bluechiip
TRACKING SOLUTIONS

Why bluechiip™?

What is bluechiip™?

bluechiip™ represents a generational change from common tracking methods of hand-written or printed labels, barcodes and more recently RFID (Radio Frequency Identification) technology. bluechiip™ is a passive tracking technology which has been field-proven to survive autoclaving, gamma irradiation, cryogenic frosting and storage. bluechiip™ is not an RFID technology and operates in a fundamentally different way; hence the properties that make bluechiip™ unique are not found or possible in barcodes or traditional RFID technologies.

How does bluechiip™ work?

bluechiip™ is based on MEMS (micro electromechanical systems) technology. MEMS is a manufacturing process used to make small mechanical structures with dimensions of a few nanometres to hundreds of micrometres. Most features are less than the width of a human hair. The ability to manufacture small mechanical structures allows devices to interact in a new way with the physical environment and consequently have very different properties to their macro world equivalents. bluechiip™ is based on micro beam structures that have a unique resonance frequency that can be excited and detected using a bluechiip™ interrogator. Each chip is programmed with a unique identification number (an electronic 'license plate').

Does gamma radiation affect the bluechiip™ device?

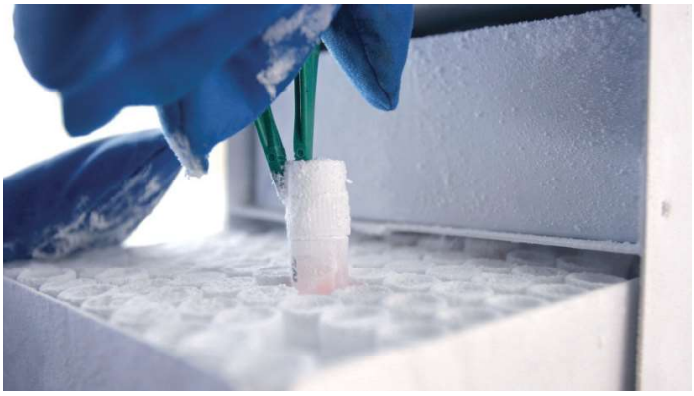
No, bluechiip™ is immune to gamma radiation and the chips have been tested up to 500kGy, which is about 12 times the maximum level required by regulation to sterilize medical consumables and supplies, with no detectable change.

Can bluechiip™ measure temperature?

Yes, bluechiip™ can measure the instantaneous temperature of the item that it is attached to or embedded in, allowing the temperature history of the tagged item to be monitored continuously, or if the item is being used outside of its normal refrigerated environment, the interrogator can be set to alarm when a critical threshold temperature of the item is reached.

How durable is the bluechiip™ device? What are the lowest and highest temperatures a bluechiip™ device can withstand?

Unlike RFID, bluechiip™ can be read at liquid nitrogen temperatures (-196°C). The typical operating temperature is between -196°C and +60°C. The storage temperature is typically between -196°C and +100°C. In fact, due to the mechanical nature of bluechiip™, a better response is detected at lower temperatures.



How is bluechiip™ different to barcodes?

bluechiip™ can be read through frost whereas barcodes require line-of-sight and thus removing the frost may over time damage the barcode and cause a loss of identity. If bluechiip™ is embedded into tubes, vials, bags and other storage containers it can never fall off the item unlike barcode labels. Further, bluechiip™ measures temperature, a property that barcodes cannot achieve by themselves.

Reading a barcode requires a line of sight optical scan, whereas bluechiip™ does not require a visible tag or label to read its stored data.

Other limitations of barcodes are misreads from frosting and adhesion of labels, orientation and the need for a quiet zone, printing inaccuracies, misprints and label selection, no security and limited error checking.

