

WORKSHEET "B"

MSI RISK FACTOR ASSESSMENT

- TO DETERMINE HIGH RISK FROM RISK IDENTIFICATION: PHYSICAL DEMANDS OF WORK -

Job Title or Task: _____

Date: _____

Completed By: _____

(mm/dd/yr)

Section 4.48 in the Ergonomics (MSI) Requirements requires an employer to assess those factors that expose workers to a risk of MSI. This document can be used to determine if the risk(s) identified in the document titled "Worksheet A - MSI Risk Factor Identification" pose a "high" or "moderate" risk.

INSTRUCTIONS: _____



1. **Document** the job title or task, date and name of person(s) completing the worksheet. Risk assessment should be performed by someone who understands the work process, the MSI risk factors, and the principles of risk assessment and control.
2. **Complete** the "Risk Factor Summary-Moderate Risk" from "Worksheet A – Risk Factor Identification." These risk factors are considered to pose at least a "moderate" risk of MSI.
3. **Perform** "Risk Factor Assessment" only on those factors identified from "Worksheet A."
4. **Observe and consult** with a representative sample of workers and those workers with signs & symptoms of MSI.
5. **Read** across the page under each risk factor and determine if all of the conditions in that row are present in the work activities.
 - *Explanatory notes regarding **magnitude, duration and exposure pattern** under "Instructions" in Worksheet A also apply to Worksheet B.*
6. **Check** the box to indicate that a "high" risk of MSI exists if all conditions are present.
 - *Make any appropriate notes to clarify specific details.*
7. **Complete** the "High Risk" column of the Risk Factor Summary Table.

INTERPRETATION OF RESULTS

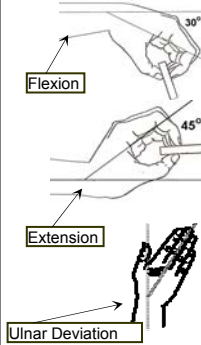

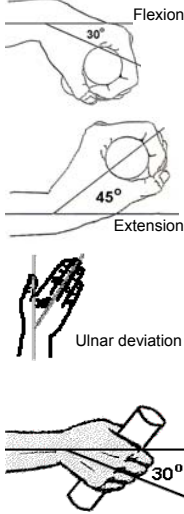
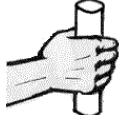
The risk factors in the "high risk" column require that controls must be implemented without undue delay. Controls should eliminate, or if that is not practicable, minimize the risk of MSI to workers. If the risk remains "moderate," controls will be required to minimize the risk of MSI. For assistance in developing controls, refer to the WCB document, "Common Risk Control Options."

RISK FACTOR SUMMARY TABLE

RISK FACTOR	"MODERATE RISK" Risk Factors Identified from Worksheet "A"	"HIGH RISK" Risk factors Indicated from Assessment Worksheet "B"
CONTACT STRESS	<input type="checkbox"/>	<input type="checkbox"/>
REPETITION	<input type="checkbox"/>	<input type="checkbox"/>
GRIP FORCE	<input type="checkbox"/>	<input type="checkbox"/>
LIFT/LOWER FORCE	<input type="checkbox"/>	<input type="checkbox"/>
AWKWARD POSTURE	<input type="checkbox"/>	<input type="checkbox"/>
VIBRATION	<input type="checkbox"/>	<input type="checkbox"/>

CONTACT STRESS:				Mark ✓ here to indicate a High Risk of MSI
BODY PART	PHYSICAL RISK FACTOR	DURATION	VISUAL AID	
HANDS	Using the hand (heel/base of palm) as a hammer more than once per minute	More than 2 hours total per day**		<input type="checkbox"/>
KNEES	Using the knee as a hammer more than once per minute	More than 2 hours total per day		<input type="checkbox"/>

