

TIRE INFORMATION SERVICE BULLETIN

TIRE RADIO FREQUENCY IDENTIFICATION (RFID) PASSIVE RFID TAGS

Radio frequency identification (RFID) is an enabling technology upon which companies, including tire manufacturers, tire dealers, fleets, and tire retreaders can develop applications that create value for end-users and manufacturers. RFID technology can be used by producers, suppliers, transporters, regulators, national security, consumers, and many other stakeholders involved in not only North American commerce but globally as well.

There are other emerging technologies where the RFID function is integrated into a tire mounted sensor such as a tire pressure monitoring system.

The passive RFID transponder (RFID tag) is a single solid state electronic chip with an antenna such as shown in Figure 1. Each tag that passes within the radio frequency transmission range of a reader/interrogator will be energized and have its circuit activated. In turn, the tag will respond by transferring its encoded identification and any additional data stored in memory.

FIGURE 1 - Tire RFID Tag with External Antenna



Global standards, such as listed in the references on page 2, have been established to standardize the identification information provided by a RFID transponder installed during the tire manufacturing process or as an aftermarket installation such as RFID patch application to tires. These standards provide basic performance criteria for use of this technology. It is the USTMA recommendation that RFID tags in tire application adhere to these standards in order that the data format is standardized within the tire industry. This consistency will allow for the interchangeability of hardware and software that will be used.

RFID Tag Attachment

RFID tags can be attached to the tire in four ways:

- encapsulated in a patch and bonded to the inner liner or outside surfaces; or,
- adhered directly to the inner liner; or,
- cured in the tire during the manufacturing process; or,
- a sticker-applied tire label.

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RFID Tag Data Encoding

There are 2 key memory storage locations which will be used for storing the data that may be placed on the tag or in a database:

1. for asset control and tracking purposes; and,
2. for storing and retrieving information useful for tire service management, as well as tracking.

RFID Emblem

ISO 29160 (Information technology -- Radio frequency identification for item management -- RFID Emblem) has standardized several RFID emblems as a means of informing the public about the use of RFID in consumer and workplace environments. The symbol shown below is one such suggested emblem which may be used to identify the existence of an RFID tag.



REFERENCES

1. American National Standards Institute (ANSI):
 - a. ANS MH10.8.2 Data Identifier and Application Identifier Standard
2. Association for Automatic Identification and Mobility (AIM):
 - a. REG 396 RFID chips and transponders – Verification and qualification of design and manufacture Part 1: Tires
3. Automotive Industry Action Group (AIAG):
 - a. B-11 Item Level Radio Frequency Identification (RFID) Standard
4. GS1/EPCglobal:
 - a. Class 1 Generation 2 UHF Air Interface Protocol Standard “Gen 2”
5. International Organization for Standardization (ISO);
 - a. ISO 17367 Supply chain applications of RFID -- Product tagging;
 - b. ISO/IEC 18000-63 (18000-6C): Information technology – Radio frequency identification for item management – Part 63: Parameters for air interface communications at 860 MHz to 960 MHz Type C;
 - c. ISO 29160 Information technology -- Radio frequency identification for item management -- RFID Emblem.
6. Joint Automotive Industry Forum (JAIF)
 - a. B-21 Global Radio Frequency Identification (RFID) Item Level Standard

This Bulletin Replaces Volume 48, Number 2