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Standard Guide for Design and Construction of Low-Rise Frame Building Wall Systems to Resist Water Intrusion¹

This standard is issued under the fixed designation E2266; 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 describes design, specification, selection, installation, and inspection of new building wall systems, exterior deck and stair components, doors, windows, penetrations and sealant joints of wood and metal frame buildings, typically four stories or less, to minimize water intrusion.

1.2 This guide does not address prevention of damage caused by water originating from the use of wet building materials or from indoor or outdoor humidity. Water from these sources can be important, and the potential for damage caused by water from these sources must not be overlooked in building design or construction.

1.3 This guide does not address roofing systems, except when the surface of a deck also serves as a roof and at locations where roof systems interface with building walls.

1.4 This guide does not address any type of barrier wall system.

1.5 This guide does not address any exterior insulation and finish system (EIFS).

1.6 This guide does not address foundation conditions where the bottom of a slab on grade or the grade of a crawl space is at or below the water table or subject to hydrostatic pressure.

1.7 This guide is intended to supplement and not duplicate building code requirements.

1.8 Maintenance, although important, is not covered in detail.

1.9 Application of finishes, such as paint and sealers, may be important in the performance of some types of cladding; however, this is not covered in detail.

1.10 This standard applies only to constructions with sheathing, which facilitates installation of the weather-resistive barrier and associated flashings in a common plane.

1.11 *This standard may involve hazardous materials, operations, and equipment. 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 requirements prior to use.

1.12 Organization of Document:

	Section
Scope	1
Referenced Documents	2
Terminology	3
Summary of Guide	4
Significance and Use	5
General Design Principles	6
Design Practices	7
General Guidelines	8
Drainage Walls	9
Drainage Walls—General	9.1
Drainage Wall Cladding—Portland Cement Plaster (Stucco)	9.2
Drainage Wall Cladding—Wood and Wood-Derived Products	9.3
Drainage Wall Cladding—Vinyl Siding	9.4
Drainage Wall Cladding—Fiber-Cement Siding	9.5
Cavity Drainage Walls	10
Cavity Drainage Walls—General	10.1
Cavity Drainage Wall Cladding—Masonry	10.2
Wood Framed Decks and Stairs with Exposed Framing and Decking	11
Plaza Decks or Stairs with Enclosed Framing and a Waterproofing Membrane with Separate Wearing Surfaces	12
Plaza Decks or Stairs with Enclosed Framing and a Waterproofing Membrane with an Integral Wearing Surface	13
Windows, Doors, and Similar Wall Penetrations	14
Special Wall Configuration	15
Exterior Sealant Joints	16
Keywords	17
Appendix—Additional Resources	Appendix X1

2. Referenced Documents

2.1 ASTM Standards:²

- A123/A123M Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- A153/A153M Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- C43 Terminology of Structural Clay Products³
- C55 Specification for Concrete Building Brick
- C62 Specification for Building Brick (Solid Masonry Units)

¹ This guide is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.55 on Exterior Building Wall Systems.

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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 Withdrawn. The last approved version of this historical standard is referenced on www.astm.org.

