



## Wonderware Mobile Solutions RFID Technology

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## 1. Radio Frequency Identification (RFID)

### What is RFID?

RFID is a highly reliable way to electronically control, detect, and track a variety of items using FM transmission methods. A small transponder, affixed to virtually any object, individually identifies the object using a unique factory programmed, unalterable code. Most transponders used for tracking objects operate on a passive power source, meaning that they obtain the energy from the burst of power sent to them from the interrogation unit or reader.

RFID systems overcome the limitations of other automatic identification approaches, such as bar coding, because they do not require line-of-sight between the transponder and the reader. This means that they work effectively in hostile environments where excessive dirt, dust, moisture, and/or poor visibility would normally hamper rapid identification. In short, the most outstanding benefit of RFID is its ability to obtain accurate reads in dirty environments at remarkable speeds.

In addition, RFID is completely automatic and transparent, eliminating the need to scan an object manually or activate a magnetic stripe, reader, or other contact ID technology. Better still, in the case of passive or battery-free transponders, the identification capability typically lasts the life of the product or system in which the transponder is integrated.

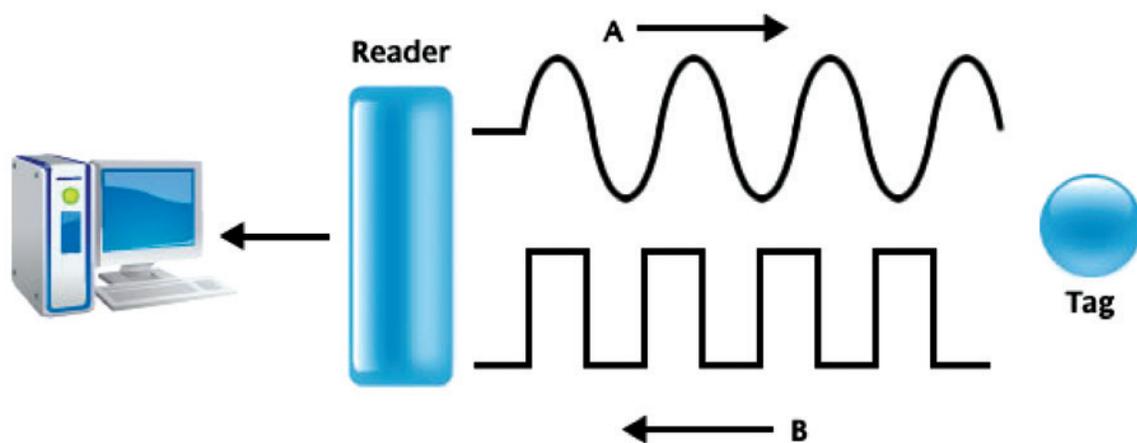
### How does it work?

The main component of a RFID transponder is a custom integrated circuit silicon chip. This chip controls the communications to the reader and has a section of memory that stores the permanent identification code that is transmitted to the reader once activated.

The reader performs several functions, one of which is to produce a low-level radio frequency (RF) magnetic field. The RF magnetic field serves as a carrier of power from the reader to the passive RFID tag.

When a tag is brought into the reader's magnetic field, the recovered energy powers the integrated circuit in the tag, and the memory contents are transmitted back to the reader.

Once the reader has checked for errors and validated the received data, the data is decoded and restructured for transmission to a user in the format required by the host computer system. All of the operations take place in the blink of an eye.



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## 2. The Wonderware Tracking System

The Wonderware tracking system is an integrated hardware and software system specifically designed to meet the needs of the process industries that combines wireless hand-held computers, state-of-the-art software, and RFID technology to redefine field data collection and asset management.

The system is a unique combination of RFID tags, scanners, and hand-held computers designed to work in harsh environments and provide an efficient, cost-effective means for performing asset identification and tracking, mechanical integrity inspections, and safety systems inspections.

