



Designation: E1663 – 22

Standard Classification for Serviceability of an Office Facility for Typical Office Information Technology^{1, 2}

This standard is issued under the fixed designation E1663; 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 classification covers matched sets of scales 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 performance to support typical office equipment for information technology.

1.2 Within that aspect of serviceability, each matched set of scales, shown in **Figs. 1-18**, are 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 (see **Figs. 1-18**) summarizes one level of serviceability on that topic, which occupants might require. The matching entry in the Facility Rating Scale (see **Figs. 1-18**) 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. 1-18**) 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

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.

Current edition approved Oct. 1, 2022. Published November 2022. Originally approved in 1995. Last previous edition approved in 2019 as E1663–03 (2019). DOI: 10.1520/E1663-22.

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.

how to conduct a serviceability rating nor how to assign a serviceability score. That information is found in Practice E1679. The scales in this classification 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 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.*

1.9 *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

E1662 Classification for Serviceability of an Office Facility for Sound and Visual Environment

E1666 Classification for Serviceability of an Office Facility for Work Outside Normal Hours or Conditions

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.

*A Summary of Changes section appears at the end of this standard

A.5.1. **Density of office computers and equipment**

Subject Matter: The ability to locate workplaces based on their density of office computers, equipment, and personal devices.

Notes:

1. Prior editions of this topic included the visual and acoustical environment related to the use of office computers and associated equipment. It is now assumed that these are consistent throughout the office environment regardless of the density of office equipment. Requirements and ratings for the visual environment are found in Topic A.3.4 of Classification E1662. Requirements and ratings related to office noise are found in Topic A.3.2 of Classification E1662.
2. Prior editions of this topic included HVAC services related to the density of office computers and related equipment. It is now assumed that these are consistent throughout the office environment regardless of the density of office equipment. Requirements and ratings for thermal comfort are found in Topic A.4 of Classification E2320.
3. Requirements and ratings for network access are found in Topic A.5.4 of this classification.

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

Requirement Level	DEMAND	A.5.1. Density of office computers and equipment
9 ☐	Must be able to locate or relocate densely equipped workplaces anywhere on the office floor.	
8 ☐		
7 ☐	Must be able to locate or relocate densely equipped workplaces anywhere on the office floor with easily implemented improvements.	
6 ☐		
5 ☐	Must be able to locate some densely equipped workplaces with limited building-imposed constraints on where such areas can be located.	
4 ☐		
3 ☐	Must be able to locate a few densely equipped workplaces with some building-imposed constraints on where such areas can be located.	
2 ☐		
1 ☐	Operations require only very few densely equipped workplaces with significant building-imposed constraints on where such areas can be located.	
0 ☐	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

☐ **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. 1 Demand Scale A.5.1 for Density of Office Computers and Equipment

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

E1694 Classification for Serviceability of an Office Facility for Special Facilities and Technologies

E2320 Classification for Serviceability of an Office Facility for Thermal Environment and Indoor Air Conditions

2.2 ISO Document:⁴
 ISO 19208 Framework for Specifying Performance in Buildings

⁴ Available from International Organization for Standardization (ISO), ISO Central Secretariat, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <https://www.iso.org>.

From the options below, please select the level that best describes the RATING.	
Rating Level	SUPPLY A.5.1. Density of office computers and equipment
9 ○	Spatial layout and the distribution of networks and power to individual workplaces fully support densely equipped workplaces anywhere . Power can be distributed to any workplace, Wi-Fi reaches all workplaces, and the HVAC system has the capacity for multifunction copiers at all workplaces.
8 ○	
7 ○	Spatial layout and the distribution of networks and power to individual workplaces can be easily adjusted to support densely equipped workplaces anywhere . Power, Wi-Fi, and HVAC services can be easily expanded at minimal cost to any workplace where additional demand is created by a greater density of office equipment.
6 ○	
5 ○	Spatial layout and the distribution of networks and power to individual workplaces pose limited constraints on where densely equipped workplaces can be located . Power, Wi-Fi, and HVAC services can be expanded at moderate cost to most workplaces where additional demand is created by a greater density of office equipment.
4 ○	
3 ○	Spatial layout and the distribution of networks and power to individual workplaces pose some constraints on the number and location of densely equipped workplaces. Power, Wi-Fi, and HVAC services can be expanded at substantial effort and cost to most workplaces where additional demand is created by a greater density of office equipment.
2 ○	
1 ○	Spatial layout and the distribution of networks and power to individual workplaces limit very few densely equipped workplaces to be in specific locations . Power, Wi-Fi, and/or HVAC services are not feasible to be expanded where additional demand is created by a greater density of office equipment.
0 ○	No information is available.
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. 2 Supply Scale A.5.1 for Density of Office Computers and Equipment

