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Standard Guide for Premises Design Considering Snow and Ice Management for the Reduction of Pedestrian Slips¹

This standard is issued under the fixed designation F3627; 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 guide covers design, planning, construction, renovation, maintenance, and risk management considerations of the physical exterior property with regard to snow and ice management for the purpose of reducing the risk of pedestrian slips. The provisions in this guide may also apply to the analysis of existing properties.

1.2 Conformance with this guide may reduce, but will not eliminate, the potential for slip incidents in which the presence or accumulation of snow and ice on walkways may be a contributing factor.

1.3 *Units*—The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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

1.5 *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

F1646 Terminology Relating to Walkway Safety and Footwear

¹ This guide is under the jurisdiction of ASTM Committee F13 on Pedestrian/Walkway Safety and Footwear and is the direct responsibility of Subcommittee F13.50 on Walkway Surfaces.

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

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2.2 *ANSI Standards:*³

ANSI/ASCA A1000 System Requirements for Snow and Ice Management Services

ANSI/NEMA Z535.2 Standard for Environmental and Facility Safety Signs

ANSI/SIMA-10-2020 Standard Practice for Procuring and Planning Snow and Ice Management Services

3. Terminology

3.1 See Terminology **F1646** for the following terms used in this practice: element, fair, ramp, sidewalk, walkway, and walkway surface hardware.

3.2 Definitions:

3.2.1 *anti-icing, v*—the process of applying an appropriate granular or liquid deicing product prior to the onset of a snow or ice event to make a reasonable effort to prevent the bonding of snow/ice to pavement or concrete surfaces. **ANSI/ASCA A1000**

3.3 Definitions of Terms Specific to This Standard:

3.3.1 *anti-icing materials, n*—dry or liquid snow and ice control materials applied before a snow or ice event intended to prevent precipitation from bonding with the pavement/walkway surface or weaken bonds formed for easier removal.

3.3.2 *bonding, n*—process of snow or ice adhering to an underlying surface.

3.3.3 *deicing materials, n*—snow- and ice-melting products applied on top of a layer of snow or ice or both that may be bonded to the underlying surface.

3.3.4 *drainage path, n*—the route excess surface water or groundwater flows from land by means of gutters, ditches, pipes, culverts, manmade and natural channels, or subsurface drains.

3.3.5 *obstructions, n*—low roadway/walkway objects that may be hit by plows.

3.3.5.1 *Discussion*—Examples of obstructions include wheel stops, speed bumps, protruding drainage and utility

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

features, landscape islands/curbs, accessible ramps, built-up curb ramps (ramps protruding from the face of the curb into the parking lot), low-lying vegetation, cart corrals, light posts, and signposts.

3.3.6 *refreeze conditions, n*—circumstances or factors that can cause snow or ice that has been melted or thawed to freeze again.

3.3.7 *snow pile, n*—accumulation of piled snow that has been relocated or removed from another location (also referred to as stockpiled snow).

4. Summary of Guide

4.1 This guide addresses planning, risk management, design, construction, renovation, and ongoing maintenance of walkways in areas exposed to snow, ice, and temperatures that can result in the formation of ice on walkways. The reduction of snow and ice accumulation on walkways should aid in reducing the risk of slip incidents.

5. Significance and Use

5.1 This guide is intended to act as an aid during the planning, risk management, design, renovation, construction, and ongoing maintenance phases of a project by persons/entities involved (including, engineers, architects, project management personnel/facilities management, contractors, inspectors, risk managers, safety committees, government agencies, and snow removal companies and owners) to reduce snow and ice slip hazards on walkway surfaces. This guide is also intended to complement aspects from Guide **F2966** to promote the management of snow and ice on premises using prevention through design strategies.

6. Procedure

6.1 Evaluate jurisdictional requirements during design and site analysis, which could include snow pile placement and the use of de-icing or anti-icing materials.

6.2 Site Design:

6.2.1 *Site Snow and Ice Assessment*—The entity that is designing or planning spaces with walkway surfaces should assess weather patterns for typical and worst-case scenarios of ice and snowfall accumulation, including the effect of seasonal accumulation, so that the frequency and amount of snow and ice are part of the design criteria.

6.2.2 *Site Design to Avoid or Minimize Snow and Ice Accumulation*—Some surfaces, such as permeable pavements and heated pavements may reduce the accumulation of snow and ice. Such systems must be installed and maintained in accordance with manufacturers' instructions to perform as intended (that is, use of sand is not recommended on permeable pavements to eliminate clogging).

6.2.3 *Site Feature Layout*—During the initial phases of site layout, the purpose and intended function(s) of the site should remain paramount in the design process. The typical layout of site features includes considerations for required parking, egress discharge routes, accessibility, loading and unloading, and both vehicular and pedestrian circulation.

6.2.4 *Snow Pile Placement*—The design of parking and walkway facilities should consider snow pile placement to

minimize the impacts of snow and ice on pedestrian safety. Following snow accumulations, snow piles may be required to be created within or around the parking lot and premises. It is recommended that down gradient or drained lawn areas or landscaped buffer areas adjacent to parking areas be provided for snow pile storage as the primary design option. Snow piles that should be placed on parking facilities may reduce the parking capacity of the parking lot and, therefore, consideration should be given to the potential location and size of these piles. With snow pile storage, the effects of prevailing winds/blowing snow should also be considered. The addition of subsequent snowfall should also be taken into consideration, allowing room for such when practical. Parking stalls should be arranged such that the furthest parking stalls from these facilities are unobstructed and easily accessible to snowplowing equipment and are readily drained without water draining across drive aisles and other walkways. One example of this is avoiding the placement of undrained islands at the ends of parking stall aisles in parking areas where meltwater accumulations can refreeze.

6.2.4.1 Typically, snow pile size is determined by the amount of snow being piled, the size of the area being cleared, and the equipment used to create the pile.

6.2.4.2 Snow removal from a site as a primary means of control should only be considered for properties where no snow storage is possible or the design recommendations to limit refreezing hazards cannot be implemented.

6.2.4.3 Piles should be placed away from buildings and site features that will be accessed by those visiting the site and in areas that will not drain onto or across pedestrian pathways (minimizing intrusion on driving lanes and pedestrian walkways).

6.2.4.4 Snow pile placement should not adversely impact pedestrian lines of sight.

6.2.4.5 Snow pile placement should not adversely impact vehicular lines of sight.

6.2.5 *Initial Grading and Drainage Layout*—Having considered the placement of snow piles in initial horizontal lot layout, this consideration should continue in the initial grading analysis of a site. Typically, grading design of a site is an iterative process that requires consideration of the surrounding roadways, adjacent properties, and their uses and drainage characteristics with the intent to develop grading lines across the site that connect these features to determine the initial site grading. This iterative process usually results in the determination of basic parking lot and walkway grading and their interaction with finished floor elevations of buildings and other control grades throughout the site. Throughout this process, snow pile storage locations and catch basin layouts should be continually considered. The following are a few principles that will help in this regard:

6.2.5.1 Meltwater from snow piles should flow to a drainage feature and away from walkways,

6.2.5.2 Site design should consider obstructions to snow removal and snow storage,

6.2.5.3 Grades should create conditions of water flow away from buildings to a drainage path consistent with jurisdictionally adopted codes, and