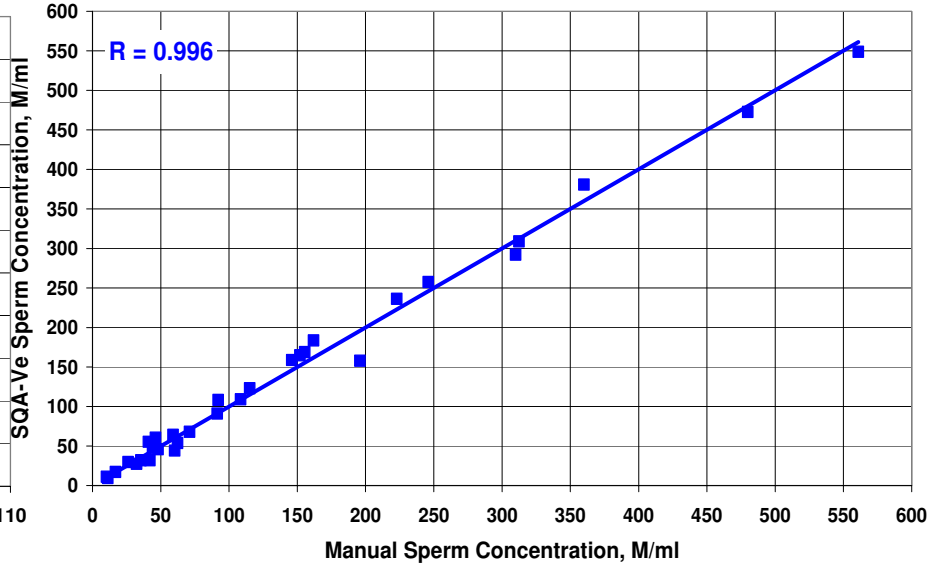
MES Medical Electronic Systems

SQA-Ve Performance Data

Correlation to Manual Method FRESH Semen

Semen Parameters	Correlation coefficients R value
Sperm Concentration, M/ml	0.996
Motility, %	0.956
Progressive Motility, %	0.892
Morphology, %	0.744





SQA-Ve Advantages

- Results in less than one minute
- Fully automated
- Dosing instructions provided automatically
- Accurate, repeatable results
- User friendly interactive screens
- Counts thousands of cells automatically compared to hundreds of cells manually

MES Medical Electronic Systems

SQA-Ve NEW TECHNOLOGY in the Equine industry

The End

Medical Electronic Systems