- Made From Clay or Shale)
- C67** Test Methods for Sampling and Testing Brick and Structural Clay Tile
- C90** Specification for Loadbearing Concrete Masonry Units
- C126** Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units
- C150** Specification for Portland Cement
- C168** Terminology Relating to Thermal Insulation
- C216** Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale)
- C270** Specification for Mortar for Unit Masonry
- C652** Specification for Hollow Brick (Hollow Masonry Units Made From Clay or Shale)
- C717** Terminology of Building Seals and Sealants
- C755** Practice for Selection of Water Vapor Retarders for Thermal Insulation
- C836** Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
- C896** Terminology Relating to Clay Products
- C898** Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with Separate Wearing Course
- C920** Specification for Elastomeric Joint Sealants
- C926** Specification for Application of Portland Cement-Based Plaster
- C957** Specification for High-Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane With Integral Wearing Surface
- C981** Guide for Design of Built-Up Bituminous Membrane Waterproofing Systems for Building Decks
- C1063** Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster
- C1088** Specification for Thin Veneer Brick Units Made From Clay or Shale
- C1127** Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with an Integral Wearing Surface
- C1180** Terminology of Mortar and Grout for Unit Masonry
- C1186** Specification for Flat Fiber-Cement Sheets
- C1193** Guide for Use of Joint Sealants
- C1209** Terminology of Concrete Masonry Units and Related Units³
- C1232** Terminology of Masonry
- C1299** Guide for Use in Selection of Liquid-Applied Sealants
- C1400** Guide for Reduction of Efflorescence Potential in New Masonry Walls
- C1405** Specification for Glazed Brick (Single Fired, Brick Units)
- D226** Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
- D779** Test Method for Water Resistance of Paper, Paperboard, and Other Sheet Materials by the Dry Indicator Method
- D1079** Terminology Relating to Roofing and Waterproofing
- D1970** Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
- D3679** Specification for Rigid Poly(Vinyl Chloride) (PVC) Siding
- D4477** Specification for Rigid (Unplasticized) Poly(Vinyl Chloride) (PVC) Soffit
- D4756** Practice for Installation of Rigid Poly(Vinyl Chloride) (PVC) Siding and Soffit
- D5843** Guide for Application of Fully Adhered Vulcanized Rubber Sheets Used in Waterproofing
- D5898** Guide for Details for Adhered Sheet Waterproofing
- D5957** Guide for Flood Testing Horizontal Waterproofing Installations
- D6134** Specification for Vulcanized Rubber Sheets Used in Waterproofing Systems
- D6135** Practice for Application of Self-Adhering Modified Bituminous Waterproofing
- D6622** Guide for Application of Fully Adhered Hot-Applied Reinforced Waterproofing Systems
- D6864** Specification for Color and Appearance Retention of Solid Colored Plastic Siding Products
- E241** Guide for Limiting Water-Induced Damage to Buildings
- E331** Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- E514** Test Method for Water Penetration and Leakage Through Masonry
- E547** Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference
- E631** Terminology of Building Constructions
- E1105** Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference
- E1677** Specification for an Air Barrier (AB) Material or System for Low-Rise Framed Building Walls
- E1825** Guide for Evaluation of Exterior Building Wall Materials, Products, and Systems
- E2112** Practice for Installation of Exterior Windows, Doors and Skylights
- F1667** Specification for Driven Fasteners: Nails, Spikes, and Staples
- 2.2 *American Architectural Manufacturers Association (AAMA):*⁴
- ANSI/AAMA/NWWDA 101/I.S. 2-97 Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors
- ANSI/AAMA/WDMA 101/I.S. 2/NAFS-02 Voluntary Performance Specification for Windows, Skylights, and Glass Doors
- 501** Methods of Test for Metal Curtain Walls

⁴ Available from American Architectural Manufacturers Association (AAMA), 1827 Walden Office Square, Suite 550, Schaumburg, IL 60196-1228.

501.2 Field Check of Metal Curtain Walls for Water Leakage

502 Voluntary Specification for Field Testing of Windows and Sliding Doors

850 Fenestration Sealants Guide Manual

IM-TM InstallationMasters Training Manual Window Selection Guide

2.3 *American Concrete Institute (ACI)*:⁵

ACI 524 Guide to Portland Cement Plastering

2.4 *American National Standards Institute (ANSI)*:⁶

ANSI/ASCE 7 Building Code Requirements for Minimum Design Loads in Buildings and Other Structures

ANSI/AHA A135.6 American National Standard for Hardboard Siding

ANSI/AAMA/NWDA 101/I.S. 2-97 Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors

ANSI/AAMA/WDMA 101/I.S. 2/NAFS-02 Voluntary Performance Specification for Windows, Skylights, and Glass Doors

2.5 *American Wood-Preservers' Association (AWPA)*:⁷

AWPA C2 Lumber, Timbers, Bridge Ties and Mine Ties, Pressure Treatment

AWPA C28 Preservative Treatment by Pressure Processes of Structural Glue Laminated Members and Laminations Before Gluing

