



Designation: E1700 – 16

Standard Classification for Serviceability of an Office Facility for Structure and Building Envelope^{1,2}

This standard is issued under the fixed designation E1700; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This classification covers matched sets of scales (see Figs. 1-24) for classifying an aspect of the serviceability of an office facility, that is, the capability of an office facility to meet certain possible requirements for structure and building envelope.

1.2 Within that aspect of serviceability, each matched set of scales (see Figs. 1-24) is for classifying one topic of serviceability. Each topic is typically broken down into two more demand functions and supply features. Each paragraph in an Occupant Requirement Scale summarizes one level of serviceability on that function, which occupants might require. The matching entry in the Facility Rating Scale is a translation of the requirement into a description of certain features of a facility which, taken in combination, indicate that the facility is likely to meet that level of required serviceability.

1.3 The entries in the Facility Rating Scale (see Figs. 1-24) are indicative and not comprehensive. They are for quick scanning, to estimate approximately, quickly, and economically, how well an office facility is likely to meet the needs of one or another type of occupant group, over time. The entries are not for measuring, knowing, or evaluating how an office facility is performing.

1.4 This classification can be used to estimate the level of serviceability of an existing facility. It can also be used to estimate the serviceability of a facility that has been planned but not yet built, such as one for which single-line drawings and outline specifications have been prepared.

1.5 This classification indicates what would cause a facility to be rated at a certain level of serviceability, but does not state how to conduct a serviceability rating nor how to assign a

serviceability score. That information is found in Practice E1679. The scales in Figs. 1-24 are complimentary to and compatible with Practice E1679. Each requires the other.

1.6 The scales are intended to identify the levels of various requirements unique to a particular user, and the serviceability (capability) of a building to meet those requirements. The scales thus supplement rather than include code requirements. It remains the responsibility of designers, builders, and building managers to meet applicable code requirements relative to their respective roles in facility design, construction, and ongoing management.

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

1.8 *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:*³

E631 Terminology of Building Constructions

E1660 Classification for Serviceability of an Office Facility for Support for Office Work

E1665 Classification for Serviceability of an Office Facility for Facility Protection

E1667 Classification for Serviceability of an Office Facility for Image to the Public and Occupants

E1669 Classification for Serviceability of an Office Facility for Location, Access and Wayfinding

E1679 Practice for Setting the Requirements for the Serviceability of a Building or Building-Related Facility, and for Determining What Serviceability is Provided or Proposed

¹ This classification is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.25 on Whole Buildings and Facilities.

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² Portions of this document are based on material originally prepared by the International Centre for Facilities (ICF) and © 1993 by ICF and Minister of Public Works and Government Services Canada. Their cooperation in the development of this standard is acknowledged.

³ 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.

2.2 ISO Documents:⁴

ISO 6240 International Standard, Performance Standards in Building—Contents and Presentation

ISO/DIS 7162 Draft International Standard, Performance Standards in Building—Contents and Format of Standards for Evaluation of Performance

ISO/DIS 7164 Draft International Standard, Performance Standards in Building—Definitions and Means of Expression for the Performance of a Whole Building

3. Terminology

3.1 Definitions:

3.1.1 *facility, n*—a physical setting used to serve a specific purpose.

3.1.1.1 *Discussion*—A facility may be within a building, or a whole building, or a building with its site and surrounding environment; or it may be a construction that is not a building. The term encompasses both the physical object and its use.

3.1.2 *facility serviceability*—the capability of a facility to perform the function(s) for which it is designed, used, or required to be used.

3.1.2.1 *Discussion*—The scope of this performance is of the facility as a system, including its subsystems, components, and materials and their interactions, such as acoustical, hydrothermal, air purity, and economic; and of the relative importance of each performance requirement.

3.1.3 *office*—a place, such as a room, suite, or building, in which business, clerical, or professional activities are conducted.

3.1.4 For standard definitions of additional terms applicable to this classification, as well as those in 3.1.1 – 3.1.3, see Terminology **E631**.

4. Significance and Use

4.1 Each Facility Rating Scale in this classification (see **Figs. 1-24**) provides a means to estimate the level of service-

ability of a building or facility for one topic of serviceability, and to compare that level against the level of any other building or facility.

4.2 This classification can be used for comparing how well different buildings or facilities meet a particular requirement for serviceability. It is applicable despite differences such as location, structure, mechanical systems, age, and building shape.

4.3 This classification can be used to estimate the amount of variance of serviceability from target or from requirement, for a single office facility, or within a group of office facilities.

