

Monitoring the Transport and Storage of Semen for Artificial Fertilization

ESCORT iLog 2 External Temperature Data Logger

CHESTERLAND OH—July 25, 2011

CAS DataLoggers recently provided the temperature data logger solution for a farmer breeding cows via artificial insemination methods to ensure optimum fertility and herd quality while avoiding the cost of keeping or borrowing a stock bull. Using this approach, all resources were devoted to the successful fertilization of the breeding cow. To guarantee high fertility rates, the farmer needed to keep the bull semen stored, transported, and ready for implant at the necessary temperature.



If storage over 4 days was required, the semen was kept and transported in special containers filled with liquid nitrogen which needed to remain at a constant temperature of **-210°C (-346°F)**. For successful artificial fertilization to occur, the deep-frozen semen needed to be thawed prior to implantation and maintained at **25°C (77°F)** for a maximum of around 2 days. In the occasional event of a container leak, the nitrogen escaped in gas form and failed to maintain the deep-freeze temperatures without showing any visual indication of the problem--the semen would be rendered infertile, but the farmer would implant the semen anyway without knowing that this was the case. As a result, his breeding cows failed to fall pregnant and the farmer fed his livestock without the expected outcome and financial reward. In case the transport and storage time did not exceed 4 days, the semen could be transported fresh. This transport was more economical due to not having to use special containers, and the semen was about 10% more viable than after having been deep-frozen. Fresh semen needed to be kept at **22°C (71.6°F)** to maintain its viability.

The farmer couldn't afford to run the risk of receiving infertile semen, so it was important for him to carefully control the temperature conditions it had been stored in. For storing deep-frozen semen, it was most effective to monitor the area around the bottom of the container. As nitrogen is heavier than air, any escaping nitrogen would fall down and significantly lower the temperature beneath the container. Therefore the customer needed a device featuring high accuracy readings, customizable alarm capabilities, and user-friendly software for easy data download.

The farmer installed an **ESCORT iLog 2 External Temperature Data Logger** directly under the liquid nitrogen storage container. The stainless steel tips of the external sensors were taped to two opposite sides of the container near the bottom. The iLog 2 featured 2 external temperature sensors with a temperature range of **-40°C to +70°C (-40°F to 158°F)** recording with a high accuracy of **± 0.35°C from -40°C to 0°C and ± 0.25°C from 0°C to +70°C**. The temperature logger measured a compact 18mm height and 76mm in diameter, with a probe size of 80 x 4.5 mm, and a cable length of 1m. For maximum reliability, the iLog 2 came well-protected from accidents, rated IP 65 with external sensors connected. In the event of a nitrogen leak, the sensors immediately registered a dramatic drop in temperature. The iLog 2 supported many features which allowed the farmer to make decisions at a glance, including a clear LCD display and active & alarm LEDs incorporating multi-function viewing to see real-time data. The data logger also listed the highest, lowest and average temperature recorded and offered

customizable alarm settings and programmable start function, so the farmer was able to assess immediately if semen viability had been jeopardized by a leaking container. Whenever seeing any indications of a problem, the farmer downloaded a full temperature profile to determine both the time and extent of any temperature drop. This evidence helped the farmer to obtain financial compensation from his insurance company.

The temperature logger's **0.1°C (32°F)** external sensor resolution provided an effective early warning system. The iLog2 also recorded temperatures that thawed or fresh semen had been exposed to, and the farmer could choose to configure the data logger in either Celsius or Fahrenheit. The real-time clock, which the temperature data was recorded against, together with the marking feature, also helped to keep track of the time the semen had been stored between thawing/retrieval and insemination. The farmer bookmarked readings with a simple magnet swipe to identify key points in time. Logger memory stored up to 32,000 samples.

Free ESCORT Console software was provided with the iLog 2 for easy programming and convenient, quick download of recorded data. This user-friendly, intuitive software enabled the farmer to quickly customize the data logger. The multi-language Console software was also compatible with accessories for additional customization.

The farmer benefitted in several ways from installing the iLog 2 temperature data logger underneath the semen storage container. The farm experienced an increased fertility in its livestock due to the temperature logger's high-accuracy readings, which in turn led to savings in feed and labor costs. The inexpensive iLog 2 provided the farmer with the technological solution he needed to introduce total quality control for the temperature-sensitive semen and the fertilization process so key to the farm's success.

For further information on the popular line of ESCORT temperature data loggers, other manufacturers of temperature monitoring devices, or to find the ideal solution for your application-specific needs, contact a CAS Data Logger Applications Analyst at (800) 956-4437 or visit the website at www.DataLoggerInc.com.

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