

Ergonomic Chair Guidelines

Workstation Components ∟ Chairs

A chair that is well-designed and appropriately adjusted is an essential element of a safe and productive computer workstation. A good chair provides necessary support to the back, legs, buttocks, and arms, while reducing exposures to awkward postures, contact stress, and forceful exertions.

Increased adjustability ensures a better fit for the user, provides adequate support in a variety of sitting postures, and allows variability of sitting positions throughout the workday. This is particularly important if the chair has multiple users.

To ensure that the chair will provide adequate support, it is important that you try out different chairs before purchasing one.

The following parts of the chair are important elements to consider in creating a safe and productive workstation:

- Backrest
- Seat
- Armrest
- Base

You should adjust your chair along with appropriately placing your monitor, keyboard, and desk.



Chair Quick Tips

- The backrest should conform to the natural curvature of your spine, and provide adequate lumbar support.
- The seat should be comfortable and allow your feet to rest flat on the floor or footrest.
- Armrests, if provided, should be soft, allow your shoulders to relax and your elbows to stay close to your body.
- The chair should have a five-leg base with casters that allow easy movement along the floor.

BACKREST

Potential Hazards:

Poor back support and inappropriate postures may result from inadequate backrest size, material, positioning, or use. Working in these postures may lead to back pain and fatigue. For example, a chair without a suitable or adjustable backrest will not provide adequate lumbar support or help maintain the natural S-shape curvature of the spine.

Possible Solutions:

- If your current chair does not have a lumbar support, use a rolled up towel or a removable back support cushion to temporarily provide support and maintain the natural curve of the spine.
- Use a chair with a backrest that is easily adjustable and able to support the back in a variety of seated postures. A backrest should have the following:

- A lumbar support that is height adjustable so it can be appropriately placed to fit the lower back. The outward curve of the backrest should fit into the small of the back.
- An adjustment that allows the user to recline at least 15 degrees from the vertical. The backrest should lock in place or be tension adjustable to provide adequate resistance to lower back movement.
- A device enabling it to move forward and backward. This will allow shorter users to sit with their backs against the backrest without the front edge of the seat pan contacting their knees. Taller users will be able to sit with their backs against the backrest while still having their buttocks and thighs fully supported. *NOTE:* some chair designs provide this adjustability by adjusting the position of the seat pan.



Figure 1. Adjustable chair and backrest

SEAT

Potential Hazards:

Using a chair with a seat that is too high may force you to work with your feet unsupported or encourage you to move forward in the chair to a point where your back is unsupported making it more difficult to maintain the S-shape of the spine (Figure 2). These awkward postures can lead to fatigue, restricted circulation, swelling, numbness, and pain.

Possible Solutions:

- If the seat cannot be lowered (for example, it would make the keyboard or monitor too high), use a footrest to provide stable support for the feet (Figure 3).
- Provide a chair with a seat pan that is adjustable and large enough to provide support in a variety of seated postures. It is recommended that the seat should be
 - Height adjustable, especially when shared by a number of users. The chair height is appropriate when the entire sole of the foot can rest on the floor with the back of the knee slightly higher than the seat of the chair (Figure 4).
 - Padded and have a rounded, "waterfall" edge (Figure 5).
 - Wide enough to accommodate the majority of hip sizes. Chairs with oversize seat pans should be provided for larger users.



Figure 2. Natural S-curve of the spine



Figure 3. Footrest

Potential Hazards:

An inappropriately sized seat pan can be uncomfortable, provide inadequate support to the legs, and restrict movement. One that is too short can place excess pressure on the buttocks of taller users, one that is too long can place excess pressure on the knee area of shorter users and minimize back support. One that is too small can restrict movement and provide inadequate support. Prolonged use can restrict blood flow to the legs and create irritation and pain.

Possible Solutions:

- Seat pan should be "depth" adjustable to adequately support taller users while allowing shorter users to sit with their back fully supported. The seat pan should provide support for most of the thigh without contact between the back of the user's knee and the front edge of the seat pan.
- Provide a footrest, which may elevate the knee slightly to relieve pressure on the back of the leg.
- Provide a chair that is sized to fit small or large users. *NOTE:* this is especially important if the chair is to be shared by several users.



Figure 4. Knee slightly higher than the seat of the chair

ARMREST

Potential Hazards:

- Armrests that are not adjustable, or those that have not been properly adjusted, may expose you to awkward postures or fail to provide adequate support. For example armrests that are:
 - *Too low* may cause you to lean over to the side to rest one forearm. This can result in uneven and awkward postures, fatiguing the neck, shoulders, and back.
 - *Too high* may cause you to maintain raised shoulders (Figure 6), which can result in muscle tension and fatigue in the neck and shoulders.
 - *Too wide* (Figure 6) cause you to reach with the elbow and bend forward for support. Reaching pulls the arm from the body and can result in muscle fatigue in the shoulders and neck.
 - *Too close* can restrict movement in and out of the chair.
 - *Too large* or inappropriately placed may interfere with the positioning of the chair. If the chair cannot be placed close enough to the keyboard, you may need to reach and lean forward in your chair. This can fatigue and strain the lower back, arm, and shoulder.

Note: Using an armrest is up to you and the system integrators. Consider factors such as the amount of time during the workday that the user performs computer work, whether the user is experiencing or has experienced a musculoskeletal disorder (MSD) or symptoms, and user preference.



Figure 5. Seat pan with a rounded, "waterfall" edge

- Armrests that are made of hard materials or that have sharp corners can irritate the nerves and blood vessels located in the forearm. This irritation can create pain or tingling in the fingers, hand, and arm.



Figure 6. Shoulders in various positions

Possible Solutions:

- If your armrests cannot be properly adjusted, or if they interfere with your workstation, remove them, or stop using them.
- Position adjustable armrests so they support your lower arm and allow your upper arm to remain close to the torso. Properly adjusted armrests will be
 - Wide enough to allow easy entrance and exit from the chair,
 - Close enough to provide support for your lower arms while keeping your upper arms close to the body,
 - Low enough so your shoulders are relaxed during use (Figure 6) (Adjust your armrests so they just make contact with your lower arms when positioned comfortably at your sides.), and
 - High enough to provide support for your lower arms when positioned comfortably at your sides. You may be able to add padding to the top of your armrests if they are too low and not adjustable.
- Armrests should be large enough to support most of your lower arm but small enough so they do not interfere with chair positioning.
- Armrests should be made of a soft material and have rounded edges.



Figure 7. Office chair with adjustable armrests

BASE

Potential Hazards:

- Chairs with four or fewer legs may provide inadequate support and are prone to tipping.
- Inappropriate choice of casters, or a chair without casters, can make positioning the chair in relation to the desk difficult. This increases reaching and bending to access computer components, which can lead to muscle strain, and fatigue.

Possible Solutions:

- Chairs should have a strong, five-legged base.
- Ensure that chairs have casters that are appropriate for the type of flooring at the workstation.



Figure 8. Chair caster



Figure 9. Chair with five-leg base