INDUSTRY FLYER

FOOD PROCESSING

HIGH TECH DATA LOGGING SOLUTIONS

Food Processing

TMI-Orion presents a full range of high tech data loggers designed for the food processing industry, measuring temperature, pressure, air flow, rotation, deformation during the thermal cycles.

TMI-Orion data loggers work with a dedicated software allowing visualization and data management.

TMI-Orion offers a high tech range of solutions for food processing applications that combines performance, reliability and lasting quality.

THE COMPANY

TMI-Orion has been a world leader in the design and manufacture of high level solutions for measurement, validation, quality control and process control in harsh environments since 1994.

TMI-Orion offers a wide range of real time and wireless 2.4 GHz data loggers, and a software platform for the management and visualization of process data. Thanks to its 20-year strategy of scientific research and industrial development, the company is able to create sophisticated solutions to meet technological challenges and to answer the needs of its customers' demanding applications. Thanks to a high level of adaptability, TMI-Orion can also design customized solutions, in close cooperation with customers.






PROCESSES OF THE FOOD INDUSTRY

Validation of thermal processes in the food industry is related to both sanitary requirements and creating quality products in terms of taste and texture. This involves the validation of sterilization and pasteurization cycles as well as the control of different industry specific manufacturing processes.






STERILIZATION

Sterilization is performed in static or rotary retorts.

The following processes are required for sterilization validation:

- Thermal cycle validation (F0)
- Heat distribution test to find the cold spot in the chamber
- Heat penetration test to find the cold spot in the container

Other data can be measured during the thermal processes such as:

- Deformation of containers during the sterilization cycles
- Difference of pressure inside and outside a container
- Rotation speed of the cans in continuous rotary sterilizers

Sterilization validation / cooking control

Static or rotary retorts are suitable for simultaneous sterilization and cooking of many kinds of products in containers like jars, cans, pouches, doypacks, trays, bottles… Temperature and pressure measurement are carried out inside retorts and inside the food containers.

TMI-Orion solutions

- **Data loggers**
  PicoVACQ Temperature or NanoVACQ Temperature
- **Software**
  Qlever software platform
  + Authentication-tracking module (FDA 21 CFR Part 11): optional
  + Calibration module: optional
  OR
  Qlever Lite
- **Connectivity**
  2.4 GHz radio modem or wired interface for NanoVACQ
  Wired interface for PicoVACQ

Packaging deformation

On cans and flexible containers, it is important to prevent defects that may occur during thermal treatments: mainly bursting and deformation.

In order to dertermine the counter-pressure to apply, it is possible to measure internal and external temperature at all times.

It is also possible to measure directly the container deformation with an inductive movement sensor.

TMI-Orion solutions

A) Inductive movement sensor

- **Data loggers**
  NanoVACQ Deformation + positioning kit.
- **Software**
  Qlever software platform
  + Authentication-tracking module (FDA 21 CFR Part 11): optional
  OR
  Qlever Lite
- **Connectivity**
  Wired interface

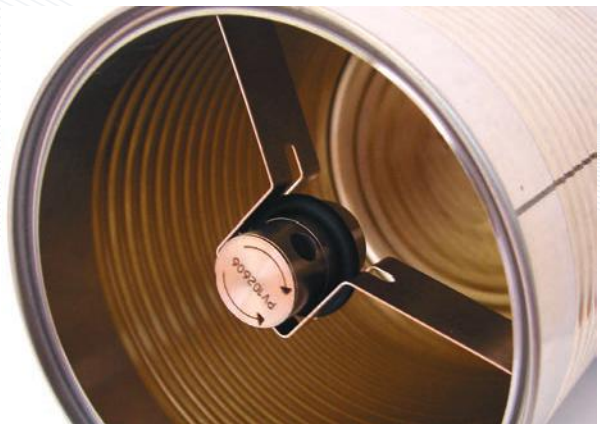
B) Counter-pressure

- **Data loggers**
  NanoVACQ PT-Tc or PicoVACQ PT
- **Software**
  Qlever software platform
  + Authentication-tracking module (FDA 21 CFR Part 11): optional
  + Calibration module: optional
  OR
  Qlever Lite
- **Connectivity**
  2.4 GHz radio modem or wired interface for NanoVACQ PT-Tc

Rotation speed measurement

Measurement of the rotation speed of cans inside continuous rotary sterilizers is necessary to validate the sterilization process.

