



GLASS HANDLING

101

Notes Pages

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Course Learning Objective

Upon completion of this course, you will be able to demonstrate safe glass handling at all times, including while manually lifting, carrying, and transferring glass. This will help ensure your safety, as well as the safety of those around you.

Module Learning Objectives

The learning objectives that will help you meet the course objective are as follows:

Calculating the Weight of Glass

Upon completion of this module, you will be able to

- Appreciate weight differences in varying thicknesses and quantities of glass lites.
- Calculate glass weight.

Safely Handling Glass

Upon completion of this module, you will be able to

- Embody the safety mindset when working with glass.
- Identify proper personal protective equipment to be worn while handling glass.
- Describe how to safely open glass cases.
- Explain the safest way to retrieve glass lites from the middle of a pack.
- Identify common glass lite defects.
- Describe appropriate action to take if there has been damage to the glass during shipment.

Safely Transporting Glass

Upon completion of this module, you will be able to

- Describe general safety considerations when transporting glass.
- Describe safe lifting technique.
- Explain how a one-person glass carry is performed.
- Explain how a two-person glass carry is performed.
- Explain the role of the person at the leading edge of the glass during a two-person glass carry.
- Explain the role of the person at the trailing edge of the glass during a two-person glass carry.
- Describe how glass is placed on the cutting table.
- Describe the implications that a machine's weight capacity will have on your choices for glass handling and transport.

Calculating the Weight of Glass Module Notes

Glass Weights Chart

THICKNESS (Inches)	WEIGHT (Lbs. per sq. ft.)
1/16	.97
3/32	1.20
1/8	1.60
3/16	2.51
7/32	2.82
1/4	3.23
3/8	4.78
1/2	6.37
3/4	9.55
7/8	11.20
1	12.80

Calculating Glass Weights Formula

Glass weight per square foot, based on thickness (in lbs/ft²) x Area of the lite (in ft²)

Safely Handling Glass Module Notes

Creating a Safety Mindset

Every employee must adhere to strict safety compliance when handling glass in order to ensure a safe work environment. Creating a safety mindset means every employee should:

- Make on-the-job choices that will protect you and your coworkers.
- Choose to make sure that you are safe in your workplace.
- Choose to never do anything that might harm the people around you.
- Choose to identify and address actions by your coworkers that might cause injury.

PPE for Glass Handling

The following items are commonly worn as protective gear when handling glass:

- Safety gloves
- Wrist protectors, forearm protectors, shoulder protectors, and leather aprons
- Safety glasses
- Safety shoes with hard toes
- A hard hat



Photo by Stephen Nyran

Opening Glass Cases

Tools required:

- Hammer
- Pry bar
- Reciprocating saw (SawzAll)

Checklist for Opening Glass Cases	
	Make sure that the case is secure and will not topple.
	Cut the steel band at the top of the case. Be careful it does not fly loose.
	If using a reciprocating saw, insert the blade between the end cap and the face board. Saw through the nails that join the end cap and face board.
	Insert the pry bar between the end caps and face board at the middle of the case. Drive the pry bar into the joint with a hammer. Work the pry bar upward from the middle and then downward from the middle to separate the boards at the joint.
	Pull out the face board. It's safer to stand on the side of the case as you pull out the face board instead of pulling it directly toward you.
	When the board is removed, bend down all the nails and dispose of the board properly.
	Cut out the remaining nails from the side of the case with the side cutters and drive them out with a hammer.
	Remove the packing material from the case.
	Split the case at the top to relieve the tension.
	Be sure the bottom and side of the case are clean before trying to remove the glass.

Retrieving Lites from the Middle of the Pack

	Move any lites that are obstructing you to a safe temporary storage location.
	Never choose to hold or support glass as someone attempts to retrieve a lite further back in a glass pack because each lite that is tilted toward you will dramatically increase the load. This can add up quickly and reach a point where it might be impossible to escape.

Handling Damaged Glass

Defects commonly encountered in glass:

- Scores or Cutting Overruns
- Cracks or Vents
 - Vents are small cracks running from a chipped edge and can be dangerous. Vents and unusual substances in the glass can open and cause the lite to break when you lift it.
- Seeds, Bubbles, or Inclusions
- Chips or Shells
- Broken Corner (most dangerous defect)

Checklist for Handling Damaged Glass	
	Have vacuum cups on hand.
	Put on sleeves, a hard hat, safety glasses, and glass gloves.
	Don't try to remove a broken lite from a case alone.
	Try to assess the extent of the damage.
	Slide out the broken piece carefully. If the damage is extensive, you may have to remove the lite from the top of the case by leaning the case opposite the direction of the fall before removing the bands and top board.
	Use vacuum cups to secure the lite.
	Cut off sections or segments until the lite is square.
	The adjacent lite may be scratched, so tag it for attention.

