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Designation: E1664 – 95a (Reapproved 2012) E1664 – 95a (Reapproved 2018) ican National Standard

## Standard Classification for Serviceability of an Office Facility for Layout and Building Factors<sup>1,2</sup>

This standard is issued under the fixed designation E1664; 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 ( $\varepsilon$ ) indicates an editorial change since the last revision or reapproval.

#### 1. Scope

1.1 This classification covers pairs 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 layout and building factors.

1.2 Within that aspect of serviceability, each pair of scales, shown in Figs. 1-3, are for classifying one topic of serviceability. Each paragraph in an Occupant Requirement Scale (see Figs. 1-3) summarizes one level of serviceability on that topic, which occupants might require. The matching entry in the Facility Rating Scale (see Figs. 1-3) 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. 1-3) 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 E1334. The scales in this classification are complimentary to and compatible with Practice E1334. Each requires the other.

<u>1.6</u> The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not considered standard.

<u>1.7 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.</u>

#### 2. Referenced Documents

2.1 ASTM Standards:<sup>3</sup>

E631 Terminology of Building Constructions

E1334 Practice for Rating the Serviceability of a Building or Building-Related Facility (Withdrawn 2013)<sup>4</sup>

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

2.2 ISO Document:<sup>5</sup>

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

<sup>&</sup>lt;sup>1</sup> 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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<sup>&</sup>lt;sup>2</sup> 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.

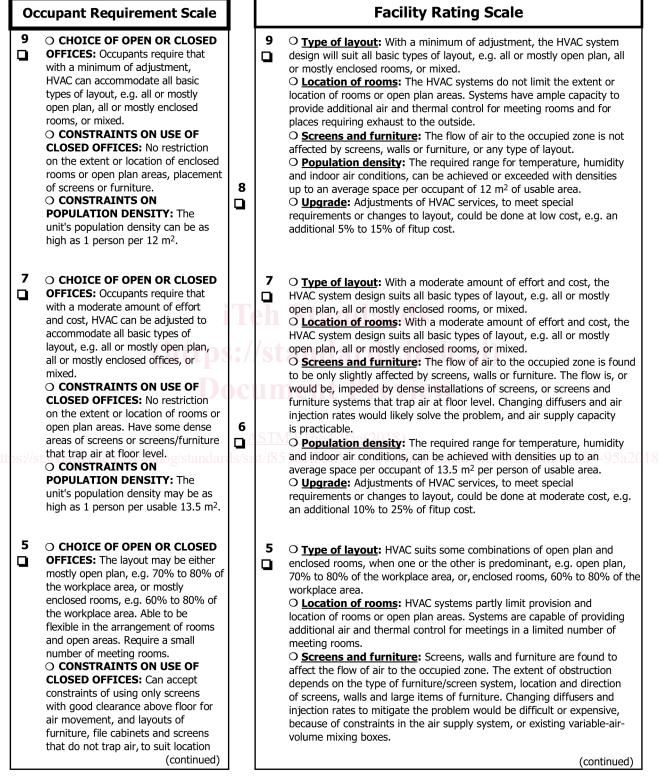
<sup>&</sup>lt;sup>3</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>&</sup>lt;sup>4</sup> The last approved version of this historical standard is referenced on www.astm.org.

