



CHEM STORES ERGONOMICS

1. Purpose:

This document provides instructions for general ergonomic procedures for Chem Stores to prevent the risk for musculoskeletal injury or disorder (MSD), such as strains, back injuries, and other injuries that could be associated with poor ergonomics.

Musculoskeletal Disorders (or MSD) at work is an umbrella term for a number of injuries and disorders of the muscles, tendons, ligaments, bone and nerves. Many body areas can be affected. The low back is the most commonly affected, followed by the shoulders, neck, elbow, hands and wrists.

Symptoms of **MSD** can be different, depending on the specific MSD, but can include:

- Pain with or without restriction in movement
- Swelling and tenderness
- Reduced range of motion and/or stiffness, and
- Tingling and/or numbness

2. Scope:

Applies to everybody working in Chem Stores

3. Prerequisites:

Understanding of proper lifting techniques (refer to appendix A for further details); EHS536 Office Ergonomics; EHS542 Ladder Safety; EHS524 Ergonomics for Campus Moving, Ground, and Recycling

4. Responsibilities:

MSD hazards are covered by the “General Duty Clause” (In Ontario, Part III of the OHS Act, 25 (2)(h)). It is the employer’s responsibility to identify and control these hazards.

Manager / Supervisor: It is the responsibility of management and supervisors to ensure that all personnel are trained on proper lifting techniques and on the use of lifting devices available with the intention to reduce the risk of musculoskeletal disorder (MSD) or injury, and that all personnel have taken the required EHS courses.

- Schedules work encouraging micro-breaks and the changing of tasks to allow muscles to rest (ex. if employee is lifting, allow them to take a break from this and complete another task that is not as strenuous)
- Encourages early reporting of excessive fatigue, discomfort, or MSD signs and symptoms
- Responds appropriately and promptly when an employee reports
- Purchases appropriate equipment considering safety and reduction of MSD risk factors
- Maintains relevant equipment
- Ensures pre-use inspections of equipment are performed as required (e.g. inspect casters on carts for damage)
- Takes every precaution reasonable in the circumstances for the protection of a worker

Worker:

- Report MSD hazards and concerns to a supervisor
- Use the equipment and tools provided to reduce exposure to MSD hazards
- Know how to operate and make adjustments to equipment
- Take micro-breaks from repetitive or forceful tasks
- Change work position as much as possible
- Offer suggestions to improve working conditions to a supervisor or health and safety representative
- Be aware of the symptoms of MSD and report the onset of MSDs early
- Complete inspections of equipment as required (e.g. inspect casters on carts for damage)
- Follow this SOP

5. Procedure:

Lifting

Like any task or job, taking a bit of time prior to lifting or moving objects/loads to think about a few key factors can greatly reduce the potential for injury.

Things to consider:

- Is a co-worker available to assist, if needed? If not, and assistance is needed to reduce the risk of injury, put the task off until someone is available to help.
- When working as a team, pre-plan and discuss your roles and how you will maintain effective communication throughout the load moving process so that your actions remain in sync and are anticipated by the other.
- Consider ways to make the load lighter and less awkward. For example, can the load be disassembled, carried in pieces, and reassembled at the desired location?
- Can the items be broken into several loads? It is always best to carry light loads that are not awkward in shape, size, or unevenly weighted, when possible. **Note:** this applies to shipments of solvents arriving in boxes of 4 bottles of 4 L each. If assistance cannot be recruited (for example personnel is required within the stores to attend to customers) then the person receiving and unloading the shipment can take this approach to store items away. Using of the adjustable cart also allows to move many bottles at the time keeping them at waist level at all times.

- How far will you have to move the load? The cart and or pump-truck, available in Stores, should be used even for light loads if they have to be moved more than a short distance.
- Heavy or awkward loads should always be moved with a mechanical aid. The mechanical aid should be appropriate to the task (not re-purposing of a tool or device).
- Are there closed doors, and if so, how will you secure your load while opening/closing the doors that you need to go through? Walk the route right before engaging in the move to be sure that you have identified hazards and verified that your equipment is suitable.
 - ⇒ Push carts instead of pulling them. Take the time to place door stoppers on the doors to keep them open to properly push the cart through the doors.
- Know your limits. No one should attempt to manually lift anything heavier than 50 pounds, and this amount should be reduced if the load is not ideally shaped and, in a position, to allow for ideal lifting conditions or the travel surface conditions are less than ideal. Pay attention to your personal limits.

Maximum Comfort Zone

- Handle boxes and materials within the maximum comfort zone, which is roughly the area just below the shoulders and just above the knees. Repeatedly lifting or carrying objects above shoulder height can put unnecessary strain on the neck and shoulders. Moving objects that are low to the ground (such as items on the bottom shelf of a storage rack) can put strain on the lower back.
 - ⇒ The placement of all products on shelves should be assessed. Most frequently ordered items should go on the middle shelf, and heavy items should not be placed on upper shelves.
 - ⇒ If you need to reach items on lower shelves, place a small stool to sit on to avoid reaching or bending down.



Plan the Lift

- Lifting an object from the ground is more stressful than lifting the same object from several inches off the ground. When possible, store objects on platforms (i.e., shelves or pallets) that raise them off the ground. Arrange with deliveries to have shipments unloaded onto the pneumatic cart, whenever possible.
 - ⇒ Ex. Use a self-leveling cart to bring the boxes of solvent to waist height. Open boxes and lift out each bottle one at a time.
- Starting positions that are at a level between the knee and waist are the least stressful to the back.
- Balance the load when possible. For example, if carrying handled containers (paint cans, etc.), carry one in each hand. If carrying or lifting a box, try to distribute the weight of the items evenly over the whole box (don't allow one side to be noticeably heavier than the other). Avoid carrying stacked items that can slip off and/or unbalance the load.