4.4 This classification can be used to estimate the following:

4.4.1 Serviceability of an existing facility for uses other than its present use.

4.4.2 Serviceability (potential) of a facility that has been planned but not yet built.

4.4.3 Serviceability (potential) of a facility for which a remodeling has been planned.

4.5 Use of this classification does not result in building evaluation or diagnosis. Building evaluation or diagnosis generally requires a special expertise in building engineering or technology, and the use of instruments, tools, or measurements.

4.6 This classification applies only to facilities that are building constructions, or parts thereof. (While this classification may be useful in rating the serviceability of facilities that are not building constructions, such facilities are outside the scope of this classification.)

5. Basis of Classification

5.1 The scales in **Figs. 1-24** contain the basis for classification.

5.2 Instructions for use of this classification are contained in Practice **E1679**.

6. Keywords

6.1 basements; buildings; building envelope and structures; facility; facility occupants; functions; offices; performances; ratings; rating scales; requirements; roofs; serviceability; serviceability of; structure and building envelopes; walls (external) and projections

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

DEMAND B.1.1.	Typical Office floors
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Demand Scales in this Topic: B.1.1. Information on allowable loading
Subject Matter: Occupants' requirements for information on the ability of existing office floors to support special load conditions, their extent, and location.
Notes: Related occupant requirement scales for floor loading, levelness, and evenness are found in Topic A.1.5 of E1660.

From the options below, please select the level that best describes the REQUIREMENT.

Requirement Level	DEMAND	B.1.1. Information on allowable loading
9 <input type="radio"/>	Occupants require very easy access to information, e.g. original structural drawings, calculations, specifications, and special engineering studies.	
8 <input type="radio"/>		
7 <input type="radio"/>	Occupants require easy access to information, e.g. essential data in an Asset Management Plan.	
6 <input type="radio"/>		
5 <input type="radio"/>	Occupants require reasonable access to information, e.g. by request from the local jurisdiction having authority.	
4 <input type="radio"/>		
3 <input type="radio"/>	Occupants accept difficult access to information, e.g. the cost, time, and effort of engineering services that can rely on direct inspection.	
2 <input type="radio"/>		
1 <input type="radio"/>	Occupants accept very difficult access to information, e.g. the cost, time, and effort of engineering services require destructive sampling, testing, and repairs.	
0 <input type="radio"/>	No requirement.	
Select Relative Importance of scale = <input type="radio"/> <input type="radio"/> <input type="radio"/> <div style="display: flex; justify-content: space-around; width: 100%;"> Extremely Important Important Minor Importance </div>		
Select Threshold Level of Scale: First, indicate whether Threshold Level of scale is a <input type="radio"/> Minimum OR <input type="radio"/> Maximum OR, if there is NO Maximum or Minimum Threshold level, then select <input type="radio"/> None .		
Then, (unless there is none) select the Threshold Level of this scale <div style="text-align: center;"> <input type="radio"/> 9 <input type="radio"/> 8 <input type="radio"/> 7 <input type="radio"/> 6 <input type="radio"/> 5 <input type="radio"/> 4 <input type="radio"/> 3 <input type="radio"/> 2 <input type="radio"/> 1 </div>		
If unable to choose scale level, select <input type="checkbox"/> OTHER and indicate reason below:		
<input type="checkbox"/> Lack Information <input type="checkbox"/> Postpone decision <input type="checkbox"/> In-depth evaluation required <input type="checkbox"/> Not applicable <input type="checkbox"/> Refer question to someone else: Whom? e-mail or phone?		

FIG. 1 Demand Scale B.1.1 for Information on Allowable Loading

SUPPLY B.1.1.	Typical office floors
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Supply Scales in this Topic: B.1.1. Information on allowable loading
Subject Matter: The availability of information on the ability of existing office floors to support special load conditions, their extent, and location.
Notes: Related rating scales for floor loading, levelness, and evenness are found in Topic A.1.5 of E1660.

From the options below, please select the level that best describes the RATING.