2.3 Other Documents:⁵

ANSI/TIA-569-E Telecommunications Pathways and Spaces

ANSI/BICSI-N1 Installation Practices for Telecommunications and ICT Cabling and Related Cabling Infrastructure

3. Terminology

3.1 *Definitions*—For definitions of general terms related to building construction used in this classification, refer to Terminology E631.

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, 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 (see Terminology E631).

3.1.2 *facility serviceability, n*—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 (see Terminology E631).

3.1.3 *office, n*—a place, such as a room, suite, or building, in which business, clerical, or professional activities are conducted (see Terminology E631).

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

A.5.2.	Power at workplace
Scales in this Topic: - Demand A.5.2.1 Location of available power - Supply A.5.2.1 Power distribution - Demand and Supply A.5.2.2 Plug-in points at workstation. Subject Matter: Access to power at their individual workstation or office. Notes: Requirements and ratings for "Uninterruptible power supply" have been deleted. Building requirements for standby power are found in Topic A.10.3 of Classification E1666.	
<i>From the options below, please select the level that best describes the REQUIREMENT.</i>	
Requirement Level	DEMAND
A.5.2.1. Location of available power	
9	☐ Operations require power supplied unobtrusively and easily to all workstations on any part of the floor.
8	☐
7	☐ Operations require power supplied easily to all workstations on any part of the floor.
6	☐
5	☐ Operations require power supplied to all workstations on any part of the floor.
4	☐
3	☐ Operations require power supplied to all workstations on most parts of the floor.
2	☐
1	☐ Operations require power supplied to all workstations somewhere on the floor.
0	☐ 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 ☐ 09 ☐ 08 ☐ 07 ☐ 06 ☐ 05 ☐ 04 ☐ 03 ☐ 02 ☐ 01	
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 A.5.2.1 for Location of Available Power

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *conduit capacity, n*—a conduit is considered full when the internal area occupied by cable has reached 50 % of the cross-sectional area of the conduit. Therefore, when additional future capacity is required, it must be part of the original 50 % permissible area.

3.2.2 *dedicated circuit, n*—an electric power supply circuit with its own circuit breaker and only one outlet box, so that its full capacity is dedicated to only one piece of electrical equipment.

3.2.2.1 *Discussion*—Dedicated circuits often are installed with an orange plug receptacle, so they can easily be recognized. A dedicated circuit may or may not be connected to an uninterruptible power supply (UPS); in most buildings, an orange plug receptacle does not normally indicate UPS.

3.2.3 *entrance facility, n*—an entrance to a building for both public and private network service cables (including wireless), including the entrance point of the building and continuing to the entrance room.

3.2.3.1 *Discussion*—Provides the point at which public and private cabling enters the building and proceeds to interface with the intrabuilding IT backbone cabling. Refer to ANSI/TIA-569-E for context related to definition.

3.2.4 *isolated circuit, n*—a dedicated electric power supply circuit with an isolated ground, separate from the ground of other circuits at its main panel.

3.2.5 *local area network, LAN, n*—connecting computers in a single building or part of a building.

