SQA-Vp

NEW TECHNOLOGY

in the Pig Industry
P-Sperm
Data Management Software for the SQA-Vp
P-Sperm Software

P-Sperm is the data management software that works together with the SQA-Vp to:

- Store and sort test results on the PC for analysis, graphing, etc.
- Provide documentation of the entire testing, dosing and storage cycle.
- View sperm samples on the PC monitor.
- Capture and store video clips and images.
- Set-up SQA-Vb system defaults
- Secure information (password protected).
B-Sperm navigation is easy. To access various menus and options:

- Click on one of seven navigation buttons that are always available in the left margin of the screen.

- Note the sub-menu buttons across the top of the P-Sperm screen that display additional options to run reports, export data, etc.
A variety of icons guide the user through the P-Sperm features and options:

Test results out of clinical range: One or more of the test results are out of clinical range.

Dosing mismatch: The selected dosing requirements cannot be implemented. This can happen when:

- The set-up values have been entered incorrectly
- The semen sample is of low quality

Picture indicator: A picture has been attached to the test results.

Video Indicator: A video clip has been attached to the test results.

Graphs: Test results can be graphed by clicking on the icon and selecting the parameter to be graphed.
Enter P-Sperm using:

- **Password:** fertility
- **Click:** OK
The first navigation button is TEST DATA. From this screen the user can locate, select and analyze test results that have been imported from the SQA-Vp.

Click the navigation button TEST DATA and three sub-buttons will appear:

- Dosing – Fresh
- Extended
- Daily Report
Overview of P-Sperm

• There are two basic sub-menus in P-Sperm that display test results imported from the SQA-Vp:
  
  Dosing-Fresh & Extended

• From these two sub-menus, the following features can be activated:

<table>
<thead>
<tr>
<th>Features</th>
<th>Dosing-Fresh</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dosing Set-Up; dosing on-line</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Import tests from the SQA-Vp</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Sort, Hide, Freeze Columns, View All</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Run Graphs of individual boar test results</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Capture images, Export data and run reports</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
DOSING-FRESH - Select this button to:

- View the test data from the DOSING mode of the SQA-Vp
- Activate the dosing feature and determine how to divide up a sample by total, motile or morphologically normal sperm in a dose
- Activate the EXPORT TEST feature
- Evaluate test results and run reports, graphs, view attached clips, etc.
# Dosing-Fresh: Test Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sperm Concentration</td>
<td>Millions per milliliter</td>
</tr>
<tr>
<td>Motile Sperm Concentration (MSC)</td>
<td>Millions per milliliter</td>
</tr>
<tr>
<td>Motility</td>
<td>%</td>
</tr>
<tr>
<td>Motility Grading</td>
<td>[0-5]</td>
</tr>
<tr>
<td>Morphology</td>
<td>%</td>
</tr>
<tr>
<td>Sperm #</td>
<td>Billions per ejaculate</td>
</tr>
<tr>
<td>Motile Sperm #</td>
<td>Billions per ejaculate</td>
</tr>
</tbody>
</table>
Select: Test Data > Dosing-Fresh and the table above will be displayed
Click on the navigation buttons and icons to run a variety of features
There are two ways to perform dosing calculations:

- From the SQA-Vp after running a test
  - Activate the Test Data > Dosing-Fresh screen in P-Sperm
  - Click the IMPORT TEST button when prompted by the SQA-Vp on-screen instructions
  - The test results will automatically populate the Dosing Set-up screen will be activated

- From P-Sperm after importing data from the SQA-Vp
  - Highlight the desired record from the Test Data > Dosing-Fresh spreadsheet
  - Click the DOSING SET-UP button
Dosing Set-up Screen

Enter:

- **Dosing Method**: The dosing criteria defined by # total, motile or morphologically normal sperm

- **Dose Volume**: The desired final volume of the AI dose

- **Target # Sperm**: The desired number of sperm for each dose

- **Motility Cutoff**: The minimal Motility threshold

- **Motility Grade Cutoff**: The minimal Motility Grade threshold

---

**Dosing Set-up**

- **Boar ID**: 130
- **Boar Name**: Vendredi 7
- **Location**: Ile Reun
- **Date**: 05/10/2023