Safely Transporting Glass Module Notes

Safe Transport General Guidelines

	<p>Practice, practice, practice carrying glass until you are proficient. This includes practicing:</p> <ul style="list-style-type: none">• Side hold.• Bottom hold.• Loading/unloading the delivery vehicle.• Moving glass with dollies.• Moving glass with a partner.• Safe lifting, using your legs, not your back and your skeletal structure, not your arm muscles, to bear the weight.
	<p>The maximum size glass a person can carry alone is 36" x 84" .</p>
	<p>Be as fit as you can be by exercising and stretching regularly.</p>
	<p>Maintain a healthy weight for your body's frame to minimize stress on your back and allow you to move and reach with ease.</p>

Safe Lifting Technique

	Recruit help if a load is too heavy.
	Plant your feet firmly, about shoulder-width apart.
	If the load is below waist-level, squat by bending at the knees with your torso as upright as possible. Do not lean forward.
	Check your footing and balance before you initiate the lift.
	Allow your leg and skeletal structure to do the work by lifting the glass with your legs as you slowly stand out of the squat, engaging your quadriceps and hamstrings to move the load.
	Keep the load as vertical as possible during the lift.
	Once you lift the glass, keep it close to your body.
	Do not jerk the object upward or twist the trunk of your body while lifting.



Shifting/Falling Glass Safety



	Do NOT try to save a falling load or falling glass.
	Always have an escape path.
	Get out of the way as fast as possible.
	Always hold the glass so that it can only fall away from the person or people holding it.
	If you slip or fall while carrying glass, drop it immediately.
	Stand aside while loosening straps and ties.
	If transporting with partner, alert your partner immediately. Communication is key to transporting glass with a partner.



Preparing Yourself for Transport

	<p>Always wear the appropriate personal protective equipment (PPE).</p> <ul style="list-style-type: none">• Remember that most PPE will offer limited protection from lacerations, but it will not offer protection from crushing loads.
	<p>Understand the characteristics of the type of glass you're handling and how environmental conditions can affect it.</p>
	<p>Know how much the glass weighs so that you can determine if one person can safely handle the lite, or if you will need help. Two reasonable loads are always better than one excessive load.</p>
	<p>Use mechanical lifting equipment if the load is too heavy to be handled by one or two people.</p>
	<p>Check the path you'll be using – be sure you'll always have a means of escape.</p> <ul style="list-style-type: none">• Never get backed into an area that does not allow an escape route.• Objects on the floor can cause a catastrophe.
	<p>Ensure glass and your hands are not wet or greasy prior to transport.</p>

Preparing the Environment for Transport

	<p>Check the path you'll be using – be sure you'll always have a means of escape.</p> <ul style="list-style-type: none"> • Never get backed into an area that does not allow an escape route. • Objects on the floor can cause a catastrophe. 
	<p>Inspect materials for splinters and rough or sharp edges.</p>
	<p>Inspect ropes, chains, hooks and all equipment before using.</p>
	<p>Inspect every lite for defects, which could cause breaking or cuts, before moving the lite. If a lite is damaged, get help.</p>
	<p>Remove oil, grease or moisture from the glass before lifting.</p> 
	<p>Center and stabilize all loads before transport.</p>
	<p>Never stand under a suspended load.</p>
	<p>Use resting blocks when necessary while moving lites.</p>
	<p>Glass trucks and racks must be on a level surface before they are used.</p>
	<p>Ensure that there is a clean place to put the glass when you are ready to set it down.</p>

Preparing the Equipment for Transport

	Inspect any mechanical lifting equipment that will be used to ensure that it is in proper working order and is designed to handle the task.
	Never overload handling equipment in excess of its recommended safe workload.
	Pile material in a careful and organized way to prevent it from falling.
	Remove slings from piled stock carefully.
	Attach a guideline to large loads.
	Make sure that loads are braced and secure. Straps must be in good condition and tightened against the load.
	Check the wheels on carts, "L" racks, and "A" frames to be sure that they are undamaged and roll freely.
	Ensure that glass racks are equipped with legs to prevent the rack from tipping if a wheel should shatter.



Methods of Glass Transport


Side Hold

	Bend slightly at your knees.
	Tightly grab the glass on the side with one hand.
	Place your other hand on the top to stabilize and maneuver the glass.
	Keep your lifting arm locked.
	Straighten your legs to lift the glass.



Bottom Hold

This is the preferred carrying method in damp conditions and is likely the most comfortable hold for beginners.

	Get as close to the glass as possible.
	Position your feet about 12 inches apart for more stability.
	Keep your back straight.
	Bend at your knees.
	<p>Get a good grip on the glass with your safety gloves.</p> <ul style="list-style-type: none">• Carry glass with one hand on the bottom and one hand on the side.• Do not leave the corner of the glass near your bottom hand exposed, as it may cut you. Instead, place your hand at the corner, with your little finger on the rear of the glass. This will protect you from being cut and help you maintain awareness of where the corner of the glass is located.
	
