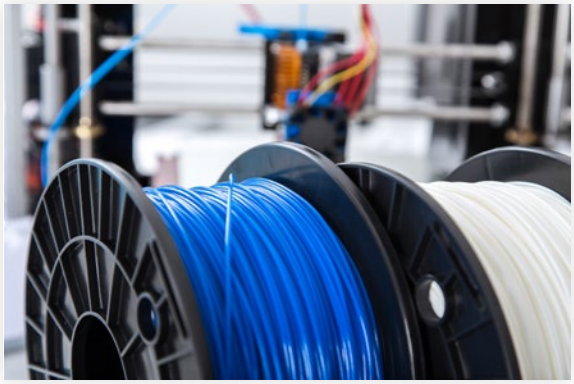
ELATEC
RFID Systems

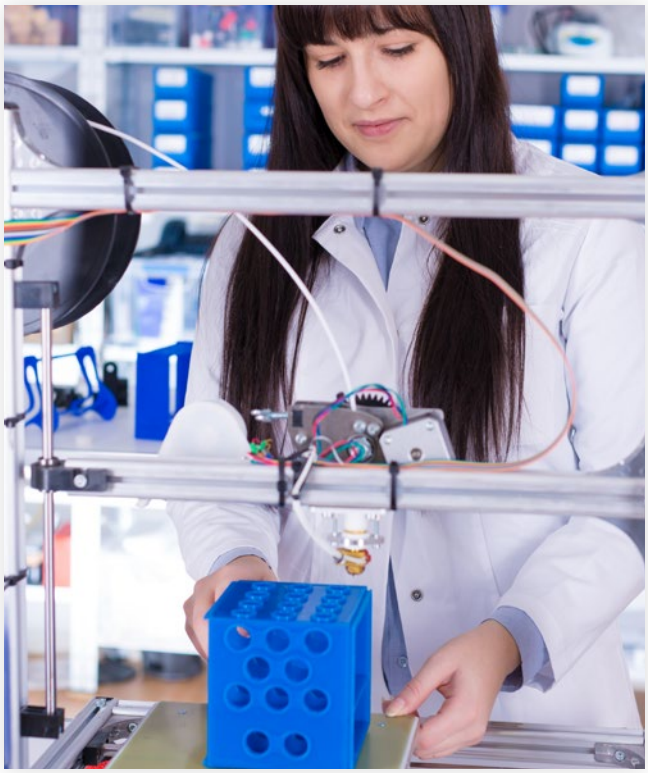
# CONSUMABLES AUTHENTICATION:
## WHY RFID TAGS ARE THE SMART OPTION.

**From 3D printers to medical devices, original equipment manufacturers (OEMs) have a vested interest in ensuring that only approved consumable materials are used in their devices. Radio-frequency identification (RFID) offers a more secure and robust solution for high-end consumable materials than barcodes, QR codes or manual entry. RFID can help OEMs protect revenue streams while improving user safety, satisfaction and workflows.**

## WHY CONSUMABLE AUTHENTICATION MATTERS

Most consumers are well acquainted with the "razor-and-blade" model of loss leader sales, in which the durable good (the razor) is sold at cost or at a loss so manufacturers can get recurring revenues for the consumables (the blades). And certainly, this revenue model applies to many kinds of goods and devices,





including standard printers and ink, 3D printers and filaments, and welding equipment and wire. The stakes are especially high for higher-end devices and equipment, such as medical devices and large industrial machines that use expensive consumable supplies.

But protecting revenue is only part of the story. OEMs have many reasons to care about the provenance of consumable materials used in their devices. For example:

+ **Protecting user safety** by ensuring that consumables used in the device are the correct type and are not expired.


+ **Preventing damage** to the device and warranty claims related to the use of substandard or non-approved materials.

As a case in point, medical device manufacturers may not produce medications or consumable supplies themselves. But to improve patient safety and protect the integrity of their devices, they still need to ensure that medications or supplies come from approved vendors and meet device specifications and quality and safety standards. They also have an opportunity to help their buyers reduce medical errors and streamline workflows with a robust consumable authentication solution.

## THE BENEFITS OF RFID FOR CONSUMABLE AUTHENTICATION

RFID has long been used for authorization and access control for both people and goods. Most employees are familiar with the RFID badge or fob, which is commonly used for building entry as well as access to printers, elevators, vending machines and other devices inside the building. A similar tag can be embedded into a product label. The RFID tag transmits information to an RFID reader using either high-frequency (HF) or low-frequency (LF) radio waves.

For consumable authentication, the RFID reader can be embedded directly in the device the consumable is used in, providing an integrated and automated solution with little need for user intervention. Alternatively, the RFID reader can be connected as an external device in which all the user has to do is scan the RFID tag on the packaging or label for the consumable before installing it—a process that takes less than a second. RFID offers significant benefits compared to manual entry, barcodes or other material authentication methods.

