

Visual Ergonomics: Solutions for Lighting & Eye Health

Visual ergonomics refers to multiple factors in our environment that impact our ability to see the details of a given task easily and accurately. Vision and lighting must be considered when designing environments to maximize efficiency and promote visual health.



SCREEN BREAKS

Take frequent micro-breaks. Look 20 feet away, for 20 seconds every 20 minutes. It is important to take visual breaks from computer work to allow the ciliary muscles to relax and for the eyes to rehydrate.



SCREEN DISTANCE

The closer your screen is to your eyes, the harder your eyes need to work to focus. Computer monitors should be approximately arm's length away and they can be even further if you can comfortably read the font size.



FONT SIZE

Increase your font size so that you can comfortably read the screen without squinting or leaning forward. Trying to focus on small font is not only more tiring for your eyes but is also more tiring mentally.



SCREEN HEIGHT

Your natural line of sight is slightly downward. The top line of text on your computer monitor should be at approximately eye height with your neck neutral and your ears over your shoulders.



STAYING HYDRATED

Your blink rate naturally slows down when looking at a digital screen and this means that your eyes are more susceptible to drying out. Staying hydrated has the added benefit of nudging you to get up more frequently.



SCREEN TIME LIMIT & CIRCADIAN RHYTHM

Blue light before bed may interfere with sleep. It is recommended to limit screen time 1 to 2 hours before bed.



TOTAL SCREEN TIME

Most of us have significantly increased our screen time in the past month. The [Canadian Society of Exercise Physiology](#) recommends limiting sedentary time to 8 hours or less, which includes no more than 3 hours of recreational screen time.



HEALTHCARE PROVIDER & ADDITIONAL RESOURCES

Follow-up with your healthcare provider, as needed. See the [CSA Z412 2017](#) document for more details on the application standard for workplace ergonomics and information on lighting levels for different tasks.





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General and task lighting

General and task lighting are important for creating appropriate light intensities depending on the task, for worker safety, for recognizing details and for preventing eye strain. Improperly lit environments can lead to poor vision, reflection/glare, poor work postures, difficulty seeing dangerous objects and an increased risk of injury or property damage.

Consider these suggestions to improve visual clarity through proper lighting:

- Ensure environment light levels are appropriate for the level of visual acuity required for a task, size of font, contrast, frequency of visual tasks performed and level of inspection/precision
- Eliminate shiny surfaces (e.g. glass, polished metal) that contribute to glare
- Provide even lighting on a work surface to prevent the formation of bright spots or visual distractions
- Avoid major shadows and contrast
- Clean and maintain light fixtures on a regular basis

Glare

Glare occurs when there is a large difference in light intensity between an object and its background. Glare can be direct (overly bright light sources in the line of sight such as the sun shining through a window) or indirect (bright light source if reflected into the eye from a surface, usually below the line of sight). Glare is a common problem experienced by office workers.

Minimize glare in the office

- Adjust environment lighting brightness and contrast
- Light coloured background on colour monitor (light green is recommended)
- Position monitors perpendicular to window and between banks of light
- Providing venetian blinds to block sunlight producing glare
- Install diffusers on overhead lighting
- Use task lighting over writing area and paper documents
- Matte walls and desktop
- Consider the possibility of removing one light bulb in overhead light fixtures that cause glare or headaches

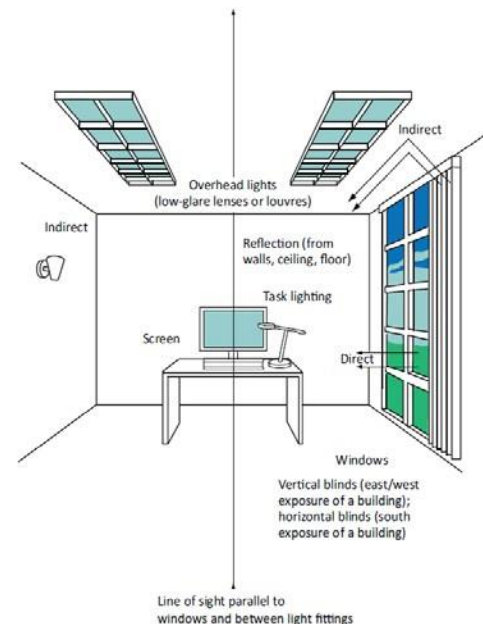


Image from CSA Z412 2017



Lighting and circadian rhythms

Lighting should contribute to the optimization of circadian rhythms and minimization of sleep restriction.

