



Performance Standard for Hand-Worn Metal Detectors Used in Safety and Security¹

This standard is issued under the fixed designation F3020; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This standard applies to all hand-worn or glove-type metal detectors used to find metal contraband concealed or hidden on people or other objects with hand-accessible surfaces. Hand-worn metal detectors (HWMDs) are significantly different in design compared to the more common hand-held metal detector (HHMD). For example, the HWMD generates a much more localized magnetic field than does the HHMD and the useful field of the HWMD is normal to the plane of the hand whereas the useful field of the HHMD is multi-directional.

1.2 This standard describes minimally acceptable performance requirements, which includes metal object detection performance, safety (electrical, mechanical, fire), electromagnetic compatibility, environmental conditions and ranges, and mechanical durability. The requirements for metal detection performance are unique and, therefore, test methods for these parameters are provided, including the design of test objects. An agency or organization using this standard is encouraged to add their unique operationally-based requirements to those requirements listed in this minimally-acceptable performance standard.

1.3 This documentary standard describes the use of spherical test objects, instead of actual threat objects or exemplars of threat objects, to test the detection performance of hand-worn metal detectors. Spherical test objects are used because the detectability of spherical test objects is not orientation dependent, whereas this is not true for non-spherical test objects. This orientation-dependent detectability of non-spherical test objects may allow a HWMD to be incorrectly attributed a higher performance capability than that HWMD is capable of providing. To aid agencies wishing to add specific threat objects to their detection performance requirements, included in [Annex A1](#) is the analysis of the probability of detection for different orientations of agency-specific non-spherical threat objects.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the*

responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ISO Standards:²

ISO 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories

ISO 10012:2003 Quality Assurance Requirements for Measuring Equipment

ISO 14117:2012 Active Implantable Medical Devices—Electromagnetic Compatibility—EMC Test Protocols for Implantable Cardiac Pacemakers, Implantable Cardioverter Defibrillators, and Cardiac Resynchronization Devices

ISO 14708–1:2000 Implants for Surgery—Active Implantable Medical Devices—Part 1: General Requirements for Safety, Marking, and for Information to be Provided by the Manufacturer

ISO 14708–2:2012 Implants for Surgery—Active Implantable Medical Devices—Part 2: Cardiac Pacemakers

ISO 14708–3:2008 Implants for Surgery—Active Implantable Medical Devices—Part 3: Implantable Devices

ISO 14708–4:2008 Implants for Surgery—Active Implantable Medical Devices—Part 4: Implantable Infusion Pumps

ISO 14708–5:2010 Implants for Surgery—Active Implantable Medical Devices—Part 5: Circulatory Support Devices

ISO 14708–6:2010 Implants for Surgery—Active Implantable Medical Devices—Part 6: Particular Requirements for Active Implantable Medical Devices Intended to Treat Tachyarrhythmia (Including Implantable Defibrillators)

2.2 IEC Standards:³

IEC 61010–1 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use—Part 1: General Requirements

¹ This performance standard is under the jurisdiction of ASTM Committee F12 on Security Systems and Equipment and is the direct responsibility of Subcommittee F12.60 on Controlled Access Security, Search, and Screening Equipment.

Current edition approved July 15, 2016. Published July 2016. DOI: 10.1520/F3020-16.

² Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.

³ Available from International Electrotechnical Commission (IEC), 3, rue de Varembe, P.O. Box 131, 1211 Geneva 20, Switzerland, <http://www.iec.ch>.