The Wonderware tracking system is designed to work with most computerized maintenance management software packages to reduce maintenance tracking costs. With the tracking system, safety and process equipment inspections can be completed with improved data integrity and in half the time of manual data collection systems.

Tracking and maintaining capital assets in the process industries can be a monumental and critical task. Typical sites are extremely hazardous and complex and the failure of capital assets, particularly pressure equipment, in a process unit can have any number of highly undesirable effects, including flammable events, toxic releases, major environmental damage, and business interruption losses.

### The Wonderware tracking system consists of three major components:

1. A transponder (which is installed in the ST-1 tag)
2. Automated data collection devices (hand-held computers equipped with RFID readers)
3. IntelaTrac software

### ST-1 RFID Tag for Industrial Identification



The Wonderware ST-1 RFID tag is a ruggedized tag that provides a permanent, durable, and cost-effective method for asset identification and control. Since the ST-1 tag is read by radio waves instead of light waves, as with bar codes, it will communicate through non-metallic materials such as paint, plastic, grease, dirt; and is impervious to vibration, light, water, and heat (up to 100°C).

The ST-1 tag houses a Texas Instruments (TI) RFID transponder, which is made up of a passive (no battery required) integrated circuit, tuning capacitor, and antenna.



ST-1 tags are available with Multi-page transponders. These transponders can be programmed with specific information about a tagged asset, such as a unique asset number (64 bits) or up to 1088 bits of user programmable and user lockable data. For instance, a tag can contain last inspection information as part of data on a particular piece of equipment. Consequently, a hand-held computer, with integrated tag reader, can notify a field inspector to enter certain inspection results or other information.

### Universal Tag Formatting

Using the Universal Tag Formatting Protocol the user can define the tag format to meet the business need rather than having to match a business need to a static, predefined format designed for retail or grocery.

- Tag formats for every plant, for every type of equipment
- Each tag can have multiple "pages" that can be locked or editable
- Multiple formats could be used within a single facility to manage diverse work processes

Field Name	Count	Value
asset_number	35	PL02-01-3133-CL-4140B
asset_description	30	Resid Column B
last_repair_date	1	10/25/2002
Inspector	15	John Smith
hazard_id	11	
Manufacture	14	Chicago Bridge & Iron
Model_Number	14	CL145-B5

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## Universal Tag Design



The ST-1 RFID tagging system was developed to provide the process industries with a tag designed for quick and easy attachment on many different types of assets, yet rugged enough to withstand the harsh conditions of the environments in which the assets are deployed, such as chemical exposure, extreme temperatures, and Mother Nature. Furthermore, the ST-1 universal tag was designed to serve as a visual reference for critical inspection points and as a means for visual warning to workers in case of hazard.

The ST-1 tag is a durable barefoot polyethylene housing that can be attached to almost any asset with nylon tie straps or safety wire. To attach the ST-1 tag to a flat surface, there are two interior shouldered through-holes for machine screw or pop-rivet attachment. The ST-1 tag also serves as a non-conductive barrier between a metal object and the integrated circuit for enhanced RFID read range.

## 3. Automated Data Collection Devices

### Mobile Computers

Wonderware has teamed with leading mobile hardware providers, including Intermec and Motorola (formerly Symbol Technologies), to offer the most advanced data capture, processing, and communications technology for your field workforce.

Hardware is available in Class 1, Division 2 certifications for use in hazardous locations.



## 4. Regulatory Compliance

### Process Safety Management

Process safety is a dynamic condition that involves the technology, materials, people, and equipment that make up a facility. Process Safety Management (PSM) is the application of management principles and systems to the identification, understanding, and control of process hazards.

### Complying with Occupational Safety & Health Administration (OSHA) Standards

OSHA establishes uniform safety-related policies, procedures, standard clarification, and compliance guidance for the enforcement of the "Standards for Industry" found in 29CFR 1910. Employers who must comply with OSHA Standards often find them complicated, confusing, and sometimes unmanageable. Because the PSM Standard and numerous safety inspection regulations apply broadly to the process industries, the Wonderware tracking system provides solutions for compliance with many different safety inspections and mechanical reliability requirements.