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neat Ejaculate Volume [ml]</td>
<td>50</td>
</tr>
<tr>
<td>Primary Extender Volume [ml]</td>
<td>50</td>
</tr>
<tr>
<td>Sperm Conc. [M/mL]</td>
<td>1000</td>
</tr>
<tr>
<td>MSC [M/mL]</td>
<td>906.2</td>
</tr>
<tr>
<td>Motility [%]</td>
<td>91.4</td>
</tr>
<tr>
<td>Motility Grade Cutoff [0-6]</td>
<td>4</td>
</tr>
<tr>
<td>Morphology [%] - Automated</td>
<td>87.6</td>
</tr>
<tr>
<td>Morphology [%] - Manual</td>
<td>Optional</td>
</tr>
</tbody>
</table>

**Dosing Method**

- Mobile Sperm

**Dose Volume**

- 80 ml

**Target # Sperm**

- 335

**Motility Cutoff**

- 70

**Motility Grade Cutoff**

- 3

**Extender Volume [ml]**

- 851

**Total Volume [ml]**

- 967

**Number of Doses [#]**

- 12

**Save and Close**

**Cancel**

**Report**
Dosing Set-up Screen

- Click the CALCULATE button to view the:
  - **Extender Volume**: The amount of extender to add to the sample
  - **Total Volume**: The sum of the semen plus the extender volume
  - **Number of Doses**: The total number of doses that can be generated

- Click the ‘SAVE and CLOSE’ button to save the results

- Click the REPORT button to view and print the dosing report
Select: Test Data > Extended to:

- View a report with QC-Extended test data
- Manage and evaluate QC-Extended data by individual board
- Evaluate test results and run reports and graphs
- View clips and pictures attached to test results
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sperm Concentration</td>
<td>Millions per milliliter</td>
</tr>
<tr>
<td>Motile Sperm Concentration (MSC)</td>
<td>Millions per milliliter</td>
</tr>
<tr>
<td>Motility</td>
<td>%</td>
</tr>
<tr>
<td>Motility Grading</td>
<td>[0-5]</td>
</tr>
<tr>
<td>Sperm #</td>
<td>Billions per ejaculate</td>
</tr>
<tr>
<td>Motile Sperm #</td>
<td>Billions per ejaculate</td>
</tr>
</tbody>
</table>
### QC-Extended Screen

**Extended**

**QC - Extended**

- Number of Records: 40
- Table Fields:
  - Date
  - Time
  - Boar ID
  - Boar Name
  - Sample #
  - Dose Prep. Date
  - Semen Volume [ml]
  - Agglutination [%]

**Buttons:**
- Sort
- Hide
- Freeze Columns
- View All

**Operational Instructions:**
- **Select:** Test Data > Extended to display the table above
- **Click on the navigation buttons and icons to run features**
The DAILY REPORT contains all the test results for both FRESH samples and their associated EXTENDED test results. This report is an excellent tool for measuring the quality of the samples through the entire production process.

To view and/or print a Daily Report:
- Click on the DAILY REPORT button
- Select the report date
The three buttons displayed above are located at the top of the screen. To run these features data has to already be imported from the SQA-Vp into P-Sperm! Click on these buttons to:

- Activate the REAL TIME video screen, save and attach images to boar records
- Send P-Sperm data to another database or external file in Excel format
- Run a test report
To save an image to a test record:

- Insert a slide in the visualization chamber of the SQA-Vp
- In P-Sperm - Highlight the record to attach the clip
- Click: CAPTURE IMAGE to activate the video screen
- Click CAPTURE PICTURE/VIDEO - A camera or video icon will now appear adjacent to the record in the data spreadsheet
FEATURES: Report

To view and/or print a semen analysis report:

- Select the desired records from the Dosing-Fresh or QC-Extended screens
- Click the report button
- Click the printer icon to print a copy of the report