	Tighten your stomach muscles.
	Lift with your leg muscles, which are much stronger than your back muscles.



One-Person Carry

The maximum size glass a person can carry alone is 36" x 84" .

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	Use the bottom hold.
	Keep the lite vertical and pointing parallel to the direction of travel. You can ensure this by turning the hand holding the bottom edge of the lite with the palm outward. Extend your free hand up and across your chest to hold the top edge of the glass.
	Never hold the glass under your arm.
	Never carry glass with the surface parallel to the ground.

Two-Person Carry

The maximum size glass a person can carry alone is 36" x 84" .

Plan Before You Lift	
	Ensure both people carrying the glass are similar in height.
	Communication is key to transporting glass with a partner.
	Before you lift the load, confirm with your coworker how you plan to lift the load and the direction and path you will follow.
	Ensure that the path you plan to take is clear of obstacles and offers wide, clear aisles with smooth floors.
	Only one person should be calling the signals as to when and how to move. This should be the trailing edge person, since he or she is walking forward and has a clear view of the path.

Assume the Proper Starting Positions	
	Both people should be on the same side of the lite (ideally facing forward) to allow for safe escape should the glass start to fall.
	The hands of the people lifting the glass will be mirror images. That is, what one person does with the right hand, the other does with the left hand.
	The glass should be kept vertical throughout the move.
	After taking the glass from a table, rack, or case, put the glass down first to reset and get a proper hold for transporting.
	Keep torque and twisting forces to a minimum.
The Leading-Edge Position	
	The lead person should have one hand lifting on the bottom edge with the palm turned outward (thumb pointing down). The other arm should extend across the chest to steady the leading edge of the lite.
	The lead person extends the free hand across the chest to grasp the back edge of the lite.
	The leading-edge person makes sure the glass is always in the correct vertical position.
	Carrying glass with two people means that one glazier – the lead glazier - has to walk backwards. This is sometimes referred to as “bucking.” Bucking is difficult because the glazier backing up has to walk backward while pressing forward against the glass to support it. Let the more experienced glazier be the one who walks backward, especially when the lite is large and heavy.



The Trailing-Edge Position	
	The person lifting the trailing edge lifts from the bottom edge with the palm turned out, using the same hand as the lead person.
	The trailing-edge person guides the direction of the glass, much like a rudder on a boat.
	Since the trailing-edge person is always walking forward and has a clear view of the path, he or she should be the one calling the signals as to when and how to move.



Lowering to the Cutting Table	
	In some cases, you may need a third qualified person to help flip the glass down on the cutting table. In this case, the third person stands on the table and holds the top of the glass. He or she then lowers the glass to the table at the same time on all edges.

Moving Glass on a Dolly with a Partner

The maximum size glass a person can carry alone is 36" x 84" .

	The person in front makes sure the glass is always in the correct vertical position.
	The person in back actually guides the glass, much like a rudder on a boat.
	Only one person should be calling the signals as to when and how to move.
	There should be constant communication between the two of you, so you'll both always be aware of any possible hazards.
	Practice moving glass with dollies until you are proficient.



Placing Glass on the Cutting Table

Prepare for Contingencies	
	Prepare for the worst. No one likes to think about the possibility of dropping a lite of glass that might weigh 200 pounds, but that possibility always exists.
	Work out a system with your partner to use if one of you should start to lose the lite. The one losing the grip should yell "Shove off!" or some other, more colorful phrase to alert the partner to danger.
	When this happens, push the glass away from your body and let go immediately.
Recruit Help	
	In some cases, you may need a third qualified person to help flip the glass down on the cutting table. The third person stands on the table and holds the top of the glass. He or she then lowers the glass to the table at the same time on all edges.
Placing Glass on the Table	
	When placing a lite of glass on a glass cutting table, use the table edge as a pivot point and support.
	The middle of the lite should be pivoted outward while the top portion rests on the table.
	Bend your knees slightly as you swing the lite onto the table, keeping the lite in constant contact with the table so the table supports the weight of the glass.
	Slide the lite completely onto the table, straightening your legs and moving your upper hand from the top edge of the glass toward the middle of the lite to steady and guide it.
Removing Glass from the Table	
	Reverse the process of placing the glass on the table.

Using Glass Handling Equipment

Glass handling equipment can be very useful in safely handling glass. Before you attempt to utilize glass handling equipment, you must know what the material weighs and the capacity of your equipment.

Capacity is how much weight a given piece of equipment can carry safely before it suffers damage. Usually there are safety factors built into a capacity rating, but for your safety and the safety of those around you:

	Always consider the rated capacity of equipment as the maximum amount of weight the equipment can handle.
	Know what the material itself weighs – do not attempt to move anything without knowing its weight!
	The weight of each case should be on the shipping manifest.