AWPA M4 Care of Pressure Treated Wood Products

2.6 *APA—The Engineered Wood Association (APA)*:⁸

303 Siding Manufacturing Specifications

Avoiding Moisture Accumulation in Walls

Buckling of Wood-Based Panel Siding

Installation of Stucco Exterior Finish Over Wood Structural Panel Wall Sheathing

Product Guide, Performance Rated Sidings

2.7 *Brick Industry Association (BIA)*:⁹

Technical Notes on Brick Construction

2.8 *Canadian Construction Materials Centre (CCMC)*:¹⁰

NRCC-45-673 Technical Guide for Sheathing, Membrane, Breather-Type

2.9 *Canadian General Standards Board (CGSB)*:¹¹

CAN/CGSB 51.32-M77 Sheathing, Membrane, Breather Type

2.10 *Canadian Mortgage and Housing Corporation (CMHC)*:¹²

Wood-Frame Envelopes in the Coastal Climate of British Columbia

2.11 *Cedar Shake and Shingle Bureau (CSSB)*:¹³

Wall Construction Manual

Grading Rules for Certigrade Red Cedar Shingles

Grading Rules for Certi-Split Red Cedar Shakes

Grading Rules for Tapersawn Red Cedar Shakes

2.12 *Composite Panel Association (CPA)*:¹⁴

ANSI/AHA 135.6 Hardboard Siding

Recommended Basic Application Instructions for Hardboard Siding

Coatings Specification for Field-Applied Coatings on Hardboard Siding

Finishing Recommendations for New Construction Using Unprimed and Primed Hardboard Siding

Maintenance Tips for Hardboard Siding

2.13 *Federal Specification (FS)*:¹⁵

UU B 790a Building Paper

2.14 *ICC Evaluation Service Inc (ICC-ES)*:¹⁶

AC38 Acceptance Criteria for Weather-Resistive Barriers

AC39 Acceptance Criteria for Walking Decks

2.15 *Minnesota Lath & Plaster Bureau (MLPB)*:¹⁷

Stucco in Residential Construction

2.16 *National Concrete Masonry Association (NCMA)*:¹⁸

NCMA TEK Bulletins

2.17 *National Roofing Contractors Association (NRCA)*:¹⁹

The NRCA Roofing and Waterproofing Manual

2.18 *Northeastern Lumber Manufacturers Association (NeLMA)*:²⁰

Standard Grading Rules for Northeastern Lumber

2.19 *Northwest Wall and Ceiling Bureau (NWCW)*:²¹

Stucco Resource Guide

2.20 *Portland Cement Association (PCA)*:²²

Portland Cement (Stucco) Manual

¹² Available from Canadian Mortgage and Housing Corporation, 2600 Granville Street, Suite 400, Vancouver, BC V6H 3H7, Canada.

¹³ Available from Cedar Shake and Shingle Bureau, 515 116th Avenue NE, Suite 275, Bellevue, WA.

¹⁴ Available from Composite Panel Association (CPA), 18922 Premier Court, Gaithersburg, MD.

¹⁵ Available from General Services Administration (GSA), F and 18th Sts., NW, Washington, DC 20405.

¹⁶ The ICC Evaluation Service is reviewing Acceptance Criteria previously issued by the ICBO Evaluation Service. At the publication of this standard, AC38 and AC39 are considered Interim Criteria. ICC Evaluation Service, Inc., 5360 Workman Mill Rd., Whittier, CA 90601-2298, (562)-699-0543. www.icc-es.org

¹⁷ Available from Minnesota Lath and Plaster Bureau, 820 Transfer Road, St. Paul, MN 55114.

¹⁸ Available from National Concrete Masonry Association (NCMA), 13750 Sunrise Valley Drive, Herndon, VA 20171-3499.

¹⁹ Available from National Roofing Contractors Association (NRCA), 10255 W. Higgins Road Suite 600, Rosemont, IL 60018.

²⁰ Available from Northeastern Lumber Manufacturers Association (NLMA), 272 Tuttle Road, P.O. Box 87A, Cumberland Center, ME 04021.

²¹ Available from Northwest Wall and Ceiling Bureau, 1032-A NE 65th Street, Seattle, WA 98115.

²² Available from Portland Cement Association, 5420 Old Orchard Road, Skokie, Illinois 60077.

