

Proposed interpretations for WSIB Functional Abilities Form:

The following interpretations were derived through a synthesis of many research sources, which are listed at the end of this document. The interpretations **are not** injury risk thresholds. “Ergonomics” guidelines (identified in *italics* and listed as references at the end of this document) that would protect a majority of healthy workers would be **less** protective than the thresholds proposed here. This interpretation attempts to cover most worker/job matches. However, these interpretations may not apply to all situations, and professional judgement should be used. These interpretations are based on the best information that we have available right now (February, 2011), and they may change as new research is completed.

Functional abilities	
Walking	<p>Forward movement of the body, more than 3 steps (approx. 2.5 metres). Does not include side stepping 1-2 steps. Note: The distance indicated on the FAF is a maximum walking distance “at one time”. (An employee who can walk 100 metres at any one time, could walk smaller distances periodically throughout the shift.)</p>
Standing	<p>Bearing weight on the feet, including both standing stationary (feet stationary for more than 6 seconds) and walking. Note: If the duration of standing should be limited to 15, or 15-30 minutes, the employee could resume work in a standing position after sitting for 5 minutes.</p>
Sitting	<p>Resting on a stool or on a chair, where the employee is not required to support his/her full weight on his/her feet. Note: If the duration of sitting should be limited to 15, or 15-30 minutes, the employee could resume work in a sitting position after standing or walking for 5 minutes.</p>
Lifting	<p>Manually grasping an object and moving the object vertically (up <u>or</u> down) without mechanical aids. Object weights should not exceed the threshold provided in the FAF. Notes: “Waist” height would be based on the dimensions of the specific employee. “Waist to shoulder” would include lifting at any height above waist height, including over shoulder height. Unless specifically indicated, the weight interpretation applies to 2-handed lifting, even if the injury is unilateral. Selecting “up to 5 kg” on the FAF means that the employee should not be required to lift more than 2.5 kg in either hand. Lifting also includes carrying, even without vertical displacement of the load.</p>
Stair climbing	<p>Ascending or descending stairs or ramps, with the full foot supported. Notes: The number of steps indicated on the FAF is assumed to represent the total number of stairs the employee can ascend or descend at one time. A hand rail may or may not be present. Climbing into a forklift, where a full step is provided, would be considered “stair climbing”.</p>
Ladder climbing	<p>Ascending or descending ladders, where the arms are significantly involved. Notes: The number of steps indicated on the FAF is assumed to represent the total number of ladder rungs the employee can climb at one time. Climbing into a forklift, where a toe hold is provided and the operator pulls him/herself up with the arms, would be considered “ladder climbing”.</p>
Repetitive bending/twisting	<p>Neck: Bending the neck more than 20° forward, sideways or backward, or twisting the neck more than 45°, at an overall rate of more than 2 neck movements/minute, for more than 15 minutes at a time. <i>Rationale: more protective than McAtamney and Corlett (1993), and Ariens et al. (2002).</i> Back: Bending the trunk more than 20° forward, backward or sideways, or twisting the trunk such that the shoulders are out of line with the hips by more than 20°, at an overall rate of more than 2 back movements/minute, for more than 15 minutes at a time. <i>Rationale: more protective than Norman et al. (1998).</i> Shoulders: Flexing or abducting the shoulder more than 60° at a rate of more than 2 shoulder movements/minute, <u>or</u> flexing or abducting the shoulder more than 30°, at a rate of more than 2.5 movements/minute, for more than 15 minutes at a time. <i>Rationale: More protective than Kilbom (1994), Bernard (1997), and Colombini (1998).</i> Elbows: Flexing/extending the elbow to the end range of motion, or pronating/supinating the forearm by 90°, at an overall rate of more than 4 elbow movements/minute, for more than 15 minutes at a time. <i>Rationale: More protective than McAtamney and Corlett (1993), Kilbom (1994).</i> Wrists: Extending, flexing, ulnar deviating, or radial deviating the wrist, at an overall rate of more than 4 wrist movements/minute, for more than 15 minutes at a time. <i>Rationale: More protective than McAtamney and Corlett (1993), and Kilbom (1994).</i> Note: Health care providers often add recommendations against “prolonged”, “static”, or “sustained” use of specific postures. This interpretation would involve maintenance of a given posture for more than 1 minute at a time, or for more than 40% of the work cycle, or for more than 2 hours total per day. <i>Rationale: more protective than Ariens (2002), and OHSCO (2008).</i></p>