REPETITION:				Mark ✓ here to indicate a High Risk of MSI
BODY PART	PHYSICAL RISK FACTOR	COMBINED WITH	DURATION	
NECK SHOULDERS ELBOWS WRISTS HANDS	Using the same motion with little or no variation every few seconds (exclude keying activities)	No other risk factors	More than 6 hours total per day	<input type="checkbox"/> Neck <input type="checkbox"/> Shoulders <input type="checkbox"/> Elbows <input type="checkbox"/> Wrists <input type="checkbox"/> Fingers
WRISTS HANDS	Using the same motion with little or no variation every few seconds (exclude keying activities)	Wrists bent in; $\geq 30^\circ$ flexion, or $\geq 45^\circ$ extension, or $\geq 30^\circ$ ulnar deviation, AND High forceful hand(s) exertions	More than 2 hours total per day	<input type="checkbox"/>
	Intensive keying	Awkward wrist posture, $\geq 30^\circ$ flexion, or $\geq 45^\circ$ extension, or $\geq 30^\circ$ ulnar deviation	More than 4 hours total per day	<input type="checkbox"/>
	<i>Keying with the hands or fingers in a rapid, steady motion with few opportunities for temporary work pauses.</i>	No other risk factors	More than 7 hours total per day	<input type="checkbox"/>

GRIP FORCE					Mark ✓ here to indicate a High Risk of MSI
BODY PART	PHYSICAL RISK FACTOR	COMBINED WITH	DURATION	VISUAL AID	
ARMS WRISTS HANDS	Pinch gripping** an unsupported object(s) <ul style="list-style-type: none"> • Weighing 1 kg (2 lbs) or more per hand, OR <ul style="list-style-type: none"> • Pinch gripping with a force of 2 kg (4 lbs) or more per hand (comparable to pinch gripping half a stack of photo-copy paper) 	Highly repetitive motion	> 3 hours total per day		<input type="checkbox"/>
		Wrists bent in $\geq 30^\circ$ flexion, or $\geq 45^\circ$ extension, or $\geq 30^\circ$ ulnar deviation <p>circle the appropriate movements</p>	More than 3 hours total per day		<input type="checkbox"/>
		No other risk factors	More than 4 hours total per day		<input type="checkbox"/>
ARMS WRISTS HANDS	Power gripping** an unsupported object(s) <ul style="list-style-type: none"> • Weighing 5 kg (10 lbs) or more per hand OR <ul style="list-style-type: none"> • Power gripping with a force of 5 kg (10 lbs) or more per hand (comparable to clamping light duty automotive jumper cables onto a battery) 	Highly repetitive motion	> 3 hours total per day		<input type="checkbox"/>
		Wrists bent in $\geq 30^\circ$ flexion, or $\geq 45^\circ$ extension, or $\geq 30^\circ$ ulnar deviation <p>circle the appropriate movements</p>	More than 3 hours total per day		<input type="checkbox"/>
		No other risk factors	More than 4 hours total per day		<input type="checkbox"/>

**Note: A pinch grip occurs when the force application is primarily between the fingers and thumb.
A power grip occurs when the force is primarily between the fingers and the palm.

LIFT/ LOWER FORCE RISK ASSESSMENT - TO DETERMINE HIGH RISK

This document can be used to assess forceful exertion due to lifting/ lowering force. Weight limits in this document represent "high" risk that require controls without undue delay.

Mark one of the two boxes (θ) to indicate which assessment situation applies. _____

- With one specific lift or when repeating the same lift, use Steps 1-5 below.
- When there is a number of lifts with different weights and/or different postures, use Steps 1-5 to:
 1. Assess the two worst case lifts - the heaviest object lifted and the lift in the most awkward posture. AND
 2. The most commonly performed lift. In Step 3, use the frequency and duration for all of the lifting done in a typical workday.