⁵ Available from American Concrete Institute (ACI), P.O. Box 9094, Farmington Hills, MI 48333.

⁶ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

⁷ Available from American Wood-Preservers' Association (AWPA), P.O. Box 5690, Granbury, TX 76049.

⁸ Available from APA – The Engineered Wood Association, P.O. Box 11700, Tacoma, Washington 98411-0700.

⁹ Available from Brick Industry Association (BIA), 11490 Commerce Park Drive, Reston, VA 20191.

¹⁰ Available from Canadian Construction Materials Centre, Institute for Research in Construction, National Research Council Canada, Montreal Road, Building M-24, Ottawa, Ontario K1A R6.

¹¹ Available from Canadian General Standards Board, Gatineau, Canada K1A1G6.

- 2.21 *Redwood Inspection Service (RIS)*:²³
Standard Specifications for Grades of California Redwood Lumber
- 2.22 *Sealant Waterproofing and Restoration Institute (SWRI)*:²⁴
Sealants: The Professional's Guide
- 2.23 *Sheet Metal and Air Conditioning Contractors National Association (SMACNA)*:²⁵
Architectural Sheet Metal Manual
Residential Sheet Metal Guidelines
- 2.24 *Southern Pine Council (SPC)*:²⁶
A Guide to Southern Pine Siding
- 2.25 *Southern Pine Inspection Bureau (SPIB)*:²⁷
Standard Grading Rules for Southern Pine Lumber
- 2.26 *Single-Ply Roofing Industry (SPRI)*:²⁸
Flexible Membrane Roofing: A Professional's Guide to Specifications
- 2.27 *Texas Lathing and Plastering Contractors Association (TLPC)*:²⁹
Lath and Plaster Systems Manual
- 2.28 *Tile Council of America (TCA)*:³⁰
The Ceramic Tile Handbook
- 2.29 *U.S. Department of Agriculture, Forest Service, Forest Products Laboratory (USDC-FPL)*:³¹
Gen. Tech. Rep. FPL-GTR-113 Wood Handbook—Wood as an Engineering Material
- 2.30 *U.S. Department of Commerce, National Institute of Standards and Technology (USDC-NIST)*:³²
DOC PS 20 American Softwood Lumber Standard
- 2.31 *Vinyl Siding Institute (VSI)*:³³
Installation: A How To Guide
- 2.32 *West Coast Lumber Inspection Bureau (WCLIB)*:³⁴
Standard No. 17 Grading Rules for West Coast Lumber
- 2.33 *Western Red Cedar Lumber Association (WRCLA)*:³⁵
Installing Siding

- 2.34 *Western States Clay Products Association*:³⁶
Design Guide for Anchored Brick Veneer Over Steel Studs
- 2.35 *Western Wood Products Association (WWPA)*:³⁷
Natural Wood Siding: Selection Installation and Finishing
Western Wood Grading Rules
- 2.36 *Window and Door Manufacturers Association Standards (WDMA)*:³⁸
WDMA I.S. 4 Water-Repellent Preservative Non-Pressure Treatment for Millwork

3. Terminology

3.1 *Definitions*—For terms used in this standard, refer to Terminology **E631**. For an explanation of terms that may be used in referenced documents refer to Terminologies **C43**, **C168**, **C717**, **C896**, **C1180**, **C1209**, **C1232**, and **D1079**.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *air retarder (AR)*—also commonly referred to as “air barrier” and “house wrap,” a material or system in building construction that is designed and installed to reduce air leakage either into or through an opaque wall. Refer to Specification **E1677**.

3.2.2 *barrier wall*—type of wall system that is intended to manage all precipitation at the exterior surface of the cladding and associated sealants and flashings. These walls are designed to prevent water intrusion by a combination of a water barrier on the exterior surface and temporary absorption of water.

3.2.2.1 *Discussion*—These wall systems consist of the exterior surface of the wall and the exterior surface of fenestration products, usually connected by a sealant joint. Barrier wall systems may include fenestration systems that collect and drain water to the exterior.

3.2.3 *building wall components*—materials that function as or are designated as being essential to the effective weatherproofing of the building.

