

Duke Ergonomics Division

Standards and Guidelines for Computer Workstations at Duke

INTRODUCTION

These technical standards and guidelines apply to computer workstations, including related equipment and furniture used regularly in office workplace environments at Duke University and Duke University Health System. For the purpose of these standards and guidelines, the term *computer workstation* refers to an operator-machine system consisting of a computing unit and, more important, several associated hardware components that form interfaces with the users of the system (ANSI/HFES 100-2007 Human Factors Engineering of Computer Workstations). The computer workstation consists primarily of a work surface, a chair, computer equipment, and other related accessories. These standards and guidelines also consider the ambient environment immediately surrounding the computer workstation.

In general, computer workstations at Duke University and Duke University Health System should be **adjustable** to fit the widest range of users, 5th percentile female to 95th percentile male. Options are available for employees outside of that range, or those with specific medical needs, and they should be accommodated accordingly.

Computer workstations should meet the ANSI/HFES 100-2007 standard (*American National Standard for Human Factors Engineering of Computer Workstations*) and the OSHA Document, 3092 *Working Safely with Video Display Terminals*. This is particularly critical if employees use computers for prolonged periods of time (> 4 hours per day).

Following are standards and guidelines for computer workstations as recommended by the Duke Ergonomics Division.

General Task Seating

In all cases, seating should fit the task. For Duke employees who sit for more than four hours per day or who have chronic back pain, task chairs shall have the following adjustments that can be performed while seated in the chair:

1. An independent backrest height adjustment with space for buttocks between the backrest and seatpan. The mid-lumbar portion of the backrest should range in height from 7.5 inches to 11 inches from the seatpan. Backrests should be at least 9 inches high by 12 inches wide and should include a pronounced lumbar support that protrudes forward from the seat back. The backrest of the chair should provide support to the lumbar and thoracic regions of the back. Mesh only backrests should be avoided.
2. Seat cushion should be made of high density foam and cloth fabric for breathability. (Polyurethane is required in “clean” areas.)
3. Pneumatic seat height adjustment, ranging from 16 to 20.5 inches from the floor. Footrings or footrests should be attached to chairs with taller cylinders (such as lab stools.)
7. Adjustable seatpan depth.
8. Minimal contouring of the seatpan.
9. Minimum of 5 star base.
10. Casters should be appropriate for the flooring type. (Rubber casters for linoleum and tile, nylon casters for carpet.)

In addition, task chairs should have:

1. Backrest tilt, minimum range of 90 to 105 degrees.
2. Removable and adjustable armrests (height and width) or no armrests.

For Duke employees who sit for four hours or less per day, task chairs should have:

1. An independent backrest height adjustment with space for buttocks between the backrest and seatpan. The mid-lumbar portion of the backrest should range in height from 7.5 inches to 11 inches from the seatpan.
2. Pneumatic seat height adjustment, ranging from 16 to 20.5 inches.
3. Minimum of 5 star base.
4. Casters should be appropriate for the flooring type. (Rubber casters for linoleum and tile, nylon casters for carpet.)

In addition, task chairs should have:

1. Minimal contouring of the seatpan.
2. Backrest tilt, minimum range of 90 to 105 degrees.
3. Removable, adjustable, armrest height and width. (Armrests are optional.)

**** NOTE:** Options should be made available for employees who are tall, petite, or those who may exceed the chair’s recommended weight limit. Some individuals may require different chair features to accommodate specific medical conditions. It is preferable to provide several chair options to employees rather than assume one size fits all.

Computer (VDT) Workstations

General Recommendations for All Computer Workstations

It is best to provide employees with workstations that are designed for computers rather than for some other function. Workstations with built-in or recessed areas for keyboards should be avoided as they are not adjustable and generally do not provide enough work area for using input devices such as a mouse.

The work surface depth must be a minimum of 24 inches deep to ensure adequate viewing distance to monitors. Monitor height should be adjustable through the use of adjustable monitors, monitor arms, risers, or platforms if needed.

Workstations with monitors recessed under glass, below the work surface are appropriate in some cases such as training areas or other short-term use areas. In general they are not recommended for every user due to the decreased leg room and viewing angle that results from this monitor placement.