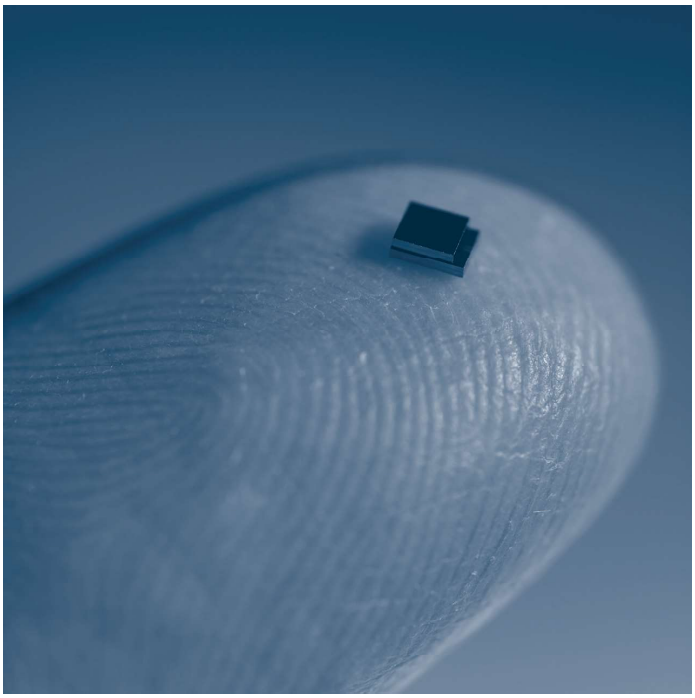
How is bluechiip™ different to RFID?

bluechiip™ is different to RFID in many fundamental ways. Firstly, bluechiip™ is a purely mechanical device, containing no electronics at all. This gives rise to many of its unique physical characteristics, namely gamma radiation immunity and an ability to survive and operate in harsh environments.

The typical operating temperature of an RFID tag is between -13°F/-25°C and +158°F/70°C. Storage temperatures typically range between -40°F/-40°C and +185°F/85°C. Environmental values vary between manufacturers and depend on the tag's components and packaging materials.

In healthcare applications, X-rays generally do not affect an RFID tag, but this factor depends on the radiation intensity. However, gamma radiation, typically used in medical consumable sterilization processes, can erase or destroy most silicon-based electronic circuits.

RFID tags or inlays come in many forms and sizes. The voltage induced on a coil is proportional to the number of turns on the coil, the size of the coil and the frequency of operation. It is not usual for HF inlays to exist at sizes smaller than 5 mm, without the need for a large number of coils.



So as bluechiip™ survives gamma radiation, low temperatures, is able to be read through frosting and can simultaneously measure temperature, what are the applications of bluechiip™?

The healthcare and life sciences industries produce and use millions of high value items around the world each day that are critical to patient care and many of these items are labelled with a unique identification code.

In the healthcare sector, no other tracking methodology can achieve all of the above features that bluechiip™ can. bluechiip™ is more advanced than any other tracking solution for the labor intensive, long life storage requirements of many high value samples.

Existing tracking options can not meet all the demands of high value biological sample archive and tracking for harsh environments such as cryogenic storage. Electronic tracking is often discussed, but due to the varied nature of sample storage i.e. from +37°C down to -196°C, no common platform exists to track samples throughout the entire process.

Numerous initial applications exist for bluechiip™ in healthcare and life sciences including stem cell and cord blood storage, tissue banking, IVF, pathology, clinical trials and forensics, which all fall under the banner of biobanking.

The bluechiip™ system is a major advance, providing a competitive alternative to the commonly available barcodes and microelectronic IC-based RFID tags. The key features of bluechiip™ are:

1. frosting resistant
2. survive extreme temperature conditions (-196°C to +200°C)
3. wide environmental tolerance (including humidification and centrifugation)
4. expandable functions (e.g. temperature sensing)
5. secure and difficult to clone
6. moldability into consumables
7. gamma radiation immunity; up to high levels (500kGy)

To date, an effective tracking solution is not available within the healthcare/life science market due to the wide range of environmental conditions.

The adoption of bluechiip™ will be a groundbreaking move within the life sciences industry as the enhanced identification capabilities over traditional bar code technologies becomes apparent. In deploying the most progressive identification solution on the market, where the chip to be encapsulated at vial manufacture, enables seamless integration of vials in the logistics chain and data management and the instantaneous temperature of the item to be measured.

Integrated temperature sensing provides essential information in the supply chain of high value perishables. Market examples include supplies of blood plasma, IVF specimens, cord blood, stem cells and other biological materials.

Identification of disposables undergoing gamma sterilization has posed a number of problems in the past. Tracking often requires the labelling of a product prior to sterilization and then again after processing because the tag could not withstand the exposure to gamma rays. By having a device that can actually go through the process and retain its data, one can have a fully sterilized, yet fully identifiable, lot-traceable item.

bluechiip welcomes the opportunity to discuss how we could work with you.

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