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Standard Guide for Installation of Walk-Through Metal Detectors¹

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1. Scope

1.1 This guide describes various elements (for examples, see [Appendix X2](#)) to be considered when planning to install walk-through metal detectors (WTMDs). The installation of WTMDs should only be accomplished by manufacturer-trained staff/personnel.

1.2 This guide applies to either permanent or temporary installations of a WTMD.

1.3 This guide applies to active WTMDs, which generate a magnetic field for the purpose of detecting metallic weapons for contraband, and does not apply to magnetometers, which are passive and use the Earth's magnetic field as the basis of detecting metallic weapons and contraband.

1.4 This guide is not intended to set performance levels, nor is it intended to limit or constrain operational technologies.

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

F3566 Performance Specifications and Test Methods for Walk-Through Metal Detectors Used in Safety and Security

¹ This guide 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.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *alarm, n*—an indication that informs the operator of an event, such as metal detection or a walk-through metal detector (WTMD) status change. **F3566 – 22**

3.1.2 *alarm, unintended, n*—an alarm caused by (1) outside interferences, environmental conditions, operational conditions, etc., not related to the sensitivity settings of the WTMD and which may occur when a person is or is not transiting through the portal of the WTMD or (2) a metal object for which an alarm is not expected because of its size, shape, and material of construction and the sensitivity setting(s) of the WTMD.

3.1.3 *discrimination, n*—the ability of the WTMD to alarm on metallic threat objects and not alarm on non-threat (or innocuous) metallic objects; WTMD discrimination is dependent on the threat object, the innocuous object, and the WTMD operational settings.

3.1.4 *threat object, n*—a device intended to do damage to personnel or equipment and requiring the attacker to physically activate or use the device.

3.1.5 *throughput rate, n*—the actual rate at which a WTMD can screen personnel for a given application.

3.1.6 *walk-through metal detector, n*—a device using magnetic induction to detect metallic objects; the device is an active detector that generates energy within the portal region of the detector; the interaction of the generated magnetic field with certain types of objects in the portal region of the detector and the ability to detect this interaction is the basis of operation for the WTMD. **F3566 – 22**

4. Significance and Use

4.1 This guide is intended for use by the designers, the evaluators, and the users of WTMDs that are installed to screen persons entering or leaving a controlled access or other designated area. This guide is not meant to constrain design liberty but is to be used as a guide in the selection of location and installation of WTMDs.

5. Safety Considerations

5.1 Warning signs should be posted if the WTMD's electromagnetic field strength is of such a magnitude that personal

medical devices may be affected or damaged when they pass through the portal. See Performance Specifications and Test Methods **F3566**. If individuals are allowed to bypass the WTMD, the installation should accommodate alternate screening methods (that is, hand-held metal detector, pat search, etc.) that may be necessary to screen these individuals.

5.2 Local fire and safety codes should be reviewed concerning requirements for areas selected for WTMD installation. WTMD installations needing exemption from the fire and safety requirements should be approved in advance.

6. Throughput Consideration

6.1 The rate at which persons may be screened is generally an important factor in security applications. WTMDs should be capable of supporting changes in transient traffic flow such as found during shift changes.

6.1.1 Throughput rate is dependent on WTMD model but should be consistent amongst units of a given model. Throughput rate requirements will vary between different security applications. Applications that require high-sensitivity settings will have lower throughput rate.

6.1.2 Once the application-specific throughput rate for a detector model has been established, the number of detector lanes required to achieve system throughput at peak times can be calculated.

7. Other Considerations

7.1 Identify and review applicable regulatory orders and policies of appropriate regulatory agencies for information pertinent to metal detector installation and operation.

7.2 Assess the building power, including emergency back-up power, to ensure that its quality is sufficient to ensure that the walk-through metal detector performs per its requirements. If the quality is not sufficient, power/line filters or regulators may need to be used. WTMDs required to operate when power has been interrupted, must be connected to outlets supported by portable generator systems or an uninterruptible power supply system.

7.3 Establish an appropriate communications interface if the alarms are to be recorded or remotely monitored. Wireless communication interface systems should be considered to reduce infrastructure costs.

7.4 Where it is necessary to operate metal detectors in close proximity to each other, they should be from the same manufacturer and be the same model so that the WTMDs may be adjusted to operate without interfering with each other. If it is necessary to operate metal detectors of different models or manufacturers, a test should be conducted for interference before the detectors are installed. Where metal detectors are not compatible, it may be necessary to isolate the WTMDs from each other based on the manufacturer's recommendations.

7.5 Ensure that the WTMD will operate as required over the expected range of environmental factors (temperature, humidity, etc.) and for the electromagnetic environment in which they are installed. See **Appendix X2** for examples of interference sources.

8. Layout of the Installation Site

8.1 The site layout for the WTMD should take into consideration the pattern of traffic flow, the number of available personnel for operation and response, and monitoring. See **Appendix X1**.

8.2 Installation of the WTMD should be arranged to minimize unintended alarms from outside interference (see **Appendix X2** for examples), which may cause operators to lose confidence in the performance of the WTMD and thus compromise security.

8.2.1 Layout of the area selected for WTMD installation should provide adequate space for calibration and maintenance of the WTMD.

8.2.2 Locate the WTMD so that it does not block or restrict access to doors, duct work, piping, and other equipment.

8.2.3 The site layout should provide an alternate means to screen personnel while the metal detector is out of service.

8.3 Since metal-detector portal width is typically less than the minimum doorway width required by the Life Safety Codes, bypass routes that meet the Life Safety Codes requirements should be included in the layout design. If no other bypass or alternate egress routes are available, the WTMD portal width must comply with the American with Disabilities Act of 1990, as Amended (portal width 32 in. or greater is required).

8.4 For permanent installations, the WTMD should be securely anchored to a solid or rigid surface to prevent swaying or tip-over. Raised computer room floors are not solid and should be avoided.

8.5 A WTMD will respond to nearby moving metal objects, but its sensitivity is less for moving material outside of the portal area. Work with the manufacturer of the WTMD, in advance of the installation, to determine for agency operational requirements, the optimal separation between the WTMD and the moving metal objects.

9. Interferences to Metal Detector Operations

9.1 If two or more metal detectors are operating in close proximity, they should be adjusted according to the manufacturer's recommendations. See **7.4**.

9.2 Very large metal objects such as metal plates or sheets, within 1 m of the WTMD, can reduce its detection sensitivity. If a large metal object is relocated near a metal detector, then recalibration and sensitivity testing is required. The WTMD should have the ability to compensate for rebar in concrete floors. Test methods for metal interference are described in Performance Specifications and Test Methods **F3566 – 22**.

9.3 The WTMD may alarm if it moves or vibrates. To minimize this potential problem, the WTMD should be anchored to a solid and rigid surface. If the WTMD is located in areas where wind will affect performance, such as an outdoor location, a WTMD with the ability to adjust or compensate for wind should be considered.

9.4 For high-sensitivity operations, which necessitates adjusting the WTMD sensitivity settings so that it can detect small metallic threat objects, the effect of wind and moving