SQA-Vp
Dosing Test Report

Report Date: 22/02/2007 22:51:10

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Time from Collect (min)</th>
<th>Board ID</th>
<th>Board Name</th>
<th>Sample ID</th>
<th>Initial Raised Vol (mL)</th>
<th>Primary Extended Vol (mL)</th>
<th>Aggl. (%</th>
<th>Sperm Conc (x10 ^ 6/mL)</th>
<th>NUC/ml</th>
<th>MOOV (%)</th>
<th>Motility Grading</th>
<th>Motility (%)</th>
<th>Morph. (%)</th>
<th>Sperm # (x10 ^ 6/mL)</th>
<th>Motile Sperm # (x10 ^ 6/mL)</th>
<th>MotileNo.</th>
<th>Number of Doses (mL)</th>
<th>Volume (mL)</th>
<th>Total Volume (mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>22/02/2007</td>
<td>00:22</td>
<td>100</td>
<td>Vankleek 7</td>
<td>2</td>
<td>50</td>
<td>66</td>
<td>21</td>
<td>1000</td>
<td>300.2</td>
<td>90.4</td>
<td>4</td>
<td>97.6</td>
<td>60.15</td>
<td>45.3</td>
<td>12</td>
<td>851</td>
<td>851</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22/02/2007</td>
<td>00:21</td>
<td>100</td>
<td>Vankleek 7</td>
<td>1</td>
<td>50</td>
<td>50</td>
<td>15</td>
<td>1005.8</td>
<td>300.7</td>
<td>90.3</td>
<td>4</td>
<td>97.7</td>
<td>50.20</td>
<td>45.4</td>
<td>12</td>
<td>851</td>
<td>851</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22/02/2007</td>
<td>00:20</td>
<td>100</td>
<td>Vankleek 6</td>
<td>2</td>
<td>100</td>
<td>100</td>
<td>9</td>
<td>349.6</td>
<td>189.3</td>
<td>54.2</td>
<td>2</td>
<td>94.2</td>
<td>54.96</td>
<td>18.93</td>
<td>12</td>
<td>701</td>
<td>851</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22/02/2007</td>
<td>00:19</td>
<td>100</td>
<td>Vankleek 8</td>
<td>1</td>
<td>100</td>
<td>100</td>
<td>30</td>
<td>354.3</td>
<td>180.6</td>
<td>53.3</td>
<td>2</td>
<td>95.2</td>
<td>55.47</td>
<td>18.08</td>
<td>12</td>
<td>701</td>
<td>851</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22/02/2007</td>
<td>00:17</td>
<td>100</td>
<td>Vankleek 3</td>
<td>1</td>
<td>50</td>
<td>100</td>
<td>21</td>
<td>1127.6</td>
<td>1107.7</td>
<td>97.7</td>
<td>3</td>
<td>97.3</td>
<td>56.30</td>
<td>56.68</td>
<td>19</td>
<td>1201</td>
<td>1441</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22/02/2007</td>
<td>00:15</td>
<td>100</td>
<td>Vankleek 1</td>
<td>2</td>
<td>150</td>
<td>100</td>
<td>8</td>
<td>338.4</td>
<td>304.1</td>
<td>76.3</td>
<td>4</td>
<td>95.6</td>
<td>56.26</td>
<td>45.62</td>
<td>15</td>
<td>960</td>
<td>1200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22/02/2007</td>
<td>00:14</td>
<td>100</td>
<td>Vankleek 1</td>
<td>1</td>
<td>150</td>
<td>100</td>
<td>8</td>
<td>368</td>
<td>265.5</td>
<td>71.8</td>
<td>4</td>
<td>92.9</td>
<td>59.65</td>
<td>42.82</td>
<td>14</td>
<td>870</td>
<td>1120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22/02/2007</td>
<td>00:12</td>
<td>100</td>
<td>Tohoku 13</td>
<td>1</td>
<td>200</td>
<td>100</td>
<td>71</td>
<td>442.8</td>
<td>330.6</td>
<td>72.5</td>
<td>4</td>
<td>77.8</td>
<td>68.01</td>
<td>64.13</td>
<td>21</td>
<td>1380</td>
<td>1660</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22/02/2007</td>
<td>00:11</td>
<td>100</td>
<td>Tohoku 11</td>
<td>1</td>
<td>50</td>
<td>60</td>
<td>29</td>
<td>1043.5</td>
<td>1000.0</td>
<td>90.2</td>
<td>4</td>
<td>97.7</td>
<td>51.22</td>
<td>50.3</td>
<td>22</td>
<td>1951</td>
<td>1761</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
• The second navigation button is CONTROLS.

• The SQA-Vp runs Qwik-Check™ LATEX BEADS as an external control material to validate the concentration parameters of the system.

• In order to run these tests, defaults must be set-up in P-Sperm.

• The test results will then be archived and can be viewed in P-Sperm.
Two buttons are available after clicking on CONTROLS:

- **Set-up**: CONTROL default settings must be set-up prior to running Qwik-Check™ beads on the SQA-Vp. Click this button to activate the CONTROLS SET-UP screen.