TMI-Orion offers a solution to measure speed rotation inside any rotating process, such as retorts, from -40°C to +140°C, up to 150 rpm.



TMI-Orion solutions

- **Data loggers**
  PicoVACQ Rotation
- **Software**
  Qlever software platform
  + Authentication-tracking module (FDA 21 CFR Part 11): optional
  OR
  Qlever Lite
- **Connectivity**
  Wired interface

PASTEURIZATION

Heat treatments in pasteurization processes are usually carried out in tunnel pasteurizers, where the bottles, jars or cans are conveyed under hot water sprays. The water temperature increases up to the pasteurization temperature point and then cools down so that the containers themselves are cooled at the end of the conveyer belt for unload.

The validation process includes the following steps:

- Heat distribution test to find the cold point in the tunnel
- Heat penetration test to find the cold spot in the product

Pasteurization validation

TMI-Orion offers solutions for pressure and temperature measurement and PU calculation.

TMI-Orion solutions

- **Data loggers**
  PicoVACQ Temperature or NanoVACQ Temperature or MiniVACQ
- **Software**
  Qlever software platform
  + Authentication-tracking module (FDA 21 CFR Part 11): optional
  + Calibration module: optional
  OR
  Qlever Lite
- **Connectivity**
  2.4 GHz radio modem or wired interface for NanoVACQ
  Wired interface for PicoVACQ and MiniVACQ

Microwave processes

When microwave oven processes are used, temperature is controlled with a rugged watertight logger protected by a thermal shield directly inserted in the product, or immersed into a liquid.

TMI-Orion solutions

- **Data loggers**
  Picoμwave
- **Software**
  Qlever software platform
  + Authentication-tracking module (FDA 21 CFR Part 11): optional
  + Calibration module: optional
  OR
  Qlever Lite
- **Connectivity**
  Wired interface

OTHER INDUSTRIAL PROCESSES

Bakery cooking

For specific applications of bakery or pastry cooking in tunnel ovens, temperature can be monitored at various points in the oven and inside the product.
Above +140°C, the loggers must be protected by a thermal shield.

TMI-Orion solutions

- **Data loggers**
  PicoVACQ Temperature or NanoVACQ Temperature or VACQ xFlat
- **Software**
  Qlever software platform
  + Authentication-tracking module (FDA 21 CFR Part 11): optional
  + Calibration module: optional
  OR
  Qlever Lite
- **Connectivity**
  2.4 GHz radio modem or wired interface for NanoVACQ and VACQ xFlat
  Wired interface for PicoVACQ

Roasting

For nut roasting processes, TMI-Orion recommends the use of small thermocouple data loggers.
Above +140°C, the loggers must be protected by a thermal shield.

TMI-Orion solutions

- **Data loggers**
  PicoVACQ 1TH or NanoVACQ TH or PicoVACQ Temperature
- **Software**
  Qlever software platform
  + Authentication-tracking module (FDA 21 CFR Part 11): optional
  + Calibration module: optional
  OR
  Qlever Lite
- **Connectivity**
  2.4 GHz radio modem or wired interface for NanoVACQ 1TH and NanoVACQ 2TH
  Wired interface for PicoVACQ and NanoVACQ 3TH

Drying

Monitoring food drying and fermentation processes requires temperature and humidity measurement during the cycles. Measuring air flow in the dryers is also required to ensure the evenness of the air distribution during the cycles.

TMI-Orion solutions

- **Data loggers**
  PicoVACQ Temperature or NanoVACQ Temperature or VACQ xFlat
  PicoVACQ HT or NanoVACQ HT
  NanoVACQ Ad-Td
- **Software**
  Qlever software platform
  + Authentication-tracking module (FDA 21 CFR Part 11): optional
  + Calibration module: optional
  OR
  Qlever Lite
- **Connectivity**
  2.4 GHz radio modem or wired interface for NanoVACQ and VACQ xFlat
  Wired interface for PicoVACQ

Freezing

For freezing processes, TMI-Orion offers solutions based on loggers measuring temperature down to -90°C without thermal shields.

