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An American National Standard

Standard Guide for In-ground Concrete Skatepark[1]

This standard is issued under the fixed designation F2480; 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 safety and performance guidelines pertaining to in-ground skatepark facilities built primarily out of concrete and other designed materials. This guide pertains to any concrete materials and other designed materials intended to be used in the performance of the sports including skateboarding, inline skating and BMX biking. Items such as fencing, lighting, and operational structures are not intended to be a part of this guide.

1.2 *Tolerance: General Measures, Tolerances, and Conversions*—General dimensional tolerances for this guide (unless otherwise noted) follow. These tolerances still apply to a dimension even when terms like greater than, less than, minimum, or maximum are used.

Dimension	Tolerance
X in. or ft	±0.5 in.
X.X in.	±0.05 in.
X.XX in.	±0.005 in.

1.3 The values stated in inch-pound units are to be regarded as 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 and health 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]

A184/A184M Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement

A185/A185M Specification for Steel Welded Wire Reinforcement, Plain, for Concrete (Withdrawn 2013)[3]

A497/A497M Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete (Withdrawn 2013)[3]

A615/A615M Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

A616/A616M Specification for Rail-Steel Deformed and Plain Bars for Concrete Reinforcement (Withdrawn 1999)[3]

A617/A617M Specification for Axle-Steel Deformed and Plain Bars for Concrete Reinforcement (Withdrawn 1999)[3]

C33 Specification for Concrete Aggregates

C94/C94M Specification for Ready-Mixed Concrete

C125 Terminology Relating to Concrete and Concrete Aggregates

C150 Specification for Portland Cement

C260 Specification for Air-Entraining Admixtures for Concrete

C494/C494M Specification for Chemical Admixtures for Concrete

C1116 Specification for Fiber-Reinforced Concrete and Shotcrete

C1141 Specification for Admixtures for Shotcrete

C1436 Specification for Materials for Shotcrete

C1480 Specification for Packaged, Pre-Blended, Dry, Combined Materials for Use in Wet or Dry Shotcrete Application

C1582/C1582M Specification for Admixtures to Inhibit Chloride-Induced Corrosion of Reinforcing Steel in Concrete

E1155 Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers

2.2 *ACI Standards:*[4]

ACI 117–90 Specifications for Tolerances for Concrete Construction and Materials

[1] This guide is under the jurisdiction of ASTM Committee F08 on Sports Equipment, Playing Surfaces, and Facilities and is the direct responsibility of Subcommittee F08.66 on Sports Facilities.

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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.

[3] The last approved version of this historical standard is referenced on www.astm.org.

[4] Available from American Concrete Institute (ACI), P.O. Box 9094, Farmington Hills, MI 48333-9094, http://www.aci-int.org.

ACI 302.1R-04 Guide for Concrete Floor and Slab Construction
ACI 309R Guide for Consolidation of Concrete
2.3 *ANSI Standards:*[5]
ANSI 2535.4 Product Safety Signs and Labels

3. Terminology

3.1 *Definitions:*

3.1.1 *bowl*—fully enclosed or partially enclosed free-flowing form with specific transitions.

3.1.2 *coping*—circular pipe or other material installed on some features.

3.1.3 *extension*—additional elevation of the top-riding surface within the platform area.

3.1.4 *features*—sections of the skate surface, which is level, inclined, or curved solid surface on which the user of skateboards, inline skates, and BMX bicycles can maneuver.

3.1.5 *flat bottom*—horizontal part of the riding surface between the transitions.

3.1.6 *flat ground* —flat, horizontal space, which is greater than 12 in. long.

3.1.7 *flatness*—degree to which a line or surface approximates a plane and is a measurement of local surface bumpiness/undulation.

3.1.8 *free falling height*—perpendicular distance between the floor space and an adjacent low-lying space.

3.1.9 *in-ground concrete skatepark*—any concrete structure placed in ground that is to be used for skateboarding, inline skating, and BMX bicycles.

3.1.10 *levelness*—degree to which a line or surface parallels horizontal or design grade; and is a measurement of local conformance to design grade over a distance.

3.1.11 *performance edging*—durable material installed on the accessible edges or surfaces of intersecting and terminating planes on features for performance purposes.

3.1.12 *pool coping*—manufactured masonry product similar in shape and function to that typically manufactured for swimming pools. (See *coping* in 3.1.2.)

3.1.13 *protective edging*—durable material that protects accessible edges of intersecting and terminating planes on the riding surfaces for the purposes of reducing wear.

3.1.14 *transition/radius*—radial change in slope between two elevations.

3.1.15 *resting area*—sport-functional clearance required for standing out of the flow of active skaters and clearing the active skating zone to avoid a collision.

3.1.16 *riding surface*—part of skatepark structure on which the skater will be in contact.