- **Test Results**: Click this button and the CONTROL TEST RESULTS spreadsheet will be displayed.
To set-up the CONTROLS defaults:

- From the SQA-Vp MAIN MENU select: SERVICE > SERVICE DATA
- In P-Sperm select: CONTROLS>Set-Up
- From the information on the QwikCheck beads box, enter the default settings for each level of CONTROLS:
  - Lot Number
  - Expiration Date
  - Target value and +/- Range
- Click APPLY to enter this information
To view the Control Test Results Report, click the TEST RESULTS button:

- Select the records to be displayed in the report from the CONTROL screen

- Click the REPORT button and the Control Test Results along with a Graph will be displayed for viewing and/or printing.
Test results need to be sent from the SQA-Vp to P-Sperm. Use the IMPORT/EXPORT button of the Main Menu and follow the instructions below:

- Connect the SQA-Vp to the PC running P-Sperm via the RS232 communication cable
- From the SQA-Vp MAIN MENU select: SERVICE > SERVICE DATA
- Click the IMPORT/EXPORT navigation button
- Select: IMPORT (TEST RESULTS or CONTROLS) > CONTINUE
- The SQA-Vp archive will be transferred to the P-Sperm
Select this option to send data from P-Sperm to an external file. This feature requires Microsoft Excel:

- Click the IMPORT/EXPORT button
- Select EXPORT > TEST RESULTS (or CONTROLS)
- Enter a path and file name; then click SAVE
- The data will be saved to the designated location
• Select the REAL TIME VIDEO button to view samples on the PC.

• Click the REAL TIME VIDEO sub-button to:
  • Display a counting grid
  • Maximize the video screen size
  • Copy/save images to external files

• Video defaults such as grid line width and color can be set-up by clicking on the REAL TIME VIDEO button and then clicking the VIDEO SETTINGS button.
Set-up

- Click the SET-UP button to enter all the required testing information and system defaults before testing samples in the SQA-Vp.

- Two buttons are displayed after clicking the SET-UP button:
  - Data Settings
  - System Settings

- Click the **Data Settings** to get:
  - Boar Settings
  - Normal Ranges

- Click the **System Settings** to get:
  - Language
  - Password
  - Port
Set-up: Data Settings

- Click the **Boar Settings** button to set up Boar ID, Name, Owner, Location and Breed information.

- Click the **Normal Ranges** button to set-up the testing range defaults for FRESH and Extended semen.
Set-up: System Settings

- Click the LANGUAGE button to display the set-up screen
- Choose “OTHER” from the drop-down menu
- Edit the table as desired and click APPLY

Password

Click on PASSWORD to change it for user security
Click the PORT button to set the communication port for the PC
• Click the EXIT button to close the P-Sperm program

• Confirm with a click
Thank you
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
ANIMAL SPERM QUALITY ANALYZERS

SQA-Vt
TURKEY

SQA-Vp
PIG

SQA-Vb
BULL
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

- 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

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

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

- Dilution media for semen
  - 50 ml sterile solution
  - Item #0800
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
SQA-V Advantages

- Results in less than one minute
- Fully automated
- Accurate, repeatable results
- User friendly interactive screens
- Counts thousands of cells automatically compared to hundreds of cells manually
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
Applications for testing pig semen:

- Artificial Insemination: For AI dosing and QC - In conjunction with P-Sperm software:
  - Fresh samples can be tested and dosing calculations performed based on total, motile or Morphologically Normal sperm per AI dose
  - Extended semen samples can be evaluated for quality after production and prior to insemination
SQA-Vp: System Components

- SQA-Vp
- P-Sperm Data Management Software
- SQA-Vp Start-up Kit
- Test Kit with I-button and 50 testing capillaries (500 tests)
- Cleaning Kit
- QwikCheck™-beads for QC
SQA-Vp Components

Disposable testing capillary (10 uses)

Diluent dispenser and pipette

SQA-V (Vb) Cleaning Kit

QC Beads

Data management software
The SQA-Vp automatically measures the following parameters in less than 1 minute:

<table>
<thead>
<tr>
<th>Semen Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration M/ml (TSC)</td>
</tr>
<tr>
<td>Morphology (% Normal)</td>
</tr>
<tr>
<td>Motile Sperm Concentration (MSC)</td>
</tr>
<tr>
<td>Total # Sperm/Ejaculate</td>
</tr>
<tr>
<td>Motility %</td>
</tr>
<tr>
<td>Total #Motile Sperm/Ejaculate (FRESH samples)</td>
</tr>
<tr>
<td>Motility Grading (0-5)</td>
</tr>
<tr>
<td>Total #Motile Sperm/Semen Volume (Extended samples)</td>
</tr>
</tbody>
</table>
Running FRESH Samples for DOSING
Preparing AI Doses from FRESH Samples

