

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

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 (ε) 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.

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.

2. Referenced Documents

2.1 ASTM Standards:³

E631 Terminology of Building Constructions

E1334 Practice for Rating the Serviceability of a Building or Building-Related Facility (Withdrawn 2013)⁴

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:⁵

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

2.3 ASHRAE Standard:⁶

ASHRAE 62-89 Ventilation for Acceptable Indoor Air Quality

2.4 ANSI Document:⁵

ANSI Z65.1 Method for Measuring Floor Area in Office Buildings

3. Terminology

3.1 Definitions:

3.1.1 *facility*—a physical setting used to serve a specific purpose. **E631**

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.

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. **E631**

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,

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.

⁴ The last approved version of this historical standard is referenced on www.astm.org.

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

⁶ Available from American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE), 1791 Tullie Circle, NE, Atlanta, GA 30329, <http://www.ashrae.org>.

**A.7. Layout and Building Features****Scale A.7.1. Influence of HVAC on layout**

Occupant Requirement Scale	Facility Rating Scale
9 ☐ ○ CHOICE OF OPEN OR CLOSED OFFICES: Occupants require that with a minimum of adjustment, HVAC can accommodate all basic types of layout, e.g. all or mostly open plan, all or mostly enclosed rooms, or mixed. ○ CONSTRAINTS ON USE OF CLOSED OFFICES: No restriction on the extent or location of enclosed rooms or open plan areas, placement of screens or furniture. ○ CONSTRAINTS ON POPULATION DENSITY: The unit's population density can be as high as 1 person per 12 m². 7 ☐ ○ CHOICE OF OPEN OR CLOSED OFFICES: Occupants require that with a moderate amount of effort and cost, HVAC can be adjusted to accommodate all basic types of layout, e.g. all or mostly open plan, all or mostly enclosed offices, or mixed. ○ CONSTRAINTS ON USE OF CLOSED OFFICES: No restriction on the extent or location of rooms or open plan areas. Have some dense areas of screens or screens/furniture that trap air at floor level. ○ CONSTRAINTS ON POPULATION DENSITY: The unit's population density may be as high as 1 person per usable 13.5 m². 5 ☐ ○ CHOICE OF OPEN OR CLOSED OFFICES: The layout may be either mostly open plan, e.g. 70% to 80% of the workplace area, or mostly enclosed rooms, e.g. 60% to 80% of the workplace area. Able to be flexible in the arrangement of rooms and open areas. Require a small number of meeting rooms. ○ CONSTRAINTS ON USE OF CLOSED OFFICES: Can accept constraints of using only screens with good clearance above floor for air movement, and layouts of furniture, file cabinets and screens that do not trap air, to suit location (continued)	9 ☐ ○ Type of layout: With a minimum of adjustment, the HVAC system design will suit all basic types of layout, e.g. all or mostly open plan, all or mostly enclosed rooms, or mixed. ○ Location of rooms: The HVAC systems do not limit the extent or location of rooms or open plan areas. Systems have ample capacity to provide additional air and thermal control for meeting rooms and for places requiring exhaust to the outside. ○ Screens and furniture: The flow of air to the occupied zone is not affected by screens, walls or furniture, or any type of layout. ○ Population density: The required range for temperature, humidity and indoor air conditions, can be achieved or exceeded with densities up to an average space per occupant of 12 m² of usable area. ○ Upgrade: Adjustments of HVAC services, to meet special requirements or changes to layout, could be done at low cost, e.g. an additional 5% to 15% of fitup cost. 7 ☐ ○ Type of layout: With a moderate amount of effort and cost, the HVAC system design suits all basic types of layout, e.g. all or mostly open plan, all or mostly enclosed rooms, or mixed. ○ Location of rooms: With a moderate amount of effort and cost, the HVAC system design suits all basic types of layout, e.g. all or mostly open plan, all or mostly enclosed rooms, or mixed. ○ Screens and furniture: The flow of air to the occupied zone is found to be only slightly affected by screens, walls or furniture. The flow is, or would be, impeded by dense installations of screens, or screens and furniture systems that trap air at floor level. Changing diffusers and air injection rates would likely solve the problem, and air supply capacity is practicable. ○ Population density: The required range for temperature, humidity and indoor air conditions, can be achieved with densities up to an average space per occupant of 13.5 m² per person of usable area. ○ Upgrade: Adjustments of HVAC services, to meet special requirements or changes to layout, could be done at moderate cost, e.g. an additional 10% to 25% of fitup cost. 5 ☐ ○ Type of layout: HVAC suits some combinations of open plan and enclosed rooms, when one or the other is predominant, e.g. open plan, 70% to 80% of the workplace area, or, enclosed rooms, 60% to 80% of the workplace area. ○ Location of rooms: HVAC systems partly limit provision and location of rooms or open plan areas. Systems are capable of providing additional air and thermal control for meetings in a limited number of meeting rooms. ○ Screens and furniture: Screens, walls and furniture are found to affect the flow of air to the occupied zone. The extent of obstruction depends on the type of furniture/screen system, location and direction of screens, walls and large items of furniture. Changing diffusers and injection rates to mitigate the problem would be difficult or expensive, because of constraints in the air supply system, or existing variable-air-volume mixing boxes. (continued)

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
5 (continued) of ceiling vents and planned air movement, e.g. from perimeter to core of building. ○ CONSTRAINTS ON POPULATION DENSITY: The unit's population density may be no higher than 1 person per usable 15 m². 3 ○ CHOICE OF OPEN OR CLOSED OFFICES: It is acceptable that the space be predominantly open plan (90%). ○ CONSTRAINTS ON USE OF CLOSED OFFICES: Few screens or high furniture. Few rooms, located at perimeter or core, are used only for short meetings. ○ CONSTRAINTS ON POPULATION DENSITY: The unit's population density can be as low as 1 person per 18 to 20 m². 1 ○ CHOICE OF OPEN OR CLOSED OFFICES: The occupant requires no enclosed rooms and few screens or high furniture. ○ CONSTRAINTS ON USE OF CLOSED OFFICES: Few meetings last over an hour. ○ CONSTRAINTS ON POPULATION DENSITY: The unit's population density is lower than 20 to 25 m² per person.	5 (continued) ○ Population density: To achieve target for temperature and indoor air, the average space per occupant should be at least 15 m² per person of usable area. ○ 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. 3 ○ Type of layout: HVAC suits predominantly open plan, e.g. 90%, or predominantly enclosed rooms with openable windows for ventilation. ○ Location of rooms: 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. ○ Screens and furniture: 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. ○ Population density: To achieve tolerable working conditions, the average space per occupant must be in the range of 18 m² to 20 m² per person of usable area. ○ Upgrade: 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. 1 ○ Type of layout: HVAC suits 100% open plan, but not enclosed rooms. ○ Location of rooms: 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. ○ Screens and furniture: 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. ○ Population density: To achieve tolerable working conditions, the average space per occupant must be in the range of 20 m² to 25 m² per person of usable area. ○ Upgrade: 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..
☐ Exceptionally important. ☐ Important. ☐ Minor Importance. 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)