TMI-Orion solutions

- **Data loggers**
  NanoVACQ Temperature or PicoVACQ Temperature
- **Software**
  Qlever software platform
  + Authentication-tracking module (FDA 21 CFR Part 11): optional
  + Calibration module: optional
  OR
  Qlever Lite
- **Connectivity**
  2.4 GHz radio modem or wired interface for NanoVACQ
  Wired interface for PicoVACQ

Smokehouse applications

Smoking is a process used in the food industry to add flavor and color to fish, meat, or cheese. Inside the smokehouse, the products are placed on hangers or screens, the air circulates at the conditions of temperature, humidity and air flow required by the process.

TMI-Orion solutions

- **Data loggers**
  PicoVACQ Temperature or NanoVACQ Temperature or VACQ xFlat
  PicoVACQ HT or NanoVACQ HT
  NanoVACQ Ad-Td
- **Software**
  Qlever software platform
  + Authentication-tracking module (FDA 21 CFR Part 11): optional
  + Calibration module: optional
  OR
  Qlever Lite
- **Connectivity**
  2.4 GHz radio modem or wired interface for NanoVACQ and VACQ xFlat
  Wired interface for PicoVACQ

Oil cooking

PicoVACQ with specific thermal shield can withstand up to 200°C. It is used to validate temperature in frying processes.

TMI-Orion solutions

- **Data loggers**
  PicoVACQ Temperature
- **Software**
  Qlever software plateform
  + Authentication-tracking module (FDA 21 CFR Part 11): optional
  + Calibration module: optional
  OR
  Qlever Lite
- **Connectivity**
  Wired interface

Force

It is often necessary to measure weight and force on cans during storage and transportation.
TMI-Orion recommends the use of the NanoVACQ Force which can be customized to the specific needs of the application.

TMI-Orion solutions

- **Data loggers**
  NanoVACQ Force
- **Software**
  Qlever software platform
  + Authentication-tracking module (FDA 21 CFR Part 11): optional
  OR
  Qlever Lite
- **Connectivity**
  Wired interface

TMI-ORION PORTFOLIO FOR FOOD PROCESSING INDUSTRY

You will find here a choice of dataloggers for food industry processes : temperature, pressure, humidity, air flow, deformation, force. Our range of temperature dataloggers covers **temperatures from -90°C to 140°C**. Beyond +140°C, a thermal shield is necessary.

Sensors are Pt100, Pt1000 or thermocouples for **high temperature data loggers**. The probes have various forms and dimensions. Sensors can be internal to the logger, placed at the end of a rigid probe 10 to 100 mm long, or at the end of a flexible or semi-rigid probe, up to 1 meter long.

Depending on the models, you can choose loggers with **1 to 16 measurement channels**.

Data loggers

- **PicoVACQ Temperature with platinum sensor:** 1 or 2 temperature sensor.


- **NanoVACQ Temperature platinum sensors, NanoVACQ Temperature FullRadio platinum sensors :** 1, 2 or 3 temperature sensors.


- **PicoVACQ Temperature with thermocouple:** 1 temperature sensor.

- **NanoVACQ Temperature thermocouples, NanoVACQ Temperature FullRadio thermocouples:** 1, 2 or 3 temperature sensors.



- **PicoVACQ HT (Humidity and Temperature)**

- **NanoVACQ HT (Humidity and Temperature), NanoVACQ HT FullRadio**


- **PicoVACQ PT (Pressure and Temperature)**

- **NanoVACQ PT (Pressure and Temperature), NanoVACQ PT FullRadio**


- **NanoVACQ Ad-Td (Air flow and Temperature), NanoVACQ Ad-Td FullRadio**

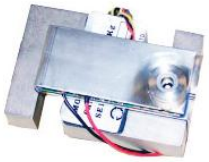

- **Picoμwave:** 1 temperature sensor for use in microwave ovens.

