

Scriba Nanotecnologie Srl

TTAG

Innovative, customizable and affordable cold chain quality control tag system

A TIME-TEMPERATURE TRACKER FOR INDIVIDUAL PACKAGES

Scriba has developed an **innovative time-temperature indicator (TTI)** architecture. A TTI is a device recording the thermal history of packaging, and it is used to monitor the storage conditions of perishable products.

The TTAG innovation is a three-component technological system: it includes a **TTI label**, the **En-TAG™ traceability barcode** and the **Nanoviewer App**.

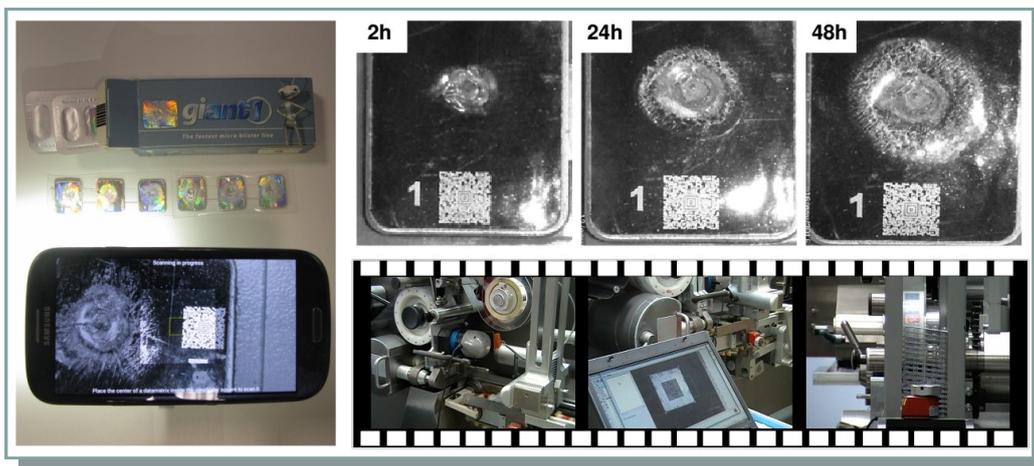
TTAG IS COMPLETELY
PASSIVE

AN ADHESIVE LABEL
DIRECTLY COUPLED WITH
ANTI-COUNTERFEITING
MINIATURIZED CODE

THE NANOVIEWER APP IS
OUR PROPRIETARY IMAGE
ANALYSIS SOFTWARE

THE LABEL CONTAINS THERMOSENSITIVE
MATERIALS THAT CAN COVER TEMPERATURE
EXCURSIONS IN A RANGE OF -80°C TO +41°C

TTAG RECORDS UP TO 48 HOURS
OF CUMULATIVE HEAT EXPOSURE
WITH A RESOLUTION OF 30 MIN



FEATURE	TARGET PACKAGING	RELIABILITY	TEMP. RANGE	SERIALIZATION & TRACEABILITY	INTEROPERABLE	PRICE
MARKET REQUIREMENT	Granular	Human independent	-80 to +41°C	Product code	ERP compatible	<0,5€
DATALOGGERS	✗	✓	✗	✗	✓	✗
RFID	✗	✓	✗	✗	✓	✗
THERMOCHROMIC	✓	✗	✓	✓	✗	✗
TTAG	✓	✓	✓	✓	✓	✓

Competing technologies

TTAG's direct competitors are other Time Temperature Indicators intended for granular use. At present, Time temperature indicators based on thermochromic inks are the only type of TTIs enabling cold-chain monitoring at the individual package level. However, these indicators lack readout automation, depending entirely on the interpretation of operators. The indirect competitors to these products rely on alternative technologies like RFID and data logger sensors. However, these technologies are larger in size and more expensive and consequently intended for monitoring the temperature of secondary and tertiary packaging, respectively.

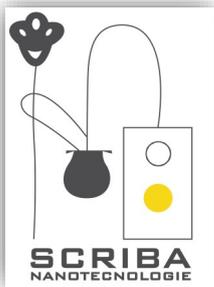
Competitive advantages of the TTAG

Our solution uses thermosensitive materials that undergo an irreversible change in their optical contrast when exposed to particular temperature ranges.

The advantages and benefits of TTAG solution are:

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- ⇒ Capability to record 'thermal excursions' above a threshold temperature with a **resolution of 1 hour over periods of 2 days**, even in the case of multiple exposures.
- ⇒ **Digital readout** of the thermal exposure with an App developed by Scriba, automating the readout and simplifying the interpretation for the final user.
- ⇒ **Thin design** and **small size** (16mm x 20mm and 2mm thickness), suitable for primary packaging.
- ⇒ **Cost-effectiveness**, since TTAG will be commercialized at fraction of the price of competing solutions.