The Wonderware tracking system provides a solution for the frequent and on-going inspections and testing required by OSHA 29 CFR 1910.119 for process safety management in the following ways:

**Requirement:** Perform inspections and tests with regular frequency and follow manufacturer's recommendations.

**Solution:** With the Wonderware tracking system, inspection worksheets are downloaded from the computerized maintenance management system to hand-held computers for scheduled maintenance and inspections.

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**Requirement:** Document each inspection and tests performed on process equipment.

**Solution:** With the Wonderware tracking system, each of the following PSM requirements is a standard procedure:

- Records are time/date stamped
- Operator/inspector I.D. is recorded at log on
- Equipment is positively identified with a unique PIN in the RFID tag
- Inspection checklist is prompted for each piece of equipment when the tag is scanned
- Inspection results are uploaded to the equipment history database upon completion

With the above features, the Wonderware tracking system plays an important role in meeting the challenges of PSM. The ST-1 tag not only houses the RFID transponder, but also facilitates compliance with OSHA 29 CFR 1926.404 and OSHA 29 CFR 1910.334 with durable inserts.

This single use insert displays a visual record of the status of equipment and the next inspection due date. If the equipment fails inspection or becomes unsafe to operate, the green insert is removed, and a highly visible "DANGER - DO NOT OPERATE" symbol is displayed to mark the equipment as unsafe as required in ANSI standard Z535.5-1991, "Accident Prevention Tags (for Temporary Hazards)."



## 5. Frequently Asked Questions

**Q:** What is the difference between RFID and barcode technologies?

**A:** The Wonderware tracking system is an automatic data collection system that features RFID technology. RFID is closely related to barcode technology, but features some distinct differences. RFID uses radio waves while barcode uses light waves. Barcode labels have to be "seen" by wands or lasers and there must be a clear line-of-sight between a barcode reader and label.

In order to function, the barcode reader must have clean, clear optics, the label must be clean or free of abrasions, and the reader and label must be properly oriented. In contrast, RFID only requires proximity between the reader and tag for a successful read.

**Q:** What is the read range and why is it important?

**A:** RFID requires only proximity between the reader and tag for a successful read. Most industrial applications will have a read range between 1" and 3". RFID read ranges can be adversely affected by high electromagnetic noise level near a tag.

Large quantities of metal or heavy duty power switching supplies in proximity to a tag or reader can reduce the read range. By carefully selecting the proper equipment and installation site, many of these influences can be effectively mitigated.

**Q:** How long will a transponder and tag last?

**A:** Wonderware ST-1 tags are made of barefoot polypropylene that was specifically designed for the harsh environments found in the petrochemical and construction industries. Each tag is equipped with a passive RFID transponder, which will last for many years without maintenance. In most cases, the tag and transponder will outlive the asset to which they are attached.

**Q:** Can a transponder be read through any material?

**A:** Almost. A transponder cannot read through metal. Since RFID requires only proximity between the reader and the tag, as long as the reader is within the read range of the ST-1 tag, the transponder may be read through non-metallic materials such as plastic, wood, paint, grease, dirt, and it is not influenced by vibration, light, or water.

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**Q:** How quickly can a transponder be read?

**A:** Read speed is a function of the amount of data stored on a transponder and the efficiency of the reader. Most passive transponders with 10 bits of data can be read in as little as 100 milliseconds.

**Q:** How much information can be stored on a tag?

**A:** The amount of information that can be stored on a transponder varies depending of the type of transponder. The Wonderware ST-1 tag is available with "read-only" and "read-write" transponders. A read-only transponder stores a unique identification number and the read-write version is capable of storing up to 1,000 bits of additional information such as inspection and maintenance data.



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