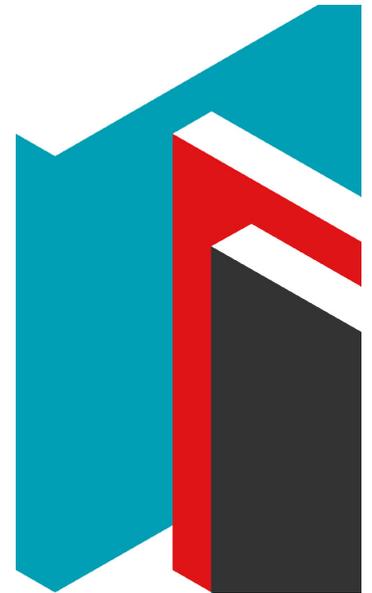




DATWYLER

RFID TRACEABILITY OF ELASTOMER COMPONENTS

Nowadays traceability becomes more and more regulated by laws and regulations. Furthermore the wide variety of products and components requires improvements in the efficiency of track and trace systems. In many packages and products RFID tags are already state of the art. Datwyler is capable of showing outstanding results by in-molding RFID tags into the elastomer material which allows for a much more efficient, secure and qualitatively superior traceability. With the help of a demonstrator kit Datwyler is capable of proving the concept of traceable elastomer components using RFID technology.



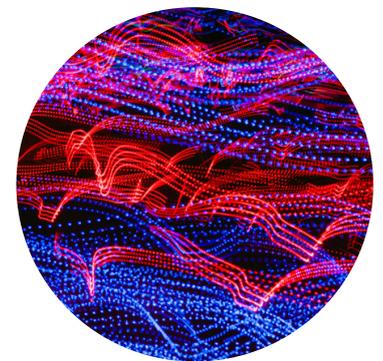
PROBLEM STATEMENT

If a problem occurs regarding the quality of a product within the supply chain, the manufacturer has to deliver a competent and effective solution as fast as possible. An ineffective response concerning traceability will create distrust among customers, which may result in significant damage to a company's business reputation. Furthermore there are laws and regulations in certain markets which require a traceability of 100% through out the whole supply chain. Datwyler, as manufacturer for elastomer components in markets like automotive, healthcare, consumer goods or general industry, has its own analog traceability system. Therefore Datwyler's quality department deals with lots of documents and paperwork to ensure a certain traceability of their components. Hence it handles a large number of physical documents to gain the right information about the component in complaint. This is inefficient and very time consuming.

RFID TECHNOLOGY

In general, the Radio-Frequency Identification (RFID) technology uses an electromagnetic field or electromagnetic waves to automatically identify and track tags attached to objects. Therefore, the RFID tag itself is a passive element, which contains no energy source. Energy is provided by the electromagnetic field or electromagnetic waves emitted by the reader antenna. This basic working principle is illustrated in figure 1. Depending on the technology in use, the RFID system works either with a frequency of 13.56 MHz or between 865–868 MHz.

Although the technology is quite mature, system miniaturization is currently one of the hot topics in the RFID industry.



Advanced Technologies

is a segment within Datwyler Sealing Solutions that dedicates itself to support existing Business by enriching it with potential new and leading technology, production processes and products. It is set up cross segmental to address customers in all industries.

