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Information technology — Radio frequency identification device performance test methods —

Part 5: Test methods for the environmental characteristics of RFID tags used in sporting goods

Technologies de l'information — Méthodes d'essai des performances du dispositif d'identification par radiofréquence —

Partie 5: Méthodes de test des performances des RFID utilisées dans les articles de sport

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Foreword

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture techniques*.

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Introduction

The global market for sporting goods is expanding rapidly each year, and as a result, RFID tags are becoming increasingly popular in the industry. These small electronic devices transmit information using radio waves and are particularly advantageous in efficiently tracking and managing individual products. While RFID technology has primarily been used by manufacturers and distributors for inventory management, it is gradually developing and being utilized by consumers for various purposes, such as monitoring an athlete's performance or facilitating the payment and maintenance of sports equipment.

It is crucial to ensure the reliability of RFID tags in sporting goods, as errors or malfunctions can have serious consequences. For instance, inaccurate inventory counts due to improperly registered RFID tags can lead to under stocking or overstocking. Similarly, malfunctioning tags can result in inaccurate data, potentially harming athlete training and leading to injury.

Various approaches can be taken to ensure the reliability of RFID tags. Performance and environmental factors play a significant role, as the environment to which the tags are exposed can consist of physical, chemical and biological conditions that can deteriorate the tag's performance or cause it to fail. This document proposes a method to identify the main use environment and related environmental characteristics of sporting goods, along with a way to measure and evaluate tag performance changes after testing the environmental conditions. It recommends environmental tests that can demonstrate the product's ability to operate or survive under the climatic and dynamic conditions typically encountered during the use of sporting goods utilizing RFID tags.

While it is not always possible to make recommendations for all types of products, locations and applications, this document offers a suitable test for the majority, increasing safety and success for businesses and users alike. It is important to note that issues such as safety margins and acceleration factors are left to the judgment of the designer, the manufacturer, the test consultant or the end user.

Information technology — Radio frequency identification device performance test methods —

Part 5:
Test methods for the environmental characteristics of RFID tags used in sporting goods

1 Scope

This document specifies the methods for testing the environmental characteristics of RFID-enabled sporting goods.

This document suggest methods for identifying the main use environments and related testing of environmental characteristics of sporting goods for indoor and outdoor sports with RFID and optionally additional advanced electronic devices like sensors.

The environmental characteristics addressed in this document are applicable to manufacturers, including distribution and inventory management, as well as the aspects of consumer use of the actual RFID-enabled sports items. This document establishes methods to measure and evaluate the performance change of tags after environmental characteristic testing.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 105-E04, *Textiles — Tests for colour fastness — Part E04: Colour fastness to perspiration*

ISO/IEC 18000-2, *Information technology — Radio frequency identification for item management — Part 2: Parameters for air interface communications below 135 kHz*

ISO/IEC 18000-3, *Information technology — Radio frequency identification for item management — Part 3: Parameters for air interface communications at 13,56 MHz*

ISO/IEC 18000-61, *Information technology — Radio frequency identification for item management — Part 61: Parameters for air interface communications at 860 MHz to 960 MHz Type A*

ISO/IEC 18000-62, *Information technology — Radio frequency identification for item management — Part 62: Parameters for air interface communications at 860 MHz to 960 MHz Type B*

ISO/IEC 18000-63, *Information technology — Radio frequency identification for item management — Part 63: Parameters for air interface communications at 860 MHz to 960 MHz Type C*

ISO/IEC 18000-64, *Information technology — Radio frequency identification for item management — Part 64: Parameters for air interface communications at 860 MHz to 960 MHz Type D*

ISO/IEC 18046-3:2020, *Information technology — Radio frequency identification device performance test methods — Part 3: Test methods for tag performance*

ISO/IEC 19762, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary*

IEC 60068-1, *Environmental Testing— Part 1: General and Guidance*

IEC 60068-2-1, *Environmental Testing— Part 2-1: Tests - Test A: Cold*

IEC 60068-2-2, *Environmental Testing— Part 2-2: Tests - Test B: Dry Heat*

IEC 60068-2-11, *Environmental Testing— Part 2-11: Tests - Test Ka: Salt Mist*

IEC 60068-2-78, *Environmental Testing Method (Electric/ Electronic) Damp Heat, Steady State Testing Method*

IEC 60068-2-27, *Environmental Testing— Part 2: Tests - Test Ea and Guidance: Shock*

IEC 60068-2-6, *Environmental Testing— Part 2-6: Tests - Test Fc: Vibration (sinusoidal)*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) - Part 4-2: Testing and Measurement Techniques - Electrostatic Discharge Immunity Test*