**STEP #1**
Dispense 2ml pre-heated extender into plastic containers

**STEP #2**
Aspirate warmed semen based on SQA-Vp instructions

**STEP #3**
Mix the semen sample and the extender

**STEP #4**
Aspirate the sample into the pre-warmed testing capillary

**SQA-Vp TESTING SCREENS**

<table>
<thead>
<tr>
<th>ENTER SAMPLE DATA: FRESH</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATE 10/01/07 TIME 10:30:17</td>
</tr>
<tr>
<td>BOAR ID 2356478 SAMPLE # 325481</td>
</tr>
<tr>
<td>NEAT EJACULATE VOLUME 100 ml</td>
</tr>
<tr>
<td>PRIMARY EXTENDER VOLUME 100 ml</td>
</tr>
<tr>
<td>TIME FROM COLLECTION &lt; 30 MIN YES/NO</td>
</tr>
<tr>
<td>AGGLUTINATION (VISUAL INPUT) 25 %</td>
</tr>
<tr>
<td>PRESS ENTER TO CONTINUE</td>
</tr>
</tbody>
</table>

FRESH SAMPLE PREPARATION
1. SEMEN: 200 microliters
2. EXTENDER: 2.0 ml
3. MIX SAMPLE THOROUGHLY
4. FILL AND CLEAN CAPILLARY

INSERT CAPILLARY INTO CHAMBER
Testing FRESH samples and Dosing

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

**TEST RESULTS: FRESH SAMPLE**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration</td>
<td>700.6 M/ml</td>
</tr>
<tr>
<td>Motility</td>
<td>78.5 %</td>
</tr>
<tr>
<td>Morphology</td>
<td>55.3 %</td>
</tr>
</tbody>
</table>

**TOTALS PER EJACULATE**

- Sperm #: 70.1 Bil
- Mot. Sperm: 55.0 Bil

**FOR DOSING CALCULATION**

Press: “IMPORT ON-LINE” BUTTON IN P-SPERM
## Dosing - Fresh

**Number of Records 59**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Time from Collect. &lt;30 min.</th>
<th>Boar ID</th>
<th>Boar Name</th>
<th>Sample #</th>
<th>Neat Ejaculate Volume [ml]</th>
</tr>
</thead>
<tbody>
<tr>
<td>23/08/2006</td>
<td>09:22</td>
<td>No</td>
<td>190</td>
<td>Vandredy 7</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>23/08/2006</td>
<td>09:21</td>
<td>No</td>
<td>190</td>
<td>Vandredy 7</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>23/08/2006</td>
<td>09:20</td>
<td>No</td>
<td>189</td>
<td>Vandredy 6</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>23/08/2006</td>
<td>09:19</td>
<td>No</td>
<td>189</td>
<td>Vandredy 6</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>23/08/2006</td>
<td>09:17</td>
<td>No</td>
<td>186</td>
<td>Vandredy 3</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>23/08/2006</td>
<td>09:16</td>
<td>No</td>
<td>184</td>
<td>Vandredy 1</td>
<td>2</td>
<td>150</td>
</tr>
<tr>
<td>23/08/2006</td>
<td>09:15</td>
<td>No</td>
<td>184</td>
<td>Vandredy 1</td>
<td>1</td>
<td>150</td>
</tr>
<tr>
<td>23/08/2006</td>
<td>09:14</td>
<td>No</td>
<td>182</td>
<td>Toledo 13</td>
<td>1</td>
<td>200</td>
</tr>
<tr>
<td>23/08/2006</td>
<td>09:13</td>
<td>No</td>
<td>181</td>
<td>Toledo 12</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>23/08/2006</td>
<td>09:12</td>
<td>No</td>
<td>181</td>
<td>Toledo 12</td>
<td>2</td>
<td>60</td>
</tr>
<tr>
<td>23/08/2006</td>
<td>09:11</td>
<td>No</td>
<td>180</td>
<td>Toledo 11</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>23/08/2006</td>
<td>09:10</td>
<td>No</td>
<td>180</td>
<td>Toledo 11</td>
<td>2</td>
<td>50</td>
</tr>
</tbody>
</table>
Extended semen samples can be evaluated for quality after production and prior to insemination.