3.1.17 *skatepark* —element, feature, structure, or group of elements, features, structures within a defined boundary for use by skateboarders, inline skaters, or BMX bikers.

3.1.18 *specified surface, plane, or line*—surface, plane, or line specified by the contract documents; specified planes and lines may slope and specified surfaces may have curvature.

3.1.19 *tolerance*—(*1*) the permitted variation from a given dimension or quantity; (*2*) the range of variation permitted in maintaining a specified dimension; and (*3*) A permitted variation from location or alignment.

3.1.20 *vert*—vertical part of the riding surface.

3.1.21 *vertical alignment*—location relative to specified vertical plane or a specified vertical line or from a line or plane reference to a vertical line or plane. When applied to battered walls, abutments, or other nearly vertical surfaces, vertical alignment is defined as the horizontal location of the surface relative to the specified profile.

4. Materials

4.1 *General*—All materials used shall fulfill the sport-specific requirements for skatepark facilities.

4.2 *Steel Elements*—All exposed steel shall be inherently corrosion resistant or be provided with a corrosion resistant coating.

4.3 *Concrete:*

4.3.1 All concrete should consider the following, which is not necessarily all-inclusive: compressive strength, flexural strength, or both, and finishability; maximum size, grading, and type of coarse aggregate; grading and type of fine aggregate; combined aggregate grading; air content of concrete, if applicable; slump of concrete; water-cement ratio or water-cementitious material ratio; and preplacement soaking requirement for lightweight aggregates; and should conform to but are not limited to the requirements of Specifications C33 and C94/C94M, Terminology C125, Specifications C150, C260, C494/C494M, C1116, C1141, C1436, C1480, C1582/C1582M, and ACI 302.1R-04.

4.3.2 Design details, site preparation, type of concrete and related materials should be provided by the designer of the concrete skatepark prior to bid documents and be applicable to the local environmental conditions. Design details should reference specifications for concrete strength characteristics, use of admixtures for freezing exposure, use of reinforcing steel, testing and inspection requirements. Concrete shall be manufactured to meet the specifications of the designer, method of concrete construction-ready-mix, precast or shotcrete concrete should comply with applicable specifications.

4.4 *Steel Reinforcing*—Steel reinforcing should conform to but are not limited to the following specifications: deformed bars should conform to the requirements of Specifications A615/A615M, A616/A616M, or A617/A617M. Bar mats conforming to Specification A184/A184M can also be used. Welded wire reinforcing should conform to Specifications A185/A185M or A497/A497M.

4.5 *Synthetic Fibers*—Synthetic fibers for use in concrete slabs should meet the requirements outlined in Specification C1116 or ACI 302.1R-04-26.

4.6 *Other Materials*—Utilization of other materials is admissible.

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

5. Physical Properties

5.1 In general, physical properties outline characteristics best suited for skateboard, roller blade, and BMX activities.

5.2 *Concrete Finish*—The concrete surface should provide a smooth and nonslip surface characteristic (see ACI 302.1R-04 Class 9 Finish).

5.3 *Surface Flatness and Levelness*—Tolerances should conform to the requirements set forth in ACI 117–90. A discussion of concrete flatness/levelness is given in the commentary to ACI 117–90.

5.3.1 Flatness and levelness requirements should be described in bid documents. Methods for defining flatness and levelness should be in accordance with ACI 117–90 and Test Method E1155. The flatness values should control local surface bumpiness in accordance with Test Method E1155. The levelness values should control local conformance to design grade (see Test Method E1155).

5.3.2 *Precautions*—Concrete surface tolerance specification and measurement procedures should be pre-bid determined. Tolerances should be defined based on what can be reasonably expected from a given construction method. The concrete flatness/levelness constitutes a potential issue, the following precautions are suggested:

5.3.2.1 The exact meaning of the flatness/levelness requirement and the exact method and time of measurement to determine compliance should be established before beginning construction.

5.3.2.2 The contractor or fabricator should confirm an ability to satisfy the concrete surface tolerance requirement by profiling previous installations or specimens.

5.3.2.3 Where feasible, test slabs or specimens should be installed or supplied to verify the effectiveness of proposed fabrication procedures under actual job conditions. If necessary, methods and procedures should then be modified for the actual job installation based on these results. The acceptance of the test slab or specimen by the owner as to tolerances and surface finish should clarify requirements for the project slab and becomes the project "Exemplar/Benchmark."

5.3.2.4 The exact remedy to be applied to every possible concrete surface tolerance deficiency should be confirmed with the designer.

5.3.3 Levelness and flatness design in concrete skatepark construction should define acceptable tolerances for radii of curved surfaces, flatness values on a radius should be similar to those of a flat surface. This applies to all elevation change tolerances, banks, ledges, and so forth.