From the options below, please select the level that best describes the <i>RATING</i> .		
Rating Level	SUPPLY	A.5.2.1. Power distribution
9 ○	Power is distributed to all workstations on any part of the floor unobtrusively and easily accessed through a raised access floor, or pre-wired modular furniture partitions, or adjacent walls or columns.	
8 ○		
7 ○	Power is distributed to all workstations on any part of the floor: - o easily accessed from power poles or pigtails fed from the ceiling at positions governed by ceiling grid dimensions and fixtures, in conduit or cable trays with power cables separated from data cables; or - o from ducts in the floor that have access points on a grid 5 ft x 3 ft (1.5 m x 1.0 m) or less with power cables in separate ducts from data cables.	
6 ○		
5 ○	Power is distributed to all workstations on any part of the floor: - o from power poles or pigtails fed from cables accessed from the ceiling in conduit or cable trays, with positions governed by ceiling grid dimensions and fixtures; or - o from ducts in the floor that have sufficient space capacity that pulling additional cables is never a problem, and that have access points on a grid 5 ft x 5 ft (1.5 m x 1.5 m) or less.	
4 ○		
3 ○	Power is distributed to all workstations on most parts of the floor from power poles or pigtails fed from the ceiling, with positions governed by ceiling grid dimensions and fixtures. There are no cable trays. If there are floor ducts for cables, they are full in some parts of the building.	
2 ○		
1 ○	Power is distributed to all workstations limited to specific areas of the floor. It is difficult to run cables, and outlets are poorly located, for example, horizontal distribution is in in-floor ducts that are mostly full, or by surface conduit, or by poke-through from the ceiling below. There is no accessible ceiling space, or space is insufficient for cable trays.	
0 ○	No information is available.	
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. 4 Supply Scale A.5.2.1 for Power Distribution

3.2.6 *telecommunications room, n*—a dedicated room that differs from equipment rooms and entrance facilities in that it is generally considered a floor-serving or tenant-serving (as opposed to building- or campus-serving) room that provides a connection point between backbone and horizontal cabling.

3.2.7 *uninterruptible power supply, UPS, n*—a source of electrical power that is protected from dropping below standard voltage for even milliseconds, so that computer operation is effectively continuous.

3.2.7.1 *Discussion*—A UPS is typically provided from batteries that are always connected to the circuit. A UPS typically provides power long enough to either shut down computers in an orderly way if outside power fails, or to start a standby generator. A UPS system of many large batteries may be used to protect a group of electrical circuits. Small UPS systems, capable of protecting a single personal computer and its

accessory equipment, that may be plugged into conventional electric power outlets and small enough to fit in an office workstation.

4. Significance and Use

4.1 Each Facility Rating Scale (see Figs. 1-18) in this classification provides a means to estimate the level of serviceability 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. Further information may be found in ASTM E1663.

Requirement Level	DEMAND	A.5.2.2. Plug-in points at workstation
9 ○	Each workplace requires up to 8 plug-in points (4 duplex outlets or an 8-outlet hard-wired power strip), with 2 or more dedicated for computer equipment and one of these on an isolated circuit. Plug-in power strips shall be prohibited by the building manager.	
8 ○		
7 ○	Each workplace requires up to 6 plug-in points (3 duplex outlets), with 1 dedicated for computer equipment. A plug-in power strip can be used with the approval of the building manager.	
6 ○		
5 ○	Each workplace requires up to 4 plug-in points (2 duplex outlets). Individuals have the flexibility to add a plug-in power strip for a small number of personal devices.	
4 ○		
3 ○	Each workplace requires up to 2 plug-in points (1 duplex outlet). Individuals have the flexibility to add a plug-in power strip for a multifunction printer and small number of personal devices.	
2 ○		
1 ○	Each workplace requires at least 1 plug-in point (a shared duplex outlet). A plug-in power strip can be used to supplement the number of plug-in points as necessary.	
0 ○	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. 5 Demand Scale A.5.2.2 for Plug-in Points at Workstation

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 re-modeling 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.)

4.7 This classification is not intended for, and is not suitable for, use for regulatory purposes, nor for fire hazard assessment nor for fire risk assessment.

5. Basis of Classification

5.1 The scales in Figs. 1-18 contain the basis for classification.

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

6. Keywords

6.1 building; computers; data cables; facility; facility occupants; function; local area network (LAN); office; performance; phone cables; rating; rating scale; requirements; serviceability; typical office information technology; uninterruptible power supply (UPS)