- Ensure that the load does not obstruct your vision and that it is secure so that it will not shift during transport.
- Test the weight of the load by tipping or moving it slightly before you pick it up.
- Face the load squarely, keep back straight, and use legs to lift. Feet should be about shoulder width apart to provide a stable stance.
- Avoid stretching/bending while lifting.
- Never lift and twist. This action is hard on the back. Move your feet to reposition your direction.
- Avoid awkward body positions in picking up/carrying/setting down items.
 - ⇒ Ex. Employees should carry Winchester chemical bottles one at a time and with both hands, one hand at the bottom of the bottle and another hand wrapped around the neck of the bottle. Alternatively, a Winchester bottle carrier can be purchased.

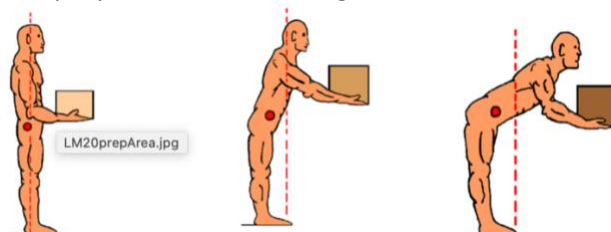
WINCHESTER BOTTLES

Many liquid chemicals are issued to laboratories in Winchester bottles (2.5 litre. capacity). These bottles must never be carried by the neck⁸⁷ and should be transported in carriers. Plastic coated bottles are recommended especially for strong acids, alkalis and other strong corrosives to contain breakages.



NO-----YES

- The load should be lifted and carried as close to the body as possible. When the load is not carried closely, the body is positioned out of alignment and more strain is put on the lower back.



- This may require bringing the object to the edge of the shelf or pallet in preparation for the lift. Do not reach over other objects.
- If you become tired, put the load down and rest briefly. If the load begins to shift, put the load down, reposition and secure contents, resume.
- Plan the placement/delivery. Once the object reaches its destination, be sure to set it down in the same manner of lifting it: do not bend at the waist, keep the object close to body, and maintain a wide stance.

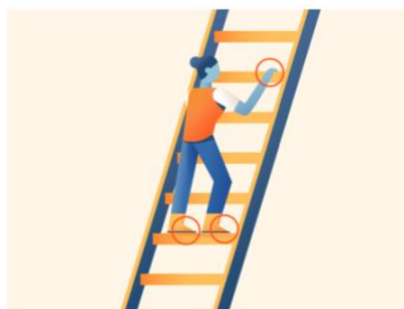
- To prevent overuse injuries, pay attention to pain, numbness and/or tingling and take action to prevent further strain or injury. Have a co-worker or manager/supervisor observe the lifting technique to see if there are position changes that can be made.
- Change the routine: do not repeat the same activity over and over but alternate it with other activities throughout the workday.
- Always use the equipment or tools that are made available with the intention of reducing physical stress.
- If you experience a musculoskeletal injury, stop doing the activity and IMMEDIATELY report the event to your manager and to chem.safety@utoronto.ca.

Devices Available

- 1) Self-elevating lift cart to automatically raise and lower materials that are removed or added to the platform.
- 2) Drum lifter attachment for an electric hoist on a monorail beam, to allow for the unloading of 200L drums from skids.
- 3) A cart was also purchased to strictly hold and transport this drum lifter (29lbs) to the loading dock.
- 4) Posted signage in LM20, Loading Dock and Solvent Shed on proper ergonomic lifting techniques.
- 5) Pump truck to move skids containing heavy items/equipment

Ladder Use

When using the ladder, employees should have both feet and one hand on the ladder when going up or down. If you are not able to carry an item and have one hand on the ladder, place the item on a lower shelf, come down from the ladder, and get the item from the shelf you placed it on.



Avoiding Awkward Postures

Acetone Recycler

- 1) When working at the acetone recycler, to avoid adopting awkward postures, attach tygon tubing adaptor to the waste receptacle while facing the waste receptacle. Face your work as much as possible.

Dispensing Solvent (Shed)

- 1) Wear kneepads when kneeling is required (ex. when dispensing solvents).
- 2) Adjust your position relative to the opening of the solvent container so that you face your work as much as possible.

Making Barcodes

- 1) To avoid adopting awkward postures, make barcodes larger by printing them onto large-sized stickers or sheets of paper to make it easier to read the barcodes.

Workstation

- 1) Follow [Office Ergonomics SOP](#)

Barcoding Station

- 1) Place posters near barcoding station and loading dock. Read through the posters already posted near barcoding station before lifting a box.
- 2) Make height adjustments to computer monitor, keyboard, and mouse at barcoding station so that they are at a suitable height for the employee working at that computer. This can be done by using books or stacks of paper to increase the height of the monitor, keyboard, and mouse.
- 3) After adjustments are made, the following criteria should be met:
 - The top of the monitor is at or slightly below the user's eye level when looking straight ahead.
 - The keyboard and mouse are at the same height.
 - The height of the keyboard and mouse are set at the user's standing elbow height to allow the elbows to maintain a 90-degree angle, the shoulders to be relaxed and the wrists to be straight during use.

References

- Canadian Center for Occupational Health and Safety (ccohs)
- OSHA
- University of Nebraska SOP
- University of Toronto EHS

APPENDIX A



EIGHT COMMANDMENTS OF LIFTING



1. Plan your lift and test load



2. Ask for help



3. Get a firm footing



4. Bend your knees



5. Tighten your stomach muscles



6. Lift with your legs



7. Keep the load close



8. Keep your back upright