3.2.4 *cladding*—the outermost component of the wall system that provides resistance to intrusion of water originating as precipitation into the wall. Examples of cladding are portland cement plaster (stucco), wood and wood-based siding, wood shingles, masonry veneer, and vinyl and aluminum siding.

3.2.5 *deck*—a horizontal surface intended for human occupancy or use that is exposed to the weather.

3.2.6 *drainage wall*—a wall system in which the cladding provides a substantial barrier to water intrusion, but which also incorporates means for dissipating water that may circumvent the cladding. For purposes of this standard a drainage wall is assumed to incorporate a concealed weather-resistive barrier over which drainage, away from water-sensitive components of the wall, may occur. In addition to drainage behind the cladding, evaporation may play an important role in dissipating moisture in some types of cladding.

3.2.7 *drainage wall, cavity*—a type of drainage wall characterized by a vertical air space, which is either wholly or

²³ Available from Redwood Inspection Service, Division of the California Redwood Association, 405 Enfronte Dr., Suite 200, Novato, CA 94949-7206.

²⁴ Available from Sealant Waterproofing & Restoration Institute, 816-472-7974, fax 816-472-7765.

²⁵ Available from Sheet Metal and Air Conditioning Contractors' National Association, 4201 Lafayette Center Dr., Chantilly, VA, 20151-1209.

²⁶ Available from Southern Pine Council, P.O. Box 641700, Kenner, LA 70064.

²⁷ Available from The Southern Pine Inspection Bureau, 4709 Scenic Highway, Pensacola, FL 32504-9094.

²⁸ Available from Single-Ply Roofing Industry (SPRI), 200 Reservoir Street, Suite 309A, Needham, MA 02494.

²⁹ Available from Texas Lathing and Plastering Contractors Association, 1615 West Abram, Suite 101, Arlington, TX 76013.

³⁰ Available from Tile Council of America, Inc., 100 Clemson Research Blvd., Anderson, SC 29625.

³¹ Available in electronic form at www.fpl.fs.fed.us/ Available in printed form from the U.S. Government Printing Office, 732 N. Capitol Street, NW Washington, DC 20401 bookstore.gpo.gov/index.html

³² Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 3460, Gaithersburg, MD 20899-3460.

³³ Available from Vinyl Siding Institute (VSI), 1801 K Street NW, Suite 600K, Washington, DC 20006-1301.

³⁴ Available from West Coast Lumber Inspection Bureau, P.O. Box 23145, Portland, OR 97281.

³⁵ Available from Western Red Cedar Lumber Association, 1501 West Pender Street, Pender Place 1, Business Building, Vancouver, B.C. Canada V6C1GB.

³⁶ Available from Western States Clay Products Association, 2550 Beverly Blvd, Los Angeles, CA 90057-1019.

³⁷ Available from Western Wood Products Association, 522 SW Fifth Ave., Suite 500, Portland, Oregon 97204-2122.

³⁸ Available from Window and Door Manufacturers Association (WDMA), 1400 East Touhy Avenue, Suite 470, Des Plaines, IL 60018.

substantially unobstructed, between the weather-resistive barrier and the back surface of the cladding system. The space between the weather-resistive barrier and the cladding may be bridged, depending on the type of cladding, by masonry ties, vertical furring, or open-mesh synthetic polymer media.

3.2.8 *exterior wall*—a wall or wall component that defines the exterior boundary of a building.

3.2.9 *flashing*—a component or system typically composed of sheet material that is employed at interfaces between building components for the purpose of diverting water directly to the exterior or onto the weather-resistive barrier.

3.2.10 *frame building*—a building in which the walls and roofs are supported structurally by wood or light steel framing. Exterior surfaces typically are finished with cladding systems.

3.2.11 *hold points*—times in the course of construction where specific components are to be inspected prior to application or installation of covering components.

3.2.12 *low-rise*—a structure consisting of four or fewer stories of frame construction.

3.2.13 *manufacturer's recommendations*—design, application, or construction recommendations provided by the manufacturer or vendor of a product or system by means of mass-distributed product literature, catalogs, internet web sites or manuals. Manufacturers may also authorize individuals to issue project-specific recommendations.

3.2.14 *maintenance interval*—the period of time a building component will function successfully without requiring action to achieve its service life.