Rating Level	SUPPLY	B.1.1. Information on allowable loading
9 <input type="radio"/>		Information is very easy to obtain, e.g. original construction documents are available on-site to occupants.
8 <input type="radio"/>		
7 <input type="radio"/>		Information is easy to obtain, e.g. essential data can be found in an Asset Management Plan.
6 <input type="radio"/>		
5 <input type="radio"/>		Information is reasonable to obtain, e.g. the local jurisdiction having authority has construction documents archived.
4 <input type="radio"/>		
3 <input type="radio"/>		Information is difficult to obtain, e.g. engineering services that can rely on drawings and direct inspection are required.
2 <input type="radio"/>		
1 <input type="radio"/>		Information is very difficult to obtain, e.g. engineering services require destructive sampling, testing, and repairs.
0 <input type="radio"/>		No information is available.
If unable to choose scale level, select <input type="checkbox"/> OTHER and indicate reason below:		
<input type="checkbox"/> Lack Information <input type="checkbox"/> Postpone decision <input type="checkbox"/> In-depth evaluation required <input type="checkbox"/> Not applicable <input type="checkbox"/> Refer question to someone else: Whom? e-mail or phone?		

<https://standards.iteh.ai/catalog/standards/sist/ff564d53-273c-4ff1-fbfc9-d22e8d802507/astm-e1700-16>

FIG. 2 Supply Scale B.1.1 for Information on Allowable Loading

DEMAND B.1.2	External walls and projections
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Demand Scales in this Topic:

- B.1.2.1 Permanence of exterior finishes
- B.1.2.2 Weathertightness at exterior walls
- B.1.2.3 Condition of exterior walls and projections

Subject Matter: Occupants' requirements for the physical condition of the exterior of a building, as distinct from the perceived quality of the exterior.

Notes:

1. Perceived quality of the exterior is dealt with in Topic A.11 Image to public and occupants of E1667.
2. Related occupant requirement scales for the weathertightness of exterior doors and windows and the roof are dealt with in scales B.1.3.1 and B.1.4 respectively.

From the options below, please select the level that best describes the REQUIREMENT.

Requirement Level	DEMAND	B.1.2.1. Permanence of exterior finishes
9 <input type="radio"/>	The expected replacement life of exterior finishes must be greater than 75 years.	
8 <input type="radio"/>		
7 <input type="radio"/>	The expected replacement life of exterior finishes must be greater than 50 years up to 75 years.	
6 <input type="radio"/>		
5 <input type="radio"/>	The expected replacement life of exterior finishes should be greater than 40 years up to 50 years.	
4 <input type="radio"/>		
3 <input type="radio"/>	The expected replacement life of exterior finishes can be greater than 30 years up to 40 years.	
2 <input type="radio"/>		
1 <input type="radio"/>	The expected replacement life of exterior finishes does not have to exceed 30 years.	
0 <input type="radio"/>	No requirement.	

Select **Relative Importance** of **scale** = Extremely Important Important Minor Importance

Select **Threshold Level of Scale:** First, indicate whether Threshold Level of **scale** is a **Minimum** OR **Maximum** OR, if there is NO Maximum or Minimum Threshold level, then select **None**.

Then, (unless there is none) select the **Threshold Level** of this **scale**
 9 8 7 6 5 4 3 2 1

If unable to choose scale level, select **OTHER** and indicate reason below:

Lack Information Postpone decision In-depth evaluation required Not applicable

Refer question to someone else: Whom? e-mail or phone?

FIG. 3 Demand Scale B.1.2.1 for Permanence of Exterior Finishes

Requirement Level	DEMAND	B.1.2.2. Weathertightness at exterior walls
9 <input type="radio"/>	Occupants cannot accept any signs of moisture penetration at the inside surface of exterior walls.	
8 <input type="radio"/>		
7 <input type="radio"/>	Occupants can accept isolated signs of minor moisture penetration at the inside surface of exterior walls.	
6 <input type="radio"/>		
5 <input type="radio"/>	Occupants can accept some minor signs of moisture penetration at the inside surface of exterior walls.	
4 <input type="radio"/>		
3 <input type="radio"/>	Occupants can accept noticeable signs of moisture penetration at the inside surface of exterior walls.	
2 <input type="radio"/>		
1 <input type="radio"/>	Occupants can accept signs of moisture penetration at the inside surface of exterior walls provided there is no moisture damage to work products, furnishings, or equipment or negative health impacts from associated mold.	
0 <input type="radio"/>	No requirement.	
Select Relative Importance of scale = <input type="radio"/> Extremely Important <input type="radio"/> Important <input type="radio"/> Minor Importance		
Select Threshold Level of Scale : First, indicate whether Threshold Level of scale is a <input type="radio"/> Minimum OR <input type="radio"/> Maximum OR, if there is NO Maximum or Minimum Threshold level, then select <input type="radio"/> None .		
Then, (unless there is none) select the Threshold Level of this scale <input type="radio"/> 9 <input type="radio"/> 8 <input type="radio"/> 7 <input type="radio"/> 6 <input type="radio"/> 5 <input type="radio"/> 4 <input type="radio"/> 3 <input type="radio"/> 2 <input type="radio"/> 1		
If unable to choose scale level, select <input type="checkbox"/> OTHER and indicate reason below:		
<input type="checkbox"/> Lack Information <input type="checkbox"/> Postpone decision <input type="checkbox"/> In-depth evaluation required <input type="checkbox"/> Not applicable <input type="checkbox"/> Refer question to someone else: Whom? e-mail or phone?		