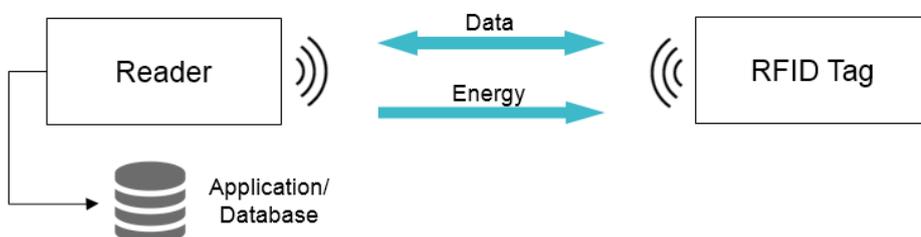


Figure 1. Basic working principle of RFID

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RSSI	EPC	Component	Article Number	Manufacturing Date	Lot Number	Compound
-71	0006	Hubmembrane	9116	05.06.2013	4569982	HNBR
-71	0015	SCR Membrane	9137	22.12.2013	8514684	HNBR
-78	0026	Krümmer	9401	28.02.2016	8745323	FKM
-76	0024	Abspermembrane	9290	22.03.2013	6543256	EPDM
-57	0021	Abspermembrane	9290	21.01.2012	4573865	EPDM
-55	0003	Hubmembrane	9116	09.12.2018	6521798	HNBR
-73	0013	Vial Stopper	S001	16.09.2011	1264587	SBR
-68	0002	Hubmembrane	9116	19.04.2012	9853462	HNBR
-71	0027	Krümmer	9401	14.01.2019	9643245	FKM
-78	0014	Vial Stopper	S002	29.08.2016	7856157	SBR

DATWYLER

10 Tags

Stop Inventory

Figure 2. Demonstrator software

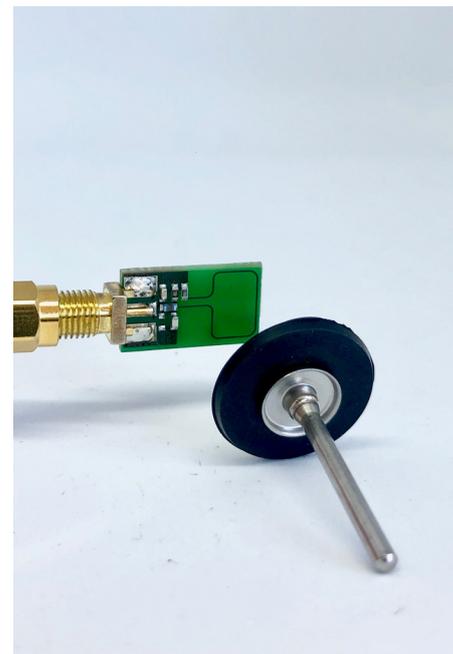


Figure 3. Demonstrator in use

INTEGRATION OF RFID TAGS IN DATWYLER'S ELASTOMER COMPONENTS

Datwyler managed to in-mold very small RFID tags into their elastomer components to increase traceability through the entire supply chain starting in the production itself. The RFID tags are implemented into the elastomer material during the vulcanization process, thus making the component intelligent; the so-called smart rubber. This leads to every product equipped with an RFID tag possessing its unique identification number. On a specific database, whether on a cloud or a physical server, Datwyler stores all kind of product data individually correlating to customer requirements. A visualization of a possible interface of such a database can be seen in figure 2. Examples for customized data packages could be lot number, manufacturing date, compound batch, production parameters and many more.

A major advantage of the complete integration is that the RFID tag is shielded from the environment and external forces, which automatically leads to counterfeiting of intelligent elastomer components.

BENEFITS

Full Traceability

Integrated RFID tags allow for a guaranteed full traceability starting in the production process. Therefore quality inspection and solving of complaints become much more efficient and of higher quality.

Industry 4.0 & IOT

The benefits of digital tracing using RFID also include enhanced flexibility and agility. It is, for example, much easier to scale the production up or down in a smart factory. Flexibility means also the addition of data through the whole supply chain. A system manufacturer could for example store additional data in the existing database linked to a unique identification number.

Anti-Counterfeiting

An integrated RFID chip with a certain signature protects the know-how and experience of the component manufacturer.

Paperless Production

The use of an RFID system with uniquely identifiable components in the production includes the digitalization of data as well. Therefore no more paper and documents are needed, which increases efficiency of production and quality control. Furthermore it has a positive effect on sustainability.

DEMONSTRATOR

To show the capabilities of the RFID technology in combination with elastomer products, Datwyler developed a demonstrator kit (figure 2 and figure 3). It contains a hardware device called "reader" (portrayed in figure 3), a software with a certain database and elastomer products equipped with an RFID tag. The reader activates the implemented RFID tag through an electromagnetic field to retrieve a unique serial number. This number, also called EPC number, is linked to individual product data stored in an external database. In order to demonstrate the capability of the database, the software shows a variety of product data according to the detected elastomer product like production date, lot number or compound (see figure 2).