5.4 *Expansion Joints and Control Joints:*

5.4.1 Expansion joints should be placed where they are least likely to interfere with a wheel. Careful consideration to expansion joints location must be given, using the flow of skaters as critical design criteria.

5.4.2 Unfilled cut control joint must not exceed ⅛ of an inch.

5.4.3 *Filled Control Joint*—Size of control joint is not important. It must be a rigid control joint filler, which must be flush with the skating surface and close the joint completely.

5.4.4 *Tooled Control Joints*—Joints should be placed where they are least likely to interfere with skate wheels, and a cut control joint is not possible.

5.5 *Consolidation and Compaction of Concrete Around Exposed Steel Materials*—The placement of concrete on sloped radii or any areas incorporating a change in elevation is critical to the stability of the exposed steel material or concrete coping. The difficulty of achieving proper consolidation around the steel material and their reinforced attachments through the use of standard air removal consolidation techniques can lead to slumping and the creation of an air pocket around the steel material, which may not be visible during construction and may result in concrete failure on the riding surface. See Section 8.3 of ACI 302.1R-04 and ACI 309R for detailed discussion.

6. Other Requirements

6.1 *Protective Edging:*

6.1.1 If protective edging/surface is used, it shall be flush with the finished riding surface. It shall be strong enough to protect the surface from damage and excessive wear due to prolonged use.

6.1.2 When protective edging is used as protection against bike pegs, it shall extend a minimum of 4.0 in. behind the coping, and be flush with the riding surface.

6.2 Coping shall protrude 0.25 ± 0.125 in. above the resting deck and shall protrude 0.25 + 0.25 in. or –0.125 in. above riding surfaces (see Fig. 1).

6.2.1 The outside radius of coping shall be a minimum of 1.18 in. or 30 mm.

6.3 Gaps or transitions between riding surfaces intended to be in the same plane shall not exceed 0.188 in. in any direction.

7. Owner's Responsibility

7.1 *Signage*—Skatepark signage shall be provided by the owner/operator for installation on a signboard at the skatepark.

7.2 Skatepark signage, free standing or fixed fence, must comply with the following:

7.2.1 Convey safety information to the user and to those providing parental or guardian supervision.

7.2.2 Indicate that adult supervision of minors is or is not present.

7.2.3 Indicate the owner-operator emergency telephone numbers.

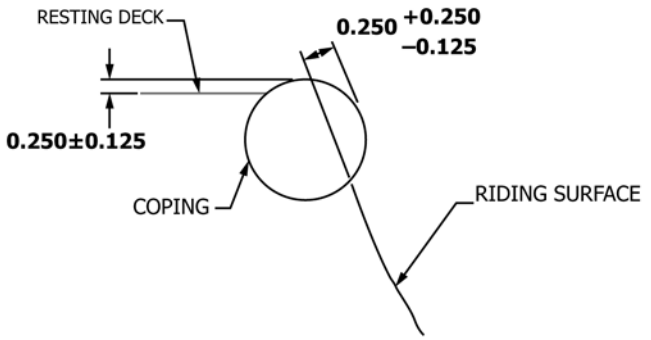

FIG. 1 Coping Example

7.2.4 Indicate emergency telephone numbers for medical, ambulance, and police.

7.2.5 Indicate any applicable regulations regarding the use of safety gear.

7.2.6 Indicate there is an inherent risk in the participation of skatepark activities. Users of skateparks, by participation, accept the risks inherent in such participation of which the ordinary prudent person is or should be aware. Users have a duty to exercise good judgment and act in a responsible manner while using the skatepark and obey all oral or written warnings, or both, prior to or during participation, or both.

7.2.7 Indicate users have a duty not to participate in or on any skatepark while under the influence of drugs or alcohol.

7.2.8 Shall be readily visible to the intended viewers/users as in accordance with Section 8.2 and Annex B3.28: B3.29 and B3.2.11-13 of ANSI 2535.4.

7.2.9 Sign type shall be the same style as in accordance with ANSI 2535.4B.

8. Maintenance

8.1 *Skatepark*—The designer or manufacturer or constructor of the skatepark shall provide to the owner/operator clear and concise inspection, maintenance, and repair instructions, including, but not limited to, what, when, and how to inspect maintain, and repair.

8.2 *Riding Surface*—The owner/operator shall maintain all riding surfaces within the skatepark free from extraneous materials that could cause injury and eliminate all holes, ruts, or tripping hazards that could cause injury.

8.3 *Records*—The owner/operator shall establish and maintain detailed installation, inspection, maintenance, and repair records for each skatepark.

9. Keywords

9.1 bid documents; concrete; consolidation; durable; in-ground; riding surface; skatepark