As an option to keyboard trays, work surfaces can be set to the user's seated elbow height as long as sufficient work surface depth (24 inches minimum) is available. Sit to stand workstations are also an option to keyboard trays, provided the height range is appropriate for the employee's seated and standing elbow height (generally 22-50 inch height range).

Mobile and wall-mounted workstations must have individual adjustments for monitor height and keyboard/input device height. Placement of the input device must be such that it can be used with the left or right hand. If routine use of touch screens is required, a separate input device must be provided.

For employees who are required to simultaneously write and use a computer, a corner configuration is not appropriate. Instead an L-shaped configuration is preferred with the keyboard tray on a straight surface directly in front and a writing return adjacent to the dominant hand. (Right return for right-handed workers and left return for left-handed workers.) Note: keyboard trays must be positioned close to the return to avoid excessive reaching to the writing surface.

For Duke employees who use computers more than four hours per day, computer workstations shall have the following features.

1. Adjustable-height keyboard trays or adjustable-height work surfaces are preferred as a means of providing keyboard/input device adjustability. The height of keyboards and input devices should be adjustable within a range of 22 to 29 inches for seated workstations and 37 to 47 inches for standing workstations. A full range of 22 to 47 is preferred for sit to stand workstations.
2. All keyboard surfaces must be able to accommodate a mouse or other input device directly beside the keyboard. The input device should be usable on either the right or left

side of the keyboard. Obstructions under keyboards should be minimal. In other words, thin profile keyboard trays are preferred over thick ones. Knobs, levers, and related keyboard tray hardware should be minimal in order to maximize legroom.

3. Input devices should not be “handed” and should be usable with either the right or left hand. Devices that require repetitive use of the thumb should be avoided.
4. Monitors should be as adjustable as possible (height, depth, and angle). Options are to provide monitors with a built-in height adjustability feature or use a monitor arm.
5. Laptops should be placed in a docking station and/or should include a separate full-size monitor, full-size keyboard, and input device.
6. Document holders may be indicated if employees frequently refer to documents.

For Duke employees who use computers for four hours or less per day, computer workstations should have the following features.

1. A means to adjust the keyboard and input device height in relation to the user is recommended. This can be achieved through the use of adjustable keyboard trays, adjustable-height work surfaces, or height-adjustable chairs. If adjustable chairs are used, footrests must be used to support the user’s feet and legs. If adjustable-height work surfaces are used, the minimum depth is 24 inches.
2. If using a keyboard tray it must be able to accommodate a mouse or other input device in addition to the keyboard. The input device should be usable on either the right or left side of the keyboard tray. Obstructions under keyboards should be minimal. In other words, thin keyboard trays and arm mechanisms are preferred over thick ones. Pencil drawers and decorative front edges should be avoided directly under computer keyboards. Knobs, levers, and related keyboard tray hardware should be minimal in order to maximize legroom.
3. Input devices should not be “handed” and should be usable with either the right or left hand. Devices that require repetitive use of the thumb should be avoided.
4. Laptops should include a separate full size keyboard and input device. A means of elevating the laptop to raise the monitor height may be required.

Lighting for Computer Workstations and Surrounding Areas

In general, computer work typically requires less light than other tasks. The following table describes intensity guidelines that should be used when selecting lighting for work areas.

IES ILLUMINANCE CATEGORIES AND VALUES

Activity	Footcandles
Extended periods of computer (VDT) use	5-10
Read standard documents, photocopies or newspapers	20-50
View photo in moderate detail, reference phone book	50-100
Perform visual task of low contrast or small size over prolonged periods of time	200-500
Illuminating Engineers Society recommended lighting levels for common office tasks	

For Duke employees who use computers, the following guidelines are recommended for lighting of computer workstations.

1. Task lighting should be adjustable in direction and brightness. Task lights should be able to be positioned so bulbs are not in direct field of view and are well shielded. Use dark, opaque shades for desk lamps rather than sheer, light colored shades.
2. Computer workstations should provide low ambient lighting levels with task lamps to supplement lighting for source documents and writing surfaces. Floor lamps are acceptable for supplemental lighting and often provide softer light than overhead ceiling fixtures. Any accent lighting should be subtle, not distracting.
3. Anti-glare and privacy screens should be made of coated glass rather than mesh or plastic.