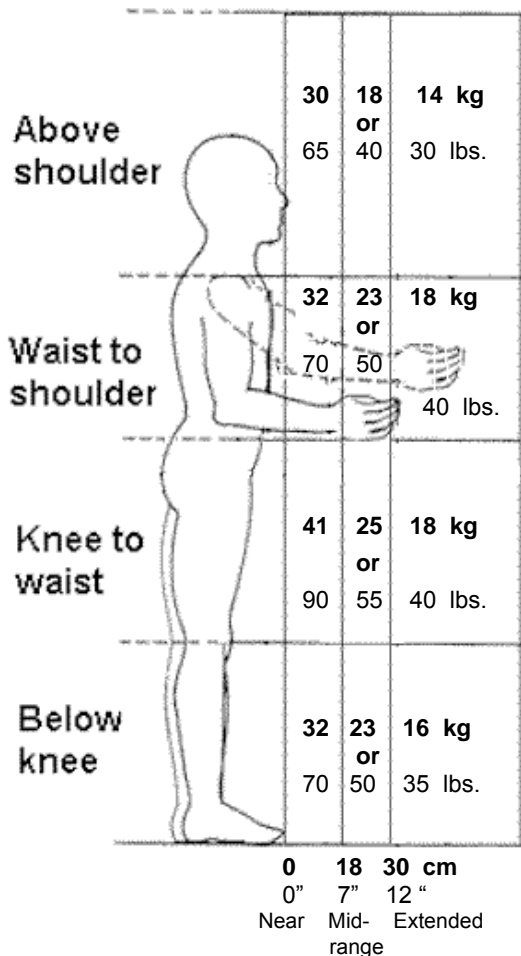
Step 1

Find the actual weight of the object that the employee lifts.

Actual Weight = _____

Step 2

Determine the Unadjusted Weight Limit. Determine the most awkward hand position during the lift/ lower task. Mark that spot on the diagram below. The number in that box is the **Unadjusted Weight Limit**.



Step 3

Find the Limit Reduction Modifier. Find out how many times the employee lifts per minute and the total number of hours per day spent lifting. Use this information to look up the **Limit Reduction Modifier** in the table below.

How Many Lift per Minute?	For How Many Hours per Day?		
	1 hr or less	1 hr to 2 hrs	2 hrs or more
1 lift every 2-5 min.	1.0	0.95	0.85
1 lift every minute	0.95	0.9	0.75
2-3 lifts every minute	0.9	0.85	0.65
4-5 lifts every minute	0.85	0.7	0.45
6-7 lifts every minute	0.75	0.5	0.25
8-9 lifts every minute	0.6	0.35	0.15
10+ lifts every minute	0.3	0.2	0.0

Note: For lifting performed less than once every five minutes, use 1.0

Limit Reduction Modifier: _____

Step 4

Calculate the Weight Limit. Start by copying the Unadjusted Weight Limit from Step 2.

Unadjusted Weight Limit (Step 2): = _____

If the employee twists more than 45 degrees while lifting, reduce the Unadjusted Weight Limit by multiplying by 0.85. Otherwise, use the Unadjusted Weight Limit

Twisting Adjustment: = _____

Adjusted Weight Limit: = _____

Multiply the Adjusted Weight Limit by the Limit Reduction Modifier from Step 3 to get the **Weight Limit**.

X

Limit Reduction Modifier (Step 3): _____



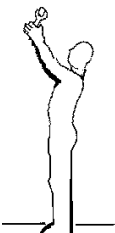
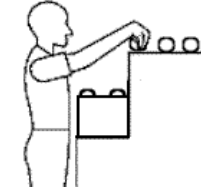
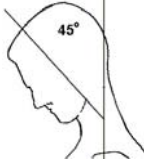


Actual Weight = _____ **Weight Limit:** = _____

Step 5

Is this a hazard? Compare the Actual Weight lifted from Step 1 to the calculated Weight Limit in Step 4. If the

Actual Weight (Step 1) > **the Weight Limit (Step 4)**, then the lift is "high" risk and requires controls without undue delay to the degree technologically and economically feasible. If the Actual Weight is below the Weight Limit, the risk is "moderate" and requires consideration for control.

