

Know Your Ergonomic Reach Zones: A Comprehensive Guide.



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Designing the workplace to fit the demands and needs of all employees is a cornerstone in preventing ergonomic-related injuries. When considering ergonomic stressors, maintaining proper Reach Zones is vital to ensuring that employees, especially those working in stationary positions for long hours, have a workspace set up to meet their daily demands.



Working in a stationary industrial or laboratory setting may not seem like a high-risk activity to the untrained eye. Still, the injuries involved in this line of work are quite frequent and can be severe. Based on the [U.S. Bureau of Labor Statistics](#), in 2019, 28% of reported non-fatal injuries were attributed to Musculoskeletal Disorders arising from ergonomic-related risk factors. [Liberty Mutual's Annual Workplace Safety index](#) estimates the cost of injuries caused by handling objects and awkward postures at over \$16 billion annually.



The natural range of motion of the human body varies from person to person. Using our knowledge of Ergonomic Reach Zones, we can tailor your workspace to cater to the human body's natural range of motion.

Working in the Green Zone

Working in an industrial or laboratory setting can subject employees to repetitive motions while positioned at a workstation. The accumulation of these repetitive motions, especially those that deviate the body from neutral posture or the natural range of motion, can result in unwanted stress that may lead to more serious injuries.

To understand the importance of Ergonomic Reach Zones, we must define them, explain their uses, and how we can set them up properly.

Reach Zones are areas within an employee's reach (usually centered around a specific workstation) that are frequented to perform daily tasks. On the other hand, Ergonomic Reach Zones are areas that employees can comfortably reach without subjecting their bodies to unnecessary harm.

They make up the envelope of the human body's natural range of motion and define the body's limits while interacting with the environment around it.

Reach Zones are classified into three main types:

- **Zone 1:** Primary Zone
- **Zone 2:** Secondary Zone
- **Zone 3:** Tertiary Zone

Zone 1, the Primary Zone, consists of the area (both horizontally and vertically) directly within reach of an employee where the usual tools and equipment most frequently used are found. This zone is characterized by the area a person can reach within their workstation while maintaining a bent elbow.

This may be where most of the commonly used tools or equipment would likely be placed in an industrial or laboratory setting, especially those that require repetitive use throughout the workday.

Zone 1 is called the “Neutral Reach Zone,” meaning that this is the area that the human body will be most comfortable in for an extended period and will cause the least amount of strain on the body. Items placed in this zone are easy to reach. Here is where we should position the most frequently used items. It’s the zone where most of the work motions should happen.

As we show in Figure 1.1 below, the range of motion in this zone focuses on movements not exceeding the maximum reach of the average forearm with a bent elbow, meaning that the natural range is up to 14” in the horizontal plane and 6” in the vertical plane (as shown in Figure 1.2).

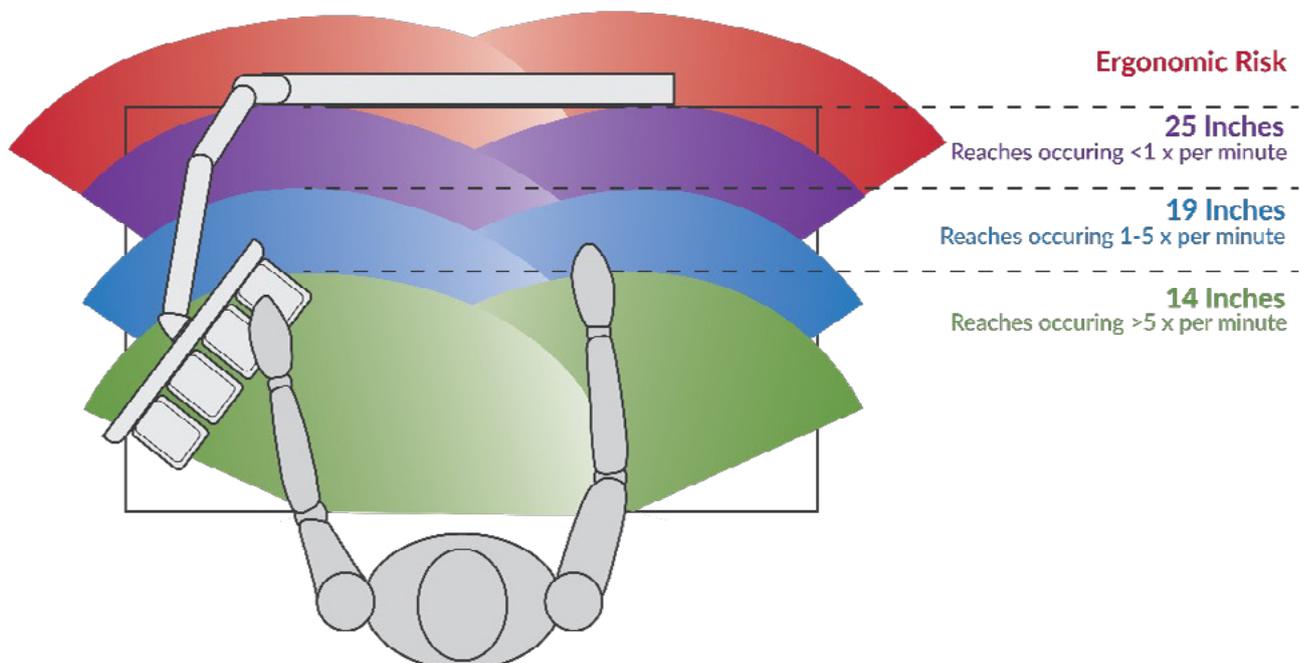


Figure 1.1 - Horizontal Reach Zones



Zone 2, the Secondary Zone, consists of the areas reachable by extending the arms but not necessarily to full extension. This area usually holds items or tools that may be needed consistently throughout the workday but are not used at a high frequency.

While not much effort may be required to access this zone, a high-frequency use of tools or equipment in this area can lead to certain ergonomic risks associated with the over-reaching and repetitive extension of arms.

As this zone will be commonly used to store items at an elevated level, a suitable application for this would be to have adjustable monitors, adjustable lighting, or specialized stationary tools or equipment that may need to be accessed during the workday.

Zone 2, in Figures 1.1 and 1.2, has a range that falls between 15" to 19" on the horizontal plane while extending between 6" to 12" vertically.

Flexible ergonomic workstation design for workers of different sizes and abilities.



Zone 3, The Tertiary Zone, is the zone that is considered least used and often requires an individual to shift from their neutral position completely to access it. This zone should be used to store non-essential tools, and repetitive motions to access it should be minimized.

This zone has a range that falls between 19" and 25" in the horizontal plane and more than 12" in the vertical plane.

Any areas that fall above the mentioned limits are considered maximum reach areas and are out of reach for the average person at a workstation. Trying to reach them regularly will pose ergonomic risks. They usually require a person to get out of their chair or move away from their neutral position (if standing) to reach them. They are usually used for excess storage of materials or equipment and tools that are rarely required.



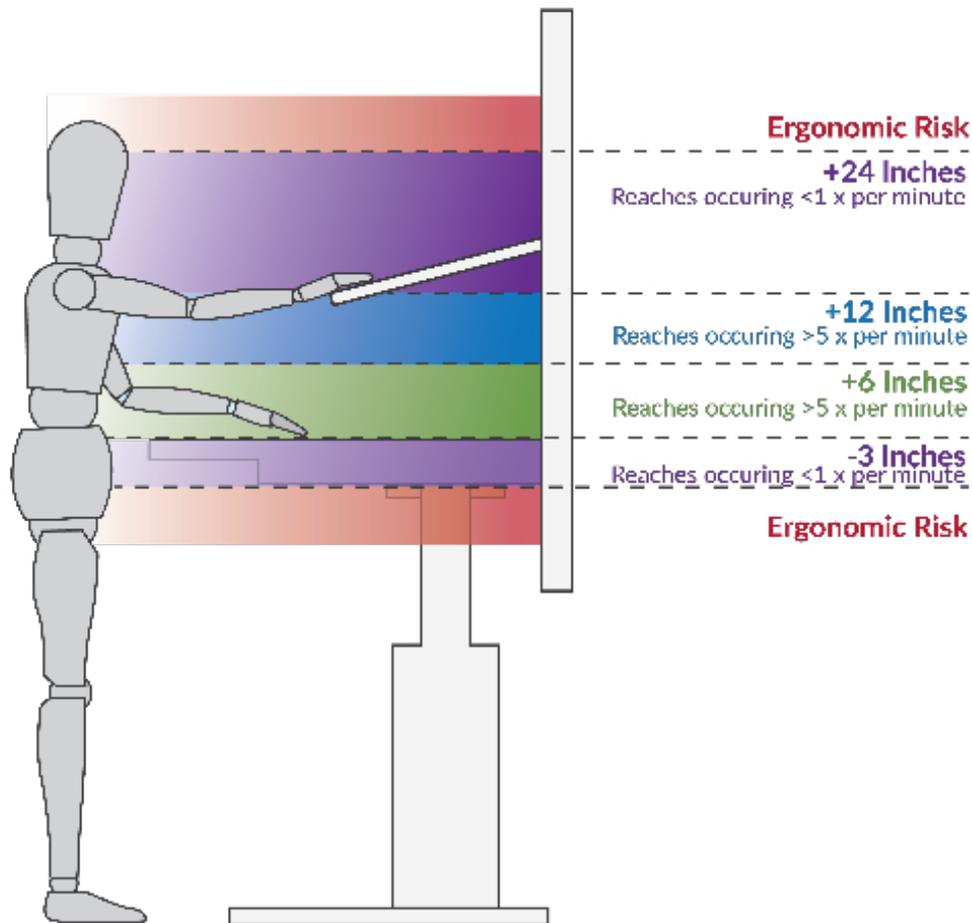


Figure 1.2 - Vertical Reach Zones

Workplace Application and Universal Design

To properly apply the concepts of ergonomic reach zones to the workplace, we must consider the vast range of human body proportions. This brings us back to the fundamental concept of designing the workplace to fit the person and not the other way around.

A workstation must be able to accommodate a large range of human body proportions, capabilities, and needs. By introducing modular workstations and accessories, we can customize the workspace not only to individual human needs but also to changing tasks and workplace alterations that a person might encounter.

The modular and adjustable workstation allows users to customize their space to match the recommended reach zone dimensions based on their body type and capability. This brings us to the subject of accessible and universal design and designing work environments that cater to a wide range of capabilities and needs.

For users requiring a wheelchair in the workplace, it becomes quite easy to adjust the workstations in terms of height or horizontal reach to provide them with a suitable and ergonomic position to work from.

Another benefit is modularity; modular stations can add or remove different components to accommodate a wide range of capabilities and needs. An example of this may be the reduction in under-desk storage to accommodate space for a wheelchair.

The [ADA](#) specifies that “employers may need to procure or adjust work stations such as desks, laboratory and workbenches, fume hoods, reception counters, teller windows, study carrels, commercial kitchen counters, and conference tables to accommodate the individual needs of employees with disabilities on an ‘as needed’ basis.”

The requirement for an unobstructed high forward reach for users utilizing a wheelchair varies depending on the workstation's height. In the case of adjustable-height workstations, this no longer becomes a problem as it can be adjusted to the desired height to create a neutral seating position for any user.

In addition, the use of horizontal slide systems (for overhead storage) aids in bringing tools and equipment from a Zone 3 position to a Zone 1 or 2 position and creating more neutral and ergonomic access zones. In Figure 1.3 we can see that regardless of the ADA-required guidelines for a high forward reach, wheelchair users have full adjustability to suit their required tasks and bring the reach zone closer to the neutral position.



 [Click here to view video](#)

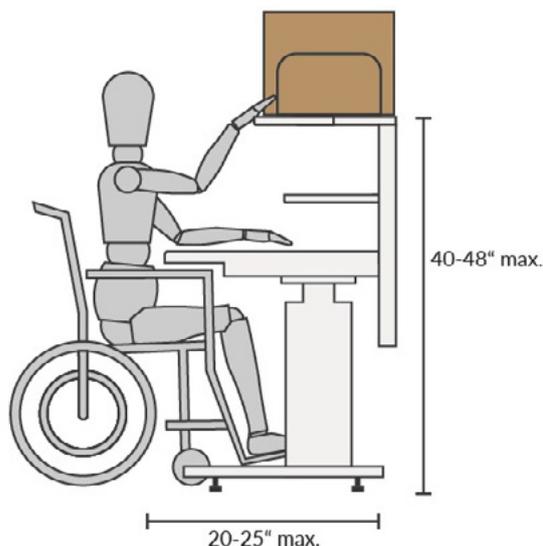


Figure 1.3 - Universal Design - Unobstructed High Forward Reach

Whether dealing with repetitive motions or motions that require reaching for tools or equipment, the most important thing to remember is that the design and organization of a worksurface will always make a difference.

Adjustable and modular workstations that provide customization options for storage and accessories help achieve a more organized space, which in turn creates the platform to properly adjust ergonomic reach zones.

Important things to keep in mind when setting up a workspace:

1. Adjust the workspace using adjustable workstations and accessories depending on the user's range of motion and physical capabilities or requirements.
2. Anticipate the types of motions, a user might be required to do for a particular task and find ways to keep those tasks as close to Zone 1 as possible.
3. Keep all tools and equipment that require frequent use in Zone 1 of the horizontal and vertical working space.
4. Proper posture goes a long way in ensuring that reach zones are properly adjusted.
5. Reduce repetitive motions that can lead to Cumulative Trauma Disorders by introducing engineering controls (using adjustable shelves and tool supports to bring the work closer to the user).

Workspace Layout

Consider the following as you evaluate the items that need to be placed on a workstation:

- Importance – The most important items should be most central and closest.
- Function – Group items with similar functions together.
- Frequency – Position most frequently used items in Zone 1.
- Sequence – Position items in optimal locations for sequence of use. We recommend the order to be:
Top to bottom – left to right.



Beyond the Workstation

There are several controls that employers can take to properly make use of Reach Zone ergonomics. These controls go beyond the engineering controls of providing adjustable and modular workstations.

Employers can focus on certain Administrative Controls in their ergonomic process that makes the use of ergonomic reach zones more effective. Some of these Administrative Controls are:

1. Management Support



Committed Top-Management provides the baseline for identifying the ergonomic goals they wish to achieve and can identify, provide, and review the tools and expertise required to make the necessary changes in the workplace.

2. Training



Training and awareness to employees regarding the ergonomic risk factors related to improper workstation adjustments and reach zones provides them with the knowledge required to understand the risks and learn how to identify the benefits of proper reach zone adjustments.

3. Employee Involvement



The most effective way of ensuring employees not only understand the information that is provided but also agree with it is by involving them in the decision-making and problem-solving process. The idea is that the user is always the best resource for improvement.

4. Identifying Root Causes



Knowing how to identify the true underlying causes and root causes of workplace ergonomic injuries to propose the most suitable controls.

5. Encouraging Reporting



By reporting ergonomic issues in the workplace, both employees and employers can then develop the necessary controls to prevent these issues from reoccurring.

6. Continuous Improvement:



The continual review of the ergonomic process in the workplace helps to tackle the everchanging work environment and regulatory requirements. This can be done by setting certain goals that the employer wants to achieve and also by periodically auditing the existing facilities to propose improvements.

By investing in modular workstations that can accommodate the proper utilization of ergonomic reach zones, employers can greatly reduce work-related injuries' frequency and severity while promoting a more productive and healthier workplace.

Creating a safe and healthy user environment is the baseline for developing a safety culture that focuses on longevity, productivity, and sustainable business practices.

[Contact](#) your BOSTONtec representative for a consultation. **989.496.3500**