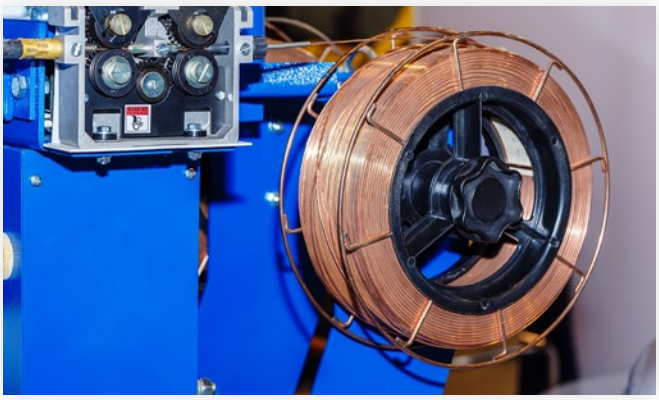
+ **RFID is more secure and reliable than barcodes or printed QR codes**, which are easy to counterfeit and may be compromised if they are torn, wrinkled or exposed to moisture. With RFID, encryption can be used for highly secure data transmission that is nearly impossible to counterfeit. This ensures that only consumables produced by the OEM or an approved vendor can be used in the device.
+ **RFID eliminates user error** associated with manual entry of part numbers and is fast, easy and frustration-free for users. Eliminating manual entry speeds up workflows for end users, improving user satisfaction.

+ **RFID stores more information** than a barcode, QR code or manual entry number. In addition to the product number, the RFID tag can store information such as lot number, manufacturing date, expiration date and other unique identifiers. This additional information can be used for enhanced usage tracking by the manufacturer or the customer's purchasing department. It also improves safety and quality by ensuring that expired materials cannot be used.
+ **The same RFID reader used to authenticate materials can also be used to authenticate users,** so that only trained and authorized users can load and operate the device. Users simply scan their ID badge or fob to activate the device, then scan the consumable. In a medical context, the reader can also be used to identify the patient, closing the loop between the patient, care provider and materials or medications used. User and/or recipient tracking improves safety by preventing unauthorized users from activating the device or using the wrong materials for the patient or client. It also enables accurate cost allocation by operator or recipient.

## SELECTING THE RIGHT RFID READER FOR CONSUMABLE AUTHENTICATION

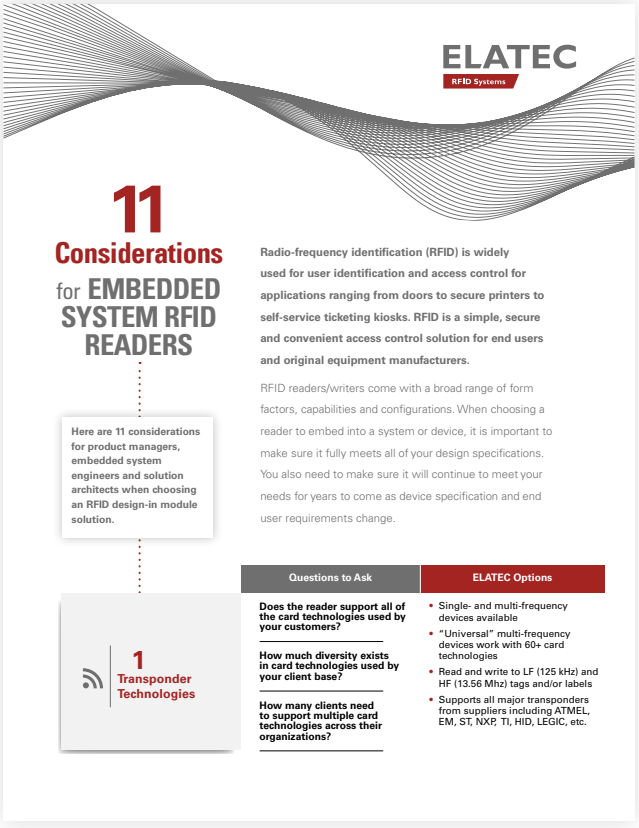
There are many types of RFID readers on the market, and they aren't all the same. Many reader manufacturers create readers that only read their own transponder technologies—a serious limitation for OEMs selling into international markets or catering to vendors or end-users with their own transponder technology preferences. There are several factors that OEMs should consider when choosing an RFID reader for consumable authentication purposes.

+ **How many transponder technologies does the reader support?** Look for a multi-technology reader that supports both LF and HF technologies from all



major global manufacturers for maximum flexibility. This is especially important if you are working with multiple third-party consumable vendors or want to enable both user and material authentication with the same device.

+ **How easy is it to update the reader?** Updates may be needed to add transponder technologies or address emerging security concerns. Readers that support contactless updates or remote updates will extend the life of your devices.
+ **Does the device have the right form factor, communication interfaces and operating power requirements?** The reader should be easy to embed into your device without making significant design or engineering changes.
+ **Does the reader support advanced encryption and custom configurations?** Look for a reader with a robust software package that allows you to choose your security configuration and customize behaviors (for example, setting light and sound sequences for user feedback).
+ **Is the reader certified for use in all of the regions in which your device is sold?** Choosing a reader already certified for sale in your target markets will speed time to market and simplify the sales process.




*Interested in learning more about technical considerations for RFID in consumables authentication? Download "11 Considerations for Embedded System RFID Readers" for additional advice, including operating power and consumption requirements, antenna placement, hardware communication interfaces and more.*

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