

RFID TECHNOLOGY



What if a label or tag could...

- Memorize information about the product or carton it's attached to?
- Broadcast data to a network on demand — even through a solid wall?
- Add, delete or modify its memory as it moves along the supply chain?

Imagine what such a device could do...

- Provide self-documented tracking.
- Carry data between independent networks.
- Enhance security through individualized digital codes.
- Deliver precise handling instructions to each new destination.
- Carry on-board chain-of-custody information.

The possibilities are significant. But this is not some vision of the distant future. These capabilities are available now through RFID technology — and the benefits listed above only begin to describe the potential that RFID offers.

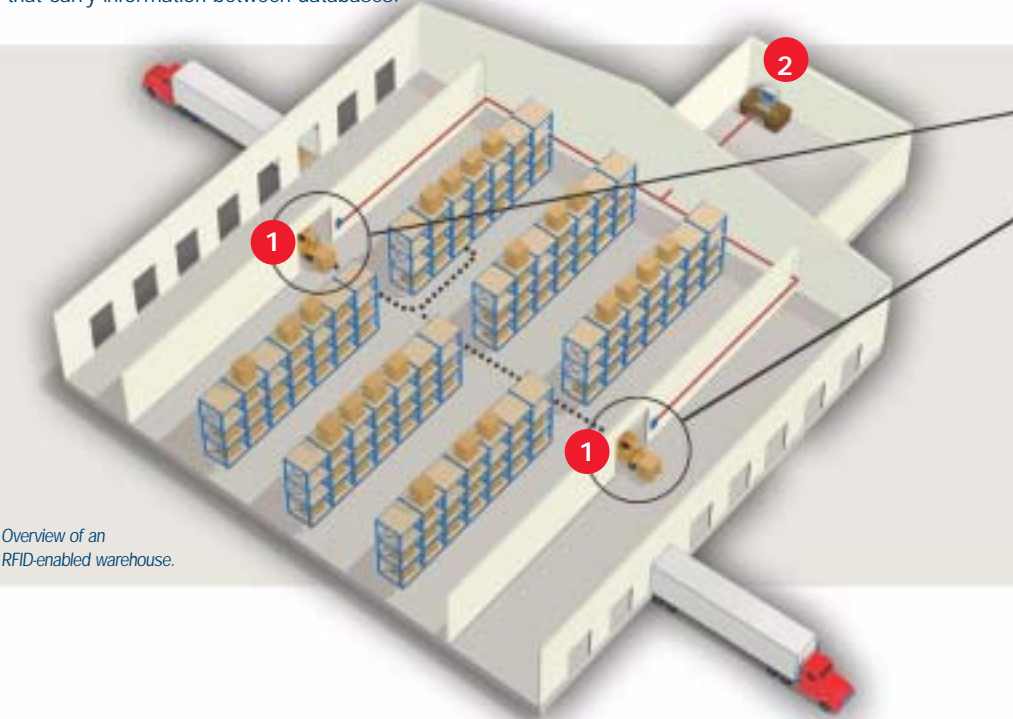
If you're involved with supply chain operations, it's important that you understand RFID technology and prepare for the impact that it's going to have on the future of your industry.

APPLICATIONS

- Supply Chain Management
- Pharmaceuticals
- Traffic Control Systems
- Event Management and Ticketing

RFID Labels and Tags...

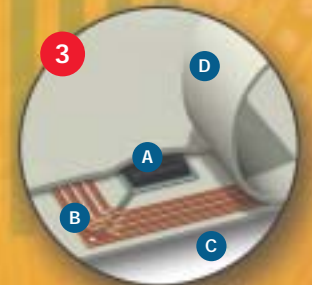
RFID devices offer unique advantages over conventional labels or tags. An RFID device is a tiny wireless computer that can store, retrieve and send information. Unlike a bar code, RFID labels and tags don't need "line-of-sight" visibility to be scanned. Even more unlike bar codes, RFID devices can act as tiny files that carry information between databases.



Overview of an RFID-enabled warehouse.



In an RFID-enabled warehouse, the labels attached to incoming products are recorded as they pass a **gateway reader (1)**. Their record automatically enters the **warehouse management system database (2)**, which can be linked to a larger network. If so equipped, the system can even instruct the staff where to place the item. When products leave, their RFID labels are again logged by the system as they pass an exit reader.



A basic RFID label includes a **silicon chip (A)** and **antenna (B)** attached to a **face sheet (D)** and undercoated with a pressure-sensitive adhesive. The **release liner (C)** below the adhesive allows the RFID label to be removed prior to placement.

What is RFID?

RFID, an acronym for Radio Frequency Identification, refers to a way of using electromagnetic energy to transmit and receive information. This is the same wireless system used by cell phones, radio and television.

What is an Inlay?

An RFID inlay (also known as an inlet or assembly) has two basic parts: a computer chip that can store and process data, and an antenna that can transmit and receive digital information by radio waves. When used as a label or tag, an inlay is usually mounted on a durable substrate and covered with a printable top sheet.

What is a Reader?

This is the "other end" of the RFID wireless system. A reader (also called an interrogator, emitter or transmitter) is an input-output device linked to either a computer or a network. The reader allows a computer to communicate with RFID inlays.

How does RFID work?

A reader emits signals as radio waves. These are received by the antenna of the inlay. The energy from these waves activates the computer chip causing it to receive, transmit or alter the information it stores. Some RFID inlays include small batteries. Others operate solely on the energy transmitted by the reader.

The operating parameters of RFID devices can vary. Some inlays must be within inches of the reader to work. Others have ranges of several yards. Some inlays are "read only" — they can only transmit data that is permanently fixed in memory. Others allow stored data to be changed, added to or deleted.

Some inlays can store only relatively modest amounts of information — a few dozen characters, for example. More advanced RFID chips store thousands of characters. Higher capacity inlays can hold entire tracking histories including when and where a product or package was made, model and serial numbers, destinations, carriers, dates and times — even documentation of environmental conditions.

The future of RFID Labels and Tags

Experts agree it's only a matter of time before RFID is widespread. Supply chains are one of the prime candidates for these early applications. RFID capability is already a requirement for several large retailers and that number will only grow.

Although RFID is relatively easy to understand, it requires considerable expertise to put in place. As an industry-leading resource in RFID, Appleton can help businesses in a wide variety of industries take advantage of the unique benefits the technology offers.

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