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

### A.7. Layout and Building Features

### Scale A.7.1. Influence of HVAC on layout



### Scale A.7.1. continued on next page

FIG. 1 Scale A.7.1 for Influence of HVAC on Layout

## A.7. Layout and Building Features

# Scale A.7.1. Influence of HVAC on layout (continued)

Occupant Requirement Scale			Facility Rating Scale
	<ul> <li><b>5</b> (continued)</li> <li>of ceiling vents and planned air movement, e.g. from perimeter to core of building.</li> <li><b>CONSTRAINTS ON</b></li> <li><b>POPULATION DENSITY:</b> The unit's population density may be no higher than 1 person per usable 15 m<sup>2</sup>.</li> </ul>	4	<ul> <li>5 (continued)</li> <li>Population density: To achieve target for temperature and indoor air, the average space per occupant should be at least 15 m<sup>2</sup> per person of usable area.</li> <li>Upgrade: Adjustments of HVAC services, while maintaining basic standard of fitup, is or would be at moderate cost. Upgrade for enhanced serviceability would substantially add to the total cost of office installation.</li> </ul>
3 D http	<ul> <li>CHOICE OF OPEN OR CLOSED OFFICES: It is acceptable that the space be predominantly open plan (90%).</li> <li>CONSTRAINTS ON USE OF CLOSED OFFICES: Few screens or high furniture. Few rooms, located at perimeter or core, are used only for short meetings.</li> <li>CONSTRAINTS ON POPULATION DENSITY: The unit's population density can be as low as 1 person per 18 to 20 m<sup>2</sup>.</li> </ul>		<ul> <li><b>3</b> O <u>Type of layout</u>: HVAC suits predominantly open plan, e.g. 90%, or predominantly enclosed rooms with openable windows for ventilation.</li> <li>O <u>Location of rooms</u>: Ventilation and temperature control systems limit the provision and location of rooms, e.g. rooms cannot total more than 10% of usable area, with rooms mostly located at perimeter or mostly at core. Rooms, if installed, become stuffy if used for meetings lasting more than two hours, or for consecutive meetings.</li> <li>O <u>Screens and furniture</u>: Standard screens and furniture are found to obstruct the flow of air to the occupied zone, regardless of the type of furniture or screen system, or layout. This could be partially mitigated by changing diffusers and air injection volumes and rates, but at great expense and disruption to office workers while ceiling is opened for work.</li> <li>O <u>Population density</u>: To achieve tolerable working conditions, the average space per occupant must be in the range of 18 m<sup>2</sup> to 20 m<sup>2</sup> per person of usable area.</li> <li>O <u>Upgrade</u>: An upgrade of HVAC services to basic standard would greatly add to the total cost of office installation, e.g. up to double the fitup cost.</li> </ul>
1	<ul> <li>CHOICE OF OPEN OR CLOSED OFFICES: The occupant requires no enclosed rooms and few screens or high furniture.</li> <li>CONSTRAINTS ON USE OF CLOSED OFFICES: Few meetings last over an hour.</li> <li>CONSTRAINTS ON POPULATION DENSITY: The unit's population density is lower than 20 to 25 m<sup>2</sup> per person.</li> </ul>		<ul> <li><u>Type of layout</u>: HVAC suits 100% open plan, but not enclosed rooms.</li> <li><u>Location of rooms</u>: Ventilation and temperature control systems severely dictate and limit the provision and location of rooms, e.g. rooms cannot total more than 5% of usable area, with rooms only located at the perimeter or only at the core. Rooms, if installed, become stuffy if used for meetings lasting more than an hour, or for consecutive meetings.</li> <li><u>Screens and furniture</u>: Standard screens and furniture are found to obstruct the flow of air to the occupied zone, regardless of the type of furniture or screen system, or layout, and it is not feasible to remedy the problem.</li> <li><u>Population density</u>: To achieve tolerable working conditions, the average space per occupant must be in the range of 20 m<sup>2</sup> to 25 m<sup>2</sup> per person of usable area.</li> <li><u>Upgrade</u>: An upgrade of HVAC services to basic standard would greatly add to the total cost of office installation, e.g. more than doubles fitup cost</li> </ul>

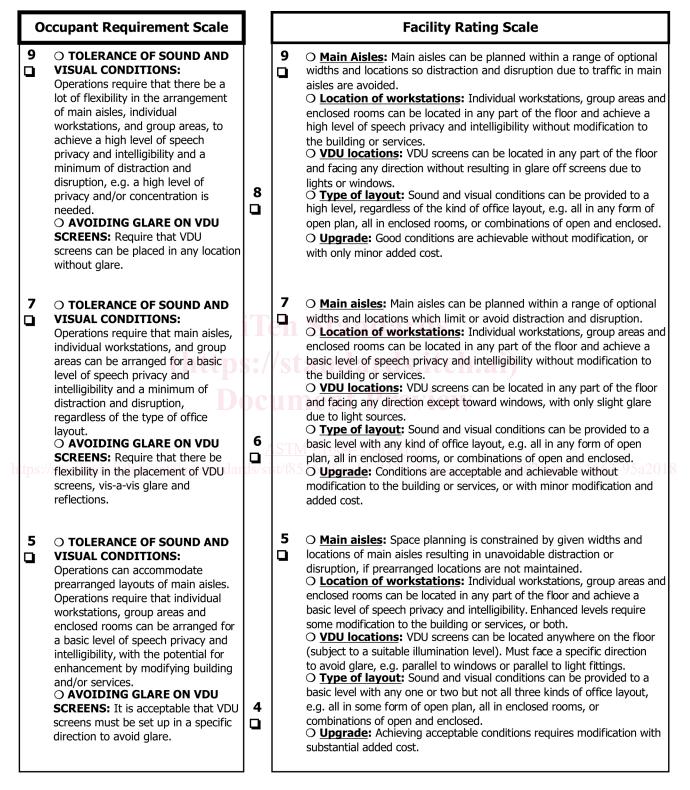
Exceptionally important.	Importa	ant. 🗖	<u>M</u> inor Im	portance.	
Minimum Threshold level =		🗖 NA	🗖 NR	🗖 Zero	🗖 DP

### NOTES Space for handwritten notes on Requirements or Ratings

FIG. 1 Scale A.7.1 for Influence of HVAC on Layout (continued)