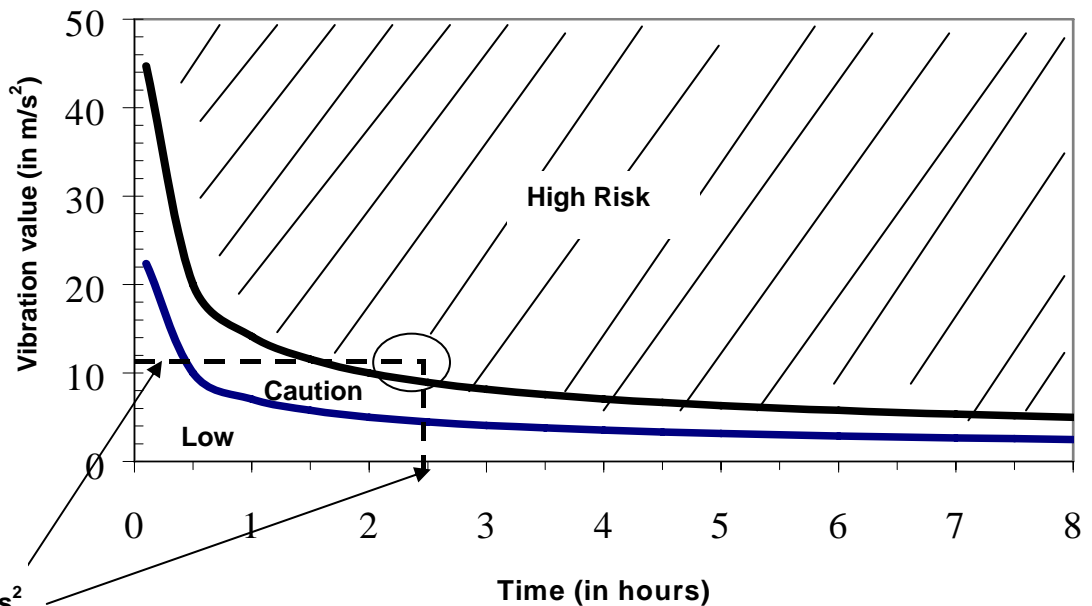
Unadjusted Weight Limit: _____

AWKWARD POSTURE				Mark ✓ here to indicate a High Risk of MSI
BODY PART	PHYSICAL RISK FACTOR	DURATION	VISUAL AID	
Knees	Squatting	More than 4 hours total per day		<input type="checkbox"/>
	Kneeling	More than 4 hours total per day		<input type="checkbox"/>
Shoulders	Working with the hand(s) above the head or the elbow(s) above the shoulder(s)	More than 4 hours total per day		<input type="checkbox"/>
	Repetitively raising the hand(s) above the head or the elbow(s) above the shoulder(s) more than once per minute	More than 4 hours total per day		<input type="checkbox"/>
Neck	Working with the neck bent more than 45° (without support or the ability to vary posture)	More than 4 hours total per day		<input type="checkbox"/>
Back	Working with the back bent forward more than 30° (without support, or the ability to vary posture)	More than 4 hours total per day		<input type="checkbox"/>
	Working with the back bent forward more than 45° (without support or the ability to vary posture)	More than 2 hours total per day		<input type="checkbox"/>

VIBRATION RISK ASSESSMENT – TO DETERMINE HIGH RISK

Use this document to determine if a "high" risk of MSI from hand-arm vibration exists.

- Step 1** Find the vibration value for the tool. (Get it from the manufacturer, look it up at this web site: <http://www.vibration.db.umu.se/Default.aspx?lang=en>, or you may measure the vibration yourself). The vibration value will be in units of meters per second squared (m/s^2). On the graph below find the point on the left side that is equal to the vibration value.
- Step 2** Determine how many total hours per day the employee is using the tool and find that point on the bottom of the graph.
- Step 3** Trace a line in from each of these two points until they cross.
- Step 4** If that point lies in the crosshatched "High Risk" area above the upper curve, then the vibration exposure is "high risk" and requires controls without undue delay. The vibration must be reduced below the high risk level or to the degree technologically and economically feasible. If the point lies between the two curves in the "Caution" area, then the job is of "moderate risk" and may merit controls to minimize the risk of MSI. If it falls in the "Low" area below the bottom curve, then no further steps are required.



Example:

An impact wrench with a vibration value of $12 m/s^2$ is used for $2\frac{1}{2}$ hours total per day. The exposure level is in the High Risk area. The vibration must be reduced below the high risk level or to the degree technologically and economically feasible.

Note: The caution limit curve (bottom) is based on an 8-hour energy-equivalent frequency-weighted acceleration value of $2.5 m/s^2$. The high risk limit curve (top) is based on an 8-hour energy-equivalent frequency-weighted acceleration value of $5 m/s^2$.