- **MiniVACQ:** 1 temperature sensor.

- **PicoVACQ Rotation**

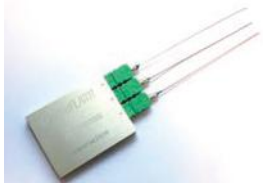

- **NanoVACQ Deformation**

- **NanoVACQ Force**



- **VACQ xFlat, VACQ xFlat FullRadio:** 4, 8 or 16 thermocouple channels.

- **VACQ uFlat:** 3 thermocouple channels.



Additional tips for packaging handling

Limited access containers

Thanks to its small size, PicoVACQ easily fits inside bottles through standard bottle-necks or any flexible packaging. It is designed to provide information during filling, sealing and transport.

Positioning the loggers inside containers

TMI-Orion has a wide range of positioning kits available to maintain the logger sensor at the cold spot inside the containers.

Solutions for packaging industrial processes

- Can lid coating polymerization,
- annealing of metal parts such as can lids,
- cans interior lacquer or varnish polymerization,
- cans exterior serigraphy cooking,
- cans joining strip varnish cooking,
- overpressurization tests in PET bottles, glass, caps, etc
- and many more industrial processes...

Accessories

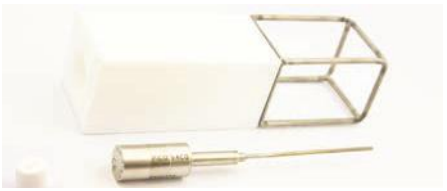
The positioning kits help maintain the logger sensor at the cold point inside the process ; some of them act as a mechanical protection for the logger. According to the applications, the logger will be placed inside or outside the container. The following examples are usual devices, but customization can be studied upon request.







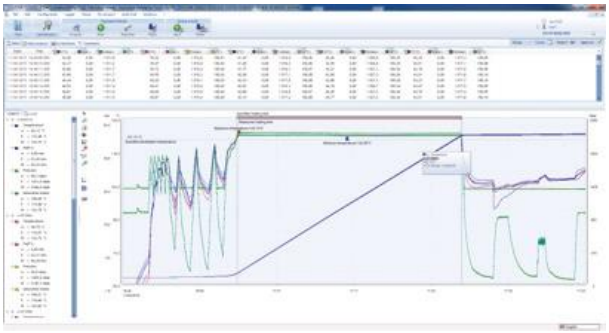





Software

Qlever is a software solution for the acquisition, analysis and visualization of data measured by TMI-Orion autonomous data loggers.

Qlever is the general platform of our software offering. It operates alone or in combination with one or several industry specific software modules.



- **Qlever:** Software platform dedicated to the management of one or several TMI-Orion data loggers.
  Set up and programming of TMI-Orion equipment, collection of data, processing (lethality calculations (F0 / A0 / Vp, saturated steam,…), analysis and display of data.

- **Qlever Lite:** Simplified software solution intended for managing a single wired TMI-Orion data logger. Cannot be combined with any of the software modules.

- **Authentication-tracking module – Compliant with FDA 21 CFR Part 11:**
  Dedicated to secure management of user access, with creation of different accounts and access levels (Administrator,approval, operator).
  Complete tracking of processes and data including any addition, deletion or modification operation (Audit Trail).

- **Calibration module:**
  Dedicated to TMI-Orion temperature and humidity loggers calibration process: calibration, adjustment, checking and editing of a report. Available with a library of drivers, to communicate with many calibration equipment: baths, ovens, reference probes. Delivers a calibration and adjustment report. Expert mode, Automatic mode and Manual mode available.

Connectivity and batteries

- Mono-USB interface (connection cable between loggers and the PC)
- 2.4 GHz radio modem connected to the PC
- User replaceable batteries or battery packs.

Services

- Calibration and adjustment of sensors: every year
- After-sales services: metrology, repair, assistance, hotline
- Design of custom solutions (products and software)

FOOD PROCESSING