<table>
<thead>
<tr>
<th>Semen Parameters: Extended Samples</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration M/ml</td>
<td>Motility Grading (1-4)</td>
</tr>
<tr>
<td>Motile Sperm Concentration M/ml</td>
<td>Total # Sperm/Ejaculate</td>
</tr>
<tr>
<td>Motility %</td>
<td>Total Motile # Sperm/Ejaculate</td>
</tr>
</tbody>
</table>
### QC - Extended

**Number of Records 40**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Boar ID</th>
<th>Boar Name</th>
<th>Sample #</th>
<th>Dose Prep. Date</th>
<th>Semen Volume [ml]</th>
<th>Agglut [1%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>23/08/2006</td>
<td>09:26</td>
<td>189</td>
<td>Vandredy 6</td>
<td>2</td>
<td>23/08/2006</td>
<td>100</td>
<td>2</td>
</tr>
<tr>
<td>23/08/2006</td>
<td>09:25</td>
<td>189</td>
<td>Vandredy 6</td>
<td>1</td>
<td>23/08/2006</td>
<td>100</td>
<td>30</td>
</tr>
<tr>
<td>23/08/2006</td>
<td>09:24</td>
<td>190</td>
<td>Vandredy 7</td>
<td>2</td>
<td>23/08/2006</td>
<td>100</td>
<td>21</td>
</tr>
<tr>
<td>23/08/2006</td>
<td>09:23</td>
<td>190</td>
<td>Vandredy 7</td>
<td>1</td>
<td>23/08/2006</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>22/08/2006</td>
<td>08:26</td>
<td>185</td>
<td>Vandredy 2</td>
<td>1</td>
<td>22/08/2006</td>
<td>100</td>
<td>18</td>
</tr>
<tr>
<td>22/08/2006</td>
<td>08:25</td>
<td>185</td>
<td>Vandredy 2</td>
<td>1</td>
<td>22/08/2006</td>
<td>100</td>
<td>8</td>
</tr>
<tr>
<td>22/08/2006</td>
<td>08:24</td>
<td>178</td>
<td>Sphinx 11</td>
<td>1</td>
<td>22/08/2006</td>
<td>100</td>
<td>9</td>
</tr>
<tr>
<td>22/08/2006</td>
<td>08:23</td>
<td>178</td>
<td>Sphinx 11</td>
<td>2</td>
<td>22/08/2006</td>
<td>100</td>
<td>30</td>
</tr>
<tr>
<td>22/08/2006</td>
<td>08:22</td>
<td>166</td>
<td>Duplex 49</td>
<td>1</td>
<td>22/08/2006</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>22/08/2006</td>
<td>08:21</td>
<td>166</td>
<td>Duplex 49</td>
<td>1</td>
<td>22/08/2006</td>
<td>100</td>
<td>7</td>
</tr>
<tr>
<td>22/08/2006</td>
<td>08:17</td>
<td>179</td>
<td>Toledo 10</td>
<td>1</td>
<td>22/08/2006</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>22/08/2006</td>
<td>08:16</td>
<td>177</td>
<td>Sphinx 10</td>
<td>1</td>
<td>22/08/2006</td>
<td>100</td>
<td>18</td>
</tr>
</tbody>
</table>
• **P-Sperm software comes with each SQA-Vp and can:**
  - Manage and save boar data to the PC
  - Provide on-line dosing calculations
  - Visualize specimens on the PC screen

• **In the Dosing FRESH mode the user can:**
  - View test results and analyze boar test results
  - Set-up the calculations for AI dose preparation
  - Capture sperm images or videos and attach to individual boar records
  - View reports of testing and sort by a variety of parameters to identify trends or analyze data

• **In the QC/EXTENDED mode the user can:**
  - Quickly assess the quality of the AI dose prior to insemination
### Daily Production Report