3.2.15 *maintenance manual*—a document organized by building components or systems in the CSI³⁹ or other format agreeable to the owner, which includes, at a minimum, the following: original drawings and specification, as-built changes, warranties and guarantees, vendor-provided maintenance instructions, anticipated maintenance life, anticipated service life, maintenance recommendations and requirements, and names, addresses and phone numbers of subcontractors and installers.

3.2.16 *pan flashing*—a type of flashing used at the base of large openings or penetrations, such as doors or windows. Pan flashings are designed to collect water and drain water directly to the exterior or onto the weather-resistive barrier. Pan flashings have an upturned inner leg and upturned end legs, which form a three-sided pan.

3.2.17 *plaza deck*—a deck, the components of which are covered with materials or systems intended to protect the structure and/or enclosed areas below from precipitation or irrigation water.

3.2.18 *portland cement plaster (stucco) system*—systems include plaster, with portland cement and aggregate, and typically on frame buildings, metallic lath. Portland cement plaster (stucco) cladding may also include adhered veneer such as thin brick, ceramic and thin stone veneer.

3.2.18.1 *Discussion*—For portland cement refer to Specification C150. For lathing and furring installation refer to Specification C1063. For portland cement plaster application refer to Specification C926.

3.2.19 *protected membrane plaza deck*—a plaza deck constructed with the waterproof membrane placed directly over the structural deck surface (usually concrete or wood panel sheathing) with a separate traffic-bearing surface, such as concrete, ceramic tile, or pedestal-supported pavers placed on top of the membrane.

3.2.20 *saddle flashing*—a type of flashing which covers the intersecting joint between a vertical surface and horizontal penetration or appendage, such as the right-angle intersection of a beam penetrating a wall, or the intersection of a parapet to a wall.

3.2.21 *self-adhering flashing*—some materials comply with Specification D1970. This term applies to membrane systems of several types in which modified asphalt or butyl rubber adhesive is applied in the factory to sheets of polyethylene, polypropylene, or foil to a total thickness of 0.5 to 1.5 mm (0.020 to 0.060 in).

3.2.21.1 *Discussion*—This material, which is generally not intended for exposed use, can be used for areas requiring additional durability or resistance to wind-driven rain, such as flashing, reinforcement of corners, and as a lap sealant. When self-adhering flashings are used in conjunction with a weather-resistive barrier, the materials should be compatible. These types of membranes have very low vapor permeance, and as such, should be used with caution when applied over large areas or entire wall surfaces.

3.2.22 *service life*—the period of time a building component or system will function successfully without replacement or excessive repair, assuming reasonable or expected periodic maintenance is performed.

3.2.23 *sheathing*—a rigid panel material fastened to the exterior surfaces of wall framing members, which provides a continuous plane interrupted only by intentional wall openings (such as those for fenestration units) and by small panel spacing gaps.

3.2.24 *soffit*—the underside of exposed horizontal surfaces, such as plaza decks, bay windows, roof overhangs, and heads of recessed window and door openings.

3.2.25 *water intrusion*—water originating as precipitation that penetrates beyond the weather-resistive barrier of the wall.

3.2.25.1 *Discussion*—Water that penetrates past the outermost surface of a drainage wall and beyond the weather-resistive barrier that has the potential to cause deterioration of sheathing or framing. If the water penetrates in sufficient quantities or occurs chronically, the deterioration may be significant. Larger amounts of water intrusion may also result in obvious leakage to the interior and damage to the interior wall finishes, interior furnishings and equipment. Damage to framing and sheathing can occur without obvious visible leakage to the interior.

3.2.26 *weather-resistive barrier*—the concealed barrier in a drainage wall system installed in exterior building walls before the installation of cladding.

³⁹ The Construction Specifications Institute, 99 Canal Center Plaza, Suite 300, Alexandria, Virginia 22314-1791 800-689-2900, 703-684-0300, fax 703-684-0465. MasterFormat 1995 Edition Master List of Numbers and Titles for the Construction Industry This revised guide is used to classify construction resources, including project information, products, and human effort. The five-digit numbering system organizes construction specifications, project manuals, cost estimates, and data files.