Daylight exposure: Fluorescent and Light-Emitting Diode (LED) lighting are types of blue-enriched lighting that strengthen circadian timing and improve human performance during the daytime. Backlit electronics such as monitors, laptops, tablets and smartphones utilize blue-enriched light.

Night light exposure: Blue-enriched lighting used in the evening and night time cause disturbances in the circadian rhythm, which has been linked to sleep disturbances and other health disorders. Red light is least likely to disrupt circadian rhythms at night. However, red light is not practical for most visual tasks. In this case, white light with no blue enhancement can be used to minimize negative circadian impact.

The settings of most backlit electronic devices have the option to turn down blue light spectrum later in the day/evening. If your devices do not have this function, a software such as [F.lux](#) can be installed to adjust the display's colour temperature according to location and time of day with the goal of reducing eye strain and minimizing circadian disruption.

Visual Interest

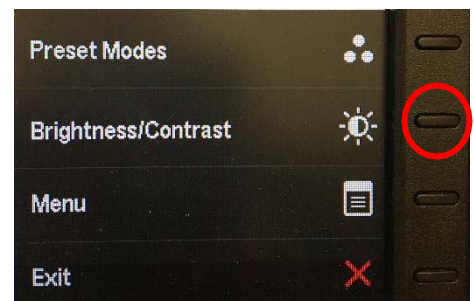
Plants and landscape murals can provide variations in illumination in a room and increase visual interest. Be sure that murals are not too bright or busy and that they are not positioned on the wall behind the monitor as this could result in a visual distraction.

Screen brightness

Screen brightness should match the light intensity of the surrounding environment to reduce the risk of eye strain and fatigue.

Adjust screen brightness (external buttons on bottom/side of monitor):

- Preferred brightness will depend on your vision and your environment
- Adjust the screen brightness to the lowest setting that you can work from and increase the brightness as needed (~40-65%)
- Recommend a light green screen background instead of the pre-programmed blue background



Brightness controls on side of monitor



Eye breaks

Regardless of how well lighting is adjusted, it is important to take visual breaks from computer work to allow the ciliary muscles to relax and for the eyes to rehydrate. It is recommended that workers take the opportunity to look away from the screen for 20 seconds for every 20 minutes of computer work. Consider rearranging tasks to increase opportunities for changes in posture that require different visual demands too.

[Eyeleo](#) (PC) and [TimeOut](#) (Mac) are software that can be installed to set reminders for eye breaks. Screen blocking occurs every hour and micro breaks can be scheduled periodically within the hour. Break length and notification type are customizable.

Monitor positioning

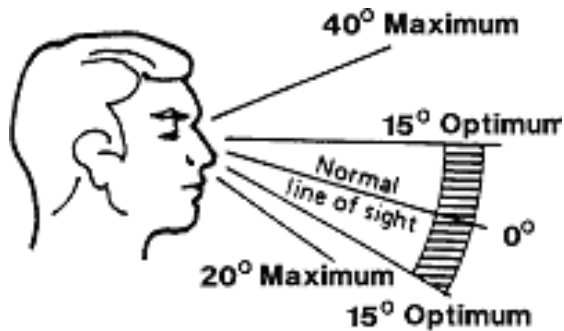


Image from CSA Z412 2012

The line of sight is 15° below horizontal eye-level; therefore, the ideal monitor position for a neutral neck posture is aligning top line of text to eye-level.

The monitor should be placed an arm's length distance away from the worker. If the words on the screen are too small, it is better to enlarge the font rather than bring the monitor closer to you.

Two Monitors:

Generally, if you have 2 monitors position them slightly further away than arm's length to increase your field of view.

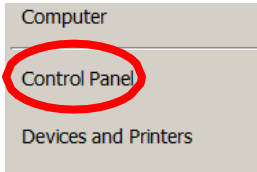
Place the monitor with the most frequently used information in the direct line of sight, and less accessed data on the secondary monitor and angle it inwards

If both monitors are used equally, center yourself with both and angle them in slightly to reduce side-to-side neck twisting.



Display size

1. Open the Start menu on your Home screen
2. Click Control Panel



3. Click Display

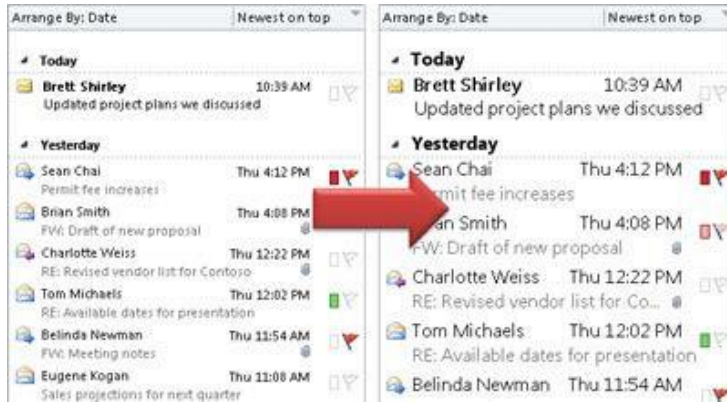


4. Choose your preferred size to read what's on your screen (Medium (125%) recommended)
5. Your computer may need to restart to complete this action
6. If you are a VDI user or you do not have permission to change this setting, please contact IT by making a [service request](#) so IT can adjust the display size.



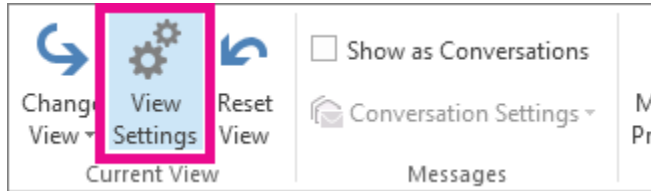
Outlook font size

Microsoft Outlook is defaulted to 8 pt. font.

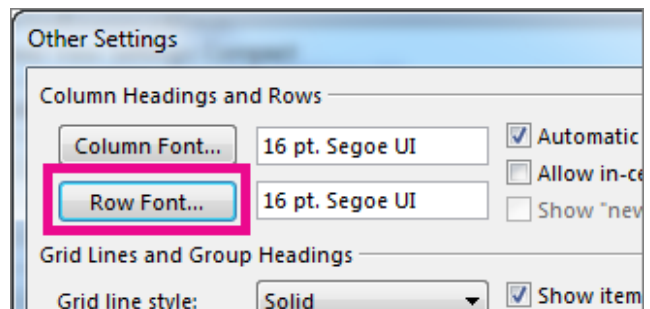
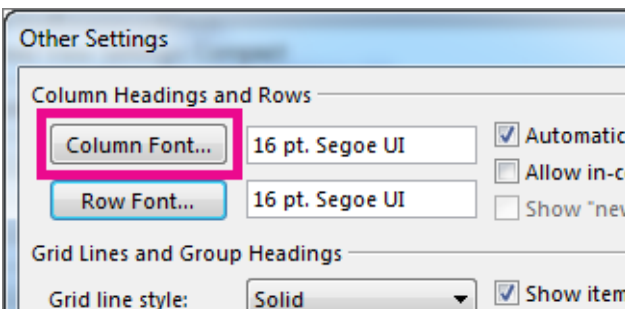


Step by step process to enlarge font:

1. Open Mail.
2. Click View > View Settings



3. Click Other Settings
4. To change the font or font size for column headers in your Inbox (e.g. "From" & "Subject") and row headers (e.g. message subject lines), click Column and Row Font and make the desired adjustment. Recommend starting at 11pt. font and adjusting as needed.





Office Equipment for Lighting

If eye strain or headaches persist after following the above recommended controls, consider office equipment that can be purchased to decrease lighting intensities:

- The [leaf canopy from IKEA](#) can be positioned as a light blocker in office workplaces. This canopy can be purchased at the Richmond IKEA.
- Removing overhead light bulbs may require task lighting to refer to paperwork. An LED lamp with low energy consumption and that reduces the formation of shadows can be useful for workers who are sensitive to fluorescent lighting and prefer LED lighting to minimize eye/headache irritation. The Humanscale Element Lamp can be purchased from [Staples E-way](#) (product code: HMSEDEBB).

Additional Resources

The [CSA Z412 2017](#) provides the application standard for workplace ergonomics, including lighting. For specific information on lighting levels for different tasks, please consult the CSA Z412 2017 document.