#### SQA-Vp

**DAILY PRODUCTION REPORT for 22/08/2006**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>06:21</td>
<td>110</td>
<td>Spike 10</td>
<td>1</td>
<td>50</td>
<td>60</td>
<td>884.3</td>
<td>122.7</td>
<td>90.5</td>
<td>4</td>
<td>97</td>
<td>Tailless</td>
<td>15</td>
<td>25</td>
<td>250</td>
<td>16.2</td>
<td>0.1</td>
<td>98.3</td>
<td>2</td>
<td>1.05</td>
<td>0.9</td>
</tr>
<tr>
<td>06:21</td>
<td>120</td>
<td>Spike 16</td>
<td>1</td>
<td>50</td>
<td>60</td>
<td>884.3</td>
<td>122.7</td>
<td>90.5</td>
<td>4</td>
<td>97</td>
<td>Tailless</td>
<td>15</td>
<td>25</td>
<td>250</td>
<td>16.2</td>
<td>0.1</td>
<td>98.3</td>
<td>2</td>
<td>1.05</td>
<td>0.9</td>
</tr>
<tr>
<td>06:22</td>
<td>120</td>
<td>Spike 51</td>
<td>2</td>
<td>50</td>
<td>60</td>
<td>1200</td>
<td>122.7</td>
<td>90.5</td>
<td>4</td>
<td>97</td>
<td>Tailless</td>
<td>2</td>
<td>40</td>
<td>3200</td>
<td>16</td>
<td>0.3</td>
<td>97.3</td>
<td>2</td>
<td>1.62</td>
<td>0.9</td>
</tr>
<tr>
<td>06:33</td>
<td>170</td>
<td>Carat 51</td>
<td>1</td>
<td>45</td>
<td>60</td>
<td>884.3</td>
<td>122.7</td>
<td>90.5</td>
<td>4</td>
<td>97</td>
<td>Tailless</td>
<td>3</td>
<td>15</td>
<td>1416</td>
<td>27.8</td>
<td>0.6</td>
<td>97.5</td>
<td>1</td>
<td>2.86</td>
<td>1.1</td>
</tr>
<tr>
<td>06:33</td>
<td>170</td>
<td>Carat 62</td>
<td>1</td>
<td>50</td>
<td>60</td>
<td>1002.4</td>
<td>326.3</td>
<td>92.2</td>
<td>4</td>
<td>97</td>
<td>Tailless</td>
<td>2</td>
<td>35</td>
<td>131</td>
<td>26.8</td>
<td>0.3</td>
<td>97.2</td>
<td>2</td>
<td>2.59</td>
<td>5.1</td>
</tr>
<tr>
<td>06:37</td>
<td>170</td>
<td>Spike 10</td>
<td>1</td>
<td>45</td>
<td>60</td>
<td>375.3</td>
<td>2001</td>
<td>99.5</td>
<td>3</td>
<td>97</td>
<td>Tailless</td>
<td>4</td>
<td>2</td>
<td>35</td>
<td>59.6</td>
<td>0.3</td>
<td>97.5</td>
<td>1</td>
<td>2.56</td>
<td>6.9</td>
</tr>
<tr>
<td>06:37</td>
<td>170</td>
<td>Spike 12</td>
<td>1</td>
<td>45</td>
<td>60</td>
<td>375.3</td>
<td>2001</td>
<td>99.5</td>
<td>3</td>
<td>97</td>
<td>Tailless</td>
<td>4</td>
<td>2</td>
<td>35</td>
<td>59.6</td>
<td>0.3</td>
<td>97.5</td>
<td>1</td>
<td>2.56</td>
<td>6.9</td>
</tr>
<tr>
<td>06:38</td>
<td>170</td>
<td>Spike 11</td>
<td>2</td>
<td>45</td>
<td>60</td>
<td>1200</td>
<td>1128</td>
<td>97.1</td>
<td>4</td>
<td>97</td>
<td>Tailless</td>
<td>3</td>
<td>30</td>
<td>189</td>
<td>30.2</td>
<td>2.6</td>
<td>71.3</td>
<td>3</td>
<td>2.32</td>
<td>7.3</td>
</tr>
<tr>
<td>06:39</td>
<td>170</td>
<td>Spike 11</td>
<td>1</td>
<td>45</td>
<td>60</td>
<td>1200</td>
<td>1128</td>
<td>97.1</td>
<td>4</td>
<td>97</td>
<td>Tailless</td>
<td>3</td>
<td>30</td>
<td>189</td>
<td>30.2</td>
<td>2.6</td>
<td>71.3</td>
<td>3</td>
<td>2.32</td>
<td>7.3</td>
</tr>
<tr>
<td>06:43</td>
<td>170</td>
<td>Tekilo 10</td>
<td>1</td>
<td>45</td>
<td>60</td>
<td>859.3</td>
<td>446.1</td>
<td>96.7</td>
<td>3</td>
<td>94</td>
<td>Tailless</td>
<td>25</td>
<td>11</td>
<td>116</td>
<td>31.5</td>
<td>11.3</td>
<td>96.5</td>
<td>2</td>
<td>3.16</td>
<td>1.1</td>
</tr>
<tr>
<td>06:43</td>
<td>170</td>
<td>Tekilo 14</td>
<td>1</td>
<td>45</td>
<td>60</td>
<td>1472</td>
<td>204.4</td>
<td>93.5</td>
<td>3</td>
<td>96</td>
<td>Tailless</td>
<td>3</td>
<td>40</td>
<td>3000</td>
<td>27.3</td>
<td>0.1</td>
<td>98.3</td>
<td>2</td>
<td>1.05</td>
<td>0.9</td>
</tr>
<tr>
<td>06:45</td>
<td>170</td>
<td>Valerij 2</td>
<td>1</td>
<td>100</td>
<td>60</td>
<td>340</td>
<td>311.2</td>
<td>97.9</td>
<td>3</td>
<td>97</td>
<td>Tailless</td>
<td>3</td>
<td>17</td>
<td>1110</td>
<td>27.3</td>
<td>0.1</td>
<td>98.3</td>
<td>2</td>
<td>1.05</td>
<td>0.9</td>
</tr>
</tbody>
</table>
SQA-Vp Technology and Performance Data
The SQA-Vp 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 converts 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.
### SQA-Vp Dynamic Range for FRESH and EXTENDED Boar Semen