## A.7. Layout and Building Features

## Scale A.7.2. Influence of sound and visual features on layout



### Scale A.7.2. continued on next page

FIG. 2 Scale A.7.2 for the Influence of Sound and Visual Factors on Layout

## A.7. Layout and Building Features

# Scale A.7.2. Influence of sound and visual features on layout (continued)

Occupant Requirement Scale				Facility Rating Scale
3	<ul> <li>TOLERANCE OF SOUND AND VISUAL CONDITIONS: Location and width of main aisles or corridors is irrelevant or not important. Poor sound and visual conditions can be tolerated.</li> <li>AVOIDING GLARE ON VDU SCREENS: Few VDU screens, or screens are used only for a short time.</li> </ul>	2	3	<ul> <li><u>Main aisles</u>: Because of floorplate configuration, main aisle or corridor locations and widths result in serious distraction and disruption to many people and groups, requiring special design measures, e.g. extra-high screens, extra meeting rooms and retreat spaces for occupants, extra distance between workstations, and avoiding regular use of workstations next to aisles.</li> <li><u>Location of workstations</u>: Almost regardless of the location, individual workstations, enclosed rooms and group areas experience poor conditions. It is possible to fix these conditions.</li> <li><u>VDU locations</u>: From most locations, VDU screens reflect glare from light or windows. Some operators suffer eyestrain, headaches, etc., if working for several hours at a screen.</li> <li><u>Type of layout</u>: Acoustic and/or visual conditions best suit only one type of office planning e.g. all or most occupants in enclosed rooms, or almost all in open plan.</li> <li><u>Upgrade</u>: Upgrade is possible but very costly.</li> </ul>
1 D	<ul> <li><b>TOLERANCE OF SOUND</b> AND VISUAL CONDITIONS: Location and width of main aisles or corridors is irrelevant or not important. Sound and visual conditions are irrelevant or not important.</li> <li><b>AVOIDING GLARE ON</b> <b>VDU SCREENS:</b> There is little use of VDU screens.</li> </ul>	tp D anda	<b>j : [</b> <b>S : /</b> <b>O C</b> / rds/s:	<ul> <li>Main aisles: Because of floorplate configuration, main aisle or corridor locations and widths result in serious distraction and disruption to many people and groups, requiring special design measures, e.g. extra-high screens, extra meeting rooms and retreat spaces for occupants, extra distance between workstations, and avoiding regular use of workstations next to aisles. Also, required locations of aisles or corridors make it impossible to have workstations for more than 15 people grouped together.</li> <li>Location of workstations: Regardless of location, individual workstations, enclosed rooms and group areas experience poor or very poor sound and visual conditions for work. It is impossible to fix these conditions.</li> <li>VDU locations: Wherever located, VDU screens reflect glare from light and windows. Many operators suffer eyestrain, headaches, etc., if working for several hours at a screen.</li> <li>Type of layout: It is only practicable to do one type of office planning, e.g. all or most occupants in enclosed rooms, or almost all in open plan.</li> <li>Upgrade: It is not possible to upgrade the building or systems to provide adequate conditions.</li> </ul>

□ Exceptionally important. □ Important. □ Minor Importance.					
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### NOTES Space for handwritten notes on Requirements or Ratings

FIG. 2 Scale A.7.2 for the Influence of Sound and Visual Factors on Layout (continued)

## A.7. Layout and Building Features

# Scale A.7.3. Influence of building loss features on space needs

	Occupant Requirement Scale			Facility Rating Scale
9	O There is NO occupant requirement for this topic. Building loss factor should not affect occupants. It should only affect the total amount of 'usable' floor area which will be made available to the occupants.		9	O <b>Usable area lost:</b> Building factor results in negligible loss of usable area, e.g. less than 3%, (refer to Table A7-1). Occupiable floor area is 98% or more of usable area.
7	O There is NO occupant requirement for this topic. Building loss factor should not affect occupants. It should only affect the total amount of 'usable' floor area which will be made available to the occupants.		7	O <b><u>Usable area lost</u></b> : Building factor results in some loss of usable area, e.g. 3%-7%, (refer to Table A7-1). Occupiable floor area is between 93% and 97% of usable area.
5	O There is NO occupant requirement for this topic. Building loss factor should not affect occupants. It should only affect the total amount of 'usable' floor area which will be made available to the occupants.		5	<ul> <li>Usable area lost: Building factor results in an average loss of usable area, e.g. 8%-12%, (refer to Table A7-1).</li> <li>Occupiable floor area is between 88% and 92% of usable area.</li> </ul>
3	O There is NO occupant requirement for this topic. Building loss factor should not affect occupants. It should only affect the total amount of 'usable' floor area which will be made available to the occupants.		3	O <b>Usable area lost:</b> Building factor results in serious loss of usable area, e.g. 13%-20%, (refer to Table A7-1). Occupiable floor area is between 80% and 87% of usable area.
1 D http	O There is NO occupant requirement for this topic. Building loss factor should not affect occupants. It should only affect the total amount of 'usable' floor area which will be made available to the occupants.	<b>en</b> E166 Soff-a	<b>t</b> 1 <b>1</b> <u>4-9</u> : 1a15	O <u>Usable area lost</u> : Building factor results in severe loss of usable area, e.g. more than 20%, (refer to Table A7-1). Occupiable floor area is 79% or less of usable area.

$\Box$ Exceptionally important. $\Box$ Important. $\Box$ Minor Importance.						
Minimum <b>T</b> hreshold level =	🖬 NA 🛄 NR 🛄 Zero 🛄 DP					

### NOTES Space for handwritten notes on Requirements or Ratings

FIG. 3 Scale A.7.3 for the Influence of Building Loss Factors on Space Needs