FIG. 4 Demand Scale B.1.2.2 for Weathertightness at Exterior Walls

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Requirement Level	DEMAND	B.1.2.3. Condition of exterior walls and projections
9 <input type="radio"/>		Occupants require exterior to be in like-new condition.
8 <input type="radio"/>		
7 <input type="radio"/>		Occupants require exterior to be in good condition.
6 <input type="radio"/>		
5 <input type="radio"/>		Occupants can accept exterior with some minor signs of deterioration.
4 <input type="radio"/>		
3 <input type="radio"/>		Occupants can accept exterior with noticeable signs of deterioration.
2 <input type="radio"/>		
1 <input type="radio"/>		Occupants can accept exterior with extensive signs of deterioration.
0 <input type="radio"/>		No requirement.
Select Relative Importance of scale = <input type="radio"/> Extremely Important <input type="radio"/> Important <input type="radio"/> Minor Importance		
Select Threshold Level of Scale : First, indicate whether Threshold Level of scale is a <input type="radio"/> Minimum OR <input type="radio"/> Maximum OR, if there is NO Maximum or Minimum Threshold level, then select <input type="radio"/> None .		
Then, (unless there is none) select the Threshold Level of this scale <input type="radio"/> 9 <input type="radio"/> 8 <input type="radio"/> 7 <input type="radio"/> 6 <input type="radio"/> 5 <input type="radio"/> 4 <input type="radio"/> 3 <input type="radio"/> 2 <input type="radio"/> 1		
If unable to choose scale level, select <input type="checkbox"/> OTHER and indicate reason below:		
<input type="checkbox"/> Lack Information <input type="checkbox"/> Postpone decision <input type="checkbox"/> In-depth evaluation required <input type="checkbox"/> Not applicable <input type="checkbox"/> Refer question to someone else: Whom? e-mail or phone?		

FIG. 5 Demand Scale B.1.2.3 for Condition of Exterior Walls and Projections

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SUPPLY B.1.2.	External walls and projections
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Supply Scales in this Topic:

- B.1.2.1 Permanence of exterior finishes
- B.1.2.2 Water penetration
- B.1.2.3 Condition of exterior walls and projections

Subject Matter: This topic deals with the physical condition of the exterior of a building, as distinct from the perceived quality of the exterior.

Notes: Building features affecting the perceived quality of the exterior are dealt with in Topic A.11 Image to public and occupants of E1667.

From the options below, please select the level that best describes the RATING.

Rating Level	SUPPLY	B.1.2.1. Permanence of exterior finishes
9	<input type="radio"/>	The expected replacement life of exterior finishes is greater than 75 years (e.g. 8 in. cast-in-place concrete walls).
8	<input type="radio"/>	
7	<input type="radio"/>	The expected replacement life of exterior finishes must be greater than 50 years up to 75 years (e.g. 4 in. masonry veneer).
6	<input type="radio"/>	
5	<input type="radio"/>	The expected replacement life of exterior finishes should be greater than 40 years up to 50 years (e.g. aluminum curtain wall).
4	<input type="radio"/>	
3	<input type="radio"/>	The expected replacement life of exterior finishes can be greater than 30 years up to 40 years (e.g. cement plaster or cedar siding).
2	<input type="radio"/>	
1	<input type="radio"/>	The expected replacement life of exterior finishes does not have to exceed 30 years (e.g. T1-11 plywood).
0	<input type="radio"/>	No information is available.
If unable to choose scale level, select <input type="checkbox"/> OTHER and indicate reason below:		
<input type="checkbox"/> Lack Information <input type="checkbox"/> Postpone decision <input type="checkbox"/> In-depth evaluation required <input type="checkbox"/> Not applicable		
<input type="checkbox"/> Refer question to someone else: Whom? e-mail or phone?		

FIG. 6 Supply Scale B.1.2.1 for Permanence of Exterior Finishes

Rating Level	SUPPLY	B.1.2.2. Weathertightness at exterior walls
9 ○		Sealants in wall joints are in new or as-new watertight condition. There are no concentrations of residual moisture after most exterior wall surfaces are dry. There is no evidence of moisture penetration to inside surfaces of exterior walls.
8 ○		
7 ○		Sealants in surface-sealed joints are in sound watertight condition. There are isolated concentrations of residual moisture after most exterior wall surfaces are dry. There is isolated evidence of minor moisture penetration to inside surfaces of exterior walls.
6 ○		
5 ○		Sealants in surface-sealed joints are in generally watertight condition. There are some concentrations of residual moisture after most exterior wall surfaces are dry. There is some evidence of minor moisture penetration to inside surfaces of exterior walls.
4 ○		
3 ○		Surface-sealed joints in walls are not fully watertight and need repair. There are noticeable concentrations of residual moisture after most exterior wall surfaces are dry. There is noticeable evidence of moisture penetration to inside surfaces of exterior walls.
2 ○		
1 ○		Surface-sealed joints in walls are not watertight and need replacement. There are extensive concentrations of residual moisture after most exterior wall surfaces are dry. There is evidence of extensive moisture penetration to inside surfaces of exterior walls.
0 ○		No information is available.
<p>If unable to choose scale level, select <input type="checkbox"/> OTHER and indicate reason below:</p> <p> <input type="checkbox"/> Lack Information <input type="checkbox"/> Postpone decision <input type="checkbox"/> In-depth evaluation required <input type="checkbox"/> Not applicable <input type="checkbox"/> Refer question to someone else: Whom? e-mail or phone? </p>		

FIG. 7 Supply Scale B.1.2.2 for Weathertightness at Exterior Walls

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Rating Level	SUPPLY	B.1.2.3. Condition of exterior walls and projections
<p>9 <input type="radio"/></p> <p>8 <input type="radio"/></p> <p>7 <input type="radio"/></p> <p>6 <input type="radio"/></p> <p>5 <input type="radio"/></p> <p>4 <input type="radio"/></p> <p>3 <input type="radio"/></p> <p>2 <input type="radio"/></p> <p>1 <input type="radio"/></p> <p>0 <input type="radio"/></p>	<p>There are no visible defects or failure in external walls or projections.</p> <p>There are minor defects, e.g. minor discoloration, stains, or efflorescence adjacent to the tops of walls, wall joints, or weeps; indicating past problems with flashings that may have been corrected. Some minor repair is needed to sealants in external wall joints or wall flashings. Exterior projections are understood by building management to be structurally sound.</p> <p>There are some defects, e.g. minor discoloration, stains, or efflorescence adjacent to the tops of walls, wall joints, or weeps. Some repair or periodic replacement is needed to sealants in external wall joints or wall flashings. Exterior projections show localized evidence of structural distress e.g. sagging, cracks, or other required maintenance.</p> <p>There are many defects, e.g. discoloration, stains, or efflorescence adjacent to the tops of walls, wall joints, or weeps. Exterior projections show general evidence of structural distress e.g. sagging, cracks, or other required maintenance and localized risk.</p> <p>There are extensive defects, e.g. many areas of discoloration, stains, or efflorescence, or, in cold winter conditions icicles and moisture adjacent to the tops of walls, wall joints, or weeps. Exterior projections show widespread evidence of structural distress e.g. sagging, cracks, rusted anchors, or looseness and widespread risk.</p> <p>No information is available.</p>	<p>9 <input type="radio"/></p> <p>8 <input type="radio"/></p> <p>7 <input type="radio"/></p> <p>6 <input type="radio"/></p> <p>5 <input type="radio"/></p> <p>4 <input type="radio"/></p> <p>3 <input type="radio"/></p> <p>2 <input type="radio"/></p> <p>1 <input type="radio"/></p> <p>0 <input type="radio"/></p>
<p>If unable to choose scale level, select <input type="checkbox"/> OTHER and indicate reason below:</p> <p><input type="checkbox"/> Lack Information <input type="checkbox"/> Postpone decision <input type="checkbox"/> In-depth evaluation required <input type="checkbox"/> Not applicable</p> <p><input type="checkbox"/> Refer question to someone else: Whom? e-mail or phone?</p>		

FIG. 8 Supply Scale B.1.2.3 for Condition of Exterior Walls and Projections

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