<table>
<thead>
<tr>
<th>Sample Type</th>
<th>Conc. M/ml</th>
<th>Motility %</th>
<th>Grading Motility</th>
<th>Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh</td>
<td>0-1500</td>
<td>0-100</td>
<td>0-5</td>
<td>0-100</td>
</tr>
<tr>
<td>Extended</td>
<td>0-500</td>
<td>0-100</td>
<td>0-5</td>
<td>-</td>
</tr>
</tbody>
</table>
## SQA-Vp: Performance Claims

### FRESH BOAR SEMEN

<table>
<thead>
<tr>
<th>Claims</th>
<th>Conc. M/ml</th>
<th>Motility %</th>
<th>Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision (CV, %)</td>
<td>2.1%</td>
<td>4.0%</td>
<td>7%</td>
</tr>
<tr>
<td>Accuracy (correlation to manual data)</td>
<td>0.99</td>
<td>0.83</td>
<td>0.71</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Repeatability (QC material)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Intra-device Variability (CV, %)</td>
<td>≤ 0.01</td>
<td>Inter-device Variability (CV, %)</td>
<td>≤ 2.5</td>
</tr>
</tbody>
</table>
SQA-Vp
Comparison to CASA
# SQA-Vp vs. CASA

## Comparison Table: SQA-Vp vs. CASA

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SQA-Vp</th>
<th>CASA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample volume for testing</td>
<td>100 µl – Fresh semen</td>
<td>5-10 µl</td>
</tr>
<tr>
<td></td>
<td>20 µl – QC/Extended semen</td>
<td></td>
</tr>
<tr>
<td># Spermatozoa tested</td>
<td>Concentration channel: Millions</td>
<td>200-400 cells (setting dependent)</td>
</tr>
<tr>
<td></td>
<td>Motility channel: Thousands</td>
<td></td>
</tr>
<tr>
<td>Dilution rate</td>
<td>Constant</td>
<td>Variable depending on sample quality</td>
</tr>
<tr>
<td>Automation</td>
<td>Full</td>
<td>Partial (a lot of settings and adjustments)</td>
</tr>
<tr>
<td>Accuracy (correlation to manual method)</td>
<td>Concentration: 0.99</td>
<td>Inconsistent</td>
</tr>
<tr>
<td></td>
<td>Motility: 0.83</td>
<td></td>
</tr>
<tr>
<td>Precision (CV, %)</td>
<td>Concentration: 2.1%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Motility: 4.0%</td>
<td></td>
</tr>
<tr>
<td>Repeatability using QC material (CV, %)</td>
<td>Intra-device ≤ 0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inter-device ≤ 2.5</td>
<td></td>
</tr>
</tbody>
</table>
The SQA Vb: Summary

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

- **FRESH/Dosing** - In conjunction with B-Sperm software:
  - Fresh samples can be tested and dosing calculations performed based on total, motile or morphologically normal sperm concentration

- **QC/Extended semen samples** can be evaluated for quality prior to insemination
SQA-Vp
NEW TECHNOLOGY
in the Pig Industry