Functional abilities	
Work at or above shoulder	Raising the hands above shoulder pivot height (based on the dimensions of the specific employee), regardless of the elbow position. Note: If the injury is unilateral, only the injured arm is restricted.
Use of hands: gripping	Gripping includes squeezing an object between the palm and fingers (e.g. squeezing a trigger to operate an air tool), power grips, hook grips, all pinch grips, single finger triggers, and all finger or thumb presses with forces greater than 1 kg. A suitable job would not require the employee to grip or pinch at a rate of more than 4 times/minute, for more than 15 minutes at a time. The job demands must not exceed the following grip force interpretations: 9.0 kg power grip, 2.7 kg chuck pinch, 1.6 kg tip pinch, and 2.3 kg lateral pinch. Does not include handling objects with the weight balanced on the palm of the hand, such as holding a tray or bowl, or "palm pressing", such as pushing open a door. <i>Rationale: more protective than Putz-Anderson (1988), Work in Progress (2007), and Mathiowetz et al. (1985).</i>
Use of hands: pinching	Pinching includes squeezing an object between the thumb and finger(s) (e.g. turning a key), chuck, tip, and lateral grips. A suitable job would not require the employee to pinch at a rate of more than 4 times/minute, for more than 15 minutes at a time. The job demands must not exceed the following force interpretations: 2.7 kg chuck pinch, 1.6 kg tip pinch, and 2.3 kg lateral pinch. Does not include power grips, hook grips, palm presses, or finger presses. <i>Rationale: more protective than Putz-Anderson (1988), Work in Progress (2007), and Mathiowetz et al. (1985)</i>
Pushing/pulling	Limiting forces to within the following interpretations: <ul style="list-style-type: none"> ▪ While walking: 10 kg of initial push/pull force, and 4 kg of sustained push/pull force ▪ While sitting or standing: <ul style="list-style-type: none"> 1-hand pull with 2.3 kg of force (2-handed pull with 4.6 kg) 1-hand push with 4.1 kg of force (2-handed push with 8.1 kg) 1-hand sideways pull toward the body (adduction) with 1.6 kg of force 1-hand sideways push away from the body (abduction) with 1.3 kg of force. <i>Rationale: more protective than Snook and Ciriello (1991), and Diffrient (1981).</i>

References:

- Ariens, G., Bongers, P., Hoogendoorn, W., van der Val, G., and van Mechelen, W. (2002). High physical and psychosocial load at work and sickness absence due to neck pain. *Scandinavian Journal of Work, Environment & Health*, 28(4), 222-231.
- Bernard, B. (ed.) (1997). *Musculoskeletal disorders and workplace factors*. Cincinnati: U.S. Department of Health and Human Services. NIOSH.
- Columbini, D. (1998). An observational method for classifying exposure to repetitive movements of the upper limbs. *Ergonomics*, 41, 9, 1261-1289. This research paper provides limits for repetitive awkward shoulder movements.
- Diffrient, N., Tilley, A. and Harman, D. (1981). *Humanscale*. Cambridge: The MIT Press.
- Kilbom, A. (1994). Repetitive work of the upper extremity: Part 1 - Guidelines for the practitioner. *International Journal of Industrial Ergonomics*, 14, 51-57.
- Mathiowetz, V., Kashman, N., Volland, G., Weber, K., Dowe, M., and Rogers, S. (1985). Grip and pinch strength normative data for adults. *Archives of Physical Medicine and Rehabilitation*, 66, 69-74.
- McAtamney, L and Corlett, E. (1993). RULA: a survey method for the investigation of work-related upper limb disorders. *Applied Ergonomics*. 24 (2). pp 91-99.
- Norman, R., Wells, R., Neumann, T., Frank, J., Shannon, H., Kerr, M. and Ontario Universities Back Pain Study Group. (1998). A comparison of peak vs. cumulative physical work exposure risk factors for reporting of low back pain in the automotive industry. *Clinical Biomechanics*, 13, 561-573.
- Occupational Health and Safety Council of Ontario (OHSCO). (2008). *Ontario MSD Prevention Toolbox*.
- Putz-Anderson, V. (1988). *Cumulative Trauma Disorders: A manual for musculoskeletal diseases of the upper limbs*. New York: Taylor & Francis.
- Snook, S. and Ciriello, V. (1991). The design of manual handling tasks: revised table of maximum acceptable weights and forces. *Ergonomics*, 34, 9, 1197-1213.
- Work in Progress Ergonomics (2007). *Handpak software, version 1.1*.
- Workplace Safety and Insurance Board (2007). *Functional Abilities Form: for Planning Early and Safe Return to Work